United States
Department of
Agriculture

Natural
Resources
Conservation
Service

National
Soil Survey
Center

Soil Survey Laboratory Data and Soil Descriptions for Puerto Rico and the U.S. Virgin Islands

Soil Survey Investigations Report No. 49

Cover

Vegetative cover indicative of humid landscapes in Puerto Rico.

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Citation

Mount H.R., and W.C. Lynn. 2004. Soil survey laboratory data and soil descriptions for Puerto Rico and the U.S. Virgin Islands. United States Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Soil Survey Investigations Report No. 49.

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Acknowledgments

Dr. Friedrich Beinroth, NCSS Cooperator and professor of soils from the University of Puerto Rico at Mayagüez, is acknowledged for his long-term dedication to science and to the understanding of the soils in Puerto Rico. Without his perseverance, this report would not have been completed. NRCS soil scientists at several State offices, Major Land Resource Area offices, and National offices are also acknowledged, including Carmen L. Santiago, Greg Brannon, Robert Engel, Thomas Reinsch, and Robert Grossman.

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Foreword

Soil Survey Investigations Report (SSIR) 49 contains information that can be used in planning research programs and conservation measures in the Natural Resources Conservation Service Caribbean Area, which includes Puerto Rico and the U.S. Virgin Islands. The report contains data on physical and chemical properties of the soil as well as descriptions of the soil.

This SSIR is designed for many users. Researchers, including foresters, can use it to evaluate the potential of the soil and the management needed for maximum fiber production. Conservationists, teachers, students, and specialists in wildlife management can use data in this SSIR to help them understand, protect, and enhance the environment.

The soils of Puerto Rico and the U.S. Virgin Islands occur on a variety of parent materials and land forms and in a variety of climates.

Help in using this publication and additional information are available at the office of the Natural Resources Conservation Service in Hato Rey and at the University of Puerto Rico in Mayagüez.

Dr. Robert J. Ahrens
Director, National Soil Survey Center
Natural Resources Conservation Service

Chapter 1

History of Soil Sampling in Puerto Rico

1957: Soils in Puerto Rico were first described and sampled for characterization data in September of 1957 (Soil Survey Staff, 1967). Dr. Lyle Alexander, head of the Beltsville Laboratory in Maryland, assembled a team to sample several soils. These soils included the Nipe, Amelia, Aguirre, Cartagena, and Santa Isabel series. It is fitting that the Nipe soil was one of the first soils to be sampled and characterized in Puerto Rico. The Nipe soil was originally characterized in Cuba by Bennett and Allison in the 1920s (Bennett and Allison, 1928). The concept that Bennett and Allison formed for the Nipe soils in Cuba was brought to Puerto Rico, where the nature of the soil is strikingly similar.

1958: In November of 1958, Dr. Alexander worked with a different team of scientists in Puerto Rico to sample and describe soils. One of the members of this team was Klaus Flach. In December of 1959, both Klaus Flach and Robert Grossman sampled additional soils.

1959: Year 1959 brought the advent of the first concerted scientific study of soils in Puerto Rico. Robert Grossman worked with several colleagues to describe and sample nine soils in the Barranquitas Soil Study Area.

1961: Two years passed before sampling commenced again in Puerto Rico. In October of 1961, Robert Grossman worked with William McKinzie to describe and sample soils in Puerto Rico. Dr. Guy D. Smith, founder of Soil Taxonomy, helped sample and describe two soils during March of 1961.

1963: During 1963, Grossman and McKinzie conducted additional sampling. Eighty-six soils in Puerto Rico had been described, sampled, and characterized by the end of 1963.

1967: The United States Department of Agriculture, Soil Conservation Service, in cooperation with the Puerto Rico Agricultural Experiment Station published Soil Survey Investigations Report No. 12 in August 1967 (Soil Survey Staff, 1967). Soil descriptions and data were provided for the 86 soils that had been sampled in Puerto Rico.

1973: In 1973, additional soils were described, sampled, and characterized in Puerto Rico. These additional soils were almost exclusively described and sampled by Luis Rivera, Staff Soil Scientist for Puerto Rico. Mr. Rivera was the first scientist in Puerto Rico to sample Histosols.

1981: In 1981, Luis Rivera teamed up with Gilberto Acevedo to describe and sample several soils in several municipalities. Rivera and Acevedo sampled Catalina, Los Guineos, Humatas, Americus, Guayabo, Nipe, Sosa, Santa

Isabel, Maguayo, and Guanica soils. This was perhaps the only year when scientists did not sample a soil as "Series Not Designated."

1982: Two Coto soils were described and sampled in 1982 by Dr. Richard Guthrie and Dr. Fred Beinroth.

1985: Year 1985 saw the advent of the South Technical Service Center providing sampling assistance to Puerto Rico. DeWayne Williams assisted in sampling several soils in the Lajas Valley and the Ponce area during May of 1985. Several other soils were also described in July of 1985 in the Río Grande Municipio by L. Daniels and L. Huffaker.

1986: During 1986, several soils were described, sampled, and characterized by Warren Lynn, DeWayne Williams, and Loran Huffaker. The soils of the Caribbean National Forest were sampled in Río Grande Municipio. Additional soils were sampled in Ponce Municipio.

1987: Year 1987 saw numerous soils sampled in the Mayagüez Soil Survey Area and the Carribean National Forest by Warren Lynn, DeWayne Williams, L. Huffaker, Richard Rolling, and members of the Puerto Rico soils staff.

1988: During February of 1988, several soils were described and sampled in the following municipios: Adjuntas, Humacao, Isabela, Las Piedras, Luquillo, Mayagüez, Río Grande, San Germán, and Yabucoa.

1989: February of 1989 saw another island-wide project. Soils were sampled by DeWayne Williams and Carmen L. Santiago in the following municipios: Camuy, Guayanilla, Isabela, Juana Diaz, Lajas, Morovis, Utuado, and Vega Alta.

1992: A carbon study was initiated for the soils in the Guánica Dry Forest of southwestern Puerto Rico during 1992. John Davis, soils correlator for the Caribbean Area, and Susan Sampson from the National Soil Survey Center (NSSC) described and sampled several soils.

1993: A concerted research effort was initiated in 1993 for soils in the Luquillo Long-Term Ecological Research Grid of the Caribbean National Forest in northeastern Puerto Rico (Soil Survey Staff, 1995). Seventeen soils were described and sampled by Warren Lynn and Henry Mount from the NSSC, Roy Vick from Puerto Rico, Bruce Dubee from Virginia, and John Davis from St. Croix in the Virgin Islands. In addition, a digital order-1 soil survey map was completed and included in the publication.

1994: During 1994, soils in the municipios of Aguadilla, Lajas, and Mayagüez were described and sampled by Roy Vick, staff soil scientist in Hato Rey, and John Davis, soils correlator for the Caribbean area.

1995: The Cartagena soil was described and sampled for characterization data during 1995. The Cartagena soil, a member of the fine, mixed, superactive, isohyperthermic Sodic Haplusterts, was sampled in Lajas Municipio by Warren Lynn, DeWayne Williams, John Davis, and Milton Cortes, project leader in Mayagüez.

1997: In 1997, several soils were described and sampled by Greg Brannon, data quality specialist (DQS) from Alabama and Jorge Lugo, Carmen L. Santiago, and Dr. Fred Beinroth from Puerto Rico. These soils were

sampled in Cabo Rojo Municipio and Lajas Municipio in southwestern Puerto Rico.

1998: Only one soil was sampled in 1998—a Bayamón soil from Arecibo Municipio. Jorge Lugo, project leader from Mayagüez; Carmen L. Santiago, Staff Soil Scientist from Hato Rey; and Greg Brannon, DQS from Auburn, Alabama, sampled this Oxisol.

Future: We need to ensure that all of our benchmark soils and soils-of-large-extent have complete data, including data about trace elements.

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Chapter 2
Soil Climate, Location of Pedons, and Classification of Soils in Puerto Rico

Soil Climate

The mean annual precipitation in Puerto Rico ranges from 737 mm (29 in) in Ensenada to 6,730 mm (265 in) in the Luquillo Division of the Caribbean National Forest. The mean annual temperature ranges from 14.5 °C (58 °F) on the highest mountains of the Commonwealth to 27.8 °C (82 °F). Because of the diversity in moisture and temperature, the island can be delineated into several areas with separate soil climate regimes. A 1:240,000 scale map of Puerto Rico was used in the preparation of the soil climate map of the United States and its Caribbean possessions. It was a half-tone mylar with 100-meter contour intervals. Lines were placed on this mylar to reflect the soil moisture and soil temperature regimes. Three soil temperature regimes and four soil moisture regimes were identified by the Caribbean soil staff of the Soil Conservation Service (Mount et al., 1992).

Soil Temperature Regimes of Puerto Rico

The soil temperature regimes in Puerto Rico are divided along elevation changes at about 610 m (2,000 ft) and 1,066 m (3,500 ft). From sea level to about 610 m, the soil temperature regime is isohyperthermic (≥22 °C; ≥72 °F). This regime covers all of Puerto Rico except the Cordillera Central and the Sierra De Luquillo. From about 610 m to about 1,066 m (3,500 ft.), the soil temperature regime is isothermic (≥15 to 22 °C; ≥59 to 72 °F). This regime covers most of the Cordillera Central and the Sierra De Luquillo areas. Two small areas have elevations over 1,066 m where the soil temperature regime is isomesic (<15 °C; <59 °F). The first consists of the El Toro and El Yunque Mountain areas in eastern Puerto Rico in the Luquillo Division of the Caribbean National Forest. The second consists of the Cerro de Punta area in the central volcaniclastic upland area (Cordillera Central) about 64 km (40 mi) north of Ponce in Toro Negro Division of the Caribbean National Forest.

Soil Moisture Regimes of Puerto Rico

The soil moisture regimes in Puerto Rico are related to rainfall and elevation. The average annual rainfall on the north side of the island and at the higher elevations ranges from 1,450 mm to more than 6,600 mm (57 to more than 260 inches), which is much more than on the south side of the island. The average annual rainfall at Ensenada is less than 760 mm (30 in). Table 1 show precipitation data for 44 sites in Puerto Rico.

The El Toro and El Yunque Mountain areas in the Luquillo Division of the Caribbean National Forest are perudic. In these areas, average annual rainfall is more than 3,810 mm (150 in) and the moisture control sections are perennially moist. Precipitation exceeds evapotranspiration every month of the year.

The northern three-fourths of Puerto Rico has an evenly distributed annual rainfall and a typic-udic soil moisture regime. The average annual rainfall in these areas ranges from 1,400 to 3,810 mm (55 to 150 in).

The typic-ustic soil moisture regime in Puerto Rico occurs between the central volcaniclastic mountains of the Cordillera Central and the Caribbean Sea (Mar Caribe). One zone extends from Cabo Rojo, near the Mona Passage, through Yauco, Peñuelas, and Juana Diaz, finally pinching off at Cuatro Calles. The other zone starts east of Coamo, extends through Cayey, down to Guayama, and ends near Hacienda San Isidro. The average annual rainfall in these areas ranges from 890 to 1,400 mm (35 to 55 in).

The south side of Puerto Rico has a soil moisture regime that is ustic bordering on aridic (aridic-ustic). This regime is south of the area that has a typic-ustic soil moisture regime. It extends from El Combate, near the Mona Passage, through Ensenada, Guayanilla, Ponce, and Salinas and ends at Arroyo. The average annual rainfall in these areas ranges from 760 to 890 mm (30 to 35 in).

The Larger Puerto Rican Offshore Islands

The larger islands adjacent to Puerto Rico include Isla's de Culebra, Vieques, and Mona. The soil temperature regime on these islands is isohyperthermic, and the soil moisture regime is ustic. The classification of these soils as ustic is based on rainfall data. Because a weather phenomenon known as "orographic lift" (which is related to elevation) is necessary for precipitation in the Caribbean islands, the mean annual rainfall on the smaller offshore islands is not more than about 1,015 mm (40 in). These islands are restricted to resort industry considerations. Vieques Island once had military installations throughout the island.

Map Polygon Composition

The soil climate map for the Commonwealth of Puerto Rico and the United States Virgin Islands includes eight polygons for the island of Puerto Rico. The combinations of soil moisture and soil temperature regimes in the Caribbean area are as follows:

- **Isomesic perudic:** One zone in the El Toro and El Yunque Mountains areas in the Luquillo Division of the Caribbean National Forest.
- **Isomesic udic:** One zone in the Cerro de Punta Mountain area of the Cordillera Central in the Toro Negro Division of the Caribbean National Forest.
- **Isothermic udic:** One zone bordering the El Toro and El Yunque Mountain areas and one large zone throughout the central volcaniclastic uplands of the Cordillera Central. Both zones are designated at elevations between 610 and 1,066 m (2,000 and 3,500 ft).

- **Isohyperthermic udic:** One zone on the north side of the island trending south and encircling the central volcaniclastic uplands on the eastern and western fringes of the island.
- **Isohyperthermic typic-ustic:** Two zones south of the central volcaniclastic uplands of the Cordillera Central, which trends from east to west.
- **Isohyperthermic aridic-ustic:** One zone that starts at the town of Boquerón on the Mona Passage (Canal del la Mona), extends east to Ponce and Coamo, and finally ends at the eastern-most point at Arroyo. This zone is south of the adjacent isohyperthermic typic-ustic zone and extends to the Caribbean Sea (Mar Caribe).
- **The larger offshore islands of Puerto Rico** each contain a polygon. Isla's de Culebra, Vieques, and Mona are isohyperthermic typic-ustic.
- **The U.S. Virgin Islands** each contain a similarly coded polygon. St. Croix Island, St. Thomas Island, and St. John Island are isohyperthermic typic-ustic.

Land Use Considerations

The significance of the soil climate zones in Puerto Rico can be indirectly related to agriculture and land use.

The soils in the isohyperthermic udic zone on the north side of the island are used for pineapple production. These soils are prominently Oxisols or low-fertility soils. Bananas and sugarcane also perform well in this zone. The dairy industry is on the north side of the island in this soil climate zone. Puerto Rico is self-sufficient in milk and milk products. Although rice could be a respectable commodity crop, economics currently do not present an opportunity for rice to be raised to any significant extent in Puerto Rico.

The soils in the isohyperthermic aridic-ustic zone on the south side of the island are also used for pineapples. The rather large pineapples grown in the Lajas Valley are considered some of the finest in the world.

The soils in the isothermic udic zone are used for coffee production. Most of the coffee is shade coffee. The shade is provided by an overstory of trees ranging from plantain to breadfruit. Coffee requires a soil temperature regime of isothermic or cooler.

The isomesic udic and isomesic perudic zones are limited to the tropical rain forest of Cerro de Punta and Luquillo. They are protected from any change in land use. The elevation is about 1,220 m (4,000 ft), which is not quite high enough for head lettuce (as in Jamaica). This elevation would, however, support leaf lettuce. These zones are used primarily for tropical forestry research.

San Juan is in the isohyperthermic udic soil climate zone. Tropical breezes blowing from the northeast pick up moisture and drop precipitation almost daily. The average annual rainfall is more than 1,511 mm (59 in).

The economies of the offshore islands of Puerto Rico and the United States Virgin Islands are dominated by tourism. Some spice production is present on the Virgin Islands, but agriculture diminished substantially in the 1970s.

Testing

The soil climate map for the Commonwealth of Puerto Rico and the United States Virgin Islands should be a useful tool in the soil survey update of these United States possessions. Its use would allow soil scientists to identify soil climate as a fundamental starting point when planning updates based on Major Land Resource Areas.

Several of the stations in table 1 were tested with the Newhall Simulation Model (upgrade 1/91). The Ensenada station came out weak aridic, but it was too small of an area to show on the soil climate map. With this information, however, any unique soils found only in the Ensenada area may be proposed with an aridic soil moisture regime.

The ultimate refinement of the soil climate map rests in the collection of hard data, which can only be attained if data pods that have soil temperature and soil moisture sensors are placed in the eight zones of the Commonwealth.

Table 1.—Precipitation Data from Stations on Puerto Rico

Station	Annual rain	Soil moisture regime
	mm	
Aguirre Central	1,128	Typic Ustic
Aibonito	1,359	Typic Ustic
Caguas 2 WNW	1,598	Typic Udic
Central San Francisco	851	Aridic Ustic
Coamo 4 S	859	Aridic Ustic
Coloso	2,085	Typic Udic
Comerio Falls, Plant 2	1,720	Typic Udic
Culebra Island	930	Typic Ustic
Dorado 2 WNW	1,694	Typic Udic
Dos Bocas	2,007	Typic Udic
Ensenada	754	Aridic
Fajardo	1,623	Typic Udic
Garzas	2,230	Typic Udic
Guajataca Dam	1,928	Typic Udic
Guayabol	1,367	Typic Ustic
Guayama	1,382	Typic Ustic
Humacao	2,139	Typic Udic
Isabela Substation	1,605	Typic Udic
Jajome Alto	1,989	Typic Udic
Juana Diaz Camp	1,133	Typic Ustic
Juncos 1 NNE	1,666	Typic Udic
Lares 3 SE	2,357	Typic Udic

Table 1.—Precipitation Data from Stations on Puerto Rico —Continued

Station	Annual rain	Soil moisture regime
	mm	
Maricao Fish Hatchery	2,550	Typic Udic
Matrullas Dam	2,278	Typic Udic
Maunabo 2 SE	1,821	Typic Udic
Mayagüez Nuclear Center	1,887	Typic Udic
Mona Island	1,090	Typic Ustic
Paraiso	2,278	Typic Udic
Peñuelas Salto Garzas	2,032	Typic Udic
Ponce 4 E	889	Aridic Ustic
Puerto Real	1,295	Typic Ustic
Quebradillas	1,458	Typic Udic
Ramey Air Force Base	1,308	Typic Ustic
Rio Blanco Lower	2,807	Typic Udic
Rio Blanco Upper	3,978	Perudic
Rio Piedras Exp Farm	1,915	Typic Udic
San Germán 4 W	1,519	Typic Udic
San Juan City	1,511	Typic Udic
San Juan WSE	1,501	Typic Udic
Santa Rita	851	Aridic Ustic
Toa Baja 1 SSW	1,732	Typic Udic
Toro Negro Plant 2	2,558	Typic Udic
Utuado 1 WSW	1,908	Typic Udic
Villalba	2,002	Typic Udic
Mean annual rainfall for all stations	1,717.5	

Table 2.—Approximate Rainfall Ranges for Soil Moisture Regimes

Aridic Range	Less than 760 mm (30 in)
Aridic-Ustic Range	760 to 890 mm (30 to 35 in)
Typic-Ustic Range	890 to 1,400 mm (35 to 55 in)
Typic-Udic Range	1,400 to 3,810 mm (55 to 150 in)
Perudic Range	More than 3,810 mm (150 in)

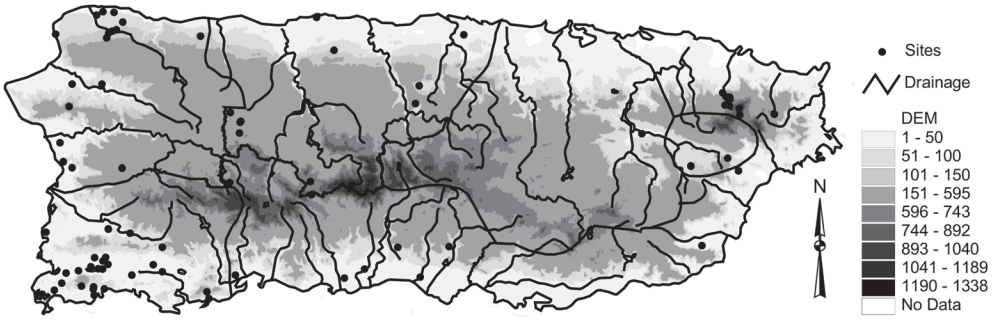

Figure 1.—Location of georeferenced pedons in Puerto Rico. The Detailed Elevation Model (DEM) portrays the elevation of the island.

Location of Pedons

Many of the pedons sampled in Puerto Rico are georeferenced (fig. 1). Others are located by descriptive terms, such as distance from a known point inside a particular municipio.

In this publication, only those soils with a narrative pedon description are included. About 50 other soils have been sampled for laboratory data but do not have a profile description.

Classification of the Soils of Puerto Rico

This section quantifies the classification of the 209 soils that represent the essence of the soils sampled in Puerto Rico. Ten of the 12 soil orders of Soil Taxonomy were sampled in Puerto Rico. Andisols (fresh volcanic soils) and Gelisols (frozen soils) did not occur. Aridisols have only recently been documented in Puerto Rico and were not sampled with the knowledge that the soil had an aridic moisture regime.

The dominant soil order sampled was the Oxisols (62 pedons). Inceptisols (35 pedons) and Mollisols (34 pedons) were sampled at essentially the same intensity as each other. Also sampled were seven additional soils that classified as Mollisols but are not included in this report because they were “grab” samples and did not have full pedon descriptions. Alfisols (24 pedons) and Ultisols (26 pedons) were also about equally represented in the sampling scheme. The Vertisols (18 pedons), dominantly in the Lajas Valley of Puerto Rico, represented 8.6 percent of the soils sampled. Fifteen additional Vertisols that represented redundant sampling are not included in this report. Entisols (4 pedons), Histosols (4 pedons), and Spodosols (2 pedons) were sampled to a minor extent. Although not shown, Aridisols have been previously sampled as taxa of Inceptisols or Mollisols.

Soils that have an isohyperthermic temperature regime accounted for 191 pedons (91.4 percent), soils that have an isothermic temperature regime accounted for 15 pedons, and soils that have an isomesic temperature regime accounted for 3 pedons.

The dominant particle-size classes sampled were fine, very-fine, and clayey (166 pedons). The other pedons that were sampled included 6 that were sandy; 7 that were coarse-loamy; 27 that were loamy, fine-loamy, or fine-silty; and 3 that lacked a particle-size class.

Several mineralogy classes are represented by historical sampling in Puerto Rico. The dominant mineralogy class is mixed (84 pedons for all mixed classes), kaolinitic (62 pedons), smectitic (19 pedons), parasesquic (12 pedons), carbonatic (11 pedons), ferruginous (10 pedons), siliceous (2 pedons), isotic (2 pedons), allic (1 pedon), magnesic (1 pedon), and sesquic (1 pedon).

Two hundred and two pedons (96.7 percent of the total) sampled in Puerto Rico are nonskeletal. This under-representation of skeletal soils is thought to be a function of the high degree of weathering of the rocks that produce a clayey saprolite.

References

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Chapter 3
Soils of the Semiarid and Subhumid Zones of Puerto Rico

In this chapter, 49 soils from the semiarid and subhumid zones of Puerto Rico are described. Soils with a ustic or aridic moisture regime are primarily located on the south side of Puerto Rico (fig. 2). All of the semiarid soils have an isohyperthermic soil temperature regime. Other dry areas include coastal areas to the west (Rincon), northwest (Isabela), and east (Fajardo). The offshore islands of Culebra, Vieques, Mona, and Desecheo have soils with an ustic moisture regime, but laboratory data not were collected from these islands. The dominant soil orders sampled in the semiarid zones of Puerto Rico were Mollisols (18 pedons), Vertisols (16 pedons), Alfisols (9 pedons), and Oxisols (4 pedons).

The laboratory data and the pedon descriptions are linked by the Pedon ID designation; e.g. S92VI-010-001. This number is included in both the primary characterization data and the narrative pedon description. A few of the pedon ID numbers do not reflect the current municipio codes. They are, however, consistant with the current National Soil Survey Laboratory online database.

For many pedons, more than one classification is presented. The classification labeled "Sampled As" in the primary characterization data is the classification according to the edition of Soil Taxonomy at the time of sampling. This is the same classification as the "Field Classification" in the narrative pedon description. Where possible, a "Revised Classification," which indicates the current classification of the pedon, is included in the narrative pedon description. The revised classification updates the pedon to the 8th edition of the Keys to Soil Taxonomy. Many of the pedon classifications are slightly different than the classifications in the official series descriptions. Diagnostic features in the narrative pedon descriptions reflect field estimates.

Data are arranged by municipio. The number of pedons for each municipio is as follows:

Municipio	Number of pedons	Municipio	Number of pedons
Arroyo	1	Juana Diaz	2
Cabo Rojo	6	Lajas	22[1]
Coamo	1	Moca	1
Guanica	2	Peñuelas	1
Guayanilla	1	Ponce	3
Hatillo	1	Sabana Grande	2
Isabela	4	Yauco	2

[1] Additional soils have been sampled in the Lajas Municipio. They are not included in this report, however, because their pedon descriptions could not be located.

Figure 2.—Soils with ustic or aridic moisture regimes near La Parguera, Puerto Rico.

Arroyo Municipio

Machete: S63PR-015-001

Primary Characterization Data

Arroyo Municipio, Puerto Rico

Sampled as: Machete; fine, mixed, isohyperthermic Typic Tropudalfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 563, Samples 40A 4126–4132

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
40A4126S	0- 18	Ap		15.4	35.9	48.7			20.1	15.8	12.1	14.4	8.5	10.3	3.4	TRC	1C	--	37	1
40A4127S	18- 36	A12		14.5	37.3	48.2			20.2	17.1	11.5	13.9	8.5	10.1	4.2	--C	--C	--	37	--
40A4128S	36- 48	B21t		34.9	29.9	35.2			17.8	12.1	10.4	10.9	5.5	6.1	2.3	TRC	--C	--	25	--
40A4129S	48- 71	B22t		37.4	29.0	33.6	23.7		16.8	12.2	9.4	9.2	4.5	6.1	4.4	TRC	1C	--	25	1
40A4130S	71-102	B23t		36.8	39.2	24.0			22.0	17.2	11.9	6.6	2.2	2.4	0.9	--C	--C	--	12	--
40A4131S	102-152	B3		31.5	38.1	30.4			20.2	17.9	17.2	8.4	2.3	2.0	0.5	--C	--C	--	13	--
40A4132S	152	C1														--	--	--		--

	ORGN TOTAL		EXTR TOTAL		(- - DITH-CIT - -)				(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 18	0.44	0.060			2.2			0.60	0.48										7.4	
18- 36	0.44	0.057			2.2			0.60	0.50										7.3	
36- 48	0.23				3.3			0.48	0.41										14.2	
48- 71	0.21				3.7			0.49	0.41										15.4	
71-102	0.09				3.2			0.61	0.39										14.5	
102-152	0.08				3.0			0.71	0.42										13.3	
152																				

	(- NH4OAC EXTRACTABLE BASES -)					ACID- EXTR		(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - ->										<- - - - -PCT - - ->								1:2	1:1
0- 18	3.5	1.2	0.1	0.3	5.1	8.4	0.4	13.5	9.3	5.5	7	38	55					4.2		4.9
18- 36	3.2	1.1	0.1	0.2	4.6	8.0	0.5	12.6	8.7	5.1	10	37	53					4.2		5.0
36- 48	12.2	2.9	0.3	0.4	15.8	7.0		22.8	16.6			69	95					4.8		5.7
48- 71	14.4	4.9	0.3	0.5	20.1	6.1		26.2	18.4			77	100					5.1		6.1
71-102	16.4	7.1	0.3	0.5	24.3	4.8		29.1	22.4			84	100					5.1		6.3
102-152	15.6	7.1	0.3	0.4	23.4	5.1		28.5	22.3			82	100					5.2		6.4
152																				

Narrative Pedon Description

Pedon: Machete

NSSL pedon number: 40A563

Pedon ID: S63PR-015-001

SSIR #12 pedon ID: S63-PR-13-1

Field classification: Fine, mixed, isohyperthermic Typic Tropudalfs

Revised classification as of Apr 01, 2001: Unnamed; fine, mixed, active, isohyperthermic Typic Paleustalfs[2]

Location: Arroyo Municipio, Puerto Rico; Sudeste Soil Conservation District; 3.3 km north of town of Arroyo; 366 meters east of kilometer 1.4, Highway 753 to iron stake, and 15 meters east and 6 meters north

Latitude: 17°59’25" north

Longitude: 66°03’10" west

Vegetation: Cultivated; used for sugarcane

Slope: Gently sloping (2 percent); on an alluvial fan or terrace

Drainage, runoff, and permeability: Well drained, medium runoff, and moderate permeability

Parent material: Alluvial fan sediments derived from volcanic rocks

Described and sampled by: W.E. McKinzie and R.A. Boccheciamp on October 10, 1963

Notes: Thin clay lens are at a depth of 145 cm. Reaction was determined by Soiltex. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; reddish brown (5YR 4/3) loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; strongly acid; gradual smooth boundary. 40A4126

A12—18 to 36 cm; dark reddish brown (5YR 3/3) loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; common fine sand grains; strongly acid; clear smooth boundary. 40A4127

B21t—36 to 48 cm; reddish brown (5YR 4/4) clay loam; weak medium subangular blocky structure; few thin patchy clay films; friable, slightly sticky, plastic; few fine black concretions; many fine sand grains; strongly acid; clear smooth boundary. 40A4128

B22t—48 to 71 cm; reddish brown (5YR 4/4) clay; moderate medium and coarse subangular blocky structure; thin discontinuous clay films on peds and in root channels; firm, slightly sticky, plastic; common fine black concretions; many fine sand grains; few fine weathered rock fragments; few fine rounded pebbles; strongly acid; clear smooth boundary. 40A4129

B23t—71 to 102; yellowish red (5YR 4/6) clay; weak medium and coarse subangular blocky structure; thin patchy clay films on peds and in root channels; firm, slightly sticky, plastic; common fine black concretions; few rounded pebbles; few weathered rock fragments; strongly acid; abrupt smooth boundary. 40A4130

[2] The change in moisture regime from udic to ustic is thought to be accurate.

BC—102 to 152 cm; reddish brown (5YR 4/4) silty clay loam; moderate medium blocky structure; very few thin patchy clay films; firm, slightly sticky, plastic; few fine black concretions; strongly acid; gradual smooth boundary. 40A4131

C1—152 cm; reddish brown (5YR 4/4) cobbly sandy clay loam; massive; strongly acid. 40A4132

Cabo Rojo Municipio

Guayabo: S81PR-023-002

Primary Characterization Data
Cabo Rojo Municipio, Puerto Rico
Sampled as: Guayabo; clayey, mixed, isohyperthermic Arenic Haplustults
SSL—Project: 81P 75, (CP81PR160) Lajas Valley Soil Survey
—Pedon: 81P 316, Samples 81P 1622–1628
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON[3]	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - PCT OF <2MM (3A1)											- - ->	<- PCT OF <75MM(3B1)			->	
81P1622S	0- 17	Ap	2.0	0.6	97.4			--	0.6	7.2	44.3	37.6	7.7	0.6	TR	--	--	90	--
81P1623S	17- 32	A12	1.6	1.0	97.4			0.8	0.2	8.0	42.0	38.6	8.3	0.5	--	--	--	89	--
81P1624S	32- 46	A13	1.6	1.4	97.0			0.4	1.0	5.8	55.2	26.0	9.4	0.6	--	--	--	91	--
81P1625S	46- 90	A14	1.2	1.3	97.5			0.4	0.9	7.5	43.9	36.6	9.0	0.5	TR	TR	--	90	TR
81P1626S	90-140	A15	2.0	0.1	97.9			--	0.1	7.7	44.4	33.1	11.9	0.8	TR	TR	--	90	TR
81P1627S	140-164	B1	1.2	3.2	95.6			0.8	2.4	14.5	51.8	24.4	4.4	0.5	1	TR	--	81	1
81P1628S	164-190	B2t	11.7	5.5	82.8			3.2	2.3	10.2	46.8	18.7	6.0	1.1	1	3	11	77	15

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 17	0.32	0.030			0.2	TR		0.65	0.40										0.8	
17- 32	0.23	0.014			0.1	TR		0.50	0.31										0.5	
32- 46	0.16	0.005			0.1	--		0.25	0.25										0.4	
46- 90	0.13				0.1	--		0.08	0.42										0.5	
90-140	0.12				0.1	TR		0.05	0.15										0.3	
140-164	0.11				0.1	--		0.08	0.17										0.2	
164-190	0.16				0.7	0.1		0.21	0.36				1.93	1.97	0.006		9.9	8.1	4.2	0.07

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									- - ->	<- - - - -PCT	- - - ->						1:2	1:1
0- 17	1.4	0.3	TR	0.1	1.8	--		1.8	1.3			100	100				5.8	6.1	6.5
17- 32	0.8	0.2	--	TR	1.0	--		1.0	0.8			100	100				5.6	5.8	6.5
32- 46	0.5	0.1	TR	TR	0.6	--		0.6	0.4			100	100				5.4	5.7	6.4
46- 90	0.2	0.1	TR	TR	0.3	--		0.3	0.1			100	100				5.2	5.6	6.3
90-140	0.1	TR	--	TR	0.1	--		0.1	0.1			100	100				5.3	5.7	6.3
140-164	0.2	TR	TR	TR	0.2	--		0.2	0.1			100	100				5.5	5.9	6.6
164-190	1.3	1.1	0.1	0.1	2.6	0.2		2.8	2.5			93	100				5.5	6.1	6.9

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	TGA 7A4b	ELEMENTAL SiO2 7C3 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
81P1628	TCLY	KK 3 MI 1 MT 1 QZ 1	KK23				8.6			0.8			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite MI mica MT montmorillon QZ quartz
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

[3] Subordinate distinctions reflect onsite descriptions during the period of documentation.

Narrative Pedon Description

Pedon: Guayabo
NSSL pedon number: 81P0316
Pedon ID: S81PR-023-002
Field classification: Clayey, mixed, isohyperthermic Arenic Huplustults
Revised classification as of March 01, 2001: Mixed, isohyperthermic Psammentic Paleustalfs
Location: Cabo Rojo Municipio, Puerto Rico; 7.6 meters east of paved road located 0.3 km south of Highway 301, kilometer marker 8.1; Pole Ojea, Cabo Rojo
Latitude: 17°54’24" north
Longitude: 67°11’00" west
*Geomorphic position: P*lains
Slope: 3 percent with an aspect of 0 degrees (north); linear upslope
Average air temperature: Annual—25.0 °C
Average annual precipitation: 889 mm; ustic moisture regime
Drainage: Excessively drained
Parent material: Sandy marine deposits
Geographically associated soils: Bahia and Sosa
Surface fragments: 1 percent
Described and sampled by: G. Acevedo and L.H. Rivera on January 20, 1981
Notes: Matrix colors are for moist ped exteriors.

Ap—0 to 17 cm; brown (10YR 5/3) fine sand; fine single grain; loose, nonsticky, nonplastic; neutral; clear smooth boundary. 81P1622

A12—17 to 32 cm; pale brown (10YR 6/3) fine sand; fine single grain; loose, nonsticky, nonplastic; neutral; clear smooth boundary. 81P1623

AC—32 to 46 cm; strong brown (7.5YR 5/6) fine sand; fine single grain; loose, nonsticky, nonplastic; neutral; clear smooth boundary. 81P1624

C1—46 to 90 cm; strong brown (7.5YR 5/6) fine sand; fine single grain; loose, nonsticky, nonplastic; neutral; gradual wavy boundary. 81P1625

C2—90 to 140 cm; very pale brown (10YR 7/3) fine sand; fine single grain; loose, nonsticky, nonplastic; neutral; gradual wavy boundary. 81P1626

C3—140 to 164 cm; very pale brown (10YR 7/4) fine sand; fine single grain; loose, nonsticky, nonplastic; fine and medium iron-manganese nodules; neutral; clear smooth boundary. 81P1627

C4—164 to 190 cm; red (2.5YR 4/6) sandy loam; fine massive and fine single grain; loose, nonsticky, nonplastic; slightly acid. 81P1628

Sosa: S81PR-007-003

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Sosa taxadjunct; clayey, oxidic, isohyperthermic Plinthic Haplustults

SSL—Project: 81P 75, (CP81PR160) Lajas Valley

—Pedon: 81P 317, Samples 81P 1629–1634

—General methods: 1B1A, 2A1, 2B

-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			(- - -TOTAL	- - -)		(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
			CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT		- - - -		WT
SAMPLE	DEPTH	HORIZON	LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)		.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - - - - - - - - -	PCT OF <2MM	(3A1)	- - - - - - - - - - - - - ->					<- PCT OF	<75MM(3B1)->			SOIL
81P1629S	0- 12	Ap	11.9	6.3	81.8	5.7		2.9	3.4	7.1	42.9	24.6	6.3	0.9	1	1	1	75	3
81P1630S	12- 30	A12	15.9	6.7	77.4	9.0		3.3	3.4	5.5	37.4	24.9	7.9	1.7	3	8	4	76	15
81P1631S	30- 50	B1	43.4	5.2	51.4	21.7		2.5	2.7	3.8	25.1	15.1	5.3	2.1	3	9	--	54	12
81P1632S	50- 84	B21	40.7	6.2	53.1	20.7		2.8	3.5	3.6	28.7	11.8	7.6	1.4	2	4	--	53	6
81P1633S	84-124	B22	29.1	6.6	64.3	11.7		4.4	2.2	5.5	24.7	21.5	11.3	1.3	TR	1	--	59	1
81P1634S	124-161	B23	25.4	6.5	68.1	6.1		4.0	2.5	4.4	29.9	23.9	8.9	1.0	TR	--	--	64	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT	- -)		(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT	<0.4MM	<- -	G/CC -	- ->	CM/CM	<- -	-PCT OF	<2MM	- ->	CM/CM
0- 12	0.97	0.092			1.8	0.1		0.44	0.40		NP		1.59	1.64	0.010		11.6	9.3	4.8	0.07
12- 30	0.80	0.059			2.4	0.2		0.32	0.37				1.74	1.77	0.005		15.9	12.1	5.9	0.10
30- 50	0.62	0.069			4.8	0.5		0.14	0.31	34	15		1.59	1.66	0.013		22.4	19.9	13.6	0.09
50- 84	0.37				4.4	0.4		0.11	0.34				1.75	1.79	0.007		19.3	16.9	13.7	0.05
84-124	0.19				4.1	0.3		0.10	0.36				1.84	1.87	0.005		16.5	13.3	10.6	0.05
124-161	0.16				3.5	0.3		0.09	0.38				1.84	1.86	0.004		14.9	11.4	9.7	0.03

	(- NH4OAC	EXTRACTABLE	BASES -)			ACID-	EXTR	(- - - -CEC	- - -)		AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH	- - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - -	- - - - - -	-	-MEQ /	100 G -	- - - - -	- - - - - -	- ->			<- - - -	-PCT -	- - ->						1:2	1:1
0- 12	3.1	1.1	TR	0.1	4.3	2.5		6.8	5.2			63	83					5.0	5.2	5.7
12- 30	3.6	1.1	0.1	TR	4.8	2.3		7.1	5.1			68	94					5.3	5.7	6.3
30- 50	4.5	1.2	0.1	TR	5.8	2.9		8.7	6.2			67	94					5.6	6.2	6.6
50- 84	3.6	0.7	0.1	TR	4.4	1.9		6.3	4.4			70	100					5.8	6.4	6.7
84-124	2.2	0.5	0.1	TR	2.8	0.4		3.2	2.8			88	100	--				5.9	6.6	6.9
124-161	1.7	0.6	0.1	TR	2.4	0.2		2.6	2.3			92	100	--				6.1	6.9	7.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
					ELEMENTAL 7C3 (Percent)								
81P1632	TCLY	KK 5 GE 2 VR 1 HE 1	KK66							0.2			
81P1633	TCLY	KK 5 GE 2 HE 1	KK44				15.7			0.1			
81P1634	TCLY	KK 5 GE 1	KK74				8.6			0.1			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite HE hematite FE iron oxides

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Sosa
NSSL pedon number: 81P0317
Pedon ID: S81PR-007-003
Field classification: Clayey, oxidic, isohyperthermic Plinthic Haplustults
Revised classification as of March 01, 2001: Fine, kaolinitic, isohyperthermic Aridic Argiustolls
Location: Cabo Rojo Municipio, Puerto Rico
Latitude: Unknown
Longitude: Unknown
Physiography: Hillside or mountainside on coastal plains
Geomorphic position: Backslope of a side slope; on slope and crest
Slope: 8 percent with a convex west aspect
Drainage and permeability: Well drained and moderate permeability
Vegetation: Pangolagrass, guineagrass, and unspecified grasses in pastureland[4]
Surface stoniness: Class 1
Particle-size control section: 25 to 100 cm
Parent material: Alluvium from sedimentary material
Described and sampled by: G. Acevedo and L.H. Rivera on January 20, 1981
Notes: Matrix colors are for moist ped exteriors.

Ap—0 to 12 cm; dark reddish brown (5YR 3/3) sandy loam; weak fine granular structure; loose, nonsticky, nonplastic; slightly acid; clear smooth boundary. 81P1629

A12—12 to 30 cm; dark reddish brown (5YR 3/3) sandy loam; weak coarse subangular blocky structure; hard, firm, nonsticky, nonplastic; fine and medium rounded iron concretions; neutral; clear smooth boundary. 81P1630

B1—30 to 50 cm; 70 percent dark red (2.5YR 3/6) and 30 percent dark reddish brown (5YR 3/3) sandy clay; massive; hard, firm, slightly sticky, plastic; many fine roots throughout; fine and medium rounded iron concretions; neutral; clear smooth boundary. 81P1631

B21—50 to 84 cm; 40 percent red (2.5YR 4/6), 20 percent strong brown (7.5YR 5/8), and 20 percent light gray (10YR 7/1) sandy clay; massive; very hard, extremely firm, slightly sticky, plastic; many fine roots throughout; neutral; gradual wavy boundary. 81P1632

B22—84 to 124 cm; 40 percent red (2.5YR 4/6), 20 percent strong brown (7.5YR 5/8), and 20 percent light gray (10YR 7/1) sandy clay; massive; very hard, extremely firm, slightly sticky, plastic; many fine roots throughout; neutral; gradual wavy boundary. 81P1633

B23—124 to 161 cm; 40 percent red (2.5YR 4/6), 20 percent strong brown (7.5YR 5/8), and 20 percent light gray (10YR 7/1) sandy clay; massive; very hard, extremely firm, slightly sticky, plastic; neutral. 81P1634

[4] Local and common names are used to describe vegetation. Scientific names can be found in the National PLANTS Database at http://plants.usda.gov/.

Teresa: S97PR-023-001

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Teresa; fine, smectitic, isohyperthermic Aquic Salusterts

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 478, Samples 97P 2864–2870

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)				(- -CLAY- -)	(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
97P2864S	0- 25	Ap		65.4	30.4	4.2	41.2		22.0	8.4	1.6	1.1	0.6	0.5	0.4	TR	--	--	3	TR
97P2865S	25- 66	Bss1		62.4	30.2	7.4	28.3		20.6	9.6	2.6	1.8	1.0	1.0	1.0	1	TR	--	6	1
97P2866S	66- 97	Bss2		62.1	30.2	7.7	23.7		20.5	9.7	2.7	1.8	1.5	0.8	0.9	1	TR	--	6	1
97P2867S	97-102	Bss		61.9	29.8	8.3	24.0		20.2	9.6	2.7	1.9	1.2	1.3	1.2	1	TR	--	7	1
97P2868S	102-158	Cgz1		59.9	31.8	8.3	17.0		22.6	9.2	3.0	1.8	1.3	1.1	1.1	1	TR	--	6	1
97P2869S	158-198	Cgz2		59.5	32.7	7.8			22.4	10.3	2.9	1.8	1.2	0.9	1.0	1	TR	--	6	1
97P2870S	198-216	Cgz3		59.5	32.6	7.9			23.1	9.5	3.2	1.9	1.1	0.8	0.9	1	TR	--	6	1

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B4a	6S3b	6R3c	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A5	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM ->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 25		0.218						0.80	0.40				1.20	1.86	0.157			37.4	26.0	0.14
25- 66		0.084						0.80	0.43				1.21	1.91	0.163			38.4	26.6	0.14
66- 97		0.056						0.78	0.43				1.23	1.97	0.169			38.3	26.4	0.15
97-102		0.049						0.77	0.43				1.20	1.96	0.177			39.4	26.6	0.15
102-158								0.76	0.43				1.21	1.97	0.175			40.5	26.0	0.17
158-198								0.75	0.43				1.22	1.97	0.173			38.8	25.6	0.16
198-216								0.75	0.42				1.19	1.96	0.180			40.7	25.2	0.18

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM	ACID- ITY	(- -CEC- -) SUM	NH4-	EXCH NA		SAR	BASE SATURATION		CARBONATE AS CACO3		CASO4 AS GYPSUM		(- - - -PH - - -) SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC				SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2		5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->								PCT			<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 25	32.1	16.0	1.1	1.0	50.2	7.3	57.5	52.6	2		2	87	95					6.6	6.5	6.6
25- 66	28.9	17.0	6.3	0.6	52.8	2.1	54.9	49.7	11		9	96	100	TR		--		7.5	7.8	7.7
66- 97		21.5	13.9	0.6		1.8		48.4	17		13		100	1		TR		7.5	7.6	7.5
97-102		21.2	13.7	0.5		1.0		47.8	17		12		100	1		TR		7.4	7.6	7.6
102-158		22.0	13.6	0.8		0.1		45.8	17		12		100	2		1		7.5	7.7	7.6
158-198		21.8	13.4	0.7		0.6		44.6	18		12		100	1		2		7.5	7.6	7.6
198-216		21.7	12.7	0.7		0.9		44.8	16		12		100	2		--		7.5	7.7	7.6

	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. 8A3a	ELEC. COND. 8I
DEPTH (CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1b	6K1d	6S9a	6X1a	6Y1a	6L1d	6W1b	6M1d	8A	8D5	MMHOS	MMHOS
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm
0- 25	5.1	3.4	3.1	0.5	--	9.5	--	0.3				1.7	--	--	83.5	TR	1.07	0.32
25- 66	3.8	2.7	17.0	0.1	--	3.3	0.2	14.9				3.9	--	--	34.9	0.1	2.21	1.03
66- 97	30.2	27.8	67.8	0.2	--	1.9	--	66.6				61.8	--	--	85.0	0.7	9.84	5.59
97-102	31.2	29.6	66.4	0.5	--	1.8	--	76.7				57.3	--	--	85.2	0.7	9.97	6.15
102-158	32.3	30.8	69.2	0.2	--	1.6	--	80.1				63.0	--	--	85.9	0.7	10.78	6.49
158-198	28.3	30.6	66.2	0.2	--	1.7	--	70.8				64.2	--	--	83.7	0.7	10.26	6.32
198-216	25.7	27.8	62.2	0.2	--	1.6	--	58.1				64.0	TR	--	85.7	0.6	9.32	4.91

```
            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - ELEMENTAL - - - - - - -><- -> EGME INTER
SAMPLE        ION <                            ><- DTA - -><- TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><- 7A6b - ><- 7A4c - ><- - - - - - - - - 7C4a- - - - - - - -><    >  7D2  TION
NUMBER      <- - ><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - Percent - - - - - - -><- -><mg/g><- - >
97P2864      TCLY  MT 3  KK 2  VR 1  QZ 1
97P2866      TCLY  MT 3  KK 2  QZ 1

MINERAL INTERPRETATION:
    MT  montmorillon     KK  kaolinite        VR  vermiculite      QZ  quartz
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
```

		ACID OPT DEN	OXALATE EXTRACTION FE	SI	AL		PHOSPHOUS CIT- ACID	KCL MN	TOTAL C	(- -WATER 0.06 BAR	CONTENT- -) 1- BAR	2- BAR	15 BAR	(- - - - WATER DISPERSIBLE - - - -) CLAY	SILT	SAND	CLAY	SILT	SAND	MIN SOIL CONT	AGGRT STABL <5mm
						RET								<- - PIPETTE - -			>< - HYDROMETER - >				
SAMPLE NO.	HZ NO	8J	6C9b	6V2b	6G12b	6S4b	6S5	6D3b	6A2e	4B1c	4B1a	4B1a	4B2b	<- - - 3A1c - -			-><- - - SML		- - ->	8F1	4G1
			<- P C T	o f	< 2 m m		-><- P P M		-><- - - - - - - - - - P E R C E N T								o f	< 2 m m		- - - - - - -	><20mm><PCT>
97P2864	1								2.45												
97P2865	2								0.90												
97P2866	3								0.64												
97P2867	4								0.69												
97P2868	5								0.72												
97P2869	6								0.52												
97P2870	7								0.47												

Narrative Pedon Description

Pedon: Teresa

NSSL pedon number: 97P0478

Pedon ID: S97PR-023-001

Field classification: Fine, smectitic, isohyperthermic Aquic Salusterts

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Sodic Haplusterts

Pedon purpose: Full pedon description

Location: Cabo Rojo Municipio, Puerto Rico; 8.7 km south of downtown Cabo Rojo; 1.8 km south of Las Arenas on Highway 301 from its intersection with Highway 101, and 0.3 km east in a pasture

Latitude: 18°00’33" north

Longitude: 67°08’49" west

Major Land Resource Area: 273—Semiarid Coastal Plains

Soil survey area: PR787—San Germán Area, Southwestern Puerto Rico

USGS 7.5-minute quadrangle: Puerto Real, Puerto Rico

Elevation: 2 meters

Geomorphic setting: Alluvial flat in a coastal plain

Microrelief: Gilgai

Slope: 1 percent; linear upslope and linear across the slope

Drainage: Somewhat poorly drained

Vegetation: Grass

Geographically associated soils: Manglillo, Serrano, and Vayas

Particle-size control section: 25 to 102 cm

Diagnostic features: Slickensides at a depth of 25 to 198 cm; salic horizon at 97 to 216 cm; mottles that have chroma of 2 or less at 112 to 216 cm

Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on June 16, 1997

Ap—0 to 25 cm; very dark gray (10YR 3/1), clay; moderate medium subangular blocky structure; firm, hard when dry, very sticky, very plastic; many very fine and fine roots throughout; many very fine interstitial pores; clear wavy boundary. 97P2864

Bss1—25 to 66 cm; very dark gray (10YR 3/1) clay; strong coarse prismatic structure; very firm, very hard, very sticky, very plastic; many very fine and fine roots throughout; few medium tubular pores; 90 percent continuous prominent slickensides (pedogenic) throughout; 1 percent iron-manganese concretions throughout; gradual wavy boundary. 97P2865

Bss2—66 to 97 cm; very dark grayish brown (10YR 3/2) clay; 1 percent fine prominent yellowish brown (10YR 5/8) mottles; strong coarse prismatic structure; very firm, very hard, very sticky, very plastic; many very fine and fine roots throughout; common fine, few medium, and many very fine tubular pores; 90 percent continuous distinct slickensides (pedogenic) throughout; 1 percent iron-manganese concretions throughout; gradual wavy boundary. 97P2866

Bssz—97 to 102 cm; very dark grayish brown (10YR 3/2) clay; 1 percent medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; very firm, very hard, very sticky, very plastic; few very fine and fine roots throughout; common fine, few medium, and many very fine tubular pores; 50 percent continuous distinct slickensides (pedogenic) throughout; 1 percent iron-manganese concretions throughout; 1 percent carbonate concretions throughout; 1 percent salt masses throughout; clear wavy boundary. 97P2867

Bssgz1—102 to 158 cm; dark brown (10YR 3/3) clay; 5 percent medium distinct olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; very firm, very hard, very sticky, very plastic; few very fine and fine roots throughout; common fine, few medium, and many very fine tubular pores; 50 percent continuous distinct slickensides (pedogenic) throughout; 10 percent iron-manganese concretions throughout; 10 percent salt masses throughout; gradual wavy boundary. 97P2868

Bssgz2—158 to 198 cm; brown (10YR 4/3) clay; 1 percent medium prominent yellowish brown (10YR 5/8) and 5 percent medium faint dark gray (2.5Y 4/1) mottles; weak medium subangular blocky structure; very firm, very hard, very sticky, very plastic; few very fine to medium roots throughout; common fine, few medium, and many very fine tubular pores; 50 percent continuous distinct slickensides (pedogenic) throughout; 50 percent iron-manganese concretions throughout; 50 percent salt masses throughout; clear wavy boundary. 97P2869

Bgz—198 to 216 cm; dark gray (2.5Y 4/1) clay; 5 percent medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very firm, very hard, very sticky, very plastic; few very fine and fine roots throughout; common fine, few medium, and many very fine tubular pores; 10 percent iron-manganese concretions throughout; 1 percent salt masses throughout. 97P2870

Aguilita: S97PR-023-002

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Aguilita; coarse-loamy, carbonatic, isohyperthermic Aridic Calciustolls

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 479, Samples 97P 2871–2877

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
97P2871S	0- 20	Ap		50.0	27.0	23.0	15.0	8.0	20.0	7.0	4.0	5.5	4.7	4.3	4.5	8	23	7	50	38
97P2872S	20- 36	Bk		45.4	32.6	22.0	13.3	23.3	23.7	8.9	5.0	5.3	4.0	4.0	3.7	14	24	7	54	45
97P2873S	36- 53	Ck1		34.4	39.5	26.1	7.4	24.3	28.9	10.6	6.3	7.3	4.8	4.9	2.8	7	15	16	50	38
97P2874S	53- 84	Ck2		34.3	40.4	25.3	7.6	21.7	31.3	9.1	6.5	7.1	4.6	4.1	3.0	10	16	13	50	39
97P2875S	84-109	Ck3		28.9	35.1	36.0	7.7	11.6	25.5	9.6	9.4	12.3	7.2	5.1	2.0	20	17	12	63	49
97P2876S	109-137	Ck4		23.6	37.3	39.1	6.5	4.8	26.2	11.1	12.3	15.1	6.9	3.2	1.6	14	18	1	51	33
97P2877S	137-200	Cr		19.5	32.8	47.7			23.1	9.7	11.6	16.4	11.9	5.4	2.4	6	5	1	44	12

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c PCT	6B4a <2MM	6S3b PPM	6R3c <- PERCENT	6C2b OF	6G7a <2MM -->	6D2a	8D1	8D1	4F1 PCT	4F <0.4MM	4A5 <- -	4A1d G/CC -	4A1h - ->	4D1 CM/CM	4B4 <- -	4B1c -PCT OF	4B1c <2MM	4B2a - ->	4C1 CM/CM
0- 20		0.360						0.74	0.51										25.3	
20- 36		0.173						0.51	0.46				1.24	1.30	0.011			26.6	21.0	0.05
36- 53		0.098						0.44	0.49				1.17	1.21	0.009			31.4	16.8	0.13
53- 84		0.064						0.51	0.45				1.09	1.15	0.014			37.9	15.6	0.19
84-109		0.053						0.94	0.76				0.98	1.07	0.022			47.8	21.9	0.19
109-137								1.75	1.05				1.10	1.32	0.051			42.5	24.7	0.16
137-200								2.35	1.22										23.7	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM	ACID- ITY	(- -CEC- -) SUM	NH4-	EXCH NA	SAR	BASE SATURATION		CARBONATE AS CACO3		CASO4 AS GYPSUM		(- - - -PH - - -) SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 20K		8.4	0.3	1.4					37.1	1	TR	100	100	39	45			7.5	7.7	8.0
20- 36		6.8	0.2	0.6					23.3	1	TR	100	100	75				7.4	7.8	8.1
36- 53		7.1	0.4	0.2					15.3	2		100	100	91					7.9	8.3
53- 84		14.9	0.5	0.1					17.6	3		100	100	80					8.1	8.5
84-109K		28.6	2.0	0.2					27.3	6	4	100	100	55	59	--		8.3	8.3	8.7
109-137K		42.6	6.6	0.4					41.4	13	12	100	100	28	39	--		8.4	8.4	8.8
137-200K		47.6	8.4	0.4		--			45.9	15	14	100	100	15	16	--		8.4	8.4	8.8

	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. 8A3a	ELEC. COND. 8I
DEPTH (CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1b	6K1d	6S9a	6X1a	6Y1a	6L1d	6W1b	6M1d	8A	8D5	MMHOS /cm	MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 20	8.1	2.5	0.7	0.5	--	9.0	--	0.6				0.9	0.4	--	77.5	TR	1.06	0.44
20- 36	5.0	1.9	0.6	0.1	--	5.2	--	1.4				0.6	0.3	--	67.1	TR	0.78	0.32
36- 53																		0.20
53- 84																		0.24
84-109	0.9	4.5	7.1	0.1	--	3.6	TR	4.8				3.0	0.6	TR	66.3	0.1	1.33	0.56
109-137	0.5	3.8	17.2	0.1	--	3.5	TR	12.0				6.6	--	--	75.6	0.1	2.08	0.97
137-200	0.3	3.5	19.6	0.4	--	3.9	TR	10.5				8.7	--	--	70.6	0.1	2.21	1.00

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                < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                FRACT < - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - ELEMENTAL - - - - - - -><- -> EGME INTER
SAMPLE            ION <                            >< - DTA - -><- TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                    < - - - - -  7A2i - - - - - -><- 7A6b - ><- 7A4c - ><- - - - - - - - - 7C4a- - - - - - - -><    >  7D2  TION
NUMBER          <- - ><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - Percent - - - - - - -><- -><mg/g><- - >
97P2872          TCLY  CA 4  MT 2  KK 1  MI 1  HE 1
97P2874          TCLY  CA 4  MT 2  KK 1  MI 1  HE 1
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    CA  calcite          MT  montmorillon     KK  kaolinite        MI  mica             HE  hematite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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                ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - WATER DISPERSIBLE - - - -) MIN   AGGRT
                 OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - ><- HYDROMETER - > SOIL STABL
                 DEN                     RET   ACID              BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4b  6S5   6D3b  6A2e  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><- - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
97P2871  1                                          7.51                                                                          93
97P2872  2                                          9.33
97P2873  3                                         10.09
97P2874  4                                          9.08
97P2875  5                                          6.71
97P2876  6                                          3.30
97P2877  7                                          1.69
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Narrative Pedon Description

Pedon: Aguilita

NSSL pedon number: 97P0479

Pedon ID: S97PR-023-002

Pedon type: Typical pedon for series

Field classification: Coarse-loamy, carbonatic, isohyperthermic Aridic Calciustolls

Revised classification as of July 01, 1998: Aguilita; coarse-loamy, carbonatic, isohyperthermic Aridic Calciustolls

Location: Cabo Rojo Municipio, Puerto Rico; 6 km northeast of El Combate, Puerto Rico, on Highway 303 from the intersection of Highway 301, about 0.2 km south on Highway 303 from the intersection of Highway 301, and 60 meters east in a pasture

Latitude: 17°59’24" north

Longitude: 67°09’26" west

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Elevation: 40 meters

Geomorphic position: On backslope of a side slope of a hill or mound in the uplands

Slope: 8 percent; concave upslope and concave across the slope

Average air temperature: Annual—28.9 °C

Average annual precipitation: 1,143 mm

Drainage: Well drained

Vegetation: Grass and herbaceous cover

Geographically associated soils: Duey, Montalva, Pozo Blanco, and San Germán

Site observations: Wet starting at a depth of 183 cm

Surface fragments: 25 percent

Particle-size control section: 25 to 102 cm

Diagnostic features: Mollic epipedon at 0 to 20 cm; calcic horizon at 20 to 36 cm; secondary carbonates at 36 to 203 cm

Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on June 16, 1997

Ap—0 to 20 cm; very dark brown (10YR 2/2) silty clay, very dark grayish brown (10YR 3/2) dry; moderate medium granular structure; very friable, slightly hard, slightly sticky, slightly plastic; many very fine to medium roots throughout; many very fine and fine interstitial pores; 25 percent rock fragments 2 to 75 mm in diameter; moderately alkaline; abrupt wavy boundary. 97P2871

Bk—20 to 36 cm; brown (10YR 4/3) silty clay, brown (10YR 5/3) dry; weak medium subangular blocky structure; very friable, soft, moderately sticky, moderately plastic; many very fine and fine roots throughout; many very fine and fine interstitial pores; medium carbonate concretions throughout and medium carbonate masses throughout; moderately alkaline; clear smooth boundary. 97P2872

Ck1—36 to 53 cm; very pale brown (10YR 8/3) clay loam, very pale brown (10YR 8/2) dry; massive; very friable, soft, slightly sticky, slightly plastic; common fine and many very fine roots throughout; common fine and many very fine interstitial pores; medium carbonate masses throughout and medium carbonate concretions throughout; moderately alkaline; clear smooth boundary. 97P2873

Ck2—53 to 84 cm; very pale brown (10YR 8/3) clay loam, very pale brown (10YR 8/2) dry; massive; very friable, soft, slightly sticky, slightly plastic; common fine and many very fine roots throughout; common fine and many very fine interstitial pores; medium carbonate concretions throughout and medium carbonate masses throughout; strongly alkaline; gradual smooth boundary. 97P2874

Ck3—84 to 109 cm; pale brown (10YR 6/3) clay loam, light gray (10YR 7/2) dry; massive; very friable, soft, slightly sticky, slightly plastic; common fine and many very fine roots throughout; common fine and many very fine interstitial pores; medium carbonate concretions throughout and medium carbonate masses throughout; strongly alkaline; gradual smooth boundary. 97P2875

Ck4—109 to 137 cm; light olive brown (2.5Y 5/3) clay loam, light yellowish brown (2.5Y 6/3) dry; massive; friable, slightly hard, slightly sticky, slightly plastic; common fine and many very fine roots throughout; many very fine interstitial pores; medium carbonate concretions throughout and medium carbonate masses throughout; strongly alkaline; clear smooth boundary. 97P2876

Cr—137 to 200 cm; clay loam, 50 percent light olive brown (2.5Y 5/3), light yellowish brown (2.5Y 6/3) dry, and 50 percent very pale brown (10YR 8/3), very pale brown (10YR 8/2) dry; massive; friable, slightly hard, slightly sticky, nonplastic; few very fine and fine roots throughout; many very fine and fine interstitial pores; medium carbonate concretions throughout and medium carbonate masses throughout; 5 percent rock fragments 2 to 75 mm in diameter; strongly alkaline. 97P2877

Melones: S97PR-023-003

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Melones; fine, smectitic, isohyperthermic Vertic Paleustalfs

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 480, Samples 97P 2878–2884

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
97P2878S	0- 17	A		53.8	21.6	24.6	25.9		13.8	7.8	7.2	11.1	3.9	1.4	1.0	1	2	4	23	7
97P2879S	17- 46	Bt		51.2	22.6	26.2	9.7	2.2	14.4	8.2	7.2	11.4	4.6	1.9	1.1	2	3	1	24	6
97P2880S	46- 95	Btk1		47.1	19.8	33.1	13.4	3.9	15.1	4.7	5.5	14.7	7.7	3.2	2.0	3	4	--	33	7
97P2881S	95-117	Btk2		46.2	21.9	31.9	12.8	5.8	17.6	4.3	4.0	11.0	8.2	4.8	3.9	3	2	1	32	6
97P2882S	117-168	B't1		51.6	21.2	27.2	12.5	7.3	16.2	5.0	4.5	10.2	7.2	3.3	2.0	2	1	--	25	3
97P2883S	168-179	B't2		36.8	15.0	48.2		2.7	11.4	3.6	2.6	10.7	17.0	11.7	6.2	6	13	8	60	27
97P2884S	179-200	2C		40.9	26.3	32.8		3.0	21.9	4.4	5.0	12.2	8.5	4.1	3.0	2	1	--	30	3

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B4a	6S3b	6R3c	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A5	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM ->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 17		0.299						0.92	0.45				1.31	1.79	0.105			33.2	24.2	0.11
17- 46		0.135						0.85	0.46										23.5	
46- 95		0.038						0.74	0.44				1.32	1.88	0.120			33.0	20.8	0.16
95-117		0.032						0.69	0.43				1.27	1.90	0.139			36.8	19.7	0.21
117-168								0.71	0.43				1.29	1.92	0.140			34.8	22.0	0.16
168-179								0.79	0.45										16.6	
179-200								0.78	0.42				1.35	1.87	0.112			31.9	17.0	0.20

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 17		12.4	0.3	1.2		1.4		49.6	1	1		100	2				7.6	7.6	8.0
17- 46		14.9	4.1	0.4				43.5	8	5	100	100	3				7.7	7.8	8.1
46- 95		16.5	11.6	0.4				35.0	24	22	100	100	14			--	8.1	8.2	8.3
95-117		15.0	14.4	0.7				31.7	27	28	100	100	9			--	7.9	8.2	8.1
117-168		16.0	18.1	0.7				36.6	28	27	100	100	9			--	7.9	8.1	8.1
168-179		12.9	14.7	0.6				29.0	27	31	100	100	11			--	7.9	8.1	8.2
179-200		14.4	16.1	0.7				31.9	29	28	100	100	27			--	7.9	8.1	8.1

	(- - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -)																		PRED.	
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	ELEC. COND. 8A3a	ELEC. COND. 8I	
DEPTH																				
(CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1b	6K1d	6S9a	6X1a	6Y1a	6L1d	6W1b	6M1d	8A	8D5	MMHOS	MMHOS		
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm		
0- 17	5.7	2.0	1.2	0.2	--	6.8	--	0.1				0.9	0.8	--	76.3	TR	0.86	0.34		
17- 46	1.7	1.0	5.9	--	--	5.7	TR	0.4				1.1	0.6	TR	71.3	TR	0.90	0.40		
46- 95	3.8	3.8	42.7	0.1	--	2.1	--	46.2				7.1	--	TR	72.6	0.3	4.96	1.98		
95-117	8.9	11.2	89.6	0.2	--	3.1	--	94.6				20.3	--	--	66.5	0.5	9.55	3.64		
117-168	11.0	15.6	97.0	--	--	6.3	--	103.0				20.0	--	--	82.6	0.7	10.42	4.77		
168-179	12.0	15.6	117.0	--	--	1.5	TR	130.9				21.4	--	--	57.6	0.6	12.06	3.97		
179-200	11.3	13.6	100.4	0.3	--	--	--	113.4				22.8	--	--	67.9	0.6	10.94	4.45		

```
           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - -><- -> EGME INTER
SAMPLE       ION <                            >< - DTA - -><- TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><- 7A6b - ><- 7A4c - ><- - - - - - - - - 7C4a- - - - - - - -><    >  7D2  TION
NUMBER     <- - ><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - Percent - - - - - - -><- -><mg/g><- - >
97P2879     TCLY  MT 3  KK 2  CA 2  QZ 1
97P2880     TCLY  MT 3  KK 2  CA 2  QZ 1
97P2881     TCLY  MT 3  CA 3  KK 2  QZ 1
97P2882     TCLY  MT 2  CA 2  KK 1  VR 1  QZ 1
97P2883     TCLY  MT 3  KK 2  CA 2  QZ 1
97P2884     TCLY  MT 3  CA 2  KK 1  QZ 1
MINERAL INTERPRETATION: MT  montmorillon   KK  kaolinite     CA  calcite       QZ  quartz       VR  vermiculite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4b  6S5   6D3b  6A2e  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><- - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
97P2878  1                                         3.68                                                                          81
97P2879  2                                         2.05
97P2880  3                                         1.77
97P2881  4                                         2.30
97P2882  5                                         2.04
97P2883  6                                         1.52
97P2884  7                                         3.30
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Narrative Pedon Description

Pedon: Melones

NSSL Pedon ID: 97P0480

Pedon number: S97PR-023-003

Field classification: Fine, smectitic, isohyperthermic Vertic Paleustalfs

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Sodic Haplusterts

Pedon purpose: Full pedon description

Location: Cabo Rojo Municipio, Puerto Rico; 2.7 miles east of El Combate on Highway 301 at the Cabo Rojo National Wildlife Refuge facilities at Boqueron, Puerto Rico; 1.2 miles southwest from the intersection of Highways 301 and 303 and east 100 feet in a hay field

Major Land Resource Area: 273—Semiarid Coastal Plains

Soil survey area: PR787—San Germán Area, Southwestern Puerto Rico

USGS 7.5-minute quadrangle: Cabo Rojo, Puerto Rico

Latitude: 17°58’38" north

Longitude: 67°10’16" west

Geomorphic setting: Alluvial fan in a coastal plain

Elevation: 8 meters

Slope: 2 percent; linear upslope and convex across the slope

Geographically associated soils: Amelia, Maguayo, Pozo Blanco, and Sosa

Drainage: Well drained

Surface fragments: 5 percent

Particle-size control section: 18 to 69 cm

Diagnostic features: Ochric epipedon at 0 to 18 cm; argillic horizon at 18 to 178 cm; slickensides at 18 to 46 cm; calcic horizon at 46 to 117 cm; slickensides at 117 to 168 cm

Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on June 17, 1997

A—0 to 17 cm; dark brown (10YR 3/3) clay loam, dark brown (10YR 3/3) dry; strong medium granular structure; firm, hard when dry, moderately sticky, moderately plastic; many very fine and fine roots throughout; many very fine interstitial pores; 5 percent rock fragments 2 to 75 mm in diameter; clear wavy boundary. 97P2878

Bt—17 to 46 cm; brown (10YR 4/3) clay; strong medium angular blocky structure; firm, hard when dry, moderately sticky, moderately plastic; many fine and many medium roots throughout; many very fine and fine tubular pores; 25 percent continuous faint brown (10YR 4/3) nonintersecting slickensides throughout; 1 percent rock fragments 2 to 75 mm in diameter; clear wavy boundary. 97P2879

Btk1—46 to 95 cm; dark brown (7.5YR 3/4) clay; moderate medium angular blocky structure; firm, hard when dry, moderately sticky, moderately plastic; many fine and many medium roots throughout; many fine interstitial, few fine and medium tubular, and many very fine interstitial pores; 25 percent pinkish

white (7.5YR 8/2) carbonate masses throughout; 5 percent rock fragments 2 to 75 mm in diameter; gradual wavy boundary. 97P2880

Btk2—95 to 117 cm; brown (7.5YR 4/4) clay; strong medium subangular blocky structure; firm, hard when dry, moderately sticky, moderately plastic; few medium roots throughout; many fine interstitial, few fine and medium tubular, and many very fine interstitial pores; 5 percent pinkish white (7.5YR 8/2) carbonate masses throughout; 5 percent rock fragments 2 to 75 mm in diameter; clear wavy boundary. 97P2881

B´t1—117 to 168 cm; brown (7.5YR 4/4) clay; moderate medium subangular blocky structure; firm, hard when dry, moderately sticky, moderately plastic; few fine and medium roots throughout; many fine interstitial, many very fine interstitial, and few very fine tubular pores; 25 percent continuous faint nonintersecting slickensides throughout; 2 percent rock fragments 2 to 75 mm in diameter; clear wavy boundary. 97P2882

B´t2—168 to 179 cm; strong brown (7.5YR 4/6) gravelly sandy clay loam; weak medium subangular blocky structure; friable, slightly hard, slightly sticky, slightly plastic; few medium roots throughout; 30 percent rock fragments 2 to 75 mm in diameter; abrupt wavy boundary. 97P2883

C—179 to 200 cm; yellowish brown (10YR 5/6) sandy clay loam; massive; friable, slightly hard, slightly sticky, slightly plastic; few fine and many very fine interstitial pores. 97P2884

Delicias: S61PR-023-003

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Delicias; clayey, oxidic, isohyperthermic Typic Haplorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 592, Samples 40A 4321–4326

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4321S	0- 15	Ap		50.7	11.9	37.4			8.3	3.6	9.3	14.9	2.8	3.5	6.9	--C	--C	--	28	--
40A4322S	15- 30	B21		57.5	10.2	32.3			7.1	3.1	6.7	10.8	2.2	3.3	9.3	1C	7C	--	32	8
40A4323S	30- 56	B22		50.6	17.6	31.8			13.1	4.5	7.1	10.4	1.9	3.3	9.1	1C	8C	--	31	9
40A4324S	56- 86	B23		39.8	32.4	27.8			20.2	12.2	9.7	9.4	1.6	2.0	5.1	1C	8C	--	25	9
40A4325S	86-114	B24		41.1	29.6	29.3			16.5	13.1	11.5	8.7	1.6	2.1	5.4	1C	6C	--	24	7
40A4326S	114-152	B25		36.0	33.6	30.4			20.6	13.0	11.7	9.4	2.2	2.8	4.3	TRC	3C	--	21	3

	ORGN TOTAL		EXTR TOTAL		(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 15	2.68	0.212			9.8			0.22	0.40			1.38		1.51		29.0			20.4	
15- 30	1.01	0.110			10.9			0.13	0.39			1.24		1.28		32.6			22.3	
30- 56	0.43	0.069			11.8			0.10	0.43			1.16		1.20		34.3			22.0	
56- 86	0.25	0.038			13.6			0.11	0.59			1.43		1.44		29.4			23.4	
86-114	0.22				17.5			0.10	0.65			1.40							26.8	
114-152	0.18				25.3			0.09	0.78			1.36		1.38		34.8			28.1	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->								1:2	1:1
0- 15	4.5	1.9	0.1	0.6	7.1	10.8		17.9	11.4			40	62					5.0		5.8
15- 30	1.2	0.9	0.1	0.2	2.4	11.6	0.4	14.0	7.5	2.8	14	17	32					4.3		5.1
30- 56	0.4	0.8	0.1	TR	1.3	10.2	0.3	11.5	5.1	1.6	19	11	25					4.3		5.0
56- 86	0.6	0.8	0.1	TR	1.5	9.6	0.1	11.1	4.4	1.6	6	14	34					5.0		5.2
86-114	0.3	0.8	0.1	TR	1.2	10.6		11.8	4.1			10	29					5.1		5.6
114-152	0.1	0.8	0.2	TR	1.1	12.6		13.7	3.2			8	34					5.6		5.5

Narrative Pedon Description

Pedon: Delicias

NSSL pedon number: 40A0592

Pedon ID: S61PR-023-003

SSIR #12 pedon ID: S61PR-14-10

Field classification: Clayey, oxidic, isohyperthermic Typic Haplorthox

Revised classification as of April 01, 2001: Fine, ferruginous, isohyperthermic Rhodic Haplustox

Location: Cabo Rojo Municipio, Puerto Rico; Suroeste Soil Conservation District; 0.5 kilometers south (on narrow road) from kilometer marker 5.6 on Puerto Rico Highway 311, east 15 meters, east of fence; aerial photograph GS-LR-9-160

Latitude: 18°07’29" north

Longitude: 67°09’37" west

Slope: 20 percent with a north aspect; on a side slope that leads to a drainageway

Vegetation: Guinea and molasses grasses; other native pasture species and weeds

Drainage, runoff, and permeability: Well drained, well internally drained, medium runoff, and moderate permeability

Particle-size control section: 25 to 100 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, L.H. Rivera, D.A. Compton, and J.E. Trigo on December 7, 1961

Notes: The Ap, B22, and B24 horizons were sampled for the Bureau of Public Roads. The soil was at field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; dark reddish brown (2.5YR 3/4) clay; moderate medium granular structure; friable, slightly sticky, moderately plastic; many fine roots; 21 percent fine and medium carbonate concretions; clear smooth boundary. 40A4321

B21—15 to 30 cm; dark red (10R 3/6) clay; moderate medium granular structure; friable, moderately sticky, moderately plastic; common fine roots; 21 percent fine and medium carbonate concretions; clear smooth boundary. 40A4322

B22—30 to 56 cm; dark red (10R 3/6) clay; weak medium subangular blocky structure parting to weak fine granular; friable, nonsticky, slightly plastic; common fine roots; 3 percent fine and medium carbonate concretions; gradual wavy boundary. 40A4323

B23—56 to 86 cm; dark yellowish brown (10YR 3/6) clay; weak fine angular blocky structure; firm, nonsticky, nonplastic; common fine roots; 3 percent fine carbonate concretions; gradual wavy boundary. 40A4324

B24—86 to 114 cm; dark red (2.5YR 3/6) clay; weak fine angular blocky structure; friable, nonsticky, nonplastic; common fine roots; 3 percent fine carbonate concretions; gradual wavy boundary. 40A4325

B25—114 to 152 cm; dark red (2.5YR 3/6) clay; weak fine angular blocky structure; friable, nonsticky, nonplastic; few fine roots; 3 percent fine carbonate concretions. 40A4326

Coamo Municipio

Llanos: S85PR-043-001

Primary Characterization Data

Coamo Municipio, Puerto Rico

Sampled as: Llanos; fine, montmorillonitic, isohyperthermic Typic Pellusterts

SSL—Project: 86P 42, (CP86PR072) Caribbean National Forest

—Pedon: 86P 225, Samples 86P 1340–1346

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	FINE .02 -.02	COARSE .05 -.05	VF .10 -.10	(- - - - - -SAND- - - - - -) F .25 -.25	M .50 -1	C 1 -2	VC 2 -5	(-COARSE FRACS (MM)-) 5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
86P1340S	0- 18	Ap	55.4	34.0	10.6	29.5		24.9	9.1	3.7	2.6	1.6	1.2	1.5	1	1	--	9	2
86P1341S	18- 37	A	61.3	29.8	8.9	28.8		21.1	8.7	4.0	2.6	1.2	0.6	0.5	TR	TR	--	5	TR
86P1342S	37- 59	Bw1	55.4	33.2	11.4	14.7		24.1	9.1	4.5	3.3	1.8	1.3	0.5	1	TR	--	8	1
86P1343S	59- 92	Bw2	50.9	34.9	14.2	9.5		26.1	8.8	5.1	4.4	2.8	1.5	0.4	TR	TR	--	9	TR
86P1344S	92-112	2Bw3	17.4	30.1	52.5	4.5		20.6	9.5	10.9	13.4	14.0	9.9	4.3	2	1	--	43	3
86P1345S	112-139	2Bw4	8.6	24.5	66.9	2.5		15.6	8.9	12.0	15.2	17.7	16.0	6.0	2	TR	--	56	2
86P1346S	139-200	2C	7.0	19.2	73.8	2.0		11.7	7.5	13.3	19.2	17.2	16.2	7.9	6	3	--	64	9

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
				<- PERCENT	OF	<2MM -->						<- - G/CC	- - ->			<- - -PCT OF <2MM			- ->	
0- 18	2.23	0.208						1.07	0.47	60	32		1.18	1.66	0.119			37.1	26.1	0.13
18- 37	1.70	0.142						1.00	0.51				1.11	1.76	0.166			45.6	31.1	0.16
37- 59	1.07	0.092						1.10	0.54	71	42		1.18	1.76	0.142			41.6	29.7	0.14
59- 92	0.79	0.075						1.16	0.54				1.22	1.77	0.131			40.3	27.3	0.16
92-112	0.33							3.09	1.02	42	15		1.40	1.53	0.030			24.6	17.8	0.09
112-139	0.17							5.85	1.57				1.47	1.56	0.020			21.0	13.5	0.11
139-200	0.14							6.81	1.64				1.47	1.56	0.019			18.8	11.5	0.10

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CO3 AS CACO3 <2MM 6E1g PCT	RES. OHMS /CM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		PCT		<- -PCT ->				
0- 18	34.5	13.9	0.4	0.5	49.3	10.6	59.9	59.5	1		82	83						5.9	6.3
18- 37	40.3	14.9	0.8	0.5	56.5	8.5	65.0	61.2	1		87	92						6.4	7.0
37- 59	42.8	16.0	1.4	0.5	60.7	6.4	67.1	60.9	2		90	100	TR					6.7	7.2
59- 92	44.1	16.4	2.1	0.5	63.1	5.2	68.3	58.8	3	2	92	100	TR				7.2	7.2	7.5
92-112	42.3	13.0	2.5	0.2	58.0		58.0	53.7	4	3	100	100	TR	1300			7.3	7.2	7.6
112-139	39.1	10.2	2.4	0.1	51.8	3.7	55.5	50.3	4	3	93	100	TR				7.4	7.2	7.7
139-200	38.3	8.6	2.2	0.1	49.2		49.2	47.7	4	4	100	100	TR				7.3	7.0	7.6

DEPTH (CM)	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	TOTAL SALTS EST. 8D5	PRED. ELEC. COND. 8A3a MMHOS /cm	ELEC. COND. 8I MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 18																		0.12
18- 37																		0.14
37- 59																		0.24
59- 92	3.2	1.5	3.2	TR	--	1.0	0.1	1.1				4.7	--	--	79.6	TR	0.79	0.42
92-112	4.3	2.0	5.1	TR	--	1.2	0.3	2.2				7.0	--	--	51.1	TR	1.15	0.40
112-139	3.9	1.7	5.5	TR	--	1.6	0.2	5.5				3.3	--	--	37.6	TR	1.18	0.30
139-200	3.6	1.3	5.5	TR	--	1.1	0.3	8.6				0.4	--	0.1	33.0	TR	1.20	0.26

```
_____________________________________________________________________________________________________________________
           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
86P1342     TCLY  MT 4  KH 3                    KK22                                10.2              0.4
86P1343     TCLY  MT 4  KH 3                    KK13                                 9.7              0.4
86P1346     TCLY  MT 4  KH 2                    KK15                                10.6              0.5
_____________________________________________________________________________________________________________________
< - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - -  ><                >INTER
SAMPLE       ION <                     ><  - DTA - -><  - TGA - ->TOT RE<  - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - ><  - 7A3b - ><  - 7A4b - ><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
86P1341     VFS                                                  11  AR49  FK22  BT12  OP 7  FP 4  QZ 4
86P1341     VFS                                                      PR 1  CL 1  HN 1  TMtr
86P1346     VFS                                                   2  AR66  FP17  FK 9  BT 3  OP 2  AM 2
86P1346     VFS                                                      PR 1  QZtr
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    AR  wthr aggrega     FK  potas feldsp     BT  biotite          OP  opaques          FP  plag-feldspa     QZ  quartz
    PR  pyroxene         CL  chlorite         HN  hornblende       TM  tourmaline       MT  montmorillon     KH  halloysite
    KK  kaolinite        AM  amphibole
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
_____________________________________________________________________________________________________________________
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Narrative Pedon Description

Pedon: Llanos

NSSL pedon number: 86P0225

Pedon ID: S85PR-043-001

Field classification: Fine, montmorillonitic, isohyperthermic Typic Pellusterts

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Typic Haplusterts

Location: Coamo Municipio, Puerto Rico; Ponce Soil Survey Area, west of Coamo; 55 meters east of kilometer marker 28.8 on Highway 14 and 37 meters south of fence at a tamarind tree

Latitude: 18°03’05" north

Longitude: 66°22’50" west

Elevation: 115 meters

Physiography: Terracettes in mountain valleys or canyons

Geomorphic position: Shoulder interfluve

Slope: 5 percent with a plane southeast aspect

Average annual precipitation: 1,000 mm; ustic moisture regime

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C

Average soil temperature: Annual—29 °C; summer—31 °C; winter—28 °C

Drainage, runoff, and permeability: Well drained, moderate runoff, and very slow permeability.

Vegetation: Irrigated mango and crops in a cultivated field

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Alluvium from mixed-igneous and metamorphic material over alluvium from mixed-igneous and metamorphic material

Diagnostic features: Mollic epipedon at 0 to 37 cm

Described and sampled by: D. Williams, L.A. Daniels, G. Acevedo, and J. Torres during May 22, 1985

Notes: Distance between center of microhigh and microlow is 37 cm. No gilgai observed.

Ap—0 to 18 cm; clay, very dark gray (10YR 3/1) dry, black (10YR 2/1) moist; weak fine subangular blocky structure parting to weak medium subangular blocky; hard, firm, very sticky, very plastic; common very fine roots; neutral; abrupt wavy boundary. 86P1340

A—18 to 37 cm; clay, black (10YR 2/1) dry and moist; moderate fine angular blocky structure parting to moderate medium angular blocky; very hard, firm, very sticky, very plastic; common very fine roots; common very fine interstitial and tubular pores; few patchy prominent nonintersecting slickensides throughout; neutral; clear wavy boundary. 86P1341

Bw1—37 to 59 cm; clay, 60 percent dark grayish brown (10YR 4/2) and 40 percent black (10YR 2/1) dry, 60 percent dark brown (7.5YR 3/2) and 40 percent black (10YR 2/1) moist; moderate coarse angular blocky structure; very hard, very

firm, very sticky, very plastic; few very fine roots; few very fine interstitial and tubular pores; many continuous prominent intersecting slickensides throughout; many slickensides 5 to 25 cm across at 3 to 5 cm intervals; neutral; gradual wavy boundary. 86P1342

Bw2—59 to 92 cm; clay, dark grayish brown (10YR 4/2) dry, dark brown (7.5YR 3/2) moist; moderate coarse angular blocky structure; very hard, very firm, very sticky, very plastic; few very fine roots; few very fine interstitial and tubular pores; many continuous prominent intersecting slickensides throughout; many intersecting slickensides 5 to 25 cm across at 3 to 5 cm intervals; neutral; abrupt smooth boundary. 86P1343

2Bw3—92 to 112 cm; sandy clay loam, brown (10YR 5/3) dry, brown to dark brown (10YR 4/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky parting to weak coarse subangular blocky; extremely hard, friable, sticky, plastic; few very fine roots; common very fine interstitial and tubular pores; few fine rounded carbonate concretions; mildly alkaline; clear smooth boundary. 86P1344

2Bw4—112 to 139 cm; sandy loam, light yellowish brown (10YR 6/4) dry, dark yellowish brown (10YR 4/4) moist; weak very coarse prismatic structure; extremely hard, friable, slightly sticky, slightly plastic; few very fine roots; common very fine interstitial and tubular pores; few fine rounded carbonate concretions and few fine rounded soft masses of carbonate; mildly alkaline; clear smooth boundary. 86P1345

2C—139 to 200 cm; coarse sandy loam, pale brown (10YR 6/3) dry, yellowish brown (10YR 5/4) moist; extremely hard, very friable, nonsticky, nonplastic; few very fine roots; common very fine and common fine interstitial and tubular pores; few fine rounded carbonate concretions and few fine rounded soft masses of carbonate; mildly alkaline. 86P1346

Guanica Municipio

Guayama: S92PR-000-004

Primary Characterization Data

Guanica Municipio, Puerto Rico

Sampled as: Guayama; clayey-skeletal, mixed, isohyperthermic Lithic Ustropepts

SSL—Project: 93P 26, (CP93PR037) Guanica

—Pedon: 93P 146, Samples 93P 1241–1245

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002 <- - - - - - - - - - - - PCT OF <2MM	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	(- -SILT- -) COARSE .02 -.05 (3A1)	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25 - - - - - - - - - - - - ->	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5 <- PCT OF <75MM(3B1)->	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
93P1241S	0- 15	A	41.9	21.2	36.9			14.8	6.4	6.2	10.9	9.6	8.1	2.1	7	8	1		42	16
93P1242S	15- 41	AB	40.7	19.2	40.1			14.3	4.9	4.0	5.1	5.5	9.5	16.0	13	34	18		78	65
93P1243S	41- 68	BC	51.3	18.8	29.9			14.3	4.5	4.0	5.0	5.3	7.5	8.1	14	33	20		76	67
93P1244S	3- 0	Oa	26.2	19.3	54.5			13.0	6.3	4.7	9.8	13.6	15.8	10.6	6	18	5		64	29
93P1245S	0- 6	A	40.0	19.1	40.9			13.4	5.7	4.7	8.3	7.8	9.5	10.6	6	28	43		85	77

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A5 <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	2.87	0.308		0.06				0.72	0.42				1.38	1.48	0.021			19.7	17.5	0.03
15- 41	2.13	0.257		0.06				0.76	0.40				1.37	1.47	0.012			18.5	16.1	0.02
41- 68	1.14	0.188		0.08				0.54	0.32				1.02	1.11	0.016			33.2	16.5	0.10
3- 0	20.0	1.605		0.21				2.23	1.62										42.5	
0- 6	4.15	0.542		0.08				0.83	0.42				0.82	0.92	0.018			26.1	16.9	0.04

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e <- - - - - - - - - - -	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b -MEQ / 100 G	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a - - - - - - - - - - - -	NH4- OAC 5A8b	BASES + AL 5A3b ->	AL SAT 5G1 <- - - -	-BASE SAT- SUM 5C3 -PCT	NH4 OAC 5C1 - - - ->	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - -) KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
0- 15	19.6	7.5	TR	1.2	28.3	6.9		35.2	30.1			80	94				8.8	6.2	6.7
15- 41	22.5	7.1	TR	0.7	30.3	4.8		35.1	30.8			86	98				6.1	6.5	7.3
41- 68	19.6	8.3	0.1	0.4	28.4	3.8		32.2	27.9			88	100				6.5	7.0	7.8
3- 0		20.8	0.2	3.8		2.9			58.3				100	1			7.4	7.5	7.6
0- 6	25.9	8.5	TR	2.2	36.6	4.5		41.1	33.0			89	100				6.6	6.8	7.1

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b <- P C T	SI 6V2b	AL 6G12b o f < 2 m m ->	PHOSPHOUS RET 6S4 <- P P M	CIT- ACID 6S5 ->	KCL MN 6D3b	TOTAL C 6A2d <- - - - - - - - - - - - P E R C E N T	(- -WATER CONTENT- -) BAR 4B1c	BAR 4B1a	BAR 4B1a	BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) CLAY <- - -	SILT 3A1c - - ->	SAND <- - -	CLAY SML	SILT - - ->	SAND 8F1	MIN SOIL CONT <20mm>	AGGRT STABL <5mm 4G1 <PCT>
93P1241	1								2.88												
93P1242	2								2.13												
93P1243	3								1.19												
93P1244	4								15.71												
93P1245	5								3.93												

Narrative Pedon Description

Pedon: Guayama
NSSL pedon number: 93P0146
Pedon ID: S92PR-000-004
Revised classification as of April 01, 2001: Clayey-skeletal, mixed, active, isohyperthermic Typic Haplustalfs
Location: Guanica Municipio; Guanica Dry Forest of southwest Puerto Rico
Latitude: 17°59’03" north
Longitude: 67°07' west (seconds not determined)
Vegetation: Grass and herbaceous cover
Geomorphic setting: Footslope of side slope
Slope: 60 percent with an aspect of 210 degrees and a length of 30 meters
Average annual precipitation: 762 mm; aridic moisture regime
Parent material: Chert-volcanic, high siliceous content
Particle-size control section: 25 to 100 cm
Diagnostic features: Ochric epipedon at 0 to 15 cm; calcic horizon at 15 to 68 cm
Described and sampled by: John Davis on August 6, 1992

A—0 to 15 cm; dark reddish brown (5YR 3/4) clay loam; weak fine and medium subangular blocky structure; very friable; no boundary recorded. 93P1241
AB—15 to 41 cm; reddish brown (5YR 4/4) very gravelly clay; weak fine and medium subangular blocky structure; very friable; no boundary recorded. 93P1242
BC—41 to 68 cm; reddish brown (5YR 4/4) very gravelly clay; strong fine subangular blocky structure; slightly hard; no boundary recorded. 93P1243
C—68 cm; reddish brown (5YR 4/4) very gravelly clay; massive; color of rock is a combination of the colors of the AB and BC horizons. Not sampled.

Oa—3 to 0 cm; satellite sample. 93P1244
A—0 to 6 cm; dark reddish brown (5YR 3/4) cobbly clay loam; satellite sample. 93P1245
AB—6 cm; reddish brown (5YR 4/4) very gravelly clay. Not sampled.

Fe: S61PR-055-001

Primary Characterization Data

Guanica Municipio, Puerto Rico

Sampled as: Fe; fine, mixed, isohyperthermic Paleustollic Chromusterts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 526, Samples 40A 3917–3923

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE -.02	COARSE -.05	VF -.10	(- - - - - -SAND- - - - - -) F -.25	M -.50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
40A3917S	0- 5	A11	51.6	29.8	18.6		6.0	19.6	10.2	7.1	5.4	1.8	2.4	1.9	--C	--C	--	11	--
40A3918S	5- 13	A12	57.6	27.1	15.3		11.0	19.3	7.8	5.0	4.3	1.8	2.6	1.6	--C	--C	--	10	--
40A3919S	13- 23	AC	59.8	27.8	12.4		15.0	20.2	7.6	4.7	3.9	1.2	1.6	1.0	--C	--C	--	8	--
40A3920S	23- 38	C1	58.8	30.1	11.1		14.0	21.2	8.9	4.5	3.5	1.2	1.2	0.7	--C	--C	--	7	--
40A3921S	38- 71	C2cs	62.0	29.3	8.7		14.0	21.4	7.9	3.9	2.8	0.9	0.8	0.3	--C	--C	--	5	--
40A3922S	71-109	C3	63.1	28.6	8.3		12.0	21.1	7.5	3.8	2.6	0.8	0.8	0.3	--C	--C	--	4	--
40A3923S	109-145	C4	62.6	28.8	8.6		11.0	21.3	7.5	3.8	2.4	0.8	0.9	0.7	--C	--C	--	5	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 5	2.28	0.202			1.0			0.65	0.40										20.4	
5- 13	1.31	0.120			0.9			0.59	0.40									34.2	22.9	
13- 23	0.69	0.061			0.8			0.53	0.35			1.50		1.76		23.5		32.4	21.2	
23- 38	0.44	0.037			0.8			0.56	0.37			1.50		1.78		23.7		31.1	21.8	
38- 71	0.27	0.021			0.7			0.53	0.40									34.1	24.9	
71-109	0.18				0.7			0.55	0.39			1.40		1.80		30.8		34.9	24.6	
109-145	0.16				0.8			0.54	0.40										25.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	6G9a	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5A3b	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	(- - - -PH - - -) SAT PASTE 8C1g	CACL2 .01M 8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->									PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	
0- 5		12.6	11.0	1.2					33.3	13		100	74	19		--		7.7		
5- 13		14.3	20.9	0.7					33.8	31		100	100	23		--		7.9		
13- 23		14.4	24.8	0.6					31.5	38		100	100	30		--		7.9		
23- 38		17.0	30.2	0.7					32.9	34		100	100	28		TR		8.0		
38- 71		17.9	32.2	0.7					33.1	36		100	100	28		TR		8.1		
71-109		17.8	33.3	0.8					34.5	43		100	100	26		--		8.3		
109-145		18.2	33.4	0.9					34.0	42		100	100	23		--		8.3		

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - - ->											<- -PCT- ->			
0- 5			71.5	0.5	--	4.2		96.3	6.0			93.5	0.7	10.0	
5- 13			115.0	0.2	--	3.2		135.0	15.7			90.0	1.0	14.0	
13- 23			138.0	0.2	--	2.8		155.0	27.9			93.3	1.1	15.0	
23- 38			194.0	0.2	--	1.4		200.0	88.4			98.2	1.2	15.0	
38- 71			187.0	0.2	--	0.7		188.0	81.0			109.0	1.3	15.0	
71-109			161.0	0.2	--	0.5		154.0	58.6			114.0	1.4	15.0	
109-145			138.0	0.2	--	0.7		119.0	64.5			138.0	1.7	15.0	

Narrative Pedon Description

Pedon: Fe

NSSL pedon number: 40A526

Pedon ID: S61PR-055-001

SSIR #12 pedon ID: S61PR-14-2

Field classification: Fine, mixed, isohyperthermic Paleustollic Chromusterts

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Sodic Calciusterts

Location: Guanica Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; Land Authority farm at Fraternidad; 84 meters east of Cristales drainage ditch, 76 meters south of road on old railroad bed; aerial photograph GS-LR-4-42

Latitude: Unknown

Longitude: Unknown

Elevation: 7 meters

Vegetation: Pasture, pajon grass, paraguita grass, cacti, weeds, and rayo trees

Slope: Nearly level (1 percent) with an aspect toward the south; on a low depositional fan

Drainage, runoff, and permeability: Moderately well drained, slow runoff, and slow permeability

Parent material: Alluvial or valley-fill material from soils derived from volcanic and limestone rocks

Described and sampled by: R.B. Grossman, L.H. Rivera, and soil survey field party on March 14, 1961

Notes: When sampled, the A11 and A12 horizons were below field capacity and the remainder of the profile was at about field capacity. Subgroup classification based on columnar structure was observed in a nearby pedon under drier conditions than those when this pedon was sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

A11—0 to 5 cm; dark reddish brown (5YR 3/2) clay; moderate medium granular structure; friable, sticky, plastic; many fine roots; many fine and sand-sized aggregates of lime; highly calcareous; clear smooth boundary. 40A3917

A12—5 to 13 cm; dark reddish brown (5YR 3/2) clay; moderate medium prismatic structure parting to moderate coarse angular blocky; firm, sticky, plastic; common fine roots; many fine and sand-sized aggregates of lime; highly calcareous; clear wavy boundary. 40A3918

AC—13 to 23 cm; dark reddish brown (5YR 3/2) clay; massive when wet; moderate medium prismatic structure parting to weak medium angular blocky; friable, slightly sticky, plastic; few roots; common small slickensides and pressure faces; many fine sand-sized aggregates of lime; highly calcareous; clear wavy boundary. 40A3918

C1—23 to 38 cm; dark reddish brown (5YR 3/2) and dark reddish gray (5YR 4/2) clay; massive when wet, upon drying breaks to weak fine angular blocky

structure; friable, slightly sticky, plastic; few roots; common small slickensides and pressure faces; common filaments of fine and sand-sized crystals (perhaps salt); highly calcareous; clear wavy boundary. 40A3920

C2cs—38 to 71 cm; dark reddish brown (5YR 3/2) and dark reddish gray (5YR 4/2) clay; massive when wet, upon drying breaks to weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine gypsum crystals; few fine roots; few slickensides; highly calcareous; gradual smooth boundary. 40A3921

C3—71 to 109 cm; dark reddish gray (5YR 4/2) clay; massive when wet, upon drying breaks to weak fine angular blocky structure; friable, slightly sticky, plastic; common slickensides less than 7.5 cm in width; few gypsum crystals; highly calcareous; arbitrary boundary. 40A3922

C4—109 to 145 cm; dark reddish gray (5YR 4/2) clay; massive parting to moderate fine angular blocky structure; friable, slightly sticky, plastic; few roots; many slickensides less than 7.5 cm in width; few gypsum crystals; few fine sand-sized crystals and shell fragments; few soft black aggregates; highly calcareous. 40A3923

Guayanilla Municipio

Ensenada: S89PR-059-001

Primary Characterization Data

Guayanilla Municipio, Puerto Rico

Sampled as: Ensenada; clayey-skeletal, mixed, isohyperthermic Typic Ustropepts

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 396, Samples 89P 2200–2203

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002 (<-PCT OF <2MM)	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) 2 -5	-14- COARSE FRACS (MM) 5 -20	-15- COARSE FRACS (MM) 20 -75	-16- WEIGHT .1- 75 (>2MM)	-17- WT % OF WHOLE SOIL
89P2200S	0- 16	A	57.5	28.2	14.3	17.7	3.4	19.4	8.8	3.4	3.4	3.4	2.5	1.6	1	5	3	19	9
89P2201S	16- 35	Bw1	59.5	27.9	12.6	15.6	3.6	20.8	7.1	3.7	2.7	2.8	2.1	1.3	2	1	2	13	5
89P2202S	35- 59	Bw2	60.9	25.2	13.9	18.6	9.3	19.4	5.8	2.7	1.7	1.6	2.5	5.4	--	12	72V	86	92
89P2203G	59- 70	R																	P

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) FE 6C2b OF	AL 6G7a <2MM -->	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <-	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h ->	COLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) WHOLE MOIST 4B4 <-	FIELD 1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 16	3.85	0.396			2.3	0.1	0.1	0.75	0.44				1.04	1.45	0.112			41.4	25.3	0.16
16- 35	3.32	0.368			2.8	0.2	0.1	0.74	0.45				1.07	1.48	0.112			42.3	26.7	0.16
35- 59	2.91	0.321			2.3	0.2	0.1	0.63	0.40										24.1	
59- 70																			3.6	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES 6H5a	ACID- ITY	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3 <-	NH4OAC 5C1 -PCT- >	CARBONATE AS CACO3 <2MM 6E1g <-	<20MM 6E4 -PCT ->	CASO4 AS GYPSUM <2MM 6F1a <-	<20MM 6F4 -PCT ->	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - -				-MEQ / 100 G	- - - - - - - - -		->											
0- 16		5.9	TR	3.7				42.9	TR	TR	100	100	21					7.6	8.1
16- 35		6.7	0.1	3.8				43.8	TR	1	100	100	20					7.7	8.4
35- 59		6.6	0.2	2.4				38.6	1	1	100	100	33					7.7	8.4
59- 70		0.7	0.1	0.1							100		91						

DEPTH (CM)	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	PRED. TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a MMHOS /cm	ELEC. COND. 8I MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 16	6.2	1.0	0.3	0.8	--	5.9	0.1	1.3				0.7	--	--	76.0	TR	0.79	3.70
16- 35	3.5	0.9	0.8	0.8	--	3.9	0.3	0.6				0.3	--	--	83.6	TR	0.57	3.10
35- 59	4.1	0.9	0.8	0.5	--	3.8	--	0.6				0.6	--	--	74.6	TR	0.58	3.30
59- 70																		

SAMPLE NUMBER	FRACT ION	< - - - - - - X-RAY - - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - - -><- -> EGME INTER RETN PRETA TION																				
		< - - - - - 7A2i - - - - - -><- 7A6 - ><- 7A4b - ><- - - - - - - - - - 7C3 - - - - - - - - -><- > 7D2																				
	<- - ><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- -><mg/g><- >																				
89P2200	TCLY	CA 3	MT 2	MC 2	MI 2	KK 2						21.0	8.3			2.0						
89P2200	TCLY	GE 1	HE 1																			
89P2201	TCLY	CA 3	MT 2	MI 2	KK 1	MC 1						16.0	8.6			1.7						
89P2201	TCLY	HE 1																				

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
CA calcite MT montmorillon MC mont-chlorit MI mica KK kaolinite GE goethite
HE hematite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

		ACID	OXALATE	EXTRACTION		PHOSPHOUS		KCL	TOTAL	(- -WATER		CONTENT- -)(- - - - WATER DISPERSIBLE - - - -)							MIN	AGGRT
		OPT	FE	SI	AL		CIT-	MN	C	0.06	1-	2-	15	<- - PIPETTE - - >< - HYDROMETER - >					SOIL	STABL
		DEN				RET	ACID			BAR	BAR	BAR	BAR	CLAY	SILT	SAND	CLAY	SILT	SAND	CONT	<5mm
SAMPLE	HZ	8J	6C9a	6V2	6G12	6S4	6S5	6D3	6A2d	4B1c	4B1a	4B1a	4B2b	<- - - 3A1c - - -><- - - SML - - ->						8F1	4G1
NO.	NO		<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
89P2200	1	0.10	0.32	0.15	0.44							34.8									
89P2201	2	0.07	0.23	0.12	0.49							35.3									
89P2202	3	0.08	0.30	0.12	0.51							33.8									
89P2203	4																				

Narrative Pedon Description

Pedon: Ensenada
NSSL pedon number: 89P0396
Pedon ID: S89PR-059-001
Field classification: Clayey-skeletal, mixed, isohyperthermic Typic Ustropepts
Revised classification as of April 01, 2001: Clayey-skeletal, mixed, superactive, isohyperthermic Typic Calciustepts
Location: Guayanilla Municipio, Puerto Rico; Ponce Soil Survey sheet 27; 2.4 km southwest of Guayanilla; 3.9 km southeast on Highway 335 from junction
Latitude: 18°00’07" north
Longitude: 48°30’02" west
Elevation: 23 meters
Physiography: Coastal plains
Geomorphic position: Summit interfluve; on upper third of component
Slope: 4 percent with an east aspect
Average annual precipitation: 840 mm; ustic moisture regime
Major Land Resource Area: 273—Semiarid Coastal Plains
Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C
Drainage, runoff, and permeability: Well drained, slow runoff, and moderate permeability
Vegetation: Hurricanegrass in pastureland and native pasture
Surface stoniness: Class 0
Erosion: Slight
Particle-size control section: 25 to 58 cm
Parent material: Marine sediments from Ponce limestone material
Weather station number: 2316
Diagnostic features: Ochric epipedon at 0 to 15 cm; cambic horizon at 15 to 58 cm; lithic contact at 58 to 69 cm
Geographically associated soils: Aguilita, Constancia, and Machuelo
Described and sampled by: C.L. Santiago and D. Williams during February 1989

A—0 to 16 cm; clay, brown (7.5YR 5/4) dry, brown to dark brown (7.5YR 4/4) moist; strong fine granular structure; hard, friable, sticky, plastic; many fine roots throughout; few grub worms; 1 percent gravel; strongly effervescent; mildly alkaline; clear smooth boundary. 89P2200

Bw1—16 to 35 cm; clay, reddish brown (5YR 4/4) dry and moist; strong fine granular structure; hard, friable, sticky, plastic; many fine roots throughout; few snail shells; 1 percent gravel and cobbles; strongly effervescent; moderately alkaline; clear smooth boundary. 89P2201

Bw2—35 to 59 cm; extremely cobbly clay, yellowish red (5YR 4/6) dry and moist; 8 percent fines by volume; strong fine granular structure; hard, friable, sticky, plastic; common fine roots throughout; 12 percent gravel; 35 percent cobbles; 45 percent stones; strongly effervescent; moderately alkaline; abrupt wavy boundary. 89P2202

R—59 to 70 cm; level bedded limestone; fracture planes 30 to 50 cm apart. 89P2203

Hatillo Municipio

Carrizales: S73PR-065-001

Primary Characterization Data

Hatillo Municipio, Puerto Rico

Sampled as: Carrizales; siliceous, isohyperthermic, uncoated Typic Quartzipsamments

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1267, Samples 40A 9641–9645

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM			(	) - - - - - - - - - - - -			->	<- PCT OF <75MM(3B1)->				SOIL
40A9641S	0- 20	A1		3.3	7.0	89.7			2.9	4.1	7.3	32.9	32.3	16.6	0.6	--	--	--	82	--
40A9642S	20- 53	C1		--	6.9	93.1			4.8	2.1	7.2	35.0	32.9	17.4	0.6	--	--	--	86	--
40A9643S	53- 81	C2		0.4	5.8	93.8			3.2	2.6	4.1	29.0	36.5	22.7	1.5	--	--	--	90	--
40A9644S	81-127	C3														--	--	--		--
40A9645S	127-152	C4														--	--	--		--

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 20	1.94				0.3			2.73	2.39										7.9	
20- 53	0.15				0.2														1.2	
53- 81	0.06				0.2														1.0	
81-127																				
127-152																				

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- ITY	EXTR AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -				-MEQ / 100 G	- - - - - - - - - -				->	<- - - -		-PCT	- - - ->				1:2	1:1
0- 20		2.0	TR	0.3	2.3	2.4		4.7	9.0			49	26					5.6	6.1
20- 53	0.7	0.2	--	0.2	1.1	0.7		1.8	1.0			61	100					5.1	6.2
53- 81	0.2	0.1	--	0.1	0.4	0.8		1.2	1.4			33	29					4.8	5.8
81-127																			
127-152																			

Narrative Pedon Description

Pedon: Carrizales
NSSL pedon number: 40A1267
Pedon ID: S73PR-065-001
Series classification: Siliceous, isohyperthermic, uncoated Typic Quartzipsamments
Revised classification as of April 01, 2001: Isohyperthermic, coated Typic Quartzipsamments[5]
Location: Hatillo Municipio, Puerto Rico; Atlantico Soil Conservation District; Arecibo Soil Survey Area; 0.6 km on municipal paved road, southeast of kilometer marker 87.1 on Highway 2
Latitude: Unknown
Longitude: Unknown
Elevation: 25 meters
Slope: 3 percent
Drainage: Excessively drained
Vegetation: Grass and herbaceous cover
Particle-size control section: 25 to 100 cm
Described and sampled by: Luis H. Rivera on November 28, 1973

A1—0 to 20 cm; dark brown (10YR 3/3) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; strongly acid; abrupt smooth boundary. 40A9641
C1—20 to 53 cm; brown (7.5YR 5/2) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; strongly acid; clear smooth boundary. 40A9642
C2—53 to 81 cm; brown (7.5YR 5/4) fine sand; single grain; loose, nonsticky, slightly plastic; very strongly acid; clear smooth boundary. 40A9643
C3—81 to 127 cm; light yellowish brown (10YR 6/4) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid; clear smooth boundary. 40A9644
C4—127 to 152 cm; yellow (10YR 7/6) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid. 40A9645

[5] Because of improved knowledge about soil moisture regimes in Puerto Rico, this soil is now thought to have an ustic moisture regime.

Isabela Municipio

Coto: S82PR-071-002

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Coto; clayey, kaolinitic, isohyperthermic Tropedtic Eutrorthox

SSL—Project: 82P 136, (CP82PR253) SMSS–Benchmark soil

—Pedon: 82P 821, Samples 82P 4223–4228

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS WEIGHT 2 -5	5 -20	20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	SOIL
82P4223S	0- 13	Ap	62.9	9.5	27.6	22.0		6.3	3.2	8.2	11.1	6.9	1.2	0.2	1	--	--	20	1
82P4224S	13- 25	A	62.5	10.4	27.1	21.0		7.1	3.3	8.4	11.0	6.5	1.1	0.1	--	--	--	19	--
82P4225S	25- 45	Bw1	64.7	9.1	26.2	29.9		5.8	3.3	8.2	10.5	6.1	1.2	0.2	1	--	--	19	1
82P4226S	45- 65	Bw2	72.3	9.2	18.5	30.0		5.8	3.4	6.2	7.3	4.1	0.9	--	1	--	--	13	1
82P4227S	65- 90	Bw3	73.4	10.9	15.7	32.4		7.0	3.9	5.4	6.2	3.4	0.7	--	1	--	--	11	1
82P4228S	90-125	Bw4	66.7	17.2	16.1	29.5		12.4	4.8	5.9	6.6	3.0	0.6	--	1	--	--	11	1

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 13	1.62	0.187			8.7	1.4	0.3	0.15	0.30										18.8	
13- 25	1.60	0.185			9.2	1.4	0.3	0.16	0.31										19.2	
25- 45	0.48	0.111			9.1	1.4	0.2	0.08	0.34										21.9	
45- 65	0.38				9.7	1.4	0.1	0.07	0.32										23.4	
65- 90	0.34				10.5	1.5	0.1	0.10	0.31										22.9	
90-125	0.23				11.4	1.6	TR	0.09	0.34										22.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->					1:2	1:1
0- 13	4.8	0.8	0.1	0.1	5.8	8.6		14.4	9.7			40	60				5.1	5.6	5.7
13- 25	5.1	0.7	0.1	0.1	6.0	8.3		14.3	9.9			42	61				5.1	5.6	5.7
25- 45	2.5	0.3	0.1	0.1	3.0	6.2		9.2	5.3			33	57				5.4	5.7	5.6
45- 65	3.2	0.2	0.2	0.1	3.7	6.2		9.9	5.3			37	70				5.4	5.6	5.6
65- 90	3.3	0.1	0.1	0.1	3.6	7.0	--	10.6	7.3			34	49				5.4	5.5	5.5
90-125	3.4	0.4	0.1	0.1	4.0	6.6		10.6	5.8			38	69				5.4	5.6	5.6

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)		THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
82P4223	TCLY	KK 3	GE 2	KK59				18.6			0.3			
82P4225	TCLY	KK 3	GE 1	KK55				18.6			0.4			
82P4226	TCLY	KK 3	GE 2	KK54				18.6			0.3			
82P4228	TCLY	KK 3	GE 2	KK56				18.6			0.3			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	THERMAL TGA 7A4b (Percent)	OPTICAL TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)						INTERPRETATION
82P4223	FS				100	QZ90	OP 6	FE 3	ZR 1	FKtr	POtr	
82P4223	FS					EPtr						
82P4225	FS				101	QZ89	OP 7	FE 5	EPtr			
82P4228	FS				100	QZ78	FE12	OP10	CBtr	EPtr		

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm FS Fine Sand, 0.1-0.25mm

MINERAL INTERPRETATION:

KK kaolinite GE goethite QZ quartz OP opaques FE iron oxides ZR zircon

FK potas feldsp PO plant opal EP epidote CB carb-aggrega

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Coto
NSSL pedon number: 82P0821
Pedon ID: S82PR-071-002
Field classification: Clayey, kaolinitic, isohyperthermic Tropeptic Eutrustox
Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Eutrudox[6]
Location: Isabela Municipio, Puerto Rico; 400 meters north of kilometer marker 115.2 on Highway 2
Latitude: 18°28'02" north
Longitude: 67°03'25" west
Elevation: 131 meters
*Physiography: L*evel or undulating uplands
Vegetation: Citrus on an experiment site; used for sugarcane
Slope: 2 percent
Average annual precipitation: 1,450 mm; ustic moisture regime
Parent material: Fine-textured sediments derived from limestone
Described and sampled by: G. Acevedo, F. Beinroth, and L. Guthrie on August 18, 1982
Notes: Matrix colors are for moist ped interiors.

Ap—0 to 13 cm; brown to dark brown (7.5YR 4/4) clay, brown (7.5YR 5/4) dry; moderate fine granular structure parting to very fine subangular blocky; friable, slightly sticky, slightly plastic; clear smooth boundary. 82P4223

A—13 to 25 cm; strong brown (7.5YR 5/6) clay, reddish yellow (7.5YR 6/6) dry; weak and moderate very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine flakes of mica; gradual smooth boundary. 82P4224

Bw1—25 to 45 cm; strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) clay, reddish yellow (7.5YR 6/6) dry; weak very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few pressure faces; few fine dark nodules; few reddish brown coatings in root channels; gradual smooth boundary. 82P4225

Bw2—45 to 65 cm; yellowish red (5YR 5/6) clay, reddish yellow (5YR 6/6) and (7.5YR 6/6) dry; weak very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few clay films; few fine dark nodules; few coatings in root channels; gradual smooth boundary. 82P4226

Bw3—65 to 90 cm; yellowish red (5YR 5/6) clay, reddish yellow (7.5YR 6/6) dry; weak and moderate very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few clay films; few fine dark nodules; few coatings in root channels; gradual smooth boundary. 82P4227

Bw4—90 to 120 cm; yellowish red (5YR 5/6 and 6/6) clay, reddish yellow (7.5YR 6/6) dry; moderate fine subangular blocky structure parting to very fine angular blocky parting to granular; friable, slightly sticky, slightly plastic; few discontinuous faint clay films; common fine dark nodules. 82P4228

[6] This soil is thought to have an ustic moisture regime as described in the field.

Guerrero: S88PR-071-002

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Guerrero; loamy, mixed, isohyperthermic Arenic Paleudalfs

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 372, Samples 88P 1902–1908

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02	SILT COARSE -.05	SAND VF -.10	SAND F -.25	SAND M -.50	SAND C -1	SAND VC -2	COARSE FRACS (MM) 2	5	20	>2MM WT .1-	% OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P1902S	0- 21	A1	1.0	6.2	92.8		2.2	4.0	9.6	42.1	37.4	3.7	--	TR	1	--	83	1	
88P1903S	21- 63	A2	0.1	7.5	92.4		3.6	3.9	8.8	42.6	37.7	3.3	--	--	--	--	84	--	
88P1904S	63- 83	A3	3.1	5.9	91.0		3.0	2.9	8.3	42.6	36.5	3.6	--	TR	TR	--	83	--	
88P1905S	83-108	Bt1	21.9	6.5	71.6	17.2	3.1	3.4	7.8	33.1	27.2	3.2	0.3	3	1	--	65	4	
88P1906S	108-128	Bt2	35.4	4.8	59.8	29.1	3.0	1.8	4.8	26.5	27.1	1.4	--	--	--	--	55	--	
88P1907S	128-148	Bt3	34.5	3.5	62.0	28.2	1.3	2.2	4.1	27.9	28.7	1.3	--	TR	--	--	58	--	
88P1908S	148-180	Bt4	34.7	2.7	62.6	27.6	0.7	2.0	3.8	29.0	28.5	1.3	--	--	--	--	59	--	

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
0- 21	0.20				0.3	TR	0.1	1.20	1.20			1.48				27.0			1.2	
21- 63	0.04				0.3	TR	0.1					1.48				20.0			0.9	
63- 83	0.01				0.4	TR	0.1	0.29	0.45										1.4	
83-108	0.12		1		1.7	0.2	0.1	0.24	0.36	24	15		1.82	1.87	0.009			10.6	7.8	0.05
108-128	0.09		1		2.4	0.2	--	0.22	0.36				1.77	1.87	0.018			15.2	12.8	0.04
128-148	0.08		1		2.4	0.2	--	0.22	0.33				1.87	1.93	0.011			12.5	11.4	0.02
148-180	0.10		1		2.3	0.2	--	0.22	0.31				1.76	1.84	0.015			14.4	10.8	0.06

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																		
0- 21	0.6	0.2	TR	TR	0.8	1.0		1.8	1.2			44	67					5.1	5.6
21- 63	0.3	0.1	--	--	0.4	0.4		0.8	0.7			50	57					5.0	5.8
63- 83	0.4	0.2	--	--	0.6	0.8		1.4	0.9			43	67					4.9	5.7
83-108	3.2	1.3	0.1	0.1	4.7	2.2		6.9	5.2			68	90				4.2	4.9	5.6
108-128	5.2	2.0	0.1	TR	7.3	2.4		9.7	7.7			75	95				4.4	5.4	6.0
128-148	5.3	1.8	0.1	0.1	7.3	2.1		9.4	7.5			78	97				4.9	5.4	6.1
148-180	5.4	1.7	0.1	0.1	7.3	1.8		9.1	7.6			80	96				4.9	5.4	6.1

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	DTA 7A6	TGA 7A4b	THERMAL Peak Size	Percent	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
		<- - - - - - peak size - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	mg/g	- - - -
88P1905	TCLY	KK 5	GE 2	MI 2	HE 1				24.0	9.7		1.0			
88P1906	TCLY	KK 4	GE 2	MI 1					25.0	9.3		0.9			

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	DTA 7A3b	TGA 7A4b	TOT RE	Peak Size	Percent	OPTICAL	GRAIN COUNT 7B1a	INTER PRETA TION
88P1903	FS				99	QZ98	FK 1	OP 1	ZRtr	OTtr
88P1906	FS				98	QZ98	FK 1	OPtr	OTtr	

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm FS Fine Sand, 0.1-0.25mm

MINERAL INTERPRETATION:

QZ quartz FK potas feldsp OP opaques ZR zircon OT other KK kaolinite

GE goethite MI mica HE hematite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Guerrero[7]
NSSL pedon number: 88P0372
Pedon ID: S88PR-071-002
Field classification: Loamy, mixed, isohyperthermic Arenic Paleudalfs
Series classification: Fine, kaolinitic, isohyperthermic Arenic Paleudalfs
Revised classification as of April 01, 2001: Fine-loamy, siliceous, subactive, isohyperthermic Arenic Paleudalfs
Location: Isabela Municipio, Puerto Rico; 4.5 km west of Isabela, 800 m north of Highway 459
Latitude: 18°30’32" north
Longitude: 67°04’05" west
Elevation: 60 meters
Physiography: Coastal plains
Geomorphic position: On middle third of component
Slope: 1 percent plane with a north aspect
Average annual precipitation: 1,250 mm; udic moisture regime
Drainage, runoff, and permeability: Somewhat excessively drained, no runoff, and moderate permeability
Vegetation: Unspecified grasses in pastureland and native pasture
Erosion: Slight
Particle-size control section: 83 to 133 cm
Parent material: Sandy eolian deposits over loamy alluvium
Diagnostic features: Ochric epipedon at 0 to 83 cm; argillic horizon at 83 to 200 cm
Described and sampled by: D. Williams and G. Acevedo during February 1988

A1—0 to 21 cm; brown to dark brown (10YR 4/3) sand, brown (10YR 5/3) dry; single grain; loose, very friable, nonsticky, nonplastic; common fine roots throughout; gradual smooth boundary. 88P1902

A2—21 to 63 cm; brown to dark brown (10YR 4/3) sand, brown (10YR 5/3) dry; single grain; loose, very friable, nonsticky, nonplastic; common fine roots throughout; gradual smooth boundary. 88P1903

A3—63 to 83 cm; brown to dark brown (7.5YR 4/4) sand, brown (7.5YR 5/4) dry; single grain; loose, very friable, nonsticky, nonplastic; common fine roots throughout; clear smooth boundary. 88P1904

Bt1—83 to 108 cm; strong brown (7.5YR 4/6) sandy clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, slightly sticky, slightly plastic; few fine and few medium roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical faces of peds; common fine platelike soft masses of iron-manganese and few fine rounded iron concretions; clear smooth boundary. 88P1905

[7] This soil is now thought to have an ustic moisture regime.

Bt2—108 to 128 cm; strong brown (7.5YR 5/8) sandy clay loam; common fine distinct and few medium distinct redoximorphic features; moderate coarse prismatic structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few fine and few medium roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical faces of peds; gradual smooth boundary. 88P1906

Bt3—128 to 148 cm; strong brown (7.5YR 5/8) sandy clay loam; common medium distinct redoximorphic features; moderate coarse prismatic structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical faces of peds; slightly acid; clear smooth boundary. 88P1907

Bt4—148 to 200 cm; strong brown (7.5YR 5/8) sandy clay loam; common medium distinct and few fine distinct redoximorphic features; moderate coarse prismatic structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical faces of peds; slightly acid. 88P1908

Bejucos: S89PR-071-001

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Bejucos; fine, mixed, isohyperthermic Typic Kanhapludults

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 399, Samples 89P 2220–2229

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM) -1--	HORIZON -2--	-3--	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS (MM) WEIGHT 2 -5	-17- COARSE FRACS (MM) WEIGHT 5 -20	-18- COARSE FRACS (MM) WEIGHT 20 -75	-19- COARSE FRACS (MM) WEIGHT .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
				<- - - PCT OF <2MM (3A1)											- - ->	<- PCT OF <75MM(3B1)->				SOIL
89P2220S	0- 13	Ap		6.9	9.9	83.2	3.7		5.3	4.6	9.3	27.2	44.0	2.7	--	--	--	--	74	--
89P2221S	13- 27	A		10.9	9.2	79.9	6.1		4.9	4.3	8.6	24.1	43.0	4.1	0.1	TR	--	--	71	--
89P2222S	27- 40	Bo1		30.8	8.8	60.4	22.7		4.5	4.3	7.4	17.2	32.3	2.9	0.6	TR	--	--	53	TR
89P2223S	40- 72	Bo2		36.2	8.6	55.2	29.7		4.9	3.7	6.1	15.4	29.4	3.2	1.1	1	TR	--	50	1
89P2224S	72- 95	Boc		27.2	8.7	64.1	21.1		4.9	3.8	5.2	18.6	35.2	3.9	1.2	5	29	3	74	37
89P2225S	95-107	Bo		40.7	8.3	51.0	32.2		4.9	3.4	4.8	13.8	28.9	2.9	0.6	2	TR	--	47	2
89P2226S	107-147	2Bo1		31.6	9.5	58.9	24.0		5.7	3.8	6.0	15.0	34.4	3.2	0.3	--	--	--	53	--
89P2227S	147-196	2Bo2		33.6	8.6	57.8	23.9		5.3	3.3	5.3	15.1	33.4	3.5	0.5	--	--	--	52	--
89P2228S	196-225	2Bo3		46.5	9.1	44.4	33.0		6.1	3.0	4.7	10.7	25.2	2.8	1.0	--	--	--	40	--
89P2229S	72- 95	MNO2		38.3	6.8	54.9	28.1		2.8	4.0	6.6	15.4	26.7	4.5	1.7	7	22	2	64	31

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	(ATTERBERG) LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 13	0.81	0.060			1.4	0.2	TR	0.52	0.57				1.38	1.43	0.012			9.3	3.9	0.07
13- 27	0.34	0.044			1.8	0.2	0.1	0.28	0.42				1.67	1.71	0.008			7.8	4.6	0.05
27- 40	0.35	0.060			3.8	0.5	0.1	0.17	0.38				1.72	1.78	0.011			15.2	11.8	0.06
40- 72	0.25	0.060			3.9	0.5	0.2	0.17	0.36				1.71	1.76	0.010			16.8	13.2	0.06
72- 95	0.17				3.7	0.4	0.2	0.21	0.39				1.61	1.68	0.011			17.2	10.6	0.08
95-107	0.18				4.8	0.4	0.1	0.19	0.36				1.61	1.72	0.022			20.3	14.5	0.09
107-147	0.08				4.9	0.5	0.1	0.22	0.35				1.71	1.84	0.009			17.2	11.1	0.10
147-196	0.03				4.6	0.5	0.1	0.19	0.34				1.87	1.92	0.009			14.7	11.4	0.06
196-225	0.07				0.6	0.5	TR	0.19	0.33				1.68	1.81	0.025			19.3	15.2	0.07
72- 95	0.26				5.5	0.6	0.3	0.19	0.37										14.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									- - ->	<- - - - - -PCT		- - - - ->					1:2	1:1
0- 13	0.2	0.2	0.1	0.1	0.6	5.0	1.0	5.6	3.6	1.6	63	11	17				3.5	3.7	4.0
13- 27	0.3	0.1	--	TR	0.4	4.7	0.8	5.1	3.1	1.2	67	8	13				3.8	4.0	4.3
27- 40	0.9	0.3	--	0.1	1.3	7.6	1.4	8.9	5.3	2.7	52	15	25				3.7	3.9	4.3
40- 72	2.4	0.5	--	0.1	3.0	7.2	1.2	10.2	6.1	4.2	29	29	49				3.7	4.0	4.5
72- 95	3.1	0.6	--	0.1	3.8	5.3	TR	9.1	5.8			42	66				4.3	4.6	4.9
95-107	5.5	0.9	--	0.1	6.5	4.9	TR	11.4	7.9			57	82				4.7	5.0	5.4
107-147	4.9	1.0	--	0.1	6.0	4.4		10.4	6.9			58	87				5.3	5.5	5.9
147-196	4.2	1.6	TR	0.1	5.9	3.3		9.2	6.5			64	91				5.4	5.6	6.0
196-225	5.2	3.0	0.1	0.1	8.4	4.0		12.4	8.9			68	94				5.4	5.6	6.1
72- 95	4.1	0.7	TR	0.1	4.9	8.2	0.1	13.1	7.1	5.0	2	37	69				4.7	5.0	5.4

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)				THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
89P2223	TCLY	KK 5	GE 2	HE 2	MI 1				28.0	13.7			0.6			
89P2225	TCLY	KK 5	GE 2	HE 2	MI 1				27.0	10.7			0.6			
89P2227	TCLY	KK 4	GE 2	HE 2	MI 1				26.0	15.7			0.7			
89P2229	TCLY	KK 4	GE 2	HE 2	MI 1				25.0	12.7			0.6			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER 0.06 BAR 4B1c	1-BAR 4B1a	CONTENT- -) 2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CONT	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2	m m ->	<- P P M	->	< - - - - - - - - - - - P E R C E N T						
89P2220	1	0.01	0.07	0.02	0.04			7.9				5.2			25
89P2221	2	0.02	0.10	0.02	0.06			10.5				5.9			37
89P2222	3	0.01	0.15	0.02	0.10			17.3				13.5			
89P2223	4	0.02	0.14	0.03	0.09			10.3				15.3			
89P2224	5	0.01	0.39	0.04	0.09			9.2				15.6			
89P2225	6	0.03	0.19	0.03	0.08			3.1				16.7			
89P2226	7	0.02	0.14	0.04	0.05							16.8			
89P2227	8	0.02	0.14	0.03	0.06							13.6			
89P2228	9	0.01	0.14	0.05	0.06							17.9			
89P2229	10	0.02	0.91	0.04	0.14			8.0				16.4			

SAMPLE NO.	HZ NO	<- - PIPETTE - - > CLAY 3A1c	SILT	SAND	< - HYDROMETER - > CLAY	SILT SML	SAND	
		<- - -	o f	< 2 m m - - ->	<- - -	- - ->		><20mm><PCT>
89P2220	1							
89P2221	2							
89P2222	3							
89P2223	4							
89P2224	5							
89P2225	6							
89P2226	7							
89P2227	8							
89P2228	9							
89P2229	10							

Narrative Pedon Description

Pedon: Bejucos[8]
NSSL pedon number: 89P0399
Pedon ID: S89PR-071-001
Field classification: Fine, mixed, isohyperthermic Typic Kandhapludalfs
Revised classification as of April 01, 2001: Fine-loamy, kaolinitic, isohyperthermic Inceptic Hapludox
Location: Isabela Municipio, Puerto Rico; Mayagüez Soil Survey sheet 5; 2.1 km north on Highway 112 from junction with Highway 2 and 81 meters east of road
USGS 7.5-minute quadrangle: Moca
Latitude: 18°29’18" north
Longitude: 67°01’42" west
Elevation: 90 meters
Physiography: Coastal plains
Geomorphic position: Shoulder interfluve; on upper third of component
Slope: 2 percent with a northeast aspect
Major Land Resource Area: 270—Humid Mountains and Valleys
Drainage, runoff, and permeability: Moderately well drained, slow runoff, and slow permeability
Vegetation: A thick stand of pangolagrass in pastureland and native pasture
Erosion: Slight
Particle-size control section: 28 to 76 cm
Parent material: Residuum from limestone-arenaceous material; parent material limestone is Quebradillas (Camuy) limestone.
Weather station number: 4702
Diagnostic features: Ochric epipedon at 0 to 28 cm; argillic horizon at 28 to 224 cm
Geographically associated soils: Coto, Jobos, and San Germán
Described and sampled by: D. Williams and C.L. Santiago during February 1989

Ap—0 to 13 cm; dark yellowish brown (10YR 4/4) coarse sandy loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure parting to weak fine granular; very friable, nonsticky, nonplastic; many fine roots throughout; clear smooth boundary. 89P2220

A—13 to 27 cm; dark yellowish brown (10YR 4/4) coarse sandy loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure parting to weak fine granular; very friable, nonsticky, nonplastic; common fine roots throughout; clear smooth boundary. 89P2221

Bo1—27 to 40 cm; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots throughout; few fine tubular pores; few fine threads that are soft masses of iron-manganese; clear wavy boundary. 89P2222

[8] This soil is now thought to have an ustic moisture regime.

Bo2—40 to 72 cm; yellowish brown (10YR 5/6) sandy clay; weak medium subangular blocky structure; firm, sticky, plastic; common fine roots throughout; few fine and medium tubular pores; many fine and medium platelike soft masses of iron-manganese and common fine threads that are soft masses of iron-manganese; clear wavy boundary. 89P2223

Boc—72 to 95 cm; yellowish brown (10YR 5/6) sandy clay; weak medium and coarse subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine and medium tubular pores; many fine and medium irregular and few coarse irregular iron-manganese concretions; clear smooth boundary. 89P2224

Bo—95 to 107 cm; yellowish brown (10YR 5/6) clay; few fine distinct redoximorphic features, including brittle red features; weak medium and coarse subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine and medium and few coarse tubular pores; very few patchy faint coatings on faces of peds and in pores; common fine and medium platelike soft masses of iron-manganese and few coarse irregular iron-manganese concretions; gradual smooth boundary. 89P2225

2Bo1—107 to 147 cm; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct redoximorphic features, including brittle red features; very firm, slightly sticky, slightly plastic; few fine roots throughout; few fine and medium and few coarse tubular pores; very few patchy faint coatings on faces of peds and in pores; gray material is sandy clay, and brownish material is sandy clay loam; few large root channels filled with material from above; gradual smooth boundary. 89P2226

2Bo2—147 to 196 cm; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct redoximorphic features; very firm, slightly sticky, slightly plastic; few fine roots throughout; few fine and medium tubular pores; very few patchy faint coatings on faces of peds and in pores; gray material is sandy clay, and brownish material is sandy clay loam. 89P2227

2Bo3—196 to 225 cm; yellowish brown (10YR 5/6) sandy clay loam; few medium distinct redoximorphic features; very firm, slightly sticky, slightly plastic; few discontinuous faint coatings on faces of peds and in pores; gray material is sandy clay, and brownish material is sandy clay loam. 89P2228

Maleza: S89PR-071-002

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Maleza; clayey, oxidic, isohyperthermic Rhodic Kanhapludult

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 400, Samples 89P 2230–2237

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS (MM) 2-5	COARSE FRACS (MM) 5-20	COARSE FRACS (MM) 20-75	>2MM WEIGHT .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
89P2230S	0- 24	A	2.0	3.4	94.6	2.0		1.6	1.8	9.9	56.8	26.1	1.8	--	--	--	--	85	--
89P2231S	24- 38	Bw1	3.2	4.6	92.2	3.2		2.4	2.2	8.8	55.5	26.3	1.6	--	--	--	--	83	--
89P2232S	38- 64	Bw2	14.9	5.0	80.1	14.1		2.8	2.2	7.8	49.0	21.8	1.5	--	--	--	--	72	--
89P2233S	64- 83	Bt1	20.5	8.1	71.4	18.5		2.4	5.7	5.0	45.5	19.5	1.4	--	--	--	--	66	--
89P2234S	83-104	Bt2	36.4	4.9	58.7	32.4		3.2	1.7	6.9	34.0	16.7	1.1	--	--	--	--	52	--
89P2235S	104-163	Bt3	30.2	5.3	64.5	27.0		2.8	2.5	9.0	36.2	18.2	1.1	--	--	--	--	55	--
89P2236S	163-237	Bt4	25.6	5.5	68.9	23.3		3.2	2.3	7.9	41.3	18.1	1.6	--	--	--	--	61	--
89P2237S	145-150	Bt3	30.3	5.9	63.8	26.2		2.8	3.2	7.9	38.9	16.0	1.0	--	--	--	--	56	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 24	0.32	0.026			0.6	TR	TR	0.75	0.80				1.62	1.64	0.004			11.0	1.6	0.15
24- 38	0.09	0.013			0.8	TR	TR	0.34	0.53				1.68	1.77	0.018			7.6	1.7	0.10
38- 64	0.13	0.024			2.0	0.1	0.1	0.16	0.36				1.58	1.62	0.008			8.5	5.4	0.05
64- 83	0.18	0.037			2.3	0.2	0.1	0.15	0.34				1.69	1.71	0.004			9.4	7.0	0.04
83-104	0.21				3.5	0.3	TR	0.13	0.33				1.75	1.79	0.008			16.4	12.1	0.08
104-163	0.12				3.0	0.2	TR	0.13	0.32				1.59	1.63	0.008			12.4	9.6	0.04
163-237	0.09				2.6	0.2	TR	0.13	0.32				1.63	1.65	0.004			10.8	8.3	0.04
145-150									0.31										9.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT-NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->											<- - - - -PCT - - - ->						1:2	1:1
0- 24	0.1	0.1	TR	0.1	0.3	1.3	0.3	1.6	1.5	0.6	50	19	20			1.30	3.9	4.1	4.5
24- 38	--	TR	TR	0.1	0.1	1.6	0.1	1.7	1.1	0.2	50	6	9			0.70	4.0	4.3	4.7
38- 64	0.1	0.1	TR	0.1	0.3	3.1	0.4	3.4	2.4	0.7	57	9	12			1.10	3.7	4.0	4.3
64- 83	0.6	0.4	TR	0.1	1.1	3.6	0.5	4.7	3.0	1.6	31	23	37			1.20	3.9	4.1	4.7
83-104	2.1	1.3	0.1	0.2	3.7	3.7	0.4	7.4	4.9	4.1	10	50	76			1.20	4.5	4.8	5.4
104-163	2.0	1.1	0.1	0.1	3.3	2.9		6.2	3.9			53	85			1.00	5.0	5.2	5.5
163-237	1.6	0.2	0.2	0.6	2.6	3.3		5.9	3.2			44	81			1.10	4.6	4.8	5.2
145-150							--											5.1	5.5

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY 7A6	X-RAY 7A4b	THERMAL DTA	THERMAL TGA	ELEMENTAL SiO2	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME 7D2 mg/g	INTER PRETA TION
		peak size			Percent			Percent							
89P2232	TCLY	KK 4	GE 2	HE 2	MI 1			22.0	13.0			0.8			
89P2233	TCLY	KK 4	GE 2	HE 2	MI 1			23.0	12.4			0.8			
89P2235	TCLY	KK 5	GE 2	HE 2	MI 1			29.0	11.2			0.7			

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:

KK kaolinite GE goethite HE hematite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	AGGRT STABL CONT 8F1	<5mm 4G1
			<- P C T o f < 2 m m ->				<- P P M ->			<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -											><20mm><PCT>
89P2230	1	0.06	0.02	0.02	TR			3.8				2.2									
89P2231	2	0.01	0.02	0.01	0.02			6.6				2.1									
89P2232	3	0.01	0.05	0.01	0.04			12.6				6.2									
89P2233	4	0.01	0.07	0.03	0.05			10.6				8.1									
89P2234	5	0.02	0.08	0.03	0.06			0.9				13.1									
89P2235	6	0.01	0.04	0.03	0.03							10.5									
89P2236	7	0.03	0.04	0.03	0.04							9.2									
89P2237	8	0.03	0.05	0.03	0.04			--													

Narrative Pedon Description

Pedon: Maleza[9]

NSSL pedon number: 89P0400

Pedon ID: S89PR-071-002

Field classification: Clayey, oxidic, isohyperthermic Rhodic Kandiudults

Revised classification as of April 01, 2001: Fine-loamy, kaolinitic, isohyperthermic Rhodic Kandiudalfs

Location: Isabela Municipio, Puerto Rico; Mayagüez Soil Survey sheet 2; 2.25 km west on Highway 459 from junction with Highway 112 and 0.5 km north on unimproved road

USGS 7.5-minute quadrangle: Isabela

Latitude: 18°30’25" north

Longitude: 67°02’44" west

Elevation: 65 meters

Physiography: Coastal plains

Geomorphic position: Shoulder interfluve; on upper third of component

Slope: 4 percent with a northeast aspect

Major Land Resource Area: 270—Humid Mountains and Valleys

Drainage, runoff, and permeability: Well drained, slow runoff, and moderate permeability

Vegetation: Guineagrass and coconut palms in pastureland

Erosion: Slight

Particle-size control section: 64 to 114 cm

Parent material: Residuum from limestone-arenaceous material; parent material limestone is Quebradillas (Camuy) limestone.

Weather station number: 4702

Geographically associated soils: Jobos, Rio Lajas, and San Germán

Diagnostic features: Ochric epipedon at 0 to 38 cm; oxic horizon at 84 to 236 cm; lithic contact at 371 cm

Described and sampled by: D. Williams and C.L. Santiago during February 1989

Notes: Field morphology indicates the top of the argillic horizon is at a depth of 64 cm.

A—0 to 24 cm; yellowish red (5YR 4/6) loamy sand; weak fine subangular blocky structure parting to single grain; loose, nonsticky, nonplastic; few fine, medium, and coarse roots throughout; moderately acid; clear wavy boundary. 89P2230

Bw1—24 to 38 cm; dark red (2.5YR 3/6) sandy loam; weak fine subangular blocky structure parting to weak medium subangular blocky; loose, nonsticky, nonplastic; few fine, medium, and coarse roots throughout; moderately acid; clear smooth boundary. 89P2231

Bw2—38 to 64 cm; dark red (2.5YR 3/6) sandy loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable, slightly

[9] This soil is now thought to have an ustic moisture regime.

sticky, slightly plastic; few medium and coarse roots throughout; few fine and medium tubular pores; few fine threads that are soft masses of iron-manganese; clear smooth boundary. 89P2232

Bt1—64 to 83 cm; dark red (2.5YR 3/6) sandy clay loam; weak medium subangular blocky structure parting to weak coarse subangular blocky; friable, sticky, plastic; few fine and medium roots throughout; few fine and medium tubular pores; common fine rounded soft masses of iron-manganese; large roots concentrated at the base of the Bt1 horizon; clear smooth boundary. 89P2233

Bt2—83 to 104 cm; dark red (2.5YR 3/6) clay; few fine and medium distinct redoximorphic features; weak medium subangular blocky structure parting to weak coarse subangular blocky; friable, sticky, plastic; few fine and medium roots throughout; few fine and medium tubular pores; very few discontinuous faint coatings on faces of peds; few fine threads that are soft masses of iron-manganese and few fine platelike soft masses of iron-manganese; clear smooth boundary. 89P2234

Bt3—104 to 163 cm; dark red (2.5YR 3/6) sandy clay; weak coarse subangular blocky structure parting to weak medium subangular blocky; friable, sticky, plastic; few fine and medium roots throughout; few fine and medium tubular pores; gradual boundary. 89P2235

Bt4—163 to 237 cm; red (2.5YR 5/6) sandy clay loam; weak coarse subangular blocky structure parting to weak medium subangular blocky; friable, sticky, plastic; few fine and medium roots throughout; few fine and medium tubular pores. 89P2236

R—237 to 371 cm; neutral at contact with limestone.

Juana Diaz Municipio

San Anton: S86PR-113-001

Primary Characterization Data

Juana Diaz Municipio, Puerto Rico

Sampled as: San Anton; fine-loamy, mixed, isohyperthermic Cumulic Haplustolls

SSL—Project: 86P 44, (RP86PR075) Caribbean

—Pedon: 86P0299, Samples 86P 1762–1769

—General methods: 1B1A, 2A1, 2B

```
           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
86P1764     TCLY  MT 3  KK 2  MI 2  VM 1        KK 5                                  8.4               1.2
86P1765     TCLY  MT 2  KK 2  VM 1  MI 1        KK 5  GItr                            9.2               1.3
86P1769     TCLY  MT 3  KK 2  MI 1  VM 1        ----                                  8.7               1.0
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< - - - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                     ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - -><  - 7A3b - ><  - 7A4b - ><  - - - - - - - -  7B1a - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
1764     FS                                                    15  AR57  FP12  FK12  QZ10  OP 5  HN 2
1764     FS                                                        EP 1  OW 1  RAtr
1764     VFS                                                   25  AR35  QZ21  FP16  FK12  OP 4  HN 4
1764     VFS                                                       BT 4  EP 2  OW 2  GNtr  CAtr
1765     VFS                                                   14  AR37  FP16  FK14  QZ13  HN 7  BT 6
1765     VFS                                                       OW 3  EP 2  OP 1  GS 1  CAtr  ZRtr
1769     FS                                                    15  AR62  QZ11  FK 9  FP 6  HN 3  BT 3
1769     FS                                                        RA 2  EP 2  OP 2

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            FS    Fine Sand, 0.1-0.25mm           VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    MT  montmorillon     KK  kaolinite        MI  mica            VM  vermici-mica     AR  wthr aggrega     FP  plag-feldspa
    FK  potas feldsp     QZ  quartz           OP  opaques         HN  hornblende       EP  epidote         OW  oth-weath mn
    RA  resist-aggre     BT  biotite          GN  garnet          CA  calcite          GS  glass           ZR  zircon
    GI  gibbsite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: San Anton
NSSL pedon number: 86P0299
Pedon ID: S86PR-113-001
Field classification: Fine-loamy, mixed, isohyperthermic Cumulic Haplustolls
Revised classification as of April 01, 2001: Fine-loamy, mixed, superactive, isohyperthermic Typic Haplustolls
Location: Juana Diaz Municipio, Puerto Rico; 1.9 km north on Highway 510 from intersection with Highway 1 and 18 meters west of road
Latitude: 18°10’04" north
Longitude: 66°31’51" west
Elevation: 21 meters
Physiography: Flood plain on coastal plains
Slope: 1 percent with a plane north aspect
Average annual precipitation: 1,000 mm; ustic moisture regime
Major Land Resource Area: 273—Semiarid Coastal Plains
Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C
Average soil temperature: Annual—29 °C; summer—31 °C; winter—28 °C
Drainage, runoff, and permeability: Well drained, slow runoff, and moderate permeability
Vegetation: Sugarcane in irrigated cropland
Erosion: Slight
Particle-size control section: 25 to 100 cm
Parent material: Alluvium from mixed-igneous and sedimentary material
Diagnostic features: Mollic epipedon at 0 to 65 cm; cambic horizon at 65 to 162 cm
Map unit: SA—San Anton clay loam
Described and sampled by: D. Williams, L.H. Rivera, J. Torres, G. Acevedo, and W. Lynn during February 1986
Notes: Soil temperature was 25.5 °C at a depth of 51 cm and 25 °C at 150 cm.

Ap—0 to 14 cm; very dark grayish brown (10YR 3/2) clay loam; weak coarse subangular blocky structure; hard, firm, sticky, plastic; common fine and common medium roots throughout; few fine discontinuous tubular pores; neutral; clear smooth boundary. 86P1762

A—14 to 38 cm; very dark grayish brown (10YR 3/2) clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; hard, firm, sticky, plastic; few fine roots throughout; few fine discontinuous tubular pores; few old roots and root channels; neutral; clear wavy boundary. 86P1763

Bw1—38 to 65 cm; dark brown (10YR 3/3) clay loam; weak medium prismatic structure parting to weak medium subangular blocky; hard, firm, sticky, plastic; few fine and few medium roots throughout; common fine and few medium discontinuous tubular pores; many continuous distinct organic coatings on vertical and horizontal faces of peds; few wormcasts; few old root channels with dark coatings; neutral; gradual wavy boundary. 86P1764

Bw2—65 to 95 cm; dark yellowish brown (10YR 3/4) clay loam; weak medium prismatic structure parting to weak medium subangular blocky; hard, friable, sticky, plastic; few fine and few medium roots throughout; common fine discontinuous tubular pores; many continuous distinct organic coatings on vertical and horizontal faces of peds; few old roots and root channels; mildly alkaline; gradual smooth boundary. 86P1765

Bw3—95 to 134 cm; dark yellowish brown (10YR 3/4) sandy clay loam; weak medium prismatic structure; slightly hard, friable, sticky, plastic; few fine roots throughout; common fine discontinuous tubular pores; common continuous distinct clay films on vertical faces of peds; few old roots and root channels; dark coatings on root channels; mildly alkaline; clear smooth boundary. 86P1766

Bw4—134 to 162 cm; brown to dark brown (10YR 4/3) very fine sandy loam; weak coarse prismatic structure; soft, very friable, slightly sticky, slightly plastic; few fine roots throughout; common fine discontinuous tubular pores; few continuous faint organic coatings on vertical faces of peds; few wormcasts; few old roots and root channels; root channels coated with dark material; slightly effervescent with dilute HCl; mildly alkaline; abrupt smooth boundary. 86P1767

C1—162 to 185 cm; brown to dark brown (10YR 4/3) sandy loam; massive; soft, very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine discontinuous tubular pores; few old root channels; few carbonate pipestems; slightly effervescent with dilute HCl; moderately alkaline; abrupt smooth boundary. 86P1768

C2—185 to 210 cm; brown to dark brown (10YR 4/3) very fine sandy loam; massive; soft, very friable, slightly sticky, slightly plastic; few fine discontinuous tubular pores; few fine irregular carbonate nodules; few old root channels; slightly effervescent with dilute HCl; moderately alkaline; abrupt smooth boundary. 86P1769

C3—210 to 230 cm; sandy loam; massive.

Juana Diaz: S89PR-075-001

Primary Characterization Data

Juana Diaz Municipio, Puerto Rico

Sampled as: Juana Diaz; fine-loamy, mixed, isohyperthermic Typic Ustropepts

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 395, Samples 89P 2192–2199

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	FINE -.02	COARSE -.05	VF -.10	F -.25	M -.50	C -1	VC -2	WEIGHT 2 -5	5 -20	20 -75	.1- 75	% OF WHOLE SOIL
			(- - -TOTAL - - -)				(- -CLAY- -)	(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
89P2192S	0- 12	A1	27.6	22.6	49.8	17.7		12.1	10.5	21.7	26.1	1.0	0.4	0.6	1	1	1	30	3
89P2193S	12- 25	A2	30.0	25.0	45.0	19.7		13.3	11.7	20.4	23.1	0.9	0.2	0.4	1	1	--	26	2
89P2194S	25- 66	Bw1	9.7	20.4	69.9	5.5		9.3	11.1	24.5	41.2	3.0	0.7	0.5	1	1	--	46	2
89P2195S	66- 96	Bw2	8.8	23.0	68.2	4.6		11.3	11.7	24.5	34.2	3.4	2.8	3.3	7	6	5	54	18
89P2196S	96-139	2BC	8.4	20.2	71.4	3.8		10.5	9.7	25.5	41.8	2.3	0.8	1.0	3	3	5	52	11
89P2197S	139-177	2CB	6.7	18.2	75.1	2.5		8.8	9.4	23.3	48.4	2.6	0.5	0.3	2	3	--	54	5
89P2198S	177-209	2Ck	5.0	14.8	80.2	2.5		7.1	7.7	23.2	52.7	3.0	0.8	0.5	1	1	--	58	2
89P2199G	177-209	SEAM																	P

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 12	1.96	0.155			1.9	0.1	TR	1.20	0.43				1.11	1.33	0.062			28.4	11.8	0.18
12- 25	1.03	0.099			2.2	0.1	TR	1.13	0.56				1.33	1.67	0.078			26.2	16.7	0.13
25- 66	0.24	0.027			2.4	0.2	TR	3.31	1.33				1.38	1.51	0.030			22.2	12.9	0.13
66- 96	0.11	0.016			2.4	0.1	TR	3.59	1.49				1.44	1.54	0.020			21.3	13.1	0.10
96-139	0.04	0.007			2.0	0.1	TR	3.67	1.44				1.59	1.68	0.017			19.1	12.1	0.10
139-177	0.04				2.1	0.1	TR	4.48	1.75				1.63	1.69	0.012			16.9	11.7	0.08
177-209	0.04				1.6	0.1	TR	5.76	2.32				1.65	1.71	0.012			15.9	11.6	0.07
177-209																				

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 12	24.5	7.5	0.1	0.8	32.9	5.1		38.0	33.2			87	99			1.80	6.1	6.7
12- 25	25.0	7.3	0.2	0.4	32.9	5.7		38.6	34.0			85	97			1.00	5.9	6.7
25- 66	24.7	6.7	0.3	0.2	31.9	3.7		35.6	32.1			90	99			0.60	6.3	7.1
66- 96	23.8	6.1	0.7	0.2	30.8	3.9		34.7	31.6			89	97			0.40	6.4	7.2
96-139	25.7	4.8	0.9	0.1	31.5	2.5		34.0	30.8			93	100			0.40	6.2	7.2
139-177	28.6	4.0	0.7	0.1	33.4	4.3		37.7	30.0			89	100	--		1.50	7.0	7.8
177-209		3.9	0.6	0.1					28.8			100	100	4		1.60	7.7	8.4
177-209		2.0	0.3	TR								100		52				

SAMPLE NUMBER	FRACT ION < 7A2i	X-RAY peak size						THERMAL DTA 7A6	TGA 7A4b	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	ELEMENTAL Percent							EGME RETN	INTER PRETA TION
	<- -	- - - -	- - - -	- - - -	- - - -	- - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	<mg/g>	< - >
89P2194	TCLY	MT 3	VC 2	GE 2	KK 1	MI 1						16.0	9.0			0.7									
89P2194	TCLY	HE 1																							
89P2195	TCLY	MT 3	VC 2	GE 1	KK 1	MI 1						10.0	7.4			0.5									
89P2197	TCLY	MT 4	GE 2	MI 1	KK 1							11.0	10.2			0.5									

```
           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
89P2194     FS                                                   97  QI74  QZ19  OP 4  OT 1  FD 1  FPtr
89P2194     FS                                                       BTtr  GNtr
89P2195     FS                                                   98  QI73  QZ20  OP 4  BT 1  ZR 1  OT 1
89P2195     FS                                                       PRtr  FKtr  FPtr  FDtr  HNtr
89P2197     FS                                                   94  QI64  QZ18  OP12  FD 3  OT 2  BT 1
89P2197     FS                                                       PRtr  ZRtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            FS    Fine Sand, 0.1-0.25mm
MINERAL INTERPRETATION:
    MT  montmorillon     VC  verm-chlorit     GE  goethite         KK  kaolinite        MI  mica             HE  hematite
    QI  iron-coat qz     QZ  quartz           OP  opaques          OT  other            FD  feldspar         FP  plag-feldspa
    BT  biotite          GN  garnet           ZR  zircon           PR  pyroxene         FK  potas feldsp     HN  hornblende

RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                    RET   ACID              BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9a  6V2   6G12  6S4   6S5   6D3   6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
89P2192  1  0.03  0.27  0.06  0.18                                        22.7
89P2193  2  0.03  0.21  0.05  0.19                                        23.1
89P2194  3  0.02  0.11  0.04  0.12                                        18.0
89P2195  4  0.02  0.19  0.05  0.09                                        17.2
89P2196  5  0.01  0.08  0.04  0.06                                        16.1
89P2197  6  0.01  0.07  0.04  0.05                                        15.3
89P2198  7  0.01  0.05  0.02  0.05                                        15.6
89P2199  8
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Narrative Pedon Description

Pedon: Juana Diaz
NSSL pedon number: 89P0395
Pedon ID: S89PR-075-001
Field classification: Fine-loamy, mixed, isohyperthermic Typic Ustropepts
Revised classification as of April 01, 2001: Fine-loamy, mixed, superactive, isohyperthermic Typic Haplustepts
Location: Juana Diaz Municipio, Puerto Rico; Ponce Soil Survey sheet 23; 1.6 km east of Juana Diaz
USGS 7.5-minute quadrangle: Rio Descalabrado
Latitude: 18°03'04" north
Longitude: 66°28'59" west
Elevation: 88 meters
Physiography: On the middle third of a slope on coastal plains
Slope: 30 percent with a west aspect
Average annual precipitation: 840 mm; ustic moisture regime
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Vegetation: Hurricanegrass and mesquite in pastureland
Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C
Drainage, runoff, and permeability: Well drained, moderate runoff, and moderately slow permeability
Erosion: Slight
Particle-size control section: 25 to 102 cm
Parent material: Local colluvium from igneous-granite material over residuum from sandstone material
Weather station number: 7292
Diagnostic features: Ochric epipedon at 0 to 25 cm; cambic horizon at 25 to 97 cm
Geographically associated soils: Callabo, Fraternidad, and Paso Seco
Described and sampled by: D. Williams and C.L. Santiago during February 1989
Notes: Origin of second parent material is volcanic sandstone.

A1—0 to 12 cm; loam, brown (10YR 5/3) dry, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure parting to moderate medium granular; hard, friable, slightly sticky, plastic; many fine roots throughout; few fine tubular pores; clear smooth boundary. 89P2192

A2—12 to 25 cm; clay loam, dark yellowish brown (10YR 4/4) dry, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure parting to weak fine subangular blocky; hard, friable, slightly sticky, plastic; common fine roots throughout; few fine tubular pores; clear smooth boundary. 89P2193

Bw1—25 to 66 cm; loam, brownish yellow (10YR 6/6) dry, yellowish brown (10YR 5/6) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; hard, friable, slightly sticky, slightly plastic;

common fine roots throughout; few fine tubular pores; 2 percent partially weathered volcanic gravel; clear smooth boundary. 89P2194

Bw2—66 to 96 cm; sandy loam, light yellowish brown (10YR 6/4) dry, yellowish brown (10YR 5/8) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; hard, friable, slightly sticky, slightly plastic; few fine roots throughout; mildly alkaline; 8 percent gravel; clear smooth boundary. 89P2195

2BC—96 to 139 cm; coarse sandy loam, very pale brown (10YR 7/3) dry, brown (10YR 5/3) moist; common fine distinct redoximorphic features; extremely hard, friable, nonsticky, nonplastic; few fine roots throughout; mildly alkaline; 2 percent gravel; 1 percent cobbles; horizontal bedding evident; clear smooth boundary. 89P2196

2CB—139 to 177 cm; coarse sandy loam, very pale brown (10YR 7/3) dry, brown (10YR 5/3) moist; few fine distinct redoximorphic features; extremely hard, firm, nonsticky, nonplastic; few fine roots throughout; mildly alkaline; 1 percent gravel; 1 percent cobbles; horizontal bedding evident; abrupt wavy boundary. 89P2197

Ck—177 to 209 cm; coarse sandy loam, very pale brown (10YR 7/3) dry, brown (10YR 5/3) moist; few fine distinct redoximorphic features; extremely hard, firm, nonsticky, nonplastic; moderately alkaline; 1 percent gravel; 1 percent cobbles; horizontal bedding evident; thin coating of calcium carbonate on vertical and horizontal fracture planes. 89P2198

Lajas Municipio

Santa Isabel: S81PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Santa Isabel; fine, montmorillonitic, isohyperthermic Udic Pellusterts

SSL—Project: 81P 75, (CP81PR160) Lajas Valley Soil Survey

—Pedon: 81P 318, Samples 81P 1635–1640

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	FINE .02 -.02	COARSE .05 -.05	VF -.10	F -.25	M -.50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT %OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
81P1635S	0- 25	Ap	53.3	35.3	11.4			24.9	10.4	6.0	3.0	1.0	0.8	0.6	TR	TR	--	5	TR
81P1636S	25- 70	AC	58.6	34.2	7.2			24.4	9.8	4.5	2.3	0.2	0.1	0.1	--	--	--	3	--
81P1637S	70-100	C1	54.4	38.8	6.8			27.4	11.4	4.9	1.8	0.1	TR	TR	TR	--	--	2	--
81P1638S	100-127	C2	50.0	37.1	12.9			27.2	9.9	8.2	3.9	0.2	0.2	0.4	TR	--	--	5	--
81P1639S	127-160	C3	48.9	38.5	12.6			26.8	11.7	6.4	3.7	1.1	0.8	0.6	1	TR	--	7	1
81P1640S	160-175	C4	54.3	29.3	16.4			18.1	11.3	8.0	4.7	1.0	1.4	1.3	TR	TR	--	8	TR

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC - -	OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 25	1.92	0.171			2.4	0.2		1.11	0.49	61	31		1.35	1.89	0.118		33.6	31.7	26.3	0.07
25- 70	1.43	0.132			2.0	0.2		1.12	0.47				1.19	1.88	0.165		43.5	40.9	27.5	0.16
70-100	1.17				2.0	0.2		1.27	0.51	71	40		1.28	1.92	0.145		39.2	36.6	27.7	0.11
100-127	0.89				2.0	0.2		1.27	0.54				1.27	1.91	0.146		40.3	37.4	27.2	0.13
127-160	1.48				2.5	0.2		1.21	0.58				1.27	1.76	0.114		40.5	37.3	28.3	0.11
160-175	0.70				3.5	0.3		0.88	0.49				1.28	1.81	0.122		40.3	37.0	26.6	0.13

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 25	41.6	17.0	0.3	1.0	59.9	5.8		65.7	58.9			91	100				5.4	6.5	6.8
25- 70	47.5	18.7	0.8	0.7	67.7	4.3		72.0	65.5			94	100				5.5	6.8	6.8
70-100	52.6	19.1	1.4	0.6	73.7	2.8		76.5	68.9			96	100	--			5.6	7.0	7.1
100-127	53.3	19.1	2.5	0.5	75.4	3.3		78.7	63.6			96	100	TR			6.1	7.5	7.5
127-160	47.5	17.1	2.3	0.5	67.4	2.4		69.8	59.3			97	100	TR			6.5	7.7	7.9
160-175	41.6	16.6	1.6	0.5	60.3	2.5		62.8	47.8			96	100	TR			6.6	7.7	7.8

SAMPLE NUMBER	FRACT ION < 7A2i peak size	X-RAY 7A6	DTA	THERMAL TGA	SiO2	ELEMENTAL AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
	<- - ><- - - - - - - - - -><- - - - Percent - - - -><- - - - - - - - - - - - Percent - - - - - - - - -><- -><mg/g><- - >												
81P1637	TCLY	MT 5	KK 2		KK12			11.4			0.5		
81P1638	TCLY	MT 5	KK 2		KK11			11.6			0.5		
81P1639	TCLY	MT 5	KK 3		KK18			11.7			0.5		

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
MT montmorillon KK kaolinite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Santa Isabel
NSSL pedon number: 81P0318
Pedon ID: S81PR-079-001
Field classification: Fine, montmorillonitic, isohyperthermic Udic Pellusterts
Revised classification as of March 01, 2001: Fine, smectitic, isohyperthermic Typic Haplusterts
Location: Lajas Municipio, Puerto Rico
Latitude: 18°01’59" north
Longitude: 67°04’26" west
Geomorphic setting: Plain in valley
Slope: 2 percent with an aspect of 180 degrees
Vegetation: Crop cover, sorghum, weeds
Drainage: Moderately well drained
Parent material: Residuum from volcanic rocks and limestone
Surface fragments: 1 percent
Particle-size control section: 25 to 100 cm
Described and sampled by: G. Acevedo and L.H. Rivera on January 20, 1981
Notes: Matrix colors are for moist ped exteriors.

Ap—0 to 25 cm; very dark brown (10YR 2/2) clay; weak fine granular structure; friable, moderately sticky, moderately plastic; many fine roots; slightly acid; clear wavy boundary. 81P1635

AC—25 to 70 cm; black (10YR 2/1) clay; massive parting to weak fine subangular blocky; friable, moderately sticky, moderately plastic; common fine roots; slickensides (pedogenic) on faces of peds; slightly acid; gradual wavy boundary. 81P1636

C1—70 to 100 cm; very dark gray (10YR 3/1) clay; massive parting to weak fine subangular blocky; firm, moderately sticky, moderately plastic; common fine roots; slickensides (pedogenic) on faces of peds; neutral; gradual wavy boundary. 81P1637

C2—100 to 127 cm; very dark gray (10YR 3/1) clay; massive parting to weak fine subangular blocky; firm, moderately sticky, moderately plastic; few fine roots; slickensides (pedogenic) on faces of peds; neutral; gradual wavy boundary. 81P1638

C3—127 to 160 cm; black (10YR 2/1) clay; massive parting to weak fine subangular blocky; firm, moderately sticky, moderately plastic; few fine roots; slickensides (pedogenic) on faces of peds; neutral; gradual wavy boundary. 81P1639

C4—160 to 175 cm; very dark gray (10YR 3/1) clay; massive; friable, moderately sticky, moderately plastic; neutral. 81P1640

Maguayo: S81PR-079-002

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Maguayo; fine, mixed, isohyperthermic Vertic Ustropepts

SSL—Project: 81P 75, (CP81PR160) Lajas Valley Soil Survey

—Pedon: 81P 319, Samples 81P 1641–1646

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	(- -CLAY- -) FINE LT .0002	CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1)											- - - - - - - - - - - - - - ->	<- PCT OF <75MM(3B1)->				SOIL
81P1641S	0- 15	A11	21.1	22.8	56.1	11.8		13.9	9.0	7.2	8.7	8.7	13.1	18.4	17	20	--	68	37
81P1642S	15- 30	A12	19.2	20.3	60.5	12.1		13.3	7.0	6.3	7.9	8.7	15.1	22.5	17	21	--	72	38
81P1643S	30- 58	B21	57.4	18.2	24.4	33.2		12.3	5.9	3.9	4.2	4.7	6.3	5.3	6	6	--	30	12
81P1644S	58- 89	B22	40.3	22.8	36.9	27.7		14.7	8.1	7.3	11.5	6.6	6.9	4.6	5	7	--	38	12
81P1645S	89-120	B23	41.9	24.7	33.4	25.2	0.3	15.1	9.6	8.5	8.1	5.4	5.5	5.9	6	3	--	32	9
81P1646S	120-164	C1	47.6	23.7	28.7	27.0		13.9	9.8	6.9	6.8	4.4	4.6	6.0	5	7	--	31	12

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	2.02	0.241			2.1	0.2		0.84	0.55	39	13		1.20	1.33	0.027		24.8	23.3	11.6	0.11
15- 30	1.32	0.153			2.3	0.2		0.86	0.58				1.32	1.43	0.020		21.9	20.3	11.2	0.09
30- 58	0.61	0.068			2.4	0.3		0.62	0.41	69	40		1.22	1.70	0.108		36.3	33.6	23.6	0.11
58- 89	0.37	0.039			1.9	0.2		0.69	0.41				1.54	1.85	0.058		23.6	21.4	16.6	0.07
89-120	0.19	0.021			1.8	0.2		0.68	0.39				1.59	1.86	0.050		21.9	19.6	16.3	0.05
120-164	0.17	0.022			1.8	0.2		0.70	0.39				1.49	1.88	0.074		25.0	23.2	18.4	0.07

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - - - -MEQ / 100 G									- - - - - - - - - - - - ->		<- - - - -PCT - - - ->						1:2	1:1
0- 15	6.9	4.8	0.1	1.9	13.7	6.7		20.4	17.8			67	77				4.9	5.5	5.8
15- 30	6.2	5.2	0.1	1.6	13.1	5.4		18.5	16.6			71	79	TR			5.1	5.8	6.3
30- 58	7.5	19.9	3.5	7.5	38.4			38.4	35.7			100	100	--			6.4	7.2	7.3
58- 89	7.1	21.4	4.4	3.3	36.2			36.2	28.0			100	100	TR			6.7	7.6	7.6
89-120	5.0	23.2	4.8	1.7	34.7			34.7	28.3			100	100	TR			6.8	7.7	7.8
120-164	5.6	26.3	6.3	0.8	39.0	0.4		39.4	33.5			99	100	TR			6.9	7.9	8.0

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 (Percent) SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
81P1643	TCLY	MT 4 KK 3 MI 1 QZ 1	KK22				11.2			1.8			
81P1644	TCLY	MT 4 KK 2 CL 2 MI 1 QZ 1	KK16				11.6			1.4			
81P1645	TCLY	MT 4 KK 2 CL 2 MI 1 GE 1	KK15				11.7			1.3			
81P1645	TCLY	QZ 1											
81P1646	TCLY	MT 4 KK 2 CL 2 QZ 1	KK16				12.0			1.1			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
MT montmorillon KK kaolinite MI mica QZ quartz CL chlorite GE goethite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Maguayo
NSSL pedon number: 81P0319
Pedon ID: S81PR-079-002
Field classification: Fine, smectitic, isohyperthermic Vertic Haplustalfs
Revised classification as of March 01, 2001: Fine, smectitic, isohyperthermic Vertic Haplustalfs
Location: Lajas Municipio, Puerto Rico
Latitude: 18°00’43" north
Longitude: 67°04’53" west
Geomorphic position: Fan in valley
Vegetation: Hurricanegrass, lamilla, cacti, mesquite
Slope: 5 percent with an aspect of 0 degrees (north)
Drainage: Well drained
Parent material: Materials derived from volcanic rock and limestone
Surface fragments: 1 percent
Particle-size control section: 25 to 100 cm
Described and sampled by: G. Acevedo and L.H. Rivera on January 21, 1981
Notes: Matrix colors are for moist ped exteriors.

A11—0 to 15 cm; dark yellowish brown (10YR 3/4) gravelly clay loam; moderate fine granular structure; friable, soft, nonsticky, nonplastic; many fine roots; 15 percent sedimentary rock fragments 250 to 600 mm across; 15 percent interbedded sedimentary rock stones larger than 2 mm; slightly acid; gradual smooth boundary. 81P1641

A12—15 to 30 cm; dark yellowish brown (10YR 3/4) gravelly clay loam; weak fine subangular blocky structure; friable, slightly hard, nonsticky, nonplastic; many fine roots; 25 percent sedimentary rock fragments 250 to 600 mm across; 25 percent interbedded sedimentary rock stones larger than 2 mm; slightly acid; clear smooth boundary. 81P1642

B21—30 to 58 cm; dark yellowish brown (10YR 4/4) gravelly clay; moderate fine subangular blocky structure parting to moderate medium subangular blocky; firm, hard, nonsticky, nonplastic; common fine roots; 15 percent sedimentary rock fragments 250 to 600 mm across; 15 percent interbedded sedimentary rock stones larger than 2 mm; neutral; gradual wavy boundary. 81P1643

B22—58 to 89 cm; brown (7.5YR 4/4) gravelly clay; 1 percent medium faint grayish brown (10YR 5/2) redoximorphic features; weak fine subangular blocky structure parting to weak fine subangular blocky; firm, hard, nonsticky, moderately plastic; few fine roots; 15 percent sedimentary rock fragments 250 to 600 mm across; 15 percent interbedded sedimentary rock stones larger than 2 mm; neutral; gradual wavy boundary. 81P1644

B23—89 to 120 cm; brown (7.5YR 5/4) gravelly clay; massive parting to weak medium subangular blocky structure; firm, hard, nonsticky, moderately plastic; continuous slickensides (pedogenic) on faces of peds; 15 percent sedimentary

rock fragments 250 to 600 mm across; 15 percent interbedded sedimentary rock stones larger than 2 mm; neutral; gradual wavy boundary. 81P1645

C1—120 to 164 cm; strong brown (7.5YR 5/6) gravelly clay; massive parting to weak medium subangular blocky structure; firm, hard, nonsticky, moderately plastic; continuous slickensides (pedogenic) on faces of peds; 15 percent sedimentary rock fragments 250 to 600 mm across; 15 percent interbedded sedimentary rock stones larger than 2 mm; neutral. 81P1646

Guanica: S81PR-079-003

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Guanica; fine, montmorillonitic, isohyperthermic Udic Pellusterts

SSL—Project: 81P 75, (CP81PR160) Lajas Valley Soil Survey

—Pedon: 81P 320, Samples 81P 1647–1652

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
81P1647S	0- 14	A11	71.4	25.5	3.1			21.6	3.9	1.1	0.6	0.4	0.5	0.5	TR	--	--	2	TR
81P1648S	14- 54	A12	69.0	26.5	4.5			22.6	3.9	1.2	1.3	0.3	0.8	0.9	12	TR	--	15	12
81P1649S	54- 80	AC	70.4	26.6	3.0			22.5	4.1	1.2	0.6	0.5	0.4	0.3	TR	TR	--	2	TR
81P1650S	80-120	C1	69.1	28.8	2.1			26.4	2.4	1.2	0.4	0.2	0.2	0.1	--	--	--	1	--
81P1651S	120-143	C2	50.3	45.6	4.1			39.4	6.2	1.3	1.0	1.1	0.6	0.1	TR	TR	--	3	--
81P1652S	143-174	C3	58.5	39.1	2.4			33.5	5.6	0.9	0.6	0.3	0.3	0.3	--	--	--	1	--

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 14	1.98	0.195						0.97	0.45	82	48		1.14	1.75	0.153		44.5	40.6	32.2	0.10
14- 54	1.26	0.112						0.91	0.47				1.16	1.90	0.165		43.1	40.3	32.3	0.09
54- 80	1.02							0.85	0.46	85	53		1.19	1.92	0.173		39.9	38.3	32.5	0.07
80-120	0.59							0.77	0.45				1.23	1.92	0.160		39.4	38.3	31.4	0.08
120-143	0.29							0.91	0.59				1.31	1.92	0.136		32.3	31.6	29.5	0.03
143-174	0.19							0.78	0.50				1.32	1.97	0.143		32.7	31.7	29.3	0.03

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2	SAR 5E	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 6E4	CASO4 AS GYPSUM <2MM 6F1a	CASO4 AS GYPSUM <20MM 6F4	PH SAT PASTE 8C1b	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		PCT		<- -PCT ->			1:2	1:1
0- 14	68.6	19.0	1.1	1.8	90.5	1.7	92.2	69.2	1	1	98	100	TR		--		7.4	7.9	8.0
14- 54		23.9	7.3	1.2				63.0	10	10	100	100	5		--		7.7	8.2	8.3
54- 80		26.1	20.6	1.2				59.7	24	21	100	100	6		--		7.6	8.0	8.0
80-120		27.1	27.2	1.3				53.4	30	21	100	100	7	180	--		7.7	7.9	7.9
120-143		26.5	23.2	1.1				45.8	27	21	100	100	5		3		7.8	8.0	8.0
143-174		28.8	24.6	1.3				45.6	30	21	100	100	4		3		7.8	8.0	8.0

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a MMHOS /cm	PRED. ELEC. COND. 8I MMHOS /cm
	<- - - - - - - - - - - - - - - - - - MEQ / LITER ->														<- -PCT- ->			
0- 14	5.1	2.1	2.5	0.1	--	7.0	TR	0.5				1.5	TR	--	99.5	TR	0.86	
14- 54	1.2	0.8	9.7	TR	--	4.8	0.1	4.5				1.8	--	--	104.1	0.1	1.20	
54- 80	8.0	8.6	60.0	0.1	--	2.7	0.5	46.2				23.7	--	--	108.3	0.6	6.87	
80-120	21.5	28.4	104.3	0.1	--	1.8	0.9	66.3				80.8	--	--	108.1	1.0	11.67	
120-143	25.4	37.7	118.3	0.1	--	1.2	1.1	63.6				106.2	--	--	93.4	0.9	12.47	
143-174	25.2	42.8	122.6	0.2	--	1.3	1.0	64.0				113.4	--	--	88.5	0.9	12.90	

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)				THERMAL DTA 7A6 (Percent)	TGA 7A4b	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTERPRETATION
81P1649	TCLY	MT 3	CL 2	KK 2	MI 1	KK10				8.9			1.6			
81P1650	TCLY	MT 3	CL 2	KK 2	MI 2	KK13				8.9			1.8			
81P1651	TCLY	MT 3	CL 2	KK 2	MI 2	KK16				8.7			1.9			
81P1652	TCLY	CL 3	MT 3	KK 2	MI 2	KK18				8.7			2.0			

FRACTION INTERPRETATION:
 TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
 MT montmorillon CL chlorite KK kaolinite MI mica
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Guanica
NSSL pedon number: 81P0320
Pedon ID: S81PR-079-003
Field classification: Fine, montmorillonitic, isohyperthermic Udic Pellusterts
Revised classification as of March 01, 2001: Very-fine, smectitic, isohyperthermic Sodic Haplusterts
Location: Lajas Municipio in the Lajas Valley of Puerto Rico
Latitude: Unknown
Longitude: Unknown
Vegetation: Mesquite, bushes, angleton grass, hurricanegrass
Slope: 2 percent with an aspect of 180 degrees
Drainage: Somewhat poorly drained
Geomorphic position: Fan in coastal plain
Parent material: Clayey sediments derived from limestone and volcanic rocks
Particle-size control section: 25 to 100 cm
Described and sampled by: G. Acevedo and L.H. Rivera on January 21, 1981
Notes: Matrix colors are for moist ped exteriors.

A11—0 to 14 cm; black (10YR 2/1) clay; moderate fine granular structure; firm, hard, moderately sticky, moderately plastic; many fine roots; slight effervescence; moderately alkaline; clear wavy boundary. 81P1647

A12—14 to 54 cm; black (10YR 2/1) clay; weak coarse subangular blocky structure parting to weak fine angular blocky; firm, hard, moderately sticky, moderately plastic; common fine roots; slickensides (pedogenic) on faces of peds; slight effervescence; gradual wavy boundary. 81P1648

AC—54 to 80 cm; mixed black (10YR 2/1) and dark reddish brown (5YR 3/2) clay; massive parting to weak fine angular blocky structure; firm, hard, moderately sticky, moderately plastic; few fine roots; slickensides (pedogenic) on faces of peds; strong effervescence; gradual wavy boundary. 81P1649

C1—80 to 120 cm; mixed reddish brown (5YR 4/3) clay with black (10YR 2/1) crack fillings; massive; firm, hard, moderately sticky, moderately plastic; few fine roots; slickensides (pedogenic) on faces of peds; strong effervescence; gradual wavy boundary. 81P1650

C2—120 to 143 cm; reddish brown (5YR 4/3) clay; massive; firm, hard, moderately sticky, moderately plastic; slickensides (pedogenic) on faces of peds; strong effervescence; gradual wavy boundary. 81P1651

C3—143 to 174 cm; reddish brown (5YR 4/3) clay; massive; firm, hard, moderately sticky, moderately plastic; slickensides (pedogenic) on faces of peds; strong effervescence. 81P1652

Aguirre: S57PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Aguirre; fine, mixed, isohyperthermic Chromudic Pellusterts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 529, Samples 40A 3938–3944

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02	SILT COARSE -.05	SAND VF .10	SAND F -.25	SAND M -.50	SAND C -1	SAND VC 2	COARSE FRACS (MM) 5	COARSE FRACS (MM) 20	COARSE FRACS (MM) .1-	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM					(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				
40A3938S	0- 23	Ap	69.5	24.4	6.1		17.9	6.5	2.3	1.3	0.5	1.0	1.0	TRC	1C	--	5	1
40A3939S	23- 46	C1	57.0	24.7	18.3		17.4	7.3	3.3	2.5	1.1	3.1	8.3	TRC	2C	--	17	2
40A3940S	46- 69	C2	57.6	26.9	15.5		18.8	8.1	3.8	3.0	1.5	3.3	3.9	TRC	1C	--	13	1
40A3941S	69- 89	C3	59.6	28.2	12.2		20.1	8.1	3.6	2.4	1.0	2.2	3.0	TRC	1C	--	10	1
40A3942S	89-122	C4	60.8	29.9	9.3		23.1	6.8	3.4	2.5	1.0	1.4	1.0	TRC	--C	--	6	--
40A3943S	122-152	C5	63.9	29.4	6.7		22.9	6.5	2.4	1.6	0.8	1.2	0.7	--C	--C	--	4	--
40A3944S	152-183	C6	64.9	28.1	7.0		21.9	6.2	2.5	1.5	0.6	1.1	1.3	--C	--C	--	4	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM -->	EXTRACTABLE MN 6D2a	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	BULK DENSITY 1/3 BAR 4A1d - - ->	COLE OVEN DRY 4A1h CM/CM	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	1.76	0.173			2.1			0.85	0.40										28.0	
23- 46	0.68	0.054			2.3			0.83	0.44										24.8	
46- 69	0.44	0.035			2.3			0.82	0.43										25.0	
69- 89	0.40				2.1			0.80	0.43										25.4	
89-122	0.24				1.9			0.78	0.43										26.1	
122-152	0.11				2.3			0.73	0.42										27.0	
152-183	0.07				2.1			0.74	0.43										27.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	ACID- SUM BASES 6H5a	ACID- ITY 6G9a	CEC- SUM CATS 5A3a	CEC- NH4-OAC 5A8b	EXCH NA 5A3b	SAR 5G1	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	CARBONATE AS CACO3 <20MM 8E1	CASO4 AS GYPSUM <2MM 8I	CASO4 AS GYPSUM <20MM 8C1g	PH SAT PASTE 8C1f	PH CACL2 .01M 8C1f	PH H2O 1:2 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->|								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->				
0- 23		23.6	4.1	0.9		2.1		58.8	6			49	1		--				7.6
23- 46		23.0	9.5	0.6		--		47.2	16		100	70	9		--				7.9
46- 69		27.5	13.8	0.5		--		47.2	20		100	89	9		--				7.9
69- 89		31.5	15.4	0.6		--		47.4	21		100	100	14		--				7.9
89-122		33.3	17.8	0.6		--		47.2	25		100	100	9		--				7.8
122-152		34.3	20.8	0.7		--		46.6	31		100	100	7		--				7.9
152-183		33.3	21.4	0.8		--		47.8	32		100	100	8		--				7.9

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	PRED. ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - - ->											<- -PCT- ->			
0- 23			5.8	0.1								102.0	0.1	1.1	
23- 46			21.4	0.1								94.9	0.2	3.0	
46- 69			50.6	0.1								90.8	0.6	8.4	
69- 89			52.2	0.1								102.0	0.7	8.4	
89-122			58.4	0.2								103.0	0.8	9.4	
122-152			53.4	0.1								117.0	0.7	7.8	
152-183			44.0	0.1								137.0	0.6	5.8	

SAMPLE NUMBER	FRACT ION	X-RAY				THERMAL DTA	TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
		peak size				Percent					Percent				mg/g	
40A3940	TCLY	VR 6	MT 6	CL 6	MI 6	KK 2										

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
VR vermiculite MT montmorillon CL chlorite MI mica KK kaolinite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description
Pedon: Aguirre
NSSL pedon number: 40A529
Pedon ID: S57PR-079-001
SSIR #12 pedon ID: S57PR-14-3
Field classification: Fine, mixed, isohyperthermic Chromudic Pellusterts
Series classification: Very-fine, smectitic, isohyperthermic Sodic Haplusterts
Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Sodic Haplusterts
Location: Lajas Municipio, Puerto Rico; 91 meters east of Highway 106 at kilometer marker 9.6 and 15 meters south of farm road
Soil survey area: PR687—Lajas Valley Area, Puerto Rico
Latitude: 18°00’13" north
Longitude: 67°00’42" west
Slope: 1 percent; smooth and linear upslope and across the slope
Average annual precipitation: 889 mm
Drainage: Somewhat poorly drained
Particle-size control section: 25 to 100 cm
Climate: Semiarid; annual precipitation 760 to 1,015 mm
Vegetation: Native grass; previously cultivated and used for sugarcane
Erosion: None to slight
Root distribution: Abundant in the Ap horizon; few down to 70 cm
Described and sampled by: L.T. Alexander, C.J. Koch, J.A. Bonnet, R.E. Gierbolini, J. Juarez, Jr., and J.E. Trigo on September 6, 1957
Notes: Surface of soil is subject to severe cracking. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 23 cm; black (10YR 2/1) clay; weak medium granular structure; very sticky, moderately plastic; clear smooth boundary. 40A3938
C1—23 to 46 cm; very dark brown (10YR 2/2) clay; massive; very sticky, moderately plastic; compacted due to tillage; few volcanic fragments; slickenside faces are evident; gradual wavy boundary. 40A3939
C2—46 to 69 cm; very dark gray (10YR 3/1) clay; massive; very sticky, moderately plastic; few slickenside faces are evident; few volcanic fragments; gradual wavy boundary. 40A3940
C3—69 to 89 cm; very dark brown (10YR 2/2) clay; massive; very sticky, moderately plastic; slickenside faces are evident; common medium lime splotches; clear wavy boundary. 40A3941
C4—89 to 122 cm; dark brown (7.5YR 3/2) clay; massive; very sticky, moderately plastic; slickenside faces are evident; most cracks extend to this depth; arbitrary boundary. 40A3942
C5—122 to 152 cm; dark brown (10YR 3/3) clay; massive; very sticky, moderately plastic; 3 percent fine black (10YR 2/1) dark concretions; occasional cracks to this depth with some slickenside faces; few medium lime splotches; gradual wavy boundary. 40A3943
C6—152 to 183 cm; dark grayish brown (10YR 4/2) clay; massive; very sticky, moderately plastic; 3 percent black (10YR 2/1) dark concretions; 3 percent carbonate concretions. 40A3944

Cartagena: S57PR-079-002

Primary Characterization Data

Lajas Municipio, Puerto Rico
Sampled as: Cartagena; fine, mixed, isohyperthermic Udic Chromusterts
SSL—Project: 40A 1, (NL40) SSIR Samples
—Pedon: 40A 527, Samples 40A 3924–3930
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	>2MM WEIGHT .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
40A3924S	0- 18	Ap	63.9	27.5	8.6			20.4	7.1	3.4	2.4	0.7	1.2	0.9	TRC	1C	--	6	1
40A3925S	18- 43	A12	58.6	25.3	16.1			18.5	6.8	3.2	2.7	1.3	3.0	5.9	TRC	1C	--	14	1
40A3926S	43- 66	C1	58.7	25.9	15.4			19.7	6.2	3.0	2.7	1.4	3.6	4.7	TRC	--C	--	12	--
40A3927S	66- 97	C2	58.8	27.5	13.7			21.0	6.5	2.9	2.3	1.1	3.1	4.3	--C	--C	--	11	--
40A3928S	97-127	C3	65.0	25.2	9.8			18.4	6.8	2.7	2.0	0.9	1.9	2.3	--C	--C	--	7	--
40A3929S	127-152	C4	65.5	27.5	7.0			20.8	6.7	2.7	1.6	0.5	1.0	1.2	--C	--C	--	4	--
40A3930S	152-183	C5	63.3	28.1	8.6			20.0	8.1	3.7	2.3	0.6	1.0	1.0	--C	--C	--	5	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	EXTR TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM -->	EXTRACTABLE MN 6D2a	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT	LIMITS PI 4F <0.4MM	FIELD MOIST 4A3a <-	1/3 BAR 4A1d G/CC	OVEN DRY 4A1h - ->	WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4 <-	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WHOLE SOIL 4C1 CM/CM
0- 18	1.84	0.175			2.1			0.82	0.39										25.0	
18- 43	0.56	0.051			1.9			0.78	0.42										24.6	
43- 66	0.48	0.038			1.8			0.77	0.43										25.4	
66- 97	0.42				1.8			0.73	0.44										26.0	
97-127	0.35				1.9			0.68	0.42										27.2	
127-152	0.14				1.8			0.65	0.41										27.0	
152-183	0.06				2.1			0.65	0.39										24.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	CARBONATE AS CACO3 <20MM 8E1	CASO4 AS GYPSUM <2MM 8I	CASO4 AS GYPSUM <20MM 8I	SAT PASTE 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->											<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 18		14.4	1.2	1.2		2.5			52.4	2			32	1		--				7.5
18- 43		16.8	4.4	0.7		--			45.8	8		100	48	9		--				8.0
43- 66		20.8	8.0	0.6		--			45.0	15		100	65	12		--				8.3
66- 97		20.7	11.4	0.6		--			42.8	23		100	76	10		--				8.1
97-127		24.5	15.0	0.7		--			44.1	29		100	91	15		--				8.2
127-152		22.7	16.6	0.7		--			42.6	34		100	94	10		--				
152-183		20.0	17.0	0.7		--			41.1	37		100	92	5		--				

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	PRED. ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - - ->											<- -PCT- ->			
0- 18			2.6	0.1								93.3	TR	1.0	
18- 43			6.0	--								87.2	TR	0.9	
43- 66			10.2	--								104.0	0.1	1.2	
66- 97			13.1	--								113.0	0.1	1.9	
97-127			15.8	--								127.0	0.2	2.3	
127-152			13.4	--								145.0	0.2	1.8	
152-183			11.8	--								158.0	0.2	1.6	

SAMPLE NUMBER	FRACT ION	X-RAY peak size TCLY	VR 6	MT 6	CL 6	MI 6	KK 2	THERMAL Percent DTA	TGA	ELEMENTAL Percent SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN <mg/g>	INTER PRETA TION
40A3927																		

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
VR vermiculite MT montmorillon CL chlorite MI mica KK kaolinite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Cartagena
NSSL pedon number: 40A527
Pedon ID: S57PR-079-002
SSIR #12 pedon ID: S57PR-14-5
Field classification: Fine, mixed, isohyperthermic Udic Chromusterts
Series classification: Fine, mixed, superactive, isohyperthermic Sodic Haplusterts
Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Sodic Calciusterts
Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 1.8 km south of Highway 117 and 2.6 km east of Highway 116; aerial photograph GS-LR-4-34; 30.5 meters southeast of intersection of farm roads
Latitude: 18°01'35" north
Longitude: 67°01'31" west
Climate: Semiarid; annual precipitation 760 to 1,010 mm
Slope: 0 to 1 percent; smooth with a tendency to gilgai microrelief
Drainage: Somewhat poorly drained
Vegetation: Native grasses; previously cultivated and used for sugarcane
Erosion: None to slight
Root distribution: Abundant to a depth of 66 cm
Described and sampled by: L.T. Alexander, C.J. Koch, R.E. Gierbolini, J. Juarez, Jr., and J.E. Trigo on September 6, 1957
Notes: Deep cracks develop in this pedon during dry periods. Many of the cracks extend as deep as 122 cm. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; very dark brown (10YR 2/2) clay; moderate medium granular structure; sticky, plastic; abrupt smooth boundary. 40A3924
A12—18 to 43 cm; very dark brown (10YR 2/2) clay; massive when wet; slickenside faces present; very sticky, plastic; gradual wavy boundary. 40A3925
C1—43 to 66 cm; dark reddish brown (5YR 3/2) clay; massive when wet; slickenside faces present; very sticky, plastic; clear wavy boundary. 40A3926
C2—66 to 97 cm; very dark grayish brown (10YR 3/2) clay; massive when wet; slickenside faces present; sticky, plastic; few small rounded fragments; clear wavy boundary. 40A3927
C3—97 to 127 cm; brown to dark brown (7.5YR 4/2) clay; massive when wet; sticky, plastic; few lime specks; arbitrary boundary. 40A3928
C4—127 to 152 cm; brown to dark brown (7.5YR 4/2) clay; massive when wet; sticky, plastic; few lime specks; arbitrary boundary. 40A3929
C5—152 to 183 cm; brown to dark brown (7.5YR 4/2) clay; massive when wet; sticky, plastic; few lime specks. 40A3930

Cartagena: S57PR-079-003

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Cartagena; fine, mixed, isohyperthermic Udic Chromusterts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 528, Samples 40A 3931–3937

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT <- - - - - - - - - - - - - PCT OF <2MM	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75 <- PCT OF <75MM(3B1)->	WT % OF WHOLE SOIL
40A3931S	0- 18	Ap	59.8	32.7	7.5			24.3	8.4	4.0	2.1	0.4	0.6	0.4	--C	--C	--	3	--
40A3932S	18- 38	A12	58.5	33.5	8.0			24.0	9.5	4.1	2.1	0.5	0.7	0.6	TRC	--C	--	4	--
40A3933S	38- 56	C1	57.0	33.0	10.0			23.1	9.9	4.7	2.9	0.8	1.0	0.6	TRC	1C	--	6	1
40A3934S	56- 76	C2	61.7	27.1	11.2			18.0	9.1	4.7	2.7	0.9	1.6	1.3	TRC	1C	--	7	1
40A3935S	76-117	C3	59.4	31.3	9.3			22.4	8.9	3.7	2.2	0.9	1.5	1.0	TRC	2C	--	7	2
40A3936S	117-152	C4	62.1	28.4	9.5			20.6	7.8	3.2	1.9	0.8	1.5	2.1	TRC	2C	--	8	2
40A3937S	152-165	C5	30.5	24.3	45.2			16.1	8.2	6.9	8.7	4.4	10.1	15.1	2C	12C	--	47	14

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	COLE OVEN DRY 4A1h - - ->	WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF	1/10 BAR 4B1c <2MM	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 18	2.30	0.210			2.6			0.83	0.41										24.3	
18- 38	1.90	0.175			3.0			0.88	0.44										25.9	
38- 56	1.59	0.151			2.7			0.85	0.45										25.5	
56- 76	1.18	0.095			2.4			0.82	0.45										27.8	
76-117	0.22				1.7			0.64	0.42										25.0	
117-152								0.62	0.42										26.1	
152-165	0.05				1.8			0.80	0.48										14.5	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b <- - - - - - - - - -MEQ / 100	SUM BASES	ACID-ITY 6H5a G - - - - - - - - - ->	6G9a	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3 <- -PCT- >	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g <- -PCT ->	<20MM 8E1	CASO4 AS GYPSUM <2MM <20MM <- -PCT ->	8I	(- - - -PH - - -) SAT PASTE 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
0- 18	48.5	9.0	0.3	0.8	58.6	7.6		66.2	49.7	1		89	100	--		--				6.7
18- 38	47.9	8.7	0.5	0.8	57.9	6.7		64.6	51.2	1		90	100	--		--				6.9
38- 56	43.8	10.6	1.0	0.7	56.1	5.5		61.6	48.2	2		91	100	--		--				7.2
56- 76		15.9	3.0	0.7		3.4			50.3	5			39	12		--				7.7
76-117		18.7	6.9	0.7		--			37.9	16		100	69	12		--				8.3
117-152		23.1	9.4	0.7					38.6	22		100	86	10		--				8.6
152-165		13.5	5.6	0.3		--			24.4	21		100	80	18		--				8.8

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER											<- -PCT- ->			
0- 18			0.9	0.1								91.7	TR	0.8	
18- 38			1.0	0.1								89.9	TR	0.5	
38- 56			1.9	0.1								83.8	TR	0.6	
56- 76			4.2	--								99.9	TR	0.7	
76-117			7.3	--								125.0	0.1	1.0	
117-152			7.6	--								127.0	0.1	1.0	
152-165			7.5	--								63.8	TR	0.9	

Narrative Pedon Description

Pedon: Cartagena

NSSL pedon number: 40A528

Pedon ID: S57PR-079-003

SSIR #12 pedon ID: S57PR-14-8

Field classification: Fine, mixed, isohyperthermic Udic Chromusterts

Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Sodic Haplusterts

Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 1 km south of Highway 117 and 2.4 km east of junction of old railroad and Highway 116 in northwest corner of farm road intersection; aerial photograph GS-LR-6-82

Latitude: 18°02’06" north

Longitude: 67°01’55" west

Climate: Semiarid; annual precipitation 760 to 1,010 mm

Slope: 0 to 1 percent; smooth

Drainage: Moderately well drained

Vegetation: Sugarcane

Erosion: None to slight

Root distribution: Abundant to a depth of 76 cm

Described and sampled by: L.T. Alexander, C.J. Koch, R.E. Gierbolini, J. Juarez, Jr., and J.E. Trigo on September 6, 1957

Notes: See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; very dark grayish brown (10YR 3/2) clay; tendency to weak fine angular blocky structure, although the structure is somewhat platy due to compaction; slightly sticky, plastic; neutral; clear smooth boundary. 40A3931

A12—18 to 38 cm; very dark grayish brown (10YR 3/2) clay; moderate medium angular blocky structure; slightly sticky, plastic; few fine pebbles; slight slickenside activity; neutral; arbitrary boundary. 40A3932

C1—38 to 56 cm; very dark gray (10YR 3/1) clay; moderate fine angular blocky structure; strong slickenside activity with polished pressure faces; moderately sticky, plastic; few fine pebbles, including some that appear to be water worn; numerous fine pores; neutral; clear wavy boundary. 40A3933

C2—56 to 76 cm; black (10YR 2/1) clay; weak coarse angular blocky structure; some slickenside faces; slightly sticky, plastic; few gravel fragments; mildly alkaline; clear wavy boundary with some pockets 15 cm deep, part of the laboratory sample came from pockets at a depth of 90 cm. 40A3934

C3—76 to 117 cm; dark grayish brown (10YR 4/2) clay; weak coarse angular blocky structure; sticky, plastic; numerous fine rounded pebbles; few patchy clay skins; a portion of the laboratory sample came from pockets at a depth of 76 cm; moderately alkaline; arbitrary boundary. 40A3935

C4—117 to 152 cm; brown to dark brown (10YR 4/3) clay; massive with slight tendency to weak coarse angular blocky structure; sticky, plastic; few fine

rounded rhyolite pebbles; calcareous; moderately alkaline; abrupt irregular boundary. 40A3936

C5—152 to 165 cm; either decomposed rock or a dense stone line; a clay matrix much like that of the C4 horizon; strongly alkaline. 40A3937

Santa Isabel: S57PR-079-004

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Santa Isabel; fine, montmorillonitic, isohyperthermic Chromudic Pellusterts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 530, Samples 40A 3945–3951

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	>2MM WT .1- 75	% OF WHOLE SOIL
	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19- -20-
				<- - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->				<- PCT OF <75MM(3B1)->				
40A3945S	0- 23	Ap		52.4	38.0	9.6			27.8	10.2	3.9	2.8	1.0	1.1	0.8	--C	--C	--	6	--
40A3946S	23- 43	A12		50.2	37.9	11.9			27.7	10.2	4.8	3.8	1.4	1.4	0.5	--C	--C	--	7	--
40A3947S	43- 63	AC		54.6	35.2	10.2			25.0	10.2	5.0	3.0	0.9	0.9	0.4	--C	--C	--	5	--
40A3948S	63- 86	C1		45.0	31.9	23.1			21.2	10.7	7.8	6.4	2.2	3.8	2.9	--C	--C	--	15	--
40A3949S	86-104	C2		53.8	31.0	15.2			21.3	9.7	6.1	5.0	1.3	1.6	1.2	--C	--C	--	9	--
40A3950S	104-124	C3		65.4	29.3	5.3			22.5	6.8	2.5	1.5	0.4	0.4	0.5	--C	--C	--	3	--
40A3951S	124-152	C4		61.3	32.5	6.2			24.9	7.6	2.7	1.5	0.4	0.7	0.9	--C	--C	--	3	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a OF <2MM -->	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT <0.4MM	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	BULK DENSITY 1/3 BAR 4A1d - - ->	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a PCT OF <2MM - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	2.04	0.185			3.4			1.02	0.47										24.6	
23- 43	1.52	0.152			3.2			1.03	0.49										24.6	
43- 63	1.67	0.151			2.9			1.03	0.49										26.5	
63- 86	0.85				2.7			1.15	0.53										23.9	
86-104	0.90				2.6			1.09	0.50										26.9	
104-124	1.19				2.1			0.92	0.48										31.2	
124-152	0.64				1.9			0.80	0.46										28.1	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	ACID- 6G9a	CEC- SUM CATS 5A3a	CEC- NH4-OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3 <- -PCT- >	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g <- -PCT ->	CARBONATE AS CACO3 <20MM 8E1	CASO4 AS GYPSUM <2MM 8I <- -PCT ->	CASO4 AS GYPSUM <20MM 8C1g	PH SAT PASTE 8C1f	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->|																			
0- 23		13.3	0.3	0.6	14.2	7.2		21.4	53.3	1		66	27	--		--				6.8
23- 43		12.3	0.3	0.6		4.2			51.5	1			26	2		--				7.4
43- 63		14.5	0.5	0.6		3.8			56.1	1			28	1		--				7.4
63- 86		15.2	0.8	0.5		3.4			51.8	1			32	12		--				7.6
86-104		19.4	1.3	0.6		3.0			58.7	2			36	2		--				7.6
104-124		24.1	1.6	0.6		--			60.2	2		100	44	5		--				
124-152		23.0	1.7	0.5		--			49.3	3		100	51	19		--				7.8

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - - - ->											<- -PCT- ->			
0- 23			0.5	0.1								79.8	TR	0.6	
23- 43			0.7	--								82.1	TR	0.7	
43- 63			1.1	--								88.9	TR	0.6	
63- 86			1.6	--								76.9	TR	0.7	
86-104			2.3	--								92.4	TR	0.8	
104-124			2.6	--								115.0	TR	0.8	
124-152			2.8	--								96.8	TR	0.7	

SAMPLE NUMBER	FRACT ION	X-RAY	THERMAL DTA	THERMAL TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
		< - - - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- -><mg/g><- - >											
40A3948	TCLY	MT 4	VR 2										

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
MT montmorillon VR vermiculite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Santa Isabel

NSSL pedon number: 40A530

Pedon ID: S57PR-079-004

SSIR #12 pedon ID: S57PR-14-7

Field classification: Fine, montmorillonitic, isohyperthermic Chromudic Pellusterts

Revised classification as of March 01, 2001: Fine, smectitic, isohyperthermic Typic Haplusterts

Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 0.8 km east of Highway 116 and 0.2 km south of old railroad tracks; 15 meters south of field road and 30.5 meters east of irrigation lateral; aerial photograph GS-LR-6-84

Latitude: 18°02’22" north

Longitude: 67°02’44" west

Climate: Semiarid; annual precipitation 760 to 1,010 mm (30 to 40 in.)

Slope: 1 to 2 percent; smooth

Drainage: Moderately well drained

Vegetation: Sugarcane

Erosion: Slight

Root distribution: Abundant to a depth of 64 cm

Ground water: Saturated soil below a depth of 152 cm; water table estimated to be at 168 to 183 cm

Described and sampled by: L.T. Alexander, C.J. Koch, J. Juarez, Jr., and J.E. Trigo on September 9, 1957

Notes: Santa Isabel soils occur on level or nearly level concave alluvial fans. This pedon shows very pronounced slickenside faces, which are highly polished and show striations of movement. This condition has probably restricted the development of more distinct soil structure. The Santa Isabel soils in low positions may have concretions of salt or sodium. Soil colors are for moist conditions unless otherwise stated. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 23 cm; very dark gray (10YR 3/1) clay; weak fine granular structure; slightly sticky, plastic; many fine pores; neutral; clear wavy boundary. 40A3945

A12—23 to 43 cm; very dark grayish brown (10YR 3/2) clay; moderate medium blocky structure; slightly sticky, plastic; few fine pores; pressure faces on most ped faces; neutral; gradual wavy boundary. 40A3946

AC—43 to 63 cm; very dark gray (10YR 3/1) and black (10YR 2/1) clay; moderate fine blocky structure; slightly sticky, plastic; many fine pores; few fine water-worn pebbles; mildly alkaline; clear wavy boundary. 40A3947

C1—63 to 86 cm; very dark grayish brown (10YR 3/2) clay; weak medium blocky structure; slightly sticky, plastic; few fine water-worn pebbles; highly polished slickenside faces; mildly alkaline; clear wavy boundary. 40A3948

C2—86 to 104 cm; very dark gray (10YR 3/1) clay; pockets of very dark grayish brown (10YR 3/2) material from the overlying horizon; weak medium blocky structure; slightly sticky, plastic; prominent slickenside faces; mildly alkaline; arbitrary boundary. 40A3949

C3—104 to 124 cm; very dark gray (10YR 3/1) clay; weak medium blocky structure; slightly sticky, plastic; prominent slickenside faces; mildly alkaline; clear boundary. 40A3950

C4—124 to 152 cm; very dark grayish brown (10YR 3/2) clay; weak medium blocky structure; slightly sticky, plastic; few spots of lime; has appearance of clay skins but may be pressure faces; mildly alkaline. 40A3951

Amelia: S57PR-079-007

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Amelia; clayey-skeletal, mixed, isohyperthermic Typic Haplustalfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 566, Samples 40A 4151–4154

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .05-.05	-3-- TOTAL SAND -2	-4-- TOTAL FINE .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002-.02	-7-- SILT COARSE .02-.05	-8-- SAND VF .05-.10	-9-- SAND F .10-.25	-10- SAND M .25-.50	-11- SAND C .5-1	-12- SAND VC 1-2	-13- COARSE FRACS (MM) 2-5	-14- COARSE FRACS (MM) 5-20	-15- COARSE FRACS (MM) 20-75	-16- WEIGHT .1-75	-17- WEIGHT WHOLE	-18- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - -						<- PCT OF <75MM(3B1)->		
40A4151S	0- 18	A	22.1	25.9	52.0			14.5	11.4	11.3	14.2	6.2	11.4	8.9	TRC	2C	--	42	2	
40A4152S	18- 38	B1	20.7	18.4	60.9			10.9	7.5	7.0	9.0	4.5	11.4	29.0	3C	22C	--	65	25	
40A4153S	38- 61	B2t	43.6	19.2	37.2			12.2	7.0	4.6	5.9	3.2	7.6	15.9	5C	29C	--	56	34	
40A4154S	61- 76	C	36.1	19.5	44.4			12.3	7.2	5.8	7.3	4.5	9.5	17.3	5C	29C	--	59	34	

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR TOTAL P 6S3	EXTR TOTAL S 6R3a	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	COLE OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- - ->	CM/CM		<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.65	0.167			2.3			0.55	0.42										9.2	
18- 38	1.47	0.125			2.8			0.60	0.47										9.8	
38- 61	0.43	0.047			3.7			0.55	0.42										18.2	
61- 76	0.22				2.4			0.55	0.40										14.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5A3b	SAR 5G1	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	CARBONATE AS CACO3 <20MM 8E1	CASO4 AS GYPSUM <2MM 8I	CASO4 AS GYPSUM <20MM 8I	PH SAT PASTE 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - -			-MEQ / 100	G - - - - - - - - - -				->	PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 18	4.7	3.3	0.1	0.9	9.0	7.3		16.3	12.2	1		55	74			--				5.4
18- 38	5.1	3.3	0.2	0.2	8.8	7.8		16.6	12.5	1		53	70			--				5.8
38- 61	5.0	13.4	2.3	0.4	21.1	8.3		29.4	24.1	10		72	88							6.5
61- 76		12.2	3.3	0.3		3.7			19.9	17			79	7						7.4

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	PRED. ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - -			-MEQ / LITER								- - - - - - - - - - ->	<- -PCT- ->		
0- 18			0.9	1.0								44.7	TR	1.0	
18- 38			1.2	0.1								43.7	TR	0.5	
38- 61															
61- 76															

Narrative Pedon Description

Pedon: Amelia

NSSL pedon number: 40A566

Pedon ID: S57PR-079-007

SSIR #12 pedon ID: S57PR-14-9

Field classification: Clayey-skeletal, mixed, isohyperthermic Typic Haplustalfs

Revised classification as of April 01, 2001: Fine, mixed, active, isohyperthermic Typic Haplustalfs

Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 0.8 km west of Highway 116 along Highway 305 to Mayagüez, 91 meters west of dairy shed and 91 meters south of Highway 305; aerial photograph GS-LR-4-30

Latitude: 18°00’30" north

Longitude: 67°03’32" west

Climate: Semiarid; annual precipitation 635 to 762 mm

Vegetation: Native grasses

Slope: 3 percent; on footslopes and alluvial fans

Drainage: Well drained

Erosion: None to slight

Described and sampled by: L.T. Alexander, C.J. Koch, J. Juarez, Jr., and J.E. Trigo on September 10, 1975

A—0 to 18 cm; dark brown (7.5YR 3/2) clay loam; weak medium granular structure; hard, friable, nonsticky, nonplastic; few fine angular volcanic rock fragments; very strongly acid; clear smooth boundary. 40A4151

B1—18 to 38 cm; dark yellowish brown (10YR 4/3) gravelly sandy clay loam; weak medium granular structure; very hard, nonsticky, nonplastic; patchy clay skins; few fine angular volcanic rock fragments; many black concretions; common fine rounded iron concretions or iron-impregnated volcanic rock fragments; moderately acid; clear irregular boundary. 40A4152

B2t—38 to 61 cm; dark yellowish brown (10YR 4/4) very gravelly clay that has common spots of dark yellowish brown (10YR 3/4) material; massive; very hard, sticky, plastic; many angular volcanic rock fragments (50 to 75 percent of the soil mass); common black concretions; common fine iron concretions or iron-impregnated volcanic rock fragments; slightly acid; gradual boundary. 40A4153

C—61 to 76 cm; extremely gravelly clay; this horizon is similar to the B2t horizon, except that it is extremely hard and more than 75 percent of the soil mass is angular volcanic fragments; several large indurated plinthite boulders were found in the B2t and C horizons; the boulders are presumed to be of colluvial origin and not genetically related to the profile; mildly alkaline. 40A4154

Palmarejo: S57PR-079-008

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Palmarejo; clayey, mixed, isohyperthermic Typic Tropustults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 244, Samples 40A 1816–1820

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	(- -CLAY- -) FINE LT .0002	CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) 2 -5	5 -20	20 -75	WEIGHT - - - - .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				
40A1816S	0- 23	Ap	21.2	37.6	41.2			21.2	16.4	11.1	13.4	6.3	7.3	3.1	TRC	1C	--		31	1
40A1817S	23- 46	B21t	55.9	16.2	27.9			10.1	6.1	5.8	8.4	5.3	7.2	1.2	TRC	--C	--		22	--
40A1818S	46- 76	B22t	46.5	22.3	31.2			15.3	7.0	7.0	9.1	5.0	7.1	3.0	TRC	1C	--		25	1
40A1819S	76-105	C1	32.0	27.7	40.3			22.2	5.5	7.2	9.8	6.0	10.9	6.4	1C	3C	--		36	4
40A1820S	105-130	C2	21.5	25.5	53.0			19.8	5.7	7.2	9.7	6.7	16.6	12.8	--C	--C	--		46	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a OF <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	COLE OVEN DRY 4A1h	WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	1.64	0.149			2.3			0.63	0.55										11.7	
23- 46	0.80	0.093			4.7			0.35	0.47										26.3	
46- 76	0.49	0.053			5.1			0.37	0.47										21.9	
76-105	0.21				2.0			0.51	0.48										15.4	
105-130	0.11				3.8			0.67	0.54										11.7	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b -MEQ / 100	SUM BASES	ACID- EXTR ITY 6H5a G - - - - - - - - - -	AL 6G9a	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b ->	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3 <- -PCT- >	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g <- -PCT ->	<20MM 8E1	CASO4 AS GYPSUM <2MM <20MM 8I <- -PCT ->	SAT PASTE 8C1g	(- - - -PH - - -) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
0- 23	2.3	1.1	0.1	0.3	3.8	15.1	2.4	18.9	13.3	1		20	29			--			4.5
23- 46	3.2	1.4	0.4	0.2	5.2	23.0	8.1	28.2	19.7	1		18	26			--			4.6
46- 76	2.0	1.1	0.5	0.2	3.8	20.9	9.2	24.7	17.4	2		15	22			--			4.7
76-105	1.3	1.5	0.7	0.2	3.7	16.8	10.7	20.5	16.4	3		18	23			--			4.7
105-130	1.1	1.8	0.6	0.2	3.7	13.9	8.8	17.6	14.5	3		21	26			--			4.8

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - ->											<- -PCT- ->			
0- 23			1.2	0.3								48.6	TR	0.8	
23- 46			1.0	--								111.0	TR	0.2	
46- 76			1.4	--								99.2	TR	0.2	
76-105			2.2	0.1								67.6	TR	0.3	
105-130			2.8	0.1								45.2	TR	0.5	

Narrative Pedon Description

Pedon: Palmarejo
Lab pedon: 40A0244
Pedon ID: S57PR-079-008
SSIR #12 pedon ID: S57PR-14-2
Field classification: Clayey, mixed, isohyperthermic Typic Tropustults
Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Typic Haplustults
Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 46 meters south of bridge no. 960+85 along main irrigation canal; about 3.2 km southwest of sample S57PR-14-1
Latitude: 18°02’12" north
Longitude: 67°06’01" west
Soil survey area: PR687—Lajas Valley Area, Puerto Rico
Climate: Semiarid
Average annual precipitation: 889 mm
Slope: 1 to 2 percent; smooth surface
Vegetation: Sugarcane; agriculture land
Erosion: None to slight
Root distribution: Abundant in Ap horizon; old root channels evident down to B22t horizon
Drainage: Moderately well drained
Parent material: Volcanic rocks from the surrounding hills
Particle-size control section: 23 to 73 cm
Described and sampled by: L.T. Alexander, C.J. Koch, J.A. Bonnet, R.E. Gierbolini, J. Juarez, Jr., and J.E. Trigo on September 5, 1957
Notes: The Palmarejo soils occur on gently sloping alluvial fans in the semiarid portion of southwestern Puerto Rico. Soil Temperature was 27.5 °C at a depth of 107 cm.

Ap—0 to 23 cm; dark brown (7.5YR 3/2) loam; weak medium granular structure; friable; few small iron-impregnated volcanic fragments; abrupt smooth boundary. 40A1816

B21t—23 to 46 cm; yellowish brown (10YR 5/6) clay; distinct dark brown (7.5YR 3/2) redoximorphic features; moderate medium subangular blocky structure; slightly sticky; clay films on faces of peds; few small iron-impregnated volcanic fragments; clear smooth boundary. 40A1817

B22t—46 to 76 cm; yellowish brown (10YR 5/8) clay; 3 percent medium distinct red (10R 4/8) redoximorphic features; moderate medium subangular blocky structure parting to prismatic; moderately sticky, moderately plastic; clay films and clay skins present; clear smooth boundary. 40A1818

C1—76 to 104 cm; yellowish brown (10YR 5/8) and white (7.5YR 8/1) clay; massive; moderately sticky, moderately plastic; many iron-impregnated volcanic fragments, some of which may be indurated plinthite fragments; clear smooth boundary. 40A1819

C2—104 to 132 cm; white (7.5YR 8/1) and red (10R 4/8) clay; massive; moderately sticky, moderately plastic; many iron-impregnated volcanic fragments, some of which may be indurated plinthite fragments. 40A1820

Fraternidad: S61PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Fraternidad; very-fine, montmorillonitic, isohyperthermic Udic Chromusterts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 249, Samples 40A 1847–1852

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -					PCT OF <2MM		(	) - - - - - - - - - - - -				<- PCT OF <75MM(3B1)->				SOIL
40A1847S	0- 18	Ap		51.6	30.7	17.7			19.2	11.5	6.5	5.1	1.9	2.4	1.8	--C	--C	--	11	--
40A1848S	18- 36	A12		55.0	28.3	16.7			17.6	10.7	6.2	4.5	1.7	2.3	2.0	--C	--C	--	10	--
40A1849S	36- 58	A13		61.6	24.8	13.6			15.9	8.9	5.1	3.7	1.3	1.8	1.7	--C	--C	--	8	--
40A1850S	58- 86	C1		63.0	24.6	12.4			15.3	9.3	5.1	3.5	1.2	1.6	1.0	--C	--C	--	7	--
40A1851S	86-130	C2		58.2	28.5	13.3			17.7	10.8	5.8	3.8	1.2	1.5	1.0	--C	--C	--	7	--
40A1852S	130-150	C3		57.3	27.6	15.1			17.0	10.6	6.2	4.5	1.4	1.5	1.5	--C	--C	--	9	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.64	0.138			3.4			0.81	0.40			1.36		1.60		22.3		32.4	20.4	
18- 36	1.29	0.118			3.4			0.75	0.43			1.41		1.79		28.7		40.6	23.5	
36- 58	0.63	0.063			3.1			0.71	0.44			1.36		1.78		30.5		40.8	27.1	
58- 86	0.37	0.040			2.7			0.69	0.42			1.41		1.84		29.1		38.6	26.2	
86-130	0.12				2.5			0.68	0.42			1.48		1.79		27.0		36.9	24.6	
130-150	0.07				2.7			0.67	0.42										24.2	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.	COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS		CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM		.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1g	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - -	- -PCT	- -	- ->				1:2	1:1
0- 18	23.3	16.4	0.3	0.5	40.5	10.2		50.7	41.7			80	97						5.8
18- 36	23.6	17.5	0.5	0.5	42.1	10.0		52.1	41.2			81	100						5.9
36- 58		22.8	1.0	0.7	24.5			24.5	43.5			100	56						6.3
58- 86		24.0	1.6	0.7	26.3			26.3	43.3			100	61	--					6.8
86-130		24.4	2.1	0.7					39.5			100	69	1					7.8
130-150		23.5	2.6	0.8	26.9			26.9	38.2			100	70	TR					7.8

Narrative Pedon Description

Pedon: Fraternidad

NSSL pedon number: 40A249

Pedon ID: S61PR-079-001

SSIR #12 pedon ID: S61PR-14-9

Field classification: Very-fine, montmorillonitic, isohyperthermic Udic Chromusterts

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Typic Haplusterts

Location: Lajas Municipio, Lajas Valley, Puerto Rico; Lajas Experiment Station; Suroeste Soil Conservation District; 210 meters north and 46 meters east of junction of roads to poultry barns and to Lajas railroad station, east of Experiment Station headquarters; aerial photograph GS-LR-6-86

Latitude: 18°02’09" north

Longitude: 67°04’57" west

Slope: Nearly level (1 percent slope); at the top of low convex alluvial fan above a valley floor

Drainage, runoff, and permeability: Moderately well drained, slow to medium runoff, and moderately slow permeability

Vegetation: Weeds on old cultivated field in research area

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, and L.H. Rivera on March 21, 1961

Notes: When sampled, the Ap, A12, and A13 horizons were estimated to be below field capacity and the C horizons were estimated to be at field capacity. Prominent cracks extend down to a depth of 58 cm. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; very dark grayish brown (10YR 3/2) clay; weak medium granular structure; firm, slightly sticky, plastic; many fine roots; common fine volcanic fragments; moderately acid; clear smooth boundary. 40A1847

A12—18 to 36 cm; mixed 80 percent very dark grayish brown (10YR 3/2) and 20 percent dark brown (10YR 3/3) clay; massive when wet, upon drying breaks to weak medium and coarse angular blocky structure with many pressure faces; 2.5-cm wide slickensides; firm, sticky, plastic; few fine roots; common fine brown volcanic fragments, including a few up to 2.5 cm across; moderately acid; clear wavy boundary. 40A1848

A13—36 to 58 cm; dark brown (10YR 3/3) clay; tongues and pockets of very dark grayish brown (10YR 3/2) clay; massive when wet, upon drying breaks to weak medium and coarse angular blocky structure with many pressure faces and slickensides 15 cm wide and less; firm, sticky, plastic; common fine black aggregates; calcareous; clear wavy boundary. 40A1849

C1—58 to 86 cm; dark yellowish brown (10YR 4/4) clay; tongues and pockets of very dark grayish brown (10YR 3/2) clay; massive when wet, upon drying breaks to weak medium and coarse angular blocky structure with many

pressure faces; slickensides 15 cm wide and less; firm, sticky, plastic; common fine black aggregates; calcareous; clear wavy boundary. 40A1850

C2—86 to 130 cm; dark yellowish brown (10YR 4/4) clay; massive when wet, upon drying breaks to weak coarse subangular blocky structure bounded by very dark brown (10YR 2/2) pressure faces in a wedge shape; 2.5- to 30-cm wide slickensides, 30 degrees to horizontal; very firm, sticky, plastic; common fine black concretions or aggregates; mildly alkaline, except for common calcareous seams; clear wavy boundary. 40A1851

C3—130 to 150 cm; dark yellowish brown (10YR 4/4) clay containing less clay than the horizons above; massive when wet, upon drying breaks to weak fine angular blocky structure bounded by very dark brown (10YR 2/2) pressure faces; many slickensides less than 2.5 cm wide; friable, slightly sticky, slightly plastic; slightly calcareous. 40A1852

Jacana: S61PR-079-002

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Jacana; fine, mixed, isohyperthermic Vertic Haplustolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 559, Samples 40A 4100–4104

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				- PCT OF <2MM		(	) - - - - - - - - - - - -				->	<- PCT OF <75MM(3B1)->				SOIL
40A4100S	0- 15	Ap		47.6	32.6	19.8			20.6	12.0	6.9	6.1	2.2	2.6	2.0	--C	--C	--	13	--
40A4101S	15- 33	A12		56.9	28.6	14.5			19.3	9.3	5.2	4.1	1.5	2.1	1.6	--C	--C	--	9	--
40A4102S	33- 53	B		52.1	34.0	13.9			22.1	11.9	6.7	4.7	1.2	1.0	0.3	--C	--C	--	7	--
40A4103S	53- 71	C1		16.2	27.6	56.2			15.8	11.8	13.1	19.6	9.2	10.4	3.9	--C	--C	--	43	--
40A4104S	71- 97	C2		11.0	26.0	63.0			12.6	13.4	14.6	23.5	10.7	11.5	2.7	--C	--C	--	48	--

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	1.91	0.164			5.2			0.80	0.44									31.0	20.9	
15- 33	1.58	0.138			5.5			0.65	0.44			1.34		1.73		30.6		37.0	24.8	
33- 53	0.89	0.079			4.6			0.89	0.51			1.36		1.76		32.3		39.9	26.8	
53- 71	0.19				2.7			3.14	1.09										17.6	
71- 97	0.09				2.4			4.44	1.25			1.80		1.90		16.4			13.8	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- EXTR ITY	AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1g	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - - - ->				<- - - -	-PCT	- - - ->					1:2	1:1
0- 15	20.2	18.3	0.3	0.4	39.2	12.4		51.6	37.9			76	100	--					5.7
15- 33	18.8	19.8	0.4	0.4	39.4	11.7		51.1	37.2			77	100	--					6.0
33- 53	22.1	29.5	0.9	0.4	52.9	7.4		60.3	46.6			88	100	--					6.6
53- 71	25.0	32.4	1.5	0.2	59.1	4.4		63.5	50.9			93	100	--					7.1
71- 97	23.8	28.6	1.7	0.2	54.3	4.2		58.5	48.8			93	100	TR					7.3

Narrative Pedon Description

Pedon: Jacana

NSSL pedon number: 40A559

Pedon ID: S61PR-079-002

SSIR #12 pedon ID: S61PR-14-4

Field classification: Fine, mixed, isohyperthermic Vertic Haplustolls

Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Vertic Haplustolls

Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 18 meters east of kilometer marker 1.7 and 11 meters south of fence along Highway 117; aerial photograph GS-LR-84

Latitude: 18°02’38" north

Longitude: 67°03’02" west

Slope: Gently sloping (3 percent) with a south aspect; on lower, convex footslope

Drainage, runoff, and permeability: Moderately well drained, medium runoff, and slow permeability

Vegetation: Cultivated corn and beans for six months; before this, native pasture and weeds

Parent material: Local colluvium or alluvium derived from volcanic rocks; lower part developed from residuum

Described and sampled by: R.B. Grossman, W.E. McKinzie, S.J. Greer, and J.E. Brunet on March 18, 1961

Notes: Fine saprolite and volcanic pebbles are scattered throughout profile. The soil was estimated to be slightly below field capacity when wet. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; very dark brown (10YR 2/2) clay; weak fine granular structure; hard, friable, slightly sticky, plastic; moderately acid; abrupt smooth boundary. 40A4100

A12—15 to 33 cm; very dark brown (10YR 2/2) clay; massive when wet; weak coarse blocky structure parting to weak fine granular when dry; hard, very firm, slightly sticky, plastic; no clay films; small slickensides less than 2.5 mm wide; moderately acid; clear smooth boundary. 40A4101

B—33 to 53 cm; 80 percent dark brown (7.5YR 3/2) and 20 percent very dark brown (10YR 2/2) clay; massive when wet; weak coarse blocky structure parting to weak fine granular when dry; hard, very firm, slightly sticky, plastic; many pressure faces and 2.5- to 7.5-cm wide slickensides; neutral; clear wavy boundary. 40A4102

C1—53 to 71 cm; 80 percent saprolite of volcanic flow that does not break down on wetting and 20 percent dark brown (7.5YR 3/2) clay in pockets and seams; massive; parts along lines of cleavage; slightly sticky, plastic; neutral; gradual wavy boundary. 40A4103

C2—71 to 97 cm; coarse bedded volcanic-flow conglomerate with dark brown (7.5YR 3/2) clay in seams; hard and massive; some green-colored particles less than 5 mm in diameter; neutral. 40A4104

Guayama: S61PR-079-003

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Guayama; clayey, mixed, isohyperthermic Lithic Haplustalfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 567, Samples 40A 4155–4157

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						( ) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->			
40A4155S	0- 13	A	38.5	21.4	40.1			14.3	7.1	3.5	4.2	3.4	10.9	18.1	1C	7C	--	42	8
40A4156S	13- 30	Bt	46.8	23.1	30.1			16.7	6.4	4.0	4.5	3.0	8.0	10.6	2C	10C	--	35	12
40A4157S	30- 53	C	33.2	21.9	44.9			14.5	7.4	3.7	5.4	4.6	13.3	17.9	2C	11C	--	49	13

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	2.21	0.233			3.6			0.99	0.44										16.9	
13- 30	1.05	0.115			3.8			0.88	0.38										18.0	
30- 53	0.52	0.056			3.3			1.24	0.51										16.8	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 13	31.7	8.5	0.2	0.8	41.2	4.6		45.8	38.0			90	100	--					7.0
13- 30	37.3	7.7	0.4	0.4	45.8	4.7		50.5	41.1			91	100	--					7.3
30- 53	37.8	7.7	0.5	0.3	46.3	3.4		49.7	41.2			93	100	--					7.5

Narrative Pedon Description

Pedon: Guayama

NSSL pedon number: 40A567

Pedon ID: S61PR-079-003

SSIR #12 pedon ID: S61PR-14-3

Field classification: Clayey, mixed, isohyperthermic Lithic Haplustalfs

Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Typic Haplustalfs

Location: Lajas Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 15 meters north of kilometer marker 1.5 on Highway 303; aerial photograph GS-LR-6-200

Latitude: 17°59’48" north

Longitude: 67°04’57" west

Vegetation: Malva, pajon, other grasses, and small cacti; used for pasture

Slope: Strongly sloping (20 percent) with a south aspect; on a slightly concave side slope of a ridge

Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate internal drainage

Parent material: Very local colluvium and residuum from volcanic rocks

Described and sampled by: G.D. Smith, R.B. Grossman, W.E. McKinzie, O.R. Carter, and L.H. Rivera on March 17, 1961

Notes: Underlying rock material was not sampled. Soil was below field capacity when sampled. Depth to rock is greater where sampled than in the surrounding area. Some secondary or redeposited lime is in rock cavities beneath the C horizon. History of the site includes use as a field and pasture. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

A—0 to 13 cm; dark reddish brown (5YR 3/4) gravelly clay loam; weak fine granular structure; soft, friable, slightly sticky, plastic; many fine roots; many fine subrounded volcanic rock fragments; neutral; clear smooth boundary. 40A4155

Bt—13 to 30 cm; reddish brown (5YR 4/4) gravelly clay; moderate fine subangular blocky structure; soft, friable, sticky, plastic; common fine roots; common fine volcanic rock fragments; pebbles coated with clay; neutral; clear smooth boundary. 40A4156

C—30 to 53 cm; yellowish red (5YR 4/6) gravelly clay loam; moderate fine subangular blocky structure; soft, firm, slightly sticky, plastic; few fine roots; many fine volcanic rock fragments; grades gradually and irregularly into weathered volcanic rock at a depth of 25 to 60 cm. 40A4157

Mariana: S85PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Mariana; fine, mixed, isohyperthermic Ustic Dystropepts

SSL—Project: 86P 42, (CP86PR072)

—Pedon: 86P 226, Samples 86P 1347–1352

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
86P1347S	0- 20	Ap		29.1	30.7	40.2	11.0		19.1	11.6	8.2	7.6	6.7	8.5	9.2	9	19	--	51	28
86P1348S	20- 37	AB		38.3	32.0	29.7	15.4		20.3	11.7	5.0	3.9	3.2	4.5	13.1	4	16	3	42	23
86P1349S	37- 64	Bw1		54.3	32.4	13.3	17.6		20.3	12.1	5.6	2.2	1.4	1.6	2.5	2	7	2	18	11
86P1350S	64- 82	Bw2		53.9	32.9	13.2	14.7		20.3	12.6	6.2	2.5	1.5	1.4	1.6	1	4	4	15	9
86P1351S	82-125	BC		45.6	43.2	11.2	9.7		29.0	14.2	6.7	2.0	0.9	0.7	0.9	1	4	1	10	6
86P1352S	125-150	Cr		45.1	44.7	10.2	10.6		28.7	16.0	6.9	1.7	0.5	0.2	0.9	1	TR	--	4	1

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 20	2.90	0.208			3.7	0.3		0.85	0.46				1.29	1.35	0.013			22.6	13.5	0.10
20- 37	1.64	0.131			4.3	0.4		0.60	0.46				1.17	1.25	0.020			31.1	17.5	0.14
37- 64	0.59				3.4	0.4		0.34	0.42	60	26		1.32	1.52	0.045			30.8	22.6	0.10
64- 82	0.43				3.1	0.3		0.29	0.42				1.32	1.45	0.030			30.7	22.4	0.10
82-125	0.25				1.8	0.3		0.37	0.47				1.31	1.50	0.045			32.6	21.3	0.14
125-150	0.15				0.4	0.1		0.22	0.46	60	29		1.37	1.54	0.040			31.3	20.6	0.15

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								1:2	1:1
0- 20	1.7	0.6	0.4	0.2	2.9	23.9	12.9	26.8	24.7	15.8	82	11	12					3.3	3.6	4.0
20- 37	0.4	0.1	0.2	0.1	0.8	23.9	16.0	24.7	23.0	16.8	95	3	3					3.4	3.7	4.1
37- 64	0.2	TR	0.1	0.1	0.4	20.5	15.3	20.9	18.4	15.7	97	2	2					3.7	3.8	4.3
64- 82	0.1	TR	0.1	0.1	0.3	18.5	13.2	18.8	15.6	13.5	98	2	2					3.7	3.9	4.3
82-125	0.1	TR	0.1	0.1	0.3	18.4	15.0	18.7	16.9	15.3	98	2	2					3.7	3.8	4.4
125-150	0.1	TR	0.1	0.1	0.3	11.7	9.0	12.0	9.9	9.3	97	2	3					3.7	3.9	4.3

	< - CLAY MINERALOGY (<.002mm) ->																			
	FRACT	< - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - ELEMENTAL - - - - - - - -><- -> EGME INTER																		
SAMPLE	ION	<																		
		< - - - - - - 7A2i - - - - - -><- 7A6 - -><- 7A4b - -><- - - - - - - - - - 7C3 - - - - - - - - -><- -> 7D2 TION																		
NUMBER	<- - -><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - - -><- -><mg/g><- - >																			
86P1349	TCLY	KK 4	MT 3	MI 2			KK39						4.6				1.9			
86P1350	TCLY	KK 5	MT 2	MI 1			KK59						4.1				1.3			
86P1351	TCLY	KK 5	MT 2	MI 1			KK56						2.7				1.8			

	< - SAND - SILT MINERALOGY (2.0-0.002mm) ->																			
	FRACT	< - - - - - - X-RAY - - -><- - - THERMAL - - - -><- - - - - - - - OPTICAL - - - - - - - - -><- >INTER																		
SAMPLE	ION	<																		
		< - - - - 7A2i - - - - -><- 7A3b - -><- 7A4b - -><- - - - - - - - - 7B1a - - - - - - - - -><- > TION																		
NUMBER	< - -><- - - Peak Size - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - - -><- - - - - - - - -><- - >																			
86P1349	VFS											100	CD88	RA 9	QC 2	OP 1	QZtr			
86P1351	VFS											99	CD83	RA 8	QC 6	ZR 1	OP 1	FD 1		
86P1351	VFS												QZtr							

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

KK kaolinite MT montmorillon MI mica CD chalcedony RA resist-aggre QC clay-coat qz

OP opaques QZ quartz ZR zircon FD feldspar

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Mariana[10]
NSSL pedon number: 86P0226
Pedon ID: S85PR-079-001
Field classification: Fine, mixed, isohyperthermic Ustic Dystropepts
Revised classification as of April 01, 2001: Fine, mixed, active, isohyperthermic Typic Haplohumults
Location: Lajas Municipio, Puerto Rico; Lajas-Palmarejo Area; Lajas Soil Survey sheet 3; 23 meters southeast of fence running southeast-northeast and 206 meters northeast of trail running northwest-southeast
Latitude: Unknown
Longitude: Unknown
Physiography: Hillside or mountainside in hills
Slope: 35 percent concave with a southwest aspect
Drainage and permeability: Well drained and moderate permeability
Vegetation: Guineagrass in pastureland
Erosion: Moderate
Particle-size control section: 25 to 100 cm
Diagnostic features: Umbric horizon at 0 to 37 cm; argillic horizon at 20 to 82 cm
Map unit: MaE2—there are severely eroded areas included.
Described and samwpled by: G. Acevedo, L. Daniels, and J. Torres on July 29, 1985

Ap—0 to 20 cm; dark brown (7.5YR 3/2) gravelly clay loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, plastic; common very fine roots; very strongly acid; 20 percent gravel; clear smooth boundary. 86P1347

AB—20 to 37 cm; 50 percent dark brown (7.5YR 3/2) and 50 percent dark brown (7.5YR 3/4) clay; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, plastic; common very fine roots; very strongly acid; 10 percent gravel; clear wavy boundary. 86P1348

Bw1—37 to 64 cm; yellowish red (5YR 5/6) and reddish brown (5YR 4/4) very gravelly clay; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; common very fine roots; continuous faint clay films on faces of peds; very strongly acid; 50 percent gravel; gradual wavy boundary. 86P1349

Bw2—64 to 82 cm; 30 percent pinkish gray (7.5YR 7/2), 60 percent strong brown (7.5YR 5/6), and 10 percent dark yellowish brown (10YR 3/6) clay; weak fine and medium subangular blocky structure; hard, friable, sticky, plastic; few very fine roots; continuous faint clay films on faces of peds; very strongly acid; 2 percent gravel; gradual wavy boundary. 86P1350

[10] This soil is now thought to have an ustic moisture regime.

BC—82 to 125 cm; 60 percent light gray (10YR 7/2), 30 percent strong brown (7.5YR 5/6), and 10 percent dark red (2.5YR 3/6) silty clay loam; weak medium subangular blocky structure; hard, firm, sticky, plastic; few very fine roots; extremely acid; gradual wavy boundary. 86P1351

Cr—125 to 150 cm; 80 percent white (10YR 8/1) and 20 percent strong brown (7.5YR 5/8) silty clay loam; weak medium subangular blocky structure; extremely hard, firm, slightly sticky, plastic; very few roots; extremely acid. 86P1352

Amelia: S85PR-079-003

Primary Characterization Data
Lajas Municipio, Puerto Rico
Sampled as: Amelia; fine, mixed, isohyperthermic Typic Paleustalfs
SSL—Project: 86P 42, (CP86PR072)
—Pedon: 86P 222, Samples 86P 1318–1324
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS WEIGHT 2-5	WEIGHT 5-20	WEIGHT 20-75	.1-75	(>2MM) WT PCT WHOLE SOIL
-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
86P1318S	0- 22	Ap	23.3	30.2	46.5	9.7		19.3	10.9	10.1	13.4	11.6	9.0	2.4	1	2	--	38	3
86P1319S	22- 39	Bt1	33.9	27.0	39.1	17.5		17.8	9.3	7.6	7.9	6.2	6.9	10.5	4	21	8V	54	33
86P1320S	39- 73	Bt2	53.2	19.4	27.4	37.9		12.5	6.9	4.9	5.5	4.3	4.4	8.3	5	12	2	37	19
86P1321S	73-110	Bt3	45.0	14.3	40.7	30.0		9.2	5.1	5.7	8.8	8.6	9.4	8.2	8	23	14V	64	45
86P1322S	110-142	Bt4	28.5	13.4	58.1	17.6		8.8	4.6	5.9	10.8	11.9	13.0	16.5	7	24	7V	70	38
86P1323S	142-172	Bt5	32.1	12.1	55.8	19.4		8.0	4.1	5.3	10.3	12.3	13.7	14.2	12	27	7V	73	46
86P1324S	172-198	Bt6	30.9	12.3	56.8	19.7		7.6	4.7	6.6	11.2	10.9	11.8	16.3	7	13	14V	67	34

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 22	1.00	0.110			3.1	0.2		0.49	0.42										9.8	
22- 39	0.71	0.081			3.4	0.2		0.41	0.35				1.43	1.55	0.021			21.1	11.8	0.11
39- 73	0.39	0.066			4.3	0.3		0.32	0.33	52	32		1.52	1.72	0.037			24.8	17.3	0.10
73-110	0.18				3.9	0.3		0.32	0.34				1.59	1.71	0.016			21.1	15.1	0.06
110-142	0.11				3.3	0.2		0.36	0.35				1.72	1.91	0.025			20.6	10.1	0.13
142-172	0.08				3.7	0.3		0.36	0.37				1.56	1.66	0.014			21.6	11.9	0.10
172-198	0.09				3.8	0.3		0.32	0.35				1.71	1.82	0.016			16.7	10.8	0.08

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - -				-MEQ / 100 G					- ->	<- - -	-PCT	- ->					1:2	1:1
0- 22	7.1	1.9	0.1	0.6	9.7	5.5		15.2	11.4			64	85				5.1	5.4	5.6
22- 39	10.1	2.0	0.1	0.3	12.5	5.2		17.7	13.9			71	90				5.3	5.8	6.3
39- 73	12.2	3.1	0.3	0.4	16.0	4.7		20.7	17.1			77	94				5.3	6.0	6.6
73-110	10.3	2.6	0.3	0.3	13.5	5.2		18.7	14.6			72	92				5.0	5.6	6.2
110-142	6.6	1.8	0.3	0.2	8.9	3.5		12.4	10.3			72	86				4.7	5.2	5.8
142-172	8.1	2.0	0.2	0.3	10.6	4.1		14.7	11.7			72	91				4.7	5.3	5.9
172-198	6.4	1.7	0.2	0.3	8.6	3.2		11.8	9.9			73	87				4.7	5.3	5.9

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
86P1320	TCLY	KK 2 MI 2 MM 2 QZ 1	KK17	GItr			12.4			1.6			
86P1324	TCLY	KK 2 MI 1 MM 1 QZ 1	KK17	GItr			12.7			2.0			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	THERMAL TGA 7A4b (Percent)	OPTICAL TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)	INTERPRETATION
86P1320	VFS				100	CD82 RA 8 QZ 6 OP 4 ZRtr BTtr	
86P1324	VFS				96	CD68 RA20 QZ 4 OP 4 FK 2 OW 2	
86P1324	VFS					MI 1	

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:
KK kaolinite MI mica MM mont-mica QZ quartz CD chalcedony RA resist-aggre
OP opaques ZR zircon BT biotite GI gibbsite FK potas feldsp OW oth-weath mn

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Amelia

NSSL pedon number: 86P0222

Pedon ID: S85PR-079-003

Field classification: Fine, mixed, isohyperthermic Typic Paleustalfs

Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Typic Haplustalfs

Location: Lajas Municipio, Puerto Rico; 0.6 km east of intersection that is 2.4 km south of kilometer marker 13.2 on Highway 101 and 18.3 meters south of fence

Latitude: 18°00’50" north

Longitude: 67°07’20" west

Elevation: 17 meters

Physiography: Fan in mountain valleys or canyons

Geomorphic position: Shoulder interfluve

Slope: 7 percent plane with a south aspect

Average annual precipitation: 870 mm; ustic moisture regime

Major Land Resource Area: 273—Semiarid Coastal Plains

Average air temperature: Annual—26 °C; summer—27 °C; winter—23 °C

Average soil temperature: Annual—29 °C; summer—30 °C; winter—28 °C

Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability

*Vegetation: P*asture

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 22 to 72 cm

Parent material: Alluvium from mixed-igneous and metamorphic material

Diagnostic features: Ochric epipedon at 0 to 22 cm; argillic horizon at 22 to 198 cm

Described and sampled by: D. Williams, L.A. Daniels, G. Acevedo, and J. Torres May 20, 1985

Notes: Subgroup is udic according to taxonomy because of a lack of lime within a depth of 125 cm, but the parent material lacks lime. Typic subgroup best represents the classification.

Ap—0 to 22 cm; clay loam, brown to dark brown (7.5YR 4/4) dry, dark brown (7.5YR 3/4) moist; moderate fine granular structure; very friable, slightly sticky, slightly plastic; common very fine roots throughout; slightly acid; 5 percent igneous gravel; clear wavy boundary. 86P1318

Bt1—22 to 39 cm; gravelly clay, reddish brown (5YR 4/4) dry, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure parting to moderate fine granular; friable, sticky, plastic; common very fine roots throughout; common discontinuous faint clay films on rock fragments; neutral; 25 percent igneous gravel; 5 percent rock fragments 5 to 8 cm across; clear smooth boundary. 86P1319

Bt2—39 to 73 cm; gravelly clay, yellowish red (5YR 4/6) dry and moist; moderate fine subangular blocky structure parting to moderate medium subangular blocky; friable, sticky, plastic; few very fine roots throughout; many continuous distinct clay films on vertical and horizontal faces of peds and few continuous distinct clay films on rock fragments; neutral; 15 percent igneous gravel; gradual smooth boundary. 86P1320

Bt3—73 to 110 cm; very gravelly clay, yellowish red (5YR 4/6) dry and moist; moderate medium subangular blocky structure; friable, sticky, plastic; few very fine roots throughout; many continuous distinct clay films on vertical and horizontal faces of peds and few continuous distinct clay films on rock fragments; neutral; 40 percent igneous gravel; 2 percent igneous cobbles; clear wavy boundary. 86P1321

Bt4—110 to 142 cm; very gravelly clay, 75 percent strong brown (7.5YR 5/6) and 25 percent yellowish red (5YR 4/6) dry, and 75 percent strong brown (7.5YR 4/6) and 25 percent yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; friable, sticky, plastic; few very fine roots throughout; many discontinuous faint clay films and common discontinuous faint clay films on rock fragments; neutral; 50 percent igneous pebbles; 5 percent igneous cobbles; 5 percent rock fragments 5 to 8 cm across; gradual wavy boundary. 86P1322

Bt5—142 to 172 cm; extremely gravelly clay, yellowish red (5YR 5/6) dry, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; friable, sticky, plastic; common discontinuous faint clay films on vertical and horizontal faces of peds and common discontinuous faint clay films on rock fragments; neutral; 65 percent igneous gravel; 5 percent igneous cobbles; 5 percent rock fragments 5 to 8 cm across; gradual wavy boundary. 86P1323

Bt6—172 to 198 cm; very gravelly clay, yellowish red (5YR 5/6) dry, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; friable, sticky, plastic; common discontinuous faint clay films on vertical and horizontal faces of peds and common discontinuous faint clay films on rock fragments; neutral; 45 percent igneous gravel; 2 percent igneous cobbles; 5 percent rock fragments 5 to 8 cm across. 86P1324

Fe: S89PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Fe; fine, montmorillonitic, isohyperthermic Typic Chromusterts

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 397, Samples 89P 2204–2210

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-) (>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
89P2204S	0- 14	A1	58.1	36.5	5.4	24.3		26.4	10.2	1.4	1.3	0.8	0.9	1.0	--	TR	--	4	TR
89P2205S	14- 34	A2	58.1	35.0	6.9	24.6		26.3	8.7	2.6	1.3	0.8	0.8	1.4	2	TR	--	6	2
89P2206S	34- 90	Bw1	57.1	34.4	8.5	23.9	0.3	26.4	8.0	2.7	1.5	1.0	1.3	2.0	2	TR	--	8	2
89P2207S	90-116	Bw2	53.4	33.3	13.3	24.2	0.3	24.6	8.8	4.9	2.9	1.8	1.8	1.9	3	TR	--	11	3
89P2208S	116-141	By1	50.6	39.0	10.4	21.8	1.2	25.8	13.2	3.9	3.4	1.2	1.0	0.9	2	1	--	9	3
89P2209S	141-200	By2	55.9	36.8	7.3	27.1		26.2	10.6	5.0	1.7	0.3	0.2	0.1	TR	TR	--	2	TR
89P2210S	200-240	Bw	57.6	34.8	7.6	32.2	1.2	25.0	9.8	4.7	1.8	0.5	0.3	0.3	TR	TR	--	3	TR

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 14	1.83	0.156			2.0	0.1	0.1	0.83	0.40				1.30	1.86	0.127			34.5	23.4	0.14
14- 34	1.40	0.131			2.0	0.1	0.1	0.86	0.41				1.30	1.98	0.149			36.9	24.1	0.16
34- 90	1.19	0.102			1.8	0.1	0.1	0.88	0.43				1.29	1.98	0.151			36.7	24.4	0.16
90-116	0.65	0.040			1.1	--	TR	0.75	0.43				1.39	1.96	0.119			32.1	22.8	0.13
116-141	0.37				0.7	--	TR	0.70	0.43				1.45	1.93	0.098			29.8	21.6	0.12
141-200	0.12				1.1	--	TR	0.62	0.42				1.40	1.97	0.120			32.4	23.5	0.12
200-240	0.08				1.2	--	TR	0.61	0.42				1.42	1.94	0.109			32.0	23.9	0.12

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 14		8.5	1.4	0.8					48.4	2	3	100	100	2				7.5	8.0
14- 34		9.5	3.1	0.5					50.0	5	5	100	100	4				7.6	8.4
34- 90		13.6	8.9	0.7					50.2	14	13	100	100	4		TR		7.8	8.3
90-116		16.0	16.8	0.4					40.3	28	19	100	100	7		--		8.0	8.2
116-141		14.9	16.6	0.4					35.3	28	18	100	100	7		2		7.9	8.1
141-200		14.7	17.7	0.5					34.7	30	17	100	100	7		2		8.0	8.0
200-240		14.9	18.7	0.7					35.3	37	23	100	100	7		TR		8.1	8.6

DEPTH (CM)	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	TOTAL SALTS EST. 8D5	PRED. ELEC. COND. 8A3a MMHOS /cm	PRED. ELEC. COND. 8I MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 14	3.3	1.0	3.7	0.2	--	4.6	0.1	2.0				1.6	--	--	87.2	TR	0.85	4.20
14- 34	1.8	0.5	5.2	0.1	--	4.4	0.2	1.7				0.9	--	--	83.8	TR	0.75	3.50
34- 90	3.4	1.9	21.0	0.1	--	3.6	1.0	8.3				12.2	--	--	96.2	0.2	2.57	13.00
90-116	9.3	8.1	56.8	0.1	--	1.8	1.6	25.5				43.8	--	--	96.5	0.5	6.62	34.20
116-141	22.2	17.6	78.1	0.1	--	1.1	3.4	31.3				78.4	--	--	84.3	0.6	9.31	53.10
141-200	21.3	17.9	75.1	0.1	--	0.8	2.9	32.8				80.3	--	--	98.0	0.7	9.38	60.10
200-240	4.1	4.8	47.7	0.1	--	0.9	1.5	26.9				26.9	--	--	118.7	0.5	5.66	38.20

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
89P2205	TCLY	MT 3 KK 2 MC 2 CL 1 MI 1				19.0	7.6			1.6			
89P2205	TCLY	CA 1 HE 1											
89P2206	TCLY	MT 4 MC 3 KK 2 CL 1 MI 1				21.0	7.9			1.6			
89P2206	TCLY	HE 1											
89P2208	TCLY	MT 3 MC 2 KK 2 MI 2 CL 1				18.0	9.3			1.8			
89P2208	TCLY	HE 1 QZ 1											

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
MT montmorillon KK kaolinite MC mont-chlorit CL chlorite MI mica CA calcite
HE hematite QZ quartz

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OXALATE EXTRACTION OPT DEN 8J	FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3 (PPM)	TOTAL C 6A2d	WATER CONTENT 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	WATER DISPERSIBLE PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY SML	SILT	SAND	MIN SOIL CONT 8F1 (<20mm)	AGGRT STABL <5mm 4G1 (PCT)
89P2204	1	0.05	0.32	0.14	0.24							32.5									
89P2205	2	0.05	0.34	0.16	0.25							33.3									
89P2206	3	0.04	0.31	0.13	0.21							34.2									
89P2207	4	0.02	0.18	0.10	0.17							32.1									
89P2208	5	0.02	0.19	0.09	0.16							30.9									
89P2209	6	0.03	0.22	0.14	0.19							32.6									
89P2210	7	0.02	0.18	0.13	0.21							32.6									

(Units: P C T of < 2 mm for acid oxalate and phosphorus columns; P P M for KCL MN; P E R C E N T of < 2 m m for water content and water dispersible columns.)

Narrative Pedon Description

Pedon: Fe

NSSL pedon number: 89P0397

Pedon ID: S89PR-079-001

Field classification: Fine, montmorillonitic, isohyperthermic Typic Chromusterts

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Sodic Haplusterts

Location: Lajas Municipio, Puerto Rico; Lajas Soil Survey sheet 4; 8 km east of Lajas; 3.7 km east on Highway 117

Latitude: 18°01’26" north

Longitude: 66°58’21" west

Elevation: 6 meters

Physiography: Mountain valleys or canyons

Microrelief: Gilgai closed depressions

Slope: 5 percent

Major Land Resource Area: 273—Semiarid Coastal Plains

Drainage, runoff, and permeability: Somewhat poorly drained, very slow runoff, and very slow permeability

Vegetation: Unspecified grasses in pastureland and native pasture

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 25 to 99 cm

Parent material: Alluvium from igneous-intermediate material

Weather station number: 5097

Soil temperature: 24 °C at depths of 50 cm and 10 cm

Diagnostic features: Mollic epipedon at 0 to 117 cm; cambic horizon at 33 to 239 cm

Described and sampled by: D. Williams, T. Mas, and C.L. Santiago during February 1989

Notes: Cracks are 30 to 50 cm apart and part vertically to 80 to 85 cm where they are intercepted by large slickensides. Slickensides began at a depth of 34 cm. Slickenside surface planes are 2 to 10 cm apart.

A1—0 to14 cm; black (10YR 2/1) clay; extremely hard, extremely firm, very sticky, very plastic; few fine roots throughout; few fine and medium irregular lime concretions; clear smooth boundary. 89P2204

A2—14 to 34 cm; very dark brown (10YR 2/2) clay; weak coarse angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few fine roots throughout; common fine and medium irregular lime concretions; few volcanic pebbles; clear wavy boundary. 89P2205

Bw1—34 to 90 cm; very dark gray (10YR 3/1) clay; moderate fine and medium angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few fine roots throughout; few continuous distinct intersecting slickensides throughout and few continuous distinct pressure faces throughout;

slickenside faces are thin and striated; common fine and medium irregular lime concretions; few volcanic pebbles; clear wavy boundary. 89P2206

Bw2—90 to 116 cm; very dark grayish brown (10YR 3/2) clay; moderate fine and medium angular blocky structure; extremely firm, very sticky, very plastic; few fine roots throughout; few very fine and fine tubular pores; few continuous distinct intersecting slickensides throughout; slickenside faces are thin and striated; few fine and medium irregular gypsum crystals; few volcanic pebbles; clear wavy boundary. 89P2207

By1—116 to 141 cm; 30 percent brown to dark brown (7.5YR 4/2) and 70 percent very dark grayish brown (10YR 3/2) clay; moderate coarse angular blocky structure parting to moderate fine and medium angular blocky; extremely firm, very sticky, very plastic; few fine roots throughout; few very fine and fine tubular pores; few continuous distinct intersecting slickensides throughout; slickenside faces are thin and striated; common fine and medium irregular gypsum crystals and few fine and medium rounded iron-manganese concretions; few volcanic pebbles; clear wavy boundary. 89P2208

By2—141 to 200 cm; brown to dark brown (7.5YR 4/2) clay; moderate coarse and very coarse angular blocky structure parting to moderate fine and medium angular blocky; extremely firm, very sticky, very plastic; few fine roots throughout; few very fine and fine tubular pores; few continuous distinct intersecting slickensides throughout; slickenside faces are thin and polished; few fine and medium rounded iron-manganese concretions; ridges are 1 to 2 cm high and 2 to 4 cm wide; few quartz grains; few dark splotches from above along slickenside faces; clear wavy boundary. 89P2209

Bw—200 to 240 cm; brown to dark brown (7.5YR 4/2) clay; moderate very coarse angular blocky structure parting to moderate fine and medium angular blocky; extremely firm, very sticky, very plastic; few very fine and fine tubular pores; few continuous distinct intersecting slickensides throughout; slickenside faces are thin and striated; few fine and medium rounded iron-manganese concretions; few quartz grains. 89P2210

Palmarejo: S89PR-079-002

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Palmarejo; clayey, mixed, isohyperthermic Epiaquic Haplustults

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 398, Samples 89P 2211–2219

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002 (TOTAL)	-2-- SILT .002 -.05 (TOTAL)	-3-- SAND .05 -2 (TOTAL)	-4-- FINE LT .0002 (CLAY)	-5-- CO3 LT .002 (CLAY)	-6-- FINE .002 -.02 (SILT)	-7-- COARSE .02 -.05 (SILT)	-8-- VF .05 -.10 (SAND)	-9-- F .10 -.25 (SAND)	-10- M .25 -.50 (SAND)	-11- C .5 -1 (SAND)	-12- VC 1 -2 (SAND)	-13- 2 -5 (WEIGHT)	-14- 5 -20 (WEIGHT)	-15- 20 -75 (WEIGHT)	-16- .1- 75 (WEIGHT)	-17- WT % OF WHOLE SOIL (>2MM)
			<- - -	- - -	- - -	- - -	- - PCT OF	<2MM (3A1)	- - -	- - -	- - -	- - -	- - -	- - ->	<- PCT OF	<75MM	(3B1)	->	
89P2211S	0- 26	Ap1	25.5	43.7	30.8			30.2	13.5	7.8	8.2	7.1	5.2	2.5	4	4	--	29	8
89P2212S	26- 47	Ap2	25.7	42.0	32.3			28.7	13.3	6.4	9.5	7.8	6.2	2.4	5	3	--	32	8
89P2213S	47- 72	Bt1	41.8	36.0	22.2			24.2	11.8	7.0	5.8	4.2	3.5	1.7	5	1	--	20	6
89P2214S	72-104	Bt2	42.4	33.2	24.4			22.0	11.2	8.7	6.3	4.0	3.2	2.2	3	TR	--	18	3
89P2215S	104-117	Bt3	40.1	33.5	26.4			23.2	10.3	7.3	6.1	5.6	4.9	2.5	6	1	--	25	7
89P2216S	117-130	Bt4	45.7	36.4	17.9			25.8	10.6	4.1	5.0	3.7	3.0	2.1	7	1	--	21	8
89P2217S	130-178	BC	36.3	32.3	31.4			22.3	10.0	8.2	8.2	5.9	5.4	3.7	9	1	--	31	10
89P2218S	178-234	C	26.7	31.6	41.7			20.5	11.1	9.2	9.2	8.3	8.1	6.9	13	5	--	45	18
89P2219N	72-104	Bt2	43.3	31.8	24.9			21.2	10.6	6.5	5.2	4.2	4.7	4.3					

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	FE 6C2b (DITH-CIT EXTRACTABLE)	AL 6G7a	MN 6D2a OF <2MM -->	CEC 8D1 (RATIO/CLAY)	15 BAR 8D1 (RATIO/CLAY)	LL 4F1 (ATTERBERG LIMITS) PCT	PI 4F <0.4MM	FIELD MOIST 4A3a (BULK DENSITY) <- -	1/3 BAR 4A1d G/CC	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4 (WATER CONTENT) <- - -	1/10 BAR 4B1c -PCT	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 26	2.77	0.205			2.1	--	--	0.84	0.58				1.28	1.33	0.012			23.6	14.8	0.11
26- 47	2.27	0.177			3.6	0.3	--	0.78	0.56				1.25	1.31	0.015			25.1	14.5	0.13
47- 72	0.77	0.089			4.1	0.4	--	0.46	0.50				1.39	1.54	0.034			29.0	20.8	0.11
72-104	0.38	0.046			4.1	0.4	--	0.46	0.49				1.49	1.66	0.036			27.2	20.6	0.10
104-117	0.31				4.4	0.4	--	0.49	0.46				1.51	1.67	0.033			27.5	18.4	0.13
117-130	0.32				5.1	0.5	--	0.46	0.47				1.45	1.66	0.044			30.1	21.3	0.12
130-178	0.16				4.9	0.3	--	0.57	0.43				1.46	1.60	0.029			26.9	15.5	0.16
178-234	0.20				5.0	0.3	--	0.65	0.44				1.41	1.48	0.015			20.3	11.7	0.11
72-104	0.73				4.0	0.4	--	0.48												

DEPTH (CM)	CA 5B5a 6N2e (NH4OAC EXTRACTABLE BASES)	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	SUM CATS 5A3a (CEC)	NH4- OAC 5A8b (CEC)	BASES + AL 5A3b (CEC)	AL SAT 5G1	SUM 5C3 (BASE SAT)	NH4 OAC 5C1 (BASE SAT)	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	KCL IN 8C1g (PH)	CACL2 .01M 8C1f (PH)	H2O 8C1f (PH)
	<- - -	- - -	- - -	- - -	-MEQ /	100 G - -	- - -	- - -	- - -	- ->	<- - -	- -PCT -	- - -	->				1:2	1:1
0- 26	1.2	0.2	--	0.4	1.8	27.0	9.2	28.8	21.4	11.0	84	6	8				3.2	3.4	3.6
26- 47	0.6	0.1	--	0.3	1.0	28.5	10.1	29.5	20.0	11.1	91	3	5				3.3	3.5	3.8
47- 72	0.4	TR	--	0.1	0.5	26.0	15.0	26.5	19.2	15.5	97	2	3				3.4	3.5	4.0
72-104	0.4	0.1	--	--	0.5	26.6	16.5	27.1	19.4	17.0	97	2	3				3.4	3.6	3.9
104-117	0.5	0.2	--	TR	0.7	27.2	16.5	27.9	19.5	17.2	96	3	4				3.4	3.6	4.0
117-130	0.7	0.3	--	0.1	1.1	25.4	17.5	26.5	21.0	18.6	94	4	5				3.4	3.6	4.1
130-178	0.8	0.2	--	TR	1.0	23.1	16.6	24.1	20.6	17.6	94	4	5				3.5	3.6	3.9
178-234	0.4	0.5	--	0.1	1.0	17.6	14.0	18.6	17.3	15.0	93	5	6				3.5	3.7	4.2
72-104		0.2	TR	0.6					20.9			100	6	1					

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	SiO2 (ELEMENTAL 7C3, Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
89P2211	TCLY	MI 3 KK 2 MT 2 CL 1 CA 1				21.0	7.3			2.4			
89P2211	TCLY	QZ 1 LE 1											
89P2213	TCLY	KK 3 MI 3 MT 3 VR 2 VC 1				28.0	8.4			2.7			
89P2213	TCLY	GE 1 HE 1 LE 1											
89P2214	TCLY	MI 3 KK 3 MT 3 VC 2 GE 2				28.0	8.1			2.8			
89P2214	TCLY	CA 2 HE 1 LE 1											
89P2217	TCLY	MT 4 MI 3 KK 3 VC 2 GE 1				30.0	5.4			3.1			
89P2217	TCLY	HE 1 LE 1											

MINERAL INTERPRETATION:

MI mica KK kaolinite MT montmorillon CL chlorite CA calcite QZ quartz

LE lepidocrocit VR vermiculite VC verm-chlorit GE goethite HE hematite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL <- - PIPETTE - - ><- HYDROMETER - -> CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	AGGRT STABL CONT 8F1	<5mm 4G1
			<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
89P2211	1	0.19	1.04	0.01	0.25			0.4				29.3									
89P2212	2	0.18	1.11	TR	0.26			0.4				23.2									
89P2213	3	0.12	1.33	TR	0.31			0.3				28.6									
89P2214	4	0.07	1.03	TR	0.28			0.4				28.6									
89P2215	5	0.06	0.87	TR	0.26			0.4				26.1									
89P2216	6	0.06	0.97	0.02	0.30			0.5				30.1									
89P2217	7	0.09	0.60	0.02	0.26			0.4				22.5									
89P2218	8	0.03	0.27	TR	0.19			TR				17.3									
89P2219	9	0.08	0.65	0.03	0.30																

Narrative Pedon Description

Pedon: Palmarejo
NSSL pedon number: 89P0398
Pedon ID: S89PR-079-002
Field classification: Clayey, mixed, isohyperthermic Epiaquic Haplustults
Revised classification as of April 01, 2001: Fine, mixed, active, isohyperthermic Typic Paleustults
Location: Lajas Municipio, Puerto Rico; Lajas Soil Survey sheet 2; 1.1 km west on Highway 306 from junction with Highway 101 and 0.6 km north and east
Latitude: 18°30’18" north
Longitude: 67°05’24" west
Elevation: 52 meters
Physiography: Hillside or mountainside on coastal plains
Geomorphic position: On upper third of shoulder interfluve
Slope: 3 percent with a south aspect
Major Land Resource Area: 273—Semiarid Coastal Plains
Drainage, runoff, and permeability: Moderately well drained, slow runoff, and moderately slow permeability
Vegetation: Pineapple in cropland
Surface stoniness: Class 0
Erosion: Slight
Particle-size control section: 71 to 122 cm
Parent material: Local colluvium from igneous-intermediate material
Weather station number: 5097
Diagnostic features: Umbric epipedon at 0 to 46 cm; argillic horizon at 46 to 130 cm
Geographically associated soils: Descalabrado, Mariana, and San Anton
Described and sampled by: D. Williams, C.L. Santiago, and T. Maas during February 1989
Notes: Soil temperature was 24.6 °C at a depth of 50 cm; 24.7 °C at 100 cm; 24.7 °C at 150 cm; and 24.5 °C at 200 cm.

Ap1—0 to 26 cm; very dark brown (10YR 2/2) clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots throughout; extremely acid; 1 percent gravel; clear smooth boundary. 89P2211

Ap2—26 to 47 cm; very dark brown (10YR 2/2) clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots throughout; extremely acid; clear smooth boundary. 89P2212

Bt1—47 to 72 cm; dark yellowish brown (10YR 4/6) clay, yellowish brown (10YR 5/6) dry; moderate medium prismatic structure parting to moderate medium blocky; firm, sticky, plastic; common fine roots throughout; fine and medium pores; continuous distinct clay films on vertical and horizontal faces of peds and continuous distinct organic coatings on vertical and horizontal faces of peds; extremely acid; 1 percent gravel; clear smooth boundary. 89P2213

Bt2—72 to 104 cm; reddish yellow (7.5YR 6/8) clay; common medium distinct redoximorphic features; moderate medium and coarse prismatic structure parting to moderate coarse blocky; firm, sticky, plastic; common fine roots throughout; fine and medium pores; continuous distinct clay films on vertical and horizontal faces of peds and continuous distinct organic coatings on vertical and horizontal faces of peds; extremely acid; 1 percent gravel; clear smooth boundary. 89P2214

Bt3—104 to 117 cm; strong brown (7.5YR 5/8) clay; few medium distinct redoximorphic features; moderate medium and coarse prismatic structure parting to moderate coarse blocky; firm, sticky, plastic; common fine roots throughout; fine and medium pores; continuous distinct clay films on vertical and horizontal faces of peds and continuous distinct organic coatings on vertical and horizontal faces of peds; very strongly acid; clear smooth boundary. 89P2215

Bt4—117 to 130 cm; strong brown (7.5YR 5/8) clay; few medium distinct redoximorphic features; moderate medium and coarse prismatic structure parting to moderate coarse blocky; firm, sticky, plastic; common fine roots throughout; fine and medium pores; continuous distinct clay films on vertical faces of peds; very strongly acid; clear smooth boundary. 89P2216

BC—130 to 178 cm; strong brown (7.5YR 5/8) clay loam; few fine distinct and common medium distinct redoximorphic features; weak coarse blocky structure; friable, slightly sticky, slightly plastic; few fine roots throughout; fine and medium pores; patchy distinct clay films in root channels and/or pores; extremely acid; 2 percent gravel. 89P2217

C—178 to 234 cm; reddish yellow (7.5YR 6/8) gravelly sandy clay loam; friable, slightly sticky, slightly plastic; very strongly acid; 15 percent gravel. 89P2218

Fraternidad: S94PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Fraternidad; fine, montmorillonitic, isohyperthermic Typic Haplusterts

SSL—Project: 94P 149, (RP94PR257) PR-ARS

—Pedon: 94P 845, Samples 94P 6610–6612

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
94P6610S	0- 33	A		48.4	28.6	23.0			19.5	9.1	5.8	5.7	4.2	4.2	3.1	1	1	--	19	2
94P6611S	33- 43	ABss		60.4	21.5	18.1			16.1	5.4	4.0	4.0	3.5	3.0	3.6	1	2	--	17	3
94P6612S	43-107	Bss1		65.6	25.8	8.6			20.0	5.8	3.1	2.5	1.6	1.0	0.4	1	1	--	7	2

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B4a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A5	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 33	2.01							0.93	0.48										23.2	
33- 43	0.77							0.80	0.45										27.3	
43-107	0.17							0.65	0.42										27.7	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9c	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 33	24.5	12.0	0.9	0.5	37.9	10.0		47.9	44.8			79	85				0.25		
33- 43	25.9	16.2	2.6	0.6	45.3	5.0		50.3	48.2			90	94				0.25		
43-107	47.1	22.5	8.8	0.6	79.0	--		79.0	42.4			100	100				0.25		

Narrative Pedon Description

Pedon: Fraternidad

Lab pedon: 94079001

Pedon ID: S94PR-079-001

Pedon type: Typical pedon for series

Field classification: Fine, montmorillonitic, isohyperthermic Typic Haplusterts

Revised classification as of April 01, 2001: Very-fine, smectitic, isohyperthermic Typic Haplusterts

Location: Lajas Municipio, Puerto Rico; about 1.8 km southwest of the city of Lajas, Puerto Rico, from the intersection of the Highways 315 and 101, about 1.1 km southeast of the Palmarejo community from the intersection of the Highways 306 and 101, about 0.5 mile northeast of the Administration Building of the Lajas Agricultural Experiment Station of the University of Puerto Rico-Mayagüez Campus, and 91 meters southeast from dirt road in a pasture

Latitude: 18°02’20" north

Longitude: 67°04’05" west

Geomorphic position: On toeslope of a side slope of an alluvial flat on the coastal plain with gilgai

Slope: 1 percent with an aspect of 300 degrees; convex upslope and concave across the slope; total slope length of 100 meters, including 50 meters above the pedon location

Average air temperature: Annual—26.1 °C

Average annual precipitation: 889 mm

Drainage: Moderately well drained

Geographically associated soils: Aguirre, Cartagena, Fe, and Guanica

Surface fragments: 0 percent

Particle-size control section: 25 to 102 cm

Diagnostic features: Mollic epipedon at 0 to 33 cm; slickensides at 33 to 165 cm

Described and sampled by: R.L. Vick and J. Davis on June 17, 1994

A—0 to 33 cm; very dark gray (10YR 3/1) clay; strong medium and coarse granular structure; very firm; many very fine and fine roots; 15 percent fine iron-manganese concretions; 2 percent mixed igneous, metamorphic, and sedimentary rock fragments 2 to 75 mm in diameter; slightly alkaline; clear wavy boundary. 94P6610

ABss—33 to 43 cm; 40 percent brown (10YR 4/3) and 60 percent very dark grayish brown (10YR 3/2) clay; strong medium and coarse angular blocky structure; firm; many very fine roots; 10 percent continuous very dark grayish brown (10YR 3/2) slickensides (pedogenic); 15 percent fine iron-manganese concretions; 3 percent mixed igneous, metamorphic, and sedimentary rock fragments 2 to 75 mm in diameter; moderately alkaline; clear irregular boundary. 94P6611

Bss1—43 to 107 cm; dark yellowish brown (10YR 4/4) clay; strong medium and coarse angular blocky structure; firm; many very fine roots; 10 percent continuous brown (10YR 4/3) slickensides (pedogenic); 15 percent fine iron-

manganese concretions; 2 percent mixed calcareous rock fragments 2 to 75 mm in diameter; moderately alkaline; gradual wavy boundary. 94P6612

Bss2—107 to 165 cm; 30 percent brown (10YR 4/3) and 70 percent dark yellowish brown (10YR 4/6) clay; strong medium and coarse angular blocky structure; firm; many very fine roots; 2 percent continuous brown (10YR 4/3) slickensides (pedogenic); 25 percent fine and medium iron-manganese concretions; 2 percent mixed igneous, metamorphic, and sedimentary rock fragments 2 to 75 mm in diameter; moderately alkaline. Horizon not sampled.

Cartagena: S95PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Cartagena; fine, montmorillonitic, isohyperthermic Aquic Ustropepts

SSL—Project: 95P 92, (CP95PR204) Lajas Valley Puerto Rico

—Pedon: 95P 588, Samples 95P 4325–4332

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
95P4325S	0- 24	Ap		39.6	32.8	27.6	24.8		18.9	13.9	8.8	9.0	4.8	3.1	1.9	3	1	--	22	4
95P4326S	24- 42	BA		35.2	31.8	33.0	20.3		17.0	14.8	11.0	11.4	5.6	3.1	1.9	1	TR	--	23	1
95P4327S	42- 71	Bw1		37.2	35.1	27.7	18.8		19.4	15.7	11.1	8.8	4.3	2.2	1.3	1	TR	--	17	1
95P4328S	71-101	Bw2		34.6	34.0	31.4	17.7		18.4	15.6	12.9	12.6	3.6	1.2	1.1	1	TR	--	19	1
95P4329S	101-130	Bw3		34.9	35.4	29.7	18.5		19.6	15.8	12.3	11.3	3.5	1.4	1.2	2	TR	--	19	2
95P4330S	130-157	Bw4		43.6	32.9	23.5	28.6		19.4	13.5	9.2	7.4	3.4	1.9	1.6	1	1	--	16	2
95P4331S	157-200	Bssk		47.9	32.6	19.5	31.5		20.2	12.4	8.0	6.2	2.9	1.5	0.9	1	TR	--	12	1
95P4332S	70- 96	Bw3	SATEL	31.5	30.0	38.5	17.9		17.0	13.0	12.4	16.4	5.3	1.8	2.6	2	1	--	28	3

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	CEC	(RATIO/CLAY) 15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	COLE OVEN DRY	WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c PCT	6B4a <2MM	6S3b PPM	6R3c <- PERCENT	6C2b OF	6G7a <2MM -->	6D2a	8D1	8D1	4F1 PCT	4F <0.4MM	4A5 <- -	4A1d G/CC	4A1h - - ->	4D1 CM/CM	4B4 <- -	4B1c -PCT	4B1c OF	4B2a <2MM - ->	4C1 CM/CM
0- 24	1.53	0.166			4.3	0.3	0.1	0.69	0.45				1.51	1.85	0.068			26.1	17.7	0.12
24- 42	0.43	0.055			3.9	0.2	0.1	0.71	0.47				1.58	1.83	0.050			22.5	16.7	0.09
42- 71	0.29	0.045			3.6	0.2	0.1	0.74	0.49				1.43	1.78	0.075			29.1	18.4	0.15
71-101	0.20	0.040			3.9	0.2	0.1	0.76	0.53				1.48	1.77	0.061			27.4	18.5	0.13
101-130	0.04				4.1	0.2	0.1	0.75	0.52				1.51	1.80	0.060			26.5	18.2	0.12
130-157	0.12				3.8	0.2	0.1	0.56	0.44				1.54	1.93	0.077			27.0	19.2	0.12
157-200	0.10				4.1	0.2	0.1	0.49	0.43				1.52	1.98	0.092			27.1	20.6	0.10
70- 96	0.11				3.8	0.2	0.1	0.77	0.53				1.57	1.81	0.048			23.3	16.8	0.10

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM	ACID- ITY	(- -CEC- -) SUM CATS	NH4- OAC	EXCH NA	SAR	BASE SATURATION SUM	NH4OAC	CARBONATE AS CACO3 <2MM	<20MM	CASO4 AS GYPSUM <2MM	<20MM	(- - - -PH - - -) SAT PASTE	CACL2 .01M	H2O
DEPTH (CM)	5B5a 6N2e	5B5a 6O2d	5B5a 6P2b	5B5a 6Q2b	BASES	6H5a	5A3a	5A8b	5D2 PCT	5E	5C3 <- -PCT- >	5C1	6E1g <- -PCT ->	6E4	6F1a <- -PCT ->	6F4	8C1b	8C1f 1:2	8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->																		
0- 24	15.6	7.5	1.0	0.3	24.4	8.6	33.0	27.2	3	2	74	90					6.0	5.7	6.2
24- 42	13.7	8.5	2.3	0.2	24.7	3.6	28.3	25.0	8	6	87	99					7.0	6.9	7.4
42- 71		9.4	3.1	0.2		1.3		27.4	10	7		100	2		--		8.0	7.8	8.4
71-101		9.0	3.6	0.2		2.9		26.3	14			98	1					7.0	7.8
101-130	12.4	9.3	4.7	0.3	26.7	2.6	29.3	26.3	18		91	100						7.3	8.1
130-157	13.3	9.1	4.6	0.3	27.3	1.7	29.0	24.2	16	11	94	100					8.1	7.9	8.4
157-200		9.3	4.7	0.4		1.3		23.6	17	12		100	1		--		6.5	8.0	8.5
70- 96	12.2	8.8	2.9	0.2	24.1	3.0	27.1	24.4	12		89	99						7.0	7.9

	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	ELEC. COND. 8A3a	PRED. ELEC. COND. 8I
DEPTH (CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1b	6K1d	6S9a	6X1a	6Y1a	6L1d	6W1b	6M1d	8A	8D5	MMHOS /cm	MMHOS /cm
	<- MEQ / LITER - - - - - - - - - - - - - - - - - ->														<- -PCT- ->			
0- 24	2.0	1.2	2.7	TR	--	0.5	0.1	0.5				4.3	0.1	0.1	62.0	TR	0.64	0.30
24- 42	1.0	0.8	5.7	--	--	0.5	0.1	0.6				5.4	TR	0.4	66.1	TR	0.84	0.37
42- 71	0.7	0.6	6.0	TR	--	2.6	0.1	0.5				3.5	TR	0.2	78.5	TR	0.76	0.50
71-101																		0.24
101-130																		0.23
130-157	0.5	0.4	7.7	0.2	--	3.2	0.3	1.2				3.2	--	0.1	80.6	TR	0.92	0.41
157-200	0.5	0.4	7.9	0.2	--	3.2	0.6	1.2				3.3	--	0.1	79.1	TR	0.94	0.50
70- 96																		0.18

```
           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                             ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - - -  7A2i - - - - - -><  - 7A6b - ><  - 7A4c - ><  - - - - - - - - - - 7C4a- - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
95P4326     TCLY  MT 3  KK 3  MI 2  GE 2  HE 1                                                                                          SMEC
95P4328     TCLY  MT 3  KK 3  MI 2  GE 2  VR 1                                                                                          SMEC
95P4331     TCLY  KK 3  MT 3  QZ 2  GE 2  MI 2                                                                                          CMIX
95P4331     TCLY  HE 1
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    MT  montmorillon     KK  kaolinite        MI  mica             GE  goethite         HE  hematite         VR  vermiculite
    QZ  quartz
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):
    SMEC = Smectite               CMIX = Mixed - Clay
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Narrative Pedon Description

Pedon: Cartagena
NSSL pedon number: S95-079-001
Pedon ID: S95PR-079-001
Pedon type: Typical pedon for series
Field classification: Fine, montmorillonitic, isohyperthermic Aquic Ustropepts
Revised classification as of January 01, 1993: Cartagena; fine, mixed, superactive, isohyperthermic Vertic Haplustepts
Location: Lajas Municipio, Puerto Rico; about 2.9 km southwest of the Administration Building of the Lajas Agricultural Experiment Station of the University of Puerto Rico, Mayagüez Campus; 1.4 km southeast of the community of Llanos from the intersection of Highways 101 and 306; 1.3 km east from dirt road in a pasture field
Major Land Resource Area: 273—Semiarid Coastal Plains
Latitude: 18°01’24" north
Longitude: 67°05’55" west
Elevation: 13 meters
Geomorphic position: Alluvial flat on coastal plain; leveled land
Slope: 1 percent; linear upslope and across the slope
Average air temperature: Annual—28.9 °C
Drainage: Somewhat poorly drained
Geographically associated soils: Aguirre, Fe, Fraternidad, Guanica, Paso Seco, and Santa Isabel
Observed moisture state: Wet at a depth of 91 cm
Particle-size control section: 25 to 102 cm
Diagnostic features: Mollic epipedon at 0 to 23 cm; cambic horizon at 43 to 157 cm
Described and sampled by: M. Cortes, J. Davis, D. Williams, and W. Lynn on June 25, 1995

Ap—0 to 24 cm; very dark grayish brown (10YR 3/2) silty clay loam; strong coarse and very coarse subangular blocky structure; friable, moderately sticky, moderately plastic; many very fine to medium roots throughout; many very fine and fine high-continuity continuous tubular pores; 2 percent discontinuous prominent manganese or iron-manganese stains in root channels and/or pores; 2 percent rounded mixed rock fragments 2 to 75 mm in diameter; slightly acid; boundary not recorded. 95P4325S

BA—24 to 42 cm; yellowish brown (10YR 5/4) silty clay loam; 2 percent fine distinct brownish yellow (10YR 6/6) redoximorphic features; strong fine and medium subangular blocky structure; firm, very sticky, very plastic; many fine and medium roots throughout and many fine and medium roots in cracks; many very fine and fine high-continuity continuous tubular pores; 2 percent discontinuous prominent organic stains throughout; 2 percent rounded mixed igneous and metamorphic rock fragments 2 to 75 mm in diameter; slightly alkaline; boundary not recorded. 95P4326S

Bw1—42 to 71 cm; dark yellowish brown (10YR 4/6) silty clay loam; 10 percent fine prominent brown (10YR 4/3) redoximorphic features; moderate fine and

medium subangular blocky structure; very firm, very sticky, very plastic; common very fine roots in cracks; many very fine and fine low-continuity continuous tubular pores; 2 percent discontinuous prominent manganese or iron-manganese stains throughout; 2 percent rounded mixed igneous and metamorphic rock fragments 2 to 75 mm in diameter; moderately alkaline; boundary not recorded. 95P4327S

Bw2—71 to 101 cm; 40 percent yellowish brown (10YR 5/6) and 60 percent dark yellowish brown (10YR 4/6) silty clay loam; 20 percent fine and medium distinct gray (10YR 5/1) redoximorphic features; moderate medium and coarse subangular blocky structure; very firm, very sticky, very plastic; many very fine and fine low-continuity continuous tubular pores; 2 percent discontinuous prominent manganese or iron-manganese stains in root channels and/or pores; 2 percent fine and medium spherical iron-manganese masses throughout; 2 percent rounded mixed igneous and metamorphic rock fragments 2 to 75 mm in diameter; slightly alkaline; boundary not recorded. 95P4328S

Bw3—101 to 130 cm; yellowish brown (10YR 5/6) silty clay; 20 percent fine and medium distinct gray (10YR 5/1) redoximorphic features; moderate medium and coarse subangular blocky structure; very firm, very sticky, very plastic; common very fine and fine low continuity continuous tubular pores; 10 percent discontinuous prominent manganese or iron-manganese stains in root channels and/or pores; 2 percent fine spherical iron-manganese concretions throughout and 10 percent fine and medium spherical iron-manganese masses throughout; 2 percent rounded mixed igneous and metamorphic rock fragments 2 to 75 mm in diameter; moderately alkaline; boundary not recorded. 95P4329S

Bw4—130 to 157 cm; yellowish brown (10YR 5/6) silty clay; 10 percent fine and medium distinct grayish brown (10YR 5/2) and 10 percent fine and medium distinct light brownish gray (10YR 6/2) redoximorphic features; moderate and strong very coarse prismatic and weak and moderate fine and medium subangular blocky structure; very firm, very sticky, very plastic; common very fine and fine low-continuity continuous tubular pores; 10 percent discontinuous prominent pressure faces in root channels and/or pores; 2 percent fine spherical iron-manganese concretions throughout and 10 percent fine and medium spherical iron-manganese masses throughout; moderately alkaline; boundary not recorded. 95P4330S

Bssk—157 to 200 cm; yellowish brown (10YR 5/6) silty clay loam; 40 percent medium light brownish gray (10YR 6/2) redoximorphic features; moderate and strong coarse and very coarse wedge and moderate and strong coarse and very coarse angular blocky structure; very firm, very sticky, very plastic; common very fine and fine low-continuity continuous tubular pores; 10 percent discontinuous distinct slickensides (pedogenic) in root channels and/or pores; 4 percent fine spherical iron-manganese concretions throughout and 15 percent fine and medium spherical iron-manganese masses throughout; 15 percent fine and medium spherical carbonate nodules throughout; 2 percent rounded mixed igneous, metamorphic, and sedimentary rock fragments 2 to 75 mm in diameter and 5 percent rounded limestone fragments 2 to 75 mm in diameter; strongly alkaline. 95P4331S

Pozo Blanco: S97PR-079-001

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Pozo Blanco; fine-loamy, mixed, superactive, isohyperthermic Aridic Calciustolls

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 481, Samples 97P 2885–2891

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS (MM) WEIGHT 2 -5	-17- WEIGHT 5 -20	-18- WEIGHT 20 -75	-19- .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	SOIL
97P2885S	0- 20	A	45.6	26.5	27.9	11.0	2.8	19.3	7.2	5.6	9.1	8.4	3.4	1.4	1	1	--	24	2
97P2886S	20- 31	Bw1	47.4	26.5	26.1	8.0	5.3	18.5	8.0	4.8	6.6	5.9	5.4	3.4	3	1	TR	24	4
97P2887S	31- 65	Bw2	41.0	28.3	30.7	6.8	6.7	20.0	8.3	5.9	7.8	6.6	6.1	4.3	6	5	2	35	13
97P2888S	65-115	Bw3	23.0	32.8	44.2	5.8	6.3	22.5	10.3	8.2	11.2	8.6	10.0	6.2	11	13	TR	51	24
97P2889S	115-150	Ck1	24.8	30.8	44.4		6.3	24.6	6.2	3.9	7.4	10.5	10.9	11.7	--	--	--	40	7
97P2890S	150-193	Ck2	10.3	80.3	9.4		1.0	72.2	8.1	1.2	1.8	1.9	2.1	2.4	8	6	27	46	44
97P2891S	193-245	Ck3	37.8	32.1	30.1		0.8	27.1	5.0	4.0	7.9	9.1	5.9	3.2	11	7	2	41	26

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3b PPM	TOTAL S 6R3c	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A5	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->				<- - -PCT OF <2MM - ->				
0- 20		0.313						0.85	0.47										21.6	
20- 31		0.131						0.80	0.44				1.34	1.54	0.046			25.7	20.8	0.06
31- 65		0.083						0.32	0.46				1.27	1.43	0.037			27.1	18.9	0.10
65-115		0.029						1.11	0.53				1.22	1.32	0.023			25.4	12.1	0.14
115-150		0.026						0.89	0.47										11.7	
150-193								0.97	0.57				1.67	1.71	0.005			18.4	5.9	0.14
193-245								0.98	0.49				1.24	1.77	0.104			35.5	18.4	0.18

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	PH SAT PASTE 8C1b	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- -PCT- >		<- -PCT ->		<- -PCT ->				
0- 20		6.0	0.4	2.3				38.9	1	TR	100	100	13				7.8	7.7	8.0
20- 31		6.9	0.9	1.4				37.7	2		100	100	15					7.8	8.2
31- 65		6.2	1.5	1.3				13.1	12		100	100	25		--			7.8	8.4
65-115		6.2	1.3	0.6				25.5	5		100	100	32					7.9	8.5
115-150		5.9	1.8	0.7				22.0	7	4	100	100	45		--		7.8	7.9	8.3
150-193		4.7	1.8	1.0				10.0	11	9	100	100	93		--		8.0	8.1	8.6
193-245K		15.4	6.5	1.8				36.9	11	11	100	100	21	26	--		7.6	7.9	8.0

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1b	CL 6K1d	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1d	NO2 6W1b	NO3 6M1d	H2O 8A	PRED. TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a MMHOS /cm	ELEC. COND. 8I MMHOS /cm
	<- - - - - - - - - - - - - - - - - - - MEQ / LITER ->														<- -PCT- ->			
0- 20	6.0	1.1	0.3	0.4	--	2.8	--	0.4				3.1	0.7	--	70.6	TR	0.76	0.30
20- 31																		0.24
31- 65																		0.22
65-115																		0.22
115-150	5.2	2.0	8.1	0.2	--	1.7	--	10.7				4.2	TR	--	43.9	TR	1.58	0.50
150-193	4.2	2.5	17.1	0.4	--	3.3	TR	15.4				6.2	TR	--	40.7	0.1	2.15	0.57
193-245	11.8	10.4	35.2	0.6	--	3.3	TR	42.1				15.8	TR	--	68.5	0.3	5.02	1.95

SAMPLE NUMBER	CLAY MINERALOGY (<.002mm) FRACTION	X-RAY 7A2i (peak size)			THERMAL DTA 7A6b (Percent)	TGA 7A4c	ELEMENTAL 7C4a SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
97P2887	TCLY	MT 3	CA 3	KK 2											

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          < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE      ION <                      ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                < - - - - - 7A2i - - - - -><  - 7A6b - -><  - 7A4c - -><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER    < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
97P2887    CSi                                                    15  FK25  CA18  FP11  AR11  CB 9  FE 6
97P2887    CSi                                                        CD 4  BT 3  OP 3  MS 3  QZ 2  CM 2
97P2887    CSi                                                        PR 2  APtr  GStr  KYtr  HNtr  GNtr
97P2887    CSi                                                        ZEtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            CSi   Coarse Silt, 0.02-0.05mm
MINERAL INTERPRETATION:
    MT  montmorillon     CA  calcite          KK  kaolinite        FK  potas feldsp     FP  plag-feldspa     AR  wthr aggrega
    CB  carb-aggrega     FE  iron oxides      CD  chalcedony       BT  biotite          OP  opaques          MS  muscovite
    QZ  quartz           CM  chlorit-mica     PR  pyroxene         AP  apatite          GS  glass            KY  kyanite
    HN  hornblende       GN  garnet           ZE  zeolite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL         CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                    RET   ACID              BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4b  6S5   6D3b  6A2e  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
97P2885  1                                         4.06                                                                          80
97P2886  2                                         2.87
97P2887  3                                         3.28
97P2888  4                                         3.82
97P2889  5                                         4.64
97P2890  6                                        10.42
97P2891  7                                         3.01
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Narrative Pedon Description

Pedon: Pozo Blanco

NSSL pedon number: 97P0481

Pedon ID: S97PR-079-001

Field classification: Fine-loamy, mixed, superactive, isohyperthermic Aridic Calciustolls

Revised classification as of April 01, 2001: Fine-loamy, mixed, superactive, isohyperthermic Aridic Calciustolls

Pedon type: Typical pedon for series; full pedon description

Location: Lajas Municipio, Puerto Rico; 4.7 km southwest of La Parguera, Puerto Rico, and 3.5 km southeast of Rancho Cabassa; 30.5 meters east of dirt road

USGS 7.5-minute quadrangle: Parguera, Puerto Rico

Soil survey area: PR787—San Germán Area, Southwestern Puerto Rico

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Latitude: 17°57’58" north

Longitude: 67°05’30" west

Elevation: 12 meters

Geomorphic setting: Toeslope of side slope of alluvial fan in uplands

Slope: 2 percent with an aspect of 174 degrees; linear upslope and convex across the slope

Geographically associated soils: Aguilita, Duey, Jacana, Montalva, Parguera, and San Germán

Drainage: Well drained

Parent material: Clayey and loamy marine sediments over slightly cemented bedrock

Surface fragments: 5 percent

Particle-size control section: 25 to 102 cm

Diagnostic features: Mollic epipedon at 0 to 30 cm; cambic horizon at 20 to 30 cm; calcic horizon at 30 to 114 cm

Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on June 17, 1997

A—0 to 20 cm; dark brown (7.5YR 3/3) clay loam, dark brown (10YR 3/3) dry; strong medium granular structure; firm, slightly hard, slightly sticky, slightly plastic; many very fine to medium roots throughout; many very fine interstitial pores; 5 percent rock fragments 2 to 75 mm in diameter; slight effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2885

Bw—20 to 31 cm; very dark grayish brown (10YR 3/2) silty clay loam, dark brown (10YR 3/3) dry; strong medium angular blocky structure; firm, hard, slightly sticky, moderately plastic; many very fine and fine and few medium roots throughout; few fine and many very fine interstitial pores; 2 percent rock fragments 2 to 75 mm in diameter; slight effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2886

Bk1—31 to 65 cm; dark yellowish brown (10YR 4/4) silt loam, brown (10YR 4/3) dry; moderate medium subangular blocky structure; firm, slightly hard,

slightly sticky, moderately plastic; many fine and many very fine roots throughout; few fine and many very fine interstitial pores; 5 percent very pale brown (10YR 8/2) carbonate threads throughout; 10 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; abrupt wavy boundary. 97P2887

Bk2—65 to 115 cm; yellowish brown (10YR 5/4) gravelly clay loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable, slightly hard, slightly sticky, slightly plastic; many fine and many very fine roots throughout; common fine and many very fine interstitial pores; 50 percent very pale brown (10YR 8/2) carbonate masses throughout; 16 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2888

C1—115 to 150 cm; brown (10YR 4/3) very gravelly clay loam; massive; friable, hard, slightly sticky, nonplastic; many fine and many very fine roots throughout; common fine and many very fine interstitial pores; 10 percent very pale brown (10YR 8/2) carbonate masses throughout; 3 percent rock fragments 75 to 250 mm in diameter and 43 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2889

C2—150 to 193 cm; silty clay loam, 30 percent very dark grayish brown (10YR 3/2) and 70 percent very pale brown (10YR 7/3) moist, and 30 percent very dark gray (10YR 3/1) and 70 percent very pale brown (10YR 8/2) dry; massive; firm, hard, slightly sticky, moderately plastic; few very fine roots throughout; common fine and many very fine interstitial pores; 70 percent very pale brown (10YR 8/2) carbonate masses throughout; 7 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; gradual wavy boundary. 97P2890

C3—193 to 245 cm; sandy clay loam, 30 percent very pale brown (10YR 7/3) and 70 percent very dark grayish brown (10YR 3/2) moist, and 30 percent very pale brown (10YR 8/2) and 70 percent very dark gray (10YR 3/1) dry; massive; firm, hard, slightly sticky, slightly plastic; few fine and medium roots throughout; few very fine interstitial pores; 2 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl. 97P2891

Duey: S97PR-079-002

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Duey; loamy, carbonatic, isohyperthermic, shallow Aridic Haplustolls

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 482, Samples 97P 2892–2897

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)				(- -CLAY- -)	(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
97P2892S	0- 18	A		45.1	35.5	19.4	15.0	10.4	28.5	7.0	4.8	4.8	3.9	4.0	1.9	6	12	28	54	62
97P2893S	18- 29	AC		53.8	34.6	11.6	21.4	19.6	26.2	8.4	3.8	2.4	1.2	1.7	2.5	9	17	1	33	27
97P2894S	29- 48	C		43.8	44.1	12.1	13.3	20.2	33.8	10.3	5.2	3.3	1.5	1.3	0.8	TR	1	--	8	1
97P2895S	48- 68	Cr1		41.6	46.2	12.2		10.3	38.8	7.4	3.4	2.9	2.2	2.1	1.6	6	2	--	16	8
97P2896G	68-110	Cr2		27.0	47.0	26.0		3.2	36.4	10.6	6.5	6.1	4.7	5.3	3.4					P
97P2897G	110-160	Cr3/R		18.6	56.6	24.8		4.6	40.3	16.3	11.1	6.8	3.1	2.5	1.3					P

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)			(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -			FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B4a	6S3b	6R3c	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A5	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT	<0.4MM	<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM		- ->		CM/CM
0- 18		0.369						0.59	0.41				0.95	1.10	0.030			36.8	18.5	0.11
18- 29		0.167						0.39	0.33										17.8	
29- 48		0.082						0.37	0.34				1.09	1.16	0.021			29.4	14.8	0.16
48- 68		0.050						0.62	0.38				1.17	1.27	0.027			35.5	16.0	0.22
68-110								0.99	0.55										14.9	
110-160								0.79	0.46				1.41	1.45	0.009			28.0	8.6	0.27

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 18K		2.4	0.8	1.2				26.8	3	1	100	100	32	38	--		7.4	7.7	8.0
18- 29K		2.3	0.6	0.9				21.1	2	TR	100	100	58	59			7.3	7.7	8.2
29- 48		1.8	0.8	0.6				16.3	5		100	100	69		--			7.8	8.3
48- 68K		4.1	0.7	0.7				25.8	3		100	100	36	35				7.9	8.4
68-110		5.8	1.2	0.8				26.8	4	2	100	100	14				7.8	8.0	8.5
110-160		5.4	2.0	0.6				14.6	9	5	100	100	63		--		8.0	8.1	8.5

	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -)																	PRED.	
																TOTAL	ELEC.	ELEC.	
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	SALTS	COND.	COND.	
DEPTH																EST.	8A3a	8I	
(CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1b	6K1d	6S9a	6X1a	6Y1a	6L1d	6W1b	6M1d	8A	8D5	MMHOS	MMHOS	
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm	
0- 18	9.3	1.1	1.3	0.4	--	9.5	--	0.4				0.9	0.3	--	61.3	TR	1.00	0.37	
18- 29	8.0	0.7	1.0	0.1	--	7.0	--	0.4				1.3	0.1	TR	58.0	TR	0.89	0.31	
29- 48																		0.21	
48- 68																		0.20	
68-110	3.3	1.0	3.4	0.3	--	2.5	TR	3.0				2.1	TR	TR	72.5	TR	0.80	0.35	
110-160	5.5	2.5	10.9	0.4	--	8.2	0.1	3.2				6.0	--	0.1	56.7	0.1	2.03	0.65	

```
           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - - 7A2i - - - - -><  - 7A6b - -><  - 7A4c - -><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
97P2892     CSi                                                    5  CA62  CB27  AR 4  CD 3  FE 2  FK 1
97P2892     CSi                                                       OPtr  FPtr  HNtr  QZtr  PRtr  POtr
97P2894     CSi                                                    5  CB50  CA45  QZ 2  CD 2  FE 1  FK 1
97P2894     CSi                                                       FPtr  ARtr  OPtr  HNtr

FRACTION INTERPRETATION:
    CSi   Coarse Silt, 0.02-0.05mm
MINERAL INTERPRETATION:
    CA  calcite          CB  carb-aggrega     AR  wthr aggrega     CD  chalcedony       FE  iron oxides      FK  potas feldsp
    OP  opaques          FP  plag-feldspa     HN  hornblende       QZ  quartz           PR  pyroxene         PO  plant opal

RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4b  6S5   6D3b  6A2e  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
97P2892  1                                          8.17
97P2893  2                                          7.62
97P2894  3                                          7.97
97P2895  4                                          3.97
97P2896  5                                          1.66
97P2897  6                                          7.63
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Narrative Pedon Description

Pedon: Duey
Pedon ID: 97PR-079-002
NSSL pedon number: 97P0482
Pedon type: Typical pedon for series
Field classification: Loamy, carbonatic, isohyperthermic, shallow Aridic Calciustolls
Revised classification as of April 01, 2001: Loamy, carbonatic, isohyperthermic Aridic Calciustolls
Location: Lajas Municipio, Puerto Rico; 4.8 km west of La Parguera, Puerto Rico; 2.9 km southeast of Rancho Cabassa; 30.5 meters north of gravel road
Latitude: 17°58’40" north
Longitude: 67°05’35" west
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Soil survey area: PR787—San Germán Area, Southwestern Puerto Rico
Elevation: 80 meters
Slope: 15 percent; linear upslope and concave across the slope
Drainage: Well drained
Geomorphic position: On backslope of a side slope of a hill in uplands
Geographically associated soils: Aguilita, Pozo Blanco, and San Germán
Surface fragments: 47 percent
Particle-size control section: 0 to 48 cm
Diagnostic features: Mollic epipedon at 0 to 18 cm; paralithic contact at 48 to 109 cm; lithic contact at 109 to 160 cm
Described and sampled by: J.L. Lugo, C.L. Santiago, F. Beinroth, and G. Brannon on June 18, 1997

A—0 to 18 cm; dark yellowish brown (10YR 4/4) very gravelly loam, brown (10YR 5/3) dry; moderate medium granular structure; friable, slightly hard, slightly sticky, slightly plastic; many very fine to medium roots throughout; many fine and many very fine interstitial pores; 2 percent rock fragments 250 to 600 mm in diameter,15 percent 75 to 250 mm, and 30 percent 2 to 75 mm; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2892

AC—18 to 29 cm; dark yellowish brown (10YR 4/4) gravelly silt loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable, soft, slightly sticky, slightly plastic; many very fine to medium roots throughout; many fine and many very fine interstitial pores; 5 percent weakly cemented carbonate concretions throughout and 5 percent carbonate masses throughout; 25 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2893

C—29 to 48 cm; light yellowish brown (10YR 6/4) silt loam, pinkish white (2.5YR 8/2) dry; massive; very friable, soft, moderately sticky, moderately plastic; many fine and medium and few coarse roots throughout; many very fine and fine interstitial pores; 10 percent rock fragments 2 to 75 mm in diameter;

violent effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2894

Cr1—48 to 68 cm; soft semiconsolidated fractured limestone; few fine roots in cracks and many medium roots in cracks; 50 percent continuous carbonate coatings on rock fragments; violent effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2895

Cr2—68 to 110 cm; 25 percent very pale brown (10YR 8/4) and 75 percent yellow (10YR 7/6) semiconsolidated fractured limestone bedrock; many very fine to medium roots in cracks; 50 percent continuous carbonate coatings on rock fragments; violent effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2896

Cr3/R—110 to 160 cm; very pale brown (10YR 8/2) unconsolidated limestone bedrock, white (10YR 8/1) dry; few fine and medium roots in cracks; violent effervescence with dilute (1 normal) HCl. 97P2897

San Germán: S97PR-079-003

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: San Germán; loamy-skeletal, carbonatic, isohyperthermic Lithic Ustorthents

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 483, Samples 97P 2898–2901

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS WEIGHT 2-5	5-20	20-75	.1-75	>2MM WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
97P2898S	0- 5	A	53.9	26.7	19.4		8.6	19.4	7.3	3.9	5.3	4.9	3.6	1.7	4	6	9	32	19
97P2899S	5- 38	AC	50.9	24.2	24.9		14.3	18.2	6.0	2.7	3.4	3.2	5.6	10.0	6	27	44	82	77
97P2900S	38- 54	Cr1	33.8	30.1	36.1		23.1	21.3	8.8	4.6	6.7	7.0	10.5	7.3	14	30	20	75	64
97P2901S	54- 68	Cr2	20.4	30.6	49.0		13.6	21.8	8.8	6.2	8.6	9.6	11.8	12.8	8	13	27	70	48

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3b PPM	TOTAL S 6R3c	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A5	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->				<- - -PCT OF <2MM - ->				
0- 5								0.66	0.44										23.6	
5- 38								0.49	0.41										21.1	
38- 54								0.29	0.42										14.1	
54- 68								0.32	0.44										8.9	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a		CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	PH SAT PASTE 8C1b	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G								->			<- -PCT- >		<- -PCT ->		<- -PCT ->				
0- 5		4.3	0.6	2.5					35.8	2	TR	100	100	39		--		7.4	7.7	8.0
5- 38K		3.2	0.6	2.1					25.0	2	1	100	100	57	86			7.4	7.7	8.2
38- 54K		1.7	1.0	0.7					9.8	10	1	100	100	88	94			7.6	7.8	8.1
54- 68K		1.6	0.6	0.5					6.6	8		100	100	94	89				7.8	8.3

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1b	CL 6K1d	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1d	NO2 6W1b	NO3 6M1d	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a MMHOS/cm	PRED. ELEC. COND. 8I MMHOS/cm
	<- - MEQ / LITER													->	<- -PCT- ->			
0- 5	10.0	1.6	0.4	0.5	--	10.2	--	0.4				1.1	--	--	79.3	0.1	1.15	0.46
5- 38	6.3	1.2	1.5	0.8	--	7.3	--	0.3				1.3	--	--	74.5	TR	0.90	0.40
38- 54	5.3	1.0	1.7	0.4	--	3.3	--	3.0				2.7	--	--	54.2	TR	0.84	0.30
54- 68																		0.21

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i Peak Size	THERMAL DTA 7A6b Percent	TGA 7A4c Percent	OPTICAL TOT RE	GRAIN COUNT 7B1a Percent						INTERPRETATION
97P2898	CSi				16	CA56	CB18	FE 6	QZ 6	AR 6	FK 3	
97P2898	CSi					CD 2	OP 2	FP 1	POtr	BTtr	PRtr	
97P2898	CSi					HNtr	APtr	TMtr	SStr			

FRACTION INTERPRETATION:
CSi Coarse Silt, 0.02-0.05mm

MINERAL INTERPRETATION:

CA	calcite	CB	carb-aggrega	FE	iron oxides	QZ	quartz	AR	wthr aggrega	FK	potas feldsp
CD	chalcedony	OP	opaques	FP	plag-feldspa	PO	plant opal	BT	biotite	PR	pyroxene
HN	hornblende	AP	apatite	TM	tourmaline	SS	spon spicule				

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

		ACID	OXALATE	EXTRACTION		PHOSPHOUS		KCL	TOTAL	(- -WATER		CONTENT- -)		(- - - - WATER DISPERSIBLE - - - -)						MIN	AGGRT
		OPT	FE	SI	AL		CIT-	MN	C	0.06	1-	2-	15	<- - PIPETTE - - >< - HYDROMETER - >						SOIL	STABL
		DEN				RET	ACID			BAR	BAR	BAR	BAR	CLAY	SILT	SAND	CLAY	SILT	SAND	CONT	<5mm
SAMPLE	HZ	8J	6C9b	6V2b	6G12b	6S4b	6S5	6D3b	6A2e	4B1c	4B1a	4B1a	4B2b	<- - -	3A1c	- - ->	<- - -	SML	- - ->	8F1	4G1
NO.	NO		<- P C T		o f	< 2 m m ->		<- P P M	->	< - - - - - - - - - - - P E R C E N T						o f	< 2 m m - - - - - - -			><20mm	<PCT>
97P2898	1								9.93												
97P2899	2								9.25												
97P2900	3								10.66												
97P2901	4								10.34												

Narrative Pedon Description

Pedon: San Germán

NSSL pedon number: 97P0483

Pedon ID: S97PR-079-003

Field classification: Loamy-skeletal, mixed, superactive, nonacid, isohyperthermic, shallow Typic Ustorthents

Revised classification as of April 01, 2001: Clayey-skeletal, carbonatic, isohyperthermic Typic Ustorthents

Pedon type: Typical pedon for series

Location: Lajas Municipio, Puerto Rico; 4.8 km west of La Parguera, Puerto Rico; 2.7 km southeast of Rancho Cabassa; 6.1 meters east of gravel road

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Soil survey area: PR787—San Germán Area, Southwestern Puerto Rico

USGS 7.5-minute quadrangle: Parguera, Puerto Rico

Latitude: 17°58’56" north

Longitude: 67°05’32" west

Elevation: 100 meters

Geomorphic setting: Summit of hill in uplands

Slope: 3 percent with an aspect of 82 degrees; linear upslope and convex across the slope

Geographically associated soils: Aguilita, Duey, Pozo Blanco, Seboruco, and Tuque

Drainage: Well drained

Parent material: Material weathered from limestone bedrock

Bedrock kind: Limestone

Surface fragments: 16 percent

Particle-size control section: 0 to 28 cm

Diagnostic features: Ochric epipedon at 0 to 5 cm; paralithic contact at 28 to 66 cm; lithic contact at 66 cm

Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on June 18, 1997

A—0 to 5 cm; dark brown (10YR 3/3) gravelly loam, brown (10YR 4/3 dry); strong medium granular structure; very friable, soft, slightly sticky, slightly plastic; many very fine and fine roots throughout; many fine and many very fine interstitial pores; 2 percent rock fragments 75 to 250 mm in diameter and 14 percent 2 to 75 mm; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2898

AC—5 to 38 cm; dark brown (10YR 3/3) extremely gravelly loam, brown (10YR 4/3) dry; massive; very friable, soft, slightly sticky, slightly plastic; many fine and many very fine roots throughout; many very fine interstitial pores; 70 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; abrupt wavy boundary. 97P2899

Cr1—38 to 54 cm; stratified and fractured hard semiconsolidated limestone bedrock; many very fine roots in cracks; violent effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2900

Cr2—54 to 68 cm; stratified and fractured hard semiconsolidated limestone bedrock; violent effervescence with dilute (1 normal) HCl; abrupt wavy boundary. 97P2901

R—68 cm; consolidated hard limestone bedrock. Not sampled.

Parguera: S97PR-079-004

Primary Characterization Data

Lajas Municipio, Puerto Rico

Sampled as: Fine, mixed, superactive, isohyperthermic Aridic Calciustolls

SSL—Project: 97P 72, (CP97PR112) Cabo Rojo and Lajas Puerto Rico

—Pedon: 97P 484, Samples 97P 2902–2907

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002	-2-- SILT .05-.05	-3-- SAND -2	-4-- FINE LT .0002	-5-- CO3 LT .002	-6-- FINE .002-.02	-7-- COARSE .02-.05	-8-- VF .05-.10	-9-- F .10-.25	-10- M .25-.50	-11- C .5-1	-12- VC 1-2	-13- WEIGHT 2-5	-14- WEIGHT 5-20	-15- WEIGHT .1-75	-16- WT % OF WHOLE SOIL
			(- - -TOTAL - - -)				(- -CLAY- -)	(- -SILT- -)		(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
97P2902S	0- 19	Ap	59.2	29.8	11.0	28.0	2.6	22.6	7.2	3.7	3.9	2.0	1.0	0.4	--	TR	--	7 --
97P2903S	19- 55	Bt	48.9	28.3	22.8	17.1	3.9	20.2	8.1	6.6	7.9	4.5	2.6	1.2	TR	TR	--	16 TR
97P2904S	55- 98	2Btk	34.1	22.3	43.6	14.3	5.0	15.0	7.3	4.8	6.4	5.8	8.3	18.3	7	20	56	90 83
97P2905S	98-146	2BC	17.9	21.4	60.7	6.1	7.3	13.9	7.5	5.8	10.2	12.5	15.6	16.6	7	18	53	90 78
97P2906S	146-180	3Ck1	45.5	36.3	18.2	19.4	8.9	27.8	8.5	6.2	6.4	3.2	1.5	0.9	1	2	--	15 3
97P2907S	180-200	3Ck2	58.1	30.0	11.9	25.2	8.4	22.2	7.8	4.2	3.3	1.7	1.3	1.4	1	1	--	10 2

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR TOTAL P 6S3b PPM	S 6R3c <- PERCENT	EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	(RATIO/CLAY) LL 4F1 PCT	PI 4F <0.4MM	(ATTERBERG) FIELD MOIST 4A5	(- BULK DENSITY -) 1/3 BAR 4A1d <- - G/CC - - ->	OVEN DRY 4A1h	COLE 1/3 SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c <- - -PCT OF	1/3 BAR 4B1c <2MM - ->	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
0- 19	3.95	0.416						0.74	0.43				1.09	1.51	0.115			43.4	25.5	0.20
19- 55	1.40	0.150						0.76	0.46				1.25	1.59	0.083			36.9	22.3	0.18
55- 98	0.62	0.071						0.79	0.47										16.0	
98-146	0.29	0.043						0.93	0.50										9.0	
146-180	0.16							0.63	0.41				1.38	1.81	0.093			31.8	18.7	0.18
180-200	0.22							0.62	0.41										23.6	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES 6H5a	ACID-ITY	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 19		4.9	0.5	3.2				44.0	1	TR	100	100	13				7.6	7.6	7.4
19- 55		5.9	1.2	1.5				37.3	3		100	100	14					7.7	8.1
55- 98		4.5	1.3	0.6				26.9	5		100	100	27					7.8	8.3
98-146		3.5	1.4	0.4				16.7	8		100	100	50					7.9	8.5
146-180		11.0	8.5	0.8				28.5	24	16	100	100	34		--		8.0	8.1	8.3
180-200		14.3	13.0	1.0				35.8	26	21	100	100	22		--		8.0	8.1	8.1

DEPTH (CM)	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1b	CL 6K1d	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1d	NO2 6W1b	NO3 6M1d	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a MMHOS /cm	PRED. ELEC. COND. 8I MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 19	9.0	1.1	0.6	0.8	--	9.1	--	0.4				0.9	--	--	76.0	TR	1.11	0.39
19- 55																		0.23
55- 98																		0.19
98-146																		0.18
146-180	2.2	1.9	23.4	0.3	--	1.9	--	21.2				7.0	0.2	--	71.2	0.1	2.84	1.27
180-200	4.8	3.8	42.8	0.3	--	1.5	--	42.1				12.1	0.4	--	83.7	0.3	4.96	2.50

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4b	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2e	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m ->			<- P P M ->			< - - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -												><20mm><PCT>
97P2902	1								4.93												
97P2903	2								2.47												
97P2904	3								3.04												
97P2905	4								4.74												
97P2906	5								3.81												
97P2907	6								2.44												

Narrative Pedon Description

Pedon: Parguera
NSSL pedon number: 97P0484
Pedon ID: S97PR-079-004
Field classification: Fine, mixed, superactive, isohyperthermic Aridic Calciustolls
Revised classification as of April 01, 2001: Clayey-skeletal, carbonatic, isohyperthermic Aridic Calciustolls
Pedon type: Typical pedon for series
Location: Lajas Municipio, Puerto Rico; 3.1 km west of the junction between Highways 304 and 324; 2.4 km west of La Parguera, Puerto Rico; 6 meters east of dirt road
Latitude: 17°58’42" north
Longitude: 67°04’17" west
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Soil survey area: PR787—San Germán Area, Southwestern Puerto Rico
USGS 7.5-minute quadrangle: Parguera, Puerto Rico
Geomorphic position: Alluvial flat in uplands
Slope: 1 percent; linear upslope and linear across the slope
Vegetation: Grass and herbaceous cover in hayland
Drainage: Well drained
Geographically associated soils: Aguilita, Jacana, Montalva, and Pozo Blanco
Parent material: Material weathered from chert and silicified limestone
Surface fragments: 2 percent
Particle-size control section: 18 to 102 cm
Diagnostic features: Mollic epipedon at 0 to 18 cm; argillic horizon at 18 to 97 cm; calcic horizon at 53 to 97 cm
Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on June 19, 1997

Ap—0 to 19 cm; dark brown (10YR 3/3) clay loam, dark yellowish brown (10YR 3/4) dry; strong medium granular structure; friable, slightly hard, slightly sticky, slightly plastic; many very fine and fine and common medium roots throughout; many fine and many very fine interstitial pores; 2 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2902

Bt—19 to 55 cm; dark yellowish brown (10YR 3/4) clay, dark yellowish brown (10YR 3/4) dry; strong medium angular blocky structure; firm, slightly hard, moderately sticky, moderately plastic; many fine and medium roots throughout; many fine tubular and many very fine interstitial pores; 2 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; abrupt wavy boundary. 97P2903

2Btk—55 to 98 cm; dark yellowish brown (10YR 4/6) very gravelly clay loam, dark yellowish brown (10YR 4/4) dry; weak medium subangular blocky structure; very friable, soft, slightly sticky, slightly plastic; many very fine to medium roots throughout; many very fine and fine interstitial pores; 75 percent

continuous distinct pinkish white (7.5YR 8/2) dry carbonate coatings on rock fragments; 2 percent fine pinkish white (7.5YR 8/2) carbonate threads throughout; 55 percent rock fragments 2 to 75 mm in diameter; violent effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2904

2BC—98 to 146 cm; dark yellowish brown (10YR 4/6) extremely gravelly sandy clay loam, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; very friable, soft, slightly sticky, slightly plastic; many very fine to medium roots throughout; many very fine and fine and common medium interstitial pores; 75 percent continuous distinct pinkish white (7.5YR 8/2) dry carbonate coatings on rock fragments; 1 percent pinkish white (7.5YR 8/2) carbonate masses throughout and 1 percent fine pinkish white (7.5YR 8/2) carbonate threads throughout; 1 percent rock fragments 75 to 250 mm in diameter and 70 percent rock fragments 2 to 75 mm in diameter; violent effervescence with dilute (1 normal) HCl; abrupt smooth boundary. 97P2905

3Ck1—146 to 180 cm; strong brown (7.5YR 4/6) clay loam, yellowish red (5YR 4/6) dry; massive; firm, slightly hard, moderately sticky, moderately plastic; few fine roots throughout; many very fine and fine interstitial pores; 50 percent pinkish white (7.5YR 8/2) carbonate masses throughout; 2 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl; clear wavy boundary. 97P2906

3Ck2—180 to 200 cm; strong brown (7.5YR 4/6) clay loam, yellowish red (5YR 4/6) dry; massive; firm, slightly hard, moderately sticky, moderately plastic; few very fine roots throughout; many very fine interstitial pores; 1 percent pinkish white (7.5YR 8/2) carbonate masses throughout; 1 percent rock fragments 2 to 75 mm in diameter; strong effervescence with dilute (1 normal) HCl. 97P2907

Moca Municipio

Coto: S87PR-099-001

Primary Characterization Data

Moca Municipio, Puerto Rico

Sampled as: Coto; very-fine, kaolinitic, isohyperthermic Typic Eutrustox

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 294, Samples 87P 1463–1475

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002 <- PCT OF <2MM	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- TOTAL FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10-- SAND M .25 -.50	-11-- SAND C .5 -1	-12-- SAND VC 1 -2	-13-- COARSE FRACS (MM) 2 -5 <- PCT OF <75MM	-14-- COARSE FRACS (MM) 5 -20 (3B1)	-15-- COARSE FRACS (MM) 20 -75 ->	-16-- >2MM WEIGHT .1- 75	-17-- WT % OF WHOLE SOIL
87P1463S	0- 22	Ap	67.6	9.3	23.1	36.6		4.1	5.2	8.3	7.4	6.3	1.1	--	TR	TR	--	15	--
87P1464S	22- 48	Bo1	82.0	7.5	10.5	45.5		3.6	3.9	5.3	2.5	2.3	0.4	--	--	--	--	5	--
87P1465S	48- 78	Bo2	81.7	7.3	11.0	45.3		2.9	4.4	4.6	3.5	2.4	0.4	0.1	--	--	--	6	--
87P1466S	78- 97	Bo3	83.0	7.9	9.1	40.1		4.8	3.1	4.1	2.8	1.9	0.3	--	TR	--	--	5	--
87P1467S	97-135	2Bw1	80.5	10.5	9.0	32.5		6.9	3.6	4.3	2.9	1.6	0.2	--	--	--	--	5	--
87P1468S	135-167	2Bw2	72.8	16.9	10.3	29.4		11.5	5.4	5.1	3.2	1.7	0.3	--	--	--	--	5	--
87P1469S	167-227	3Bw3	79.0	9.1	11.9	31.0		5.2	3.9	5.3	3.8	2.4	0.4	--	--	--	--	7	--
87P1470G	78- 97	Bo3-N	80.7	9.6	9.7	34.8		6.3	3.3	4.4	3.0	2.0	0.3	--					P
87P1471G	78- 97	Bo3-M	77.1	13.3	9.6	33.5		8.9	4.4	4.5	2.8	1.9	0.4	--					P
87P1472G	97-135	2Bw1-N	74.1	15.4	10.5	30.8		9.3	6.1	5.3	3.4	1.6	0.2	--					P
87P1473G	97-135	2Bw1-M	79.5	11.4	9.1	32.4		7.4	4.0	4.5	2.9	1.5	0.2	--					P
87P1474G	97-135	2Bw2-N	79.3	10.4	10.3	32.5		6.1	4.3	5.1	3.4	1.6	0.2	--					P
87P1475G	0- 0	2Bw2-M	79.2	10.9	9.9	31.7		7.2	3.7	5.0	3.1	1.6	0.2	--					P

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	DITH-CIT EXTRACTABLE AL 6G7a <2MM -->	DITH-CIT EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 22	2.01	0.206			9.6	1.4	0.1	0.16	0.31				1.39	1.54	0.035			29.7	20.9	0.12
22- 48	0.72	0.132			11.8	1.5	0.1	0.07	0.32	52	23		1.33	1.44	0.027			32.2	26.4	0.08
48- 78	0.56	0.120			11.9	1.5	TR	0.07	0.32				1.41	1.53	0.028			30.6	25.9	0.07
78- 97	0.43	0.104			12.7	1.5	TR	0.07	0.31				1.26	1.35	0.023			32.1	25.8	0.08
97-135	0.23				12.3	1.5	TR	0.07	0.30	44	15		1.50	1.56	0.013			27.5	23.8	0.06
135-167	0.18				13.1	1.5	TR	0.08	0.33				1.52	1.59	0.015			26.9	23.9	0.05
167-227	0.12				13.4	1.5	TR	0.07	0.28	43	15		1.65	1.70	0.010			23.9	22.5	0.02
78- 97	0.42				12.9	1.6	TR	0.07	0.30										24.1	
78- 97	0.43				12.5	0.3	TR	0.07	0.32										24.8	
97-135	0.18				15.3	0.2	TR	0.08	0.31										23.1	
97-135	0.23				12.7	0.1	TR	0.07	0.30										24.0	
97-135	0.16				12.8	0.2	TR	0.07	0.29										23.0	
0- 0	0.20				13.2	0.6	TR	0.07	0.30										23.7	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES -MEQ /	ACID- ITY 6H5a 100 G	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3 -PCT	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
0- 22	3.8	0.7	--	0.2	4.7	14.9	0.6	19.6	10.7	5.3	11	24	44				4.1	4.4	4.8
22- 48	4.4	0.3	--	--	4.7	8.0		12.7	6.1			37	77				5.7	5.8	6.1
48- 78	4.4	0.3	--	--	4.7	8.0		12.7	5.6			37	84				6.0	6.0	6.4
78- 97	4.7	0.2	--	--	4.9	7.3		12.2	5.8			40	84				6.1	6.2	6.6
97-135	4.8	0.2	--	--	5.0	7.1		12.1	5.3			41	94				6.2	6.3	6.7
135-167	5.2	0.3	--	--	5.5	6.5		12.0	5.5			46	100	--			6.3	6.4	6.7
167-227	5.2	0.5	--	--	5.7	6.0		11.7	5.4			49	100				6.1	6.2	6.5
78- 97	4.5	0.3	--	--	4.8	5.8		10.6	5.7			45	84					6.2	6.5
78- 97	5.0	0.2	TR	TR	5.2	5.9		11.1	5.7			47	91				6.1	6.2	6.6
97-135	5.7	0.2	TR	TR	5.9	6.3		12.2	5.9			48	100					6.3	6.7
97-135	4.8	0.2	TR	TR	5.0	5.5		10.5	5.5			48	91				6.2	6.3	6.7
97-135	5.8	0.3	TR	TR	6.1	5.7		11.8	5.7			52	100					6.4	6.7
0- 0	5.7	0.2	--	TR	5.9	5.5		11.4	5.6			52	100				6.3	6.4	6.8

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          < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE      ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER    <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
87P1464    TCLY  KK 3  GE 2  HE 2             KK65  GI 6  KK46  GI 9             22.9              0.2
87P1466    TCLY  KK 3  GE 3  HE 2             KK65  GI 6  KK45  GI 9             21.4              0.2
87P1467    TCLY  KK 3  GE 3  HE 2             KK66  GI 7  KK44  GI 8             24.3              0.2
87P1469    TCLY  KK 3  GE 3  HE 2             KK72  GI 7  KK48  GI 7             21.4              0.2
87P1470    TCLY  KK 3  GE 2  HE 2             KK69  GI 7                         22.9              0.2
87P1472    TCLY  KK 3  GE 3  HE 2             KK68  GI 7                         22.9              0.2
87P1474    TCLY  KK 3  GE 3  HE 2             KK69  GI 7                         22.9              0.2
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          < - - - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - -><                >INTER
SAMPLE      ION <                      ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                < - - - - 7A2i - - - - -><  - 7A3b - ><  - 7A4b - ><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER    < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
87P1464    VFS   QZ 5                                                 99  QZ93  FE 4  KK 1  MG 1  ZRtr
```

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< - - - - - - - - - - - - - - - - - - - - - - - - FINE EARTH MINERALOGY (<2.0mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> SURF INTER
 DEPTH      ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > AREA PRETA
                < - - - - -  7A2i - - - - - -><  - 7A4b - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >       TION
  (cm)    <- - ><  - - - - Peak Size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><M2/G><  - >
  22-  48   FETH                              KK51  GI 5  KK35  GI 7
  97- 135   FETH                              KK54  GI 4  KK37  GI 5
 167- 227   FETH                              KK52  GI 4  KK39  GI 5
  78-  97   FETH                              KK58  GI 5  KK42  GI 6
  97- 135   FETH                              KK52  GI 5  KK39  GI 5
  97- 135   FETH                              KK52  GI 4  KK38  GI 4
MINERAL INTERPRETATION: QZ quartz  KK kaolinite  GE goethite  HE hematite  GI gibbsite  FE iron oxides   MG  magnetite  ZR  zircon
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Coto

NSSL pedon number: S87-PR-099-001

Pedon ID: S87-PR-099-001

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Eutrustox

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Eutrudox

Location: Moca Municipio, Puerto Rico; Noroeste Soil and Water Conservation District; MLRA 272; 3.1 km west on Highway 2 from junction with Highway 112, about 0.3 km south of field road, and 9.1 meters west of road

Latitude: 18°27’31" north

Longitude: 67°03’41" west

Slope: 2 percent; convex on an outwash or marine terrace in a coastal plain

Average air temperature: Annual—25.0 °C; summer—27.0 °C; winter—24.0 °C

Drainage: Well drained

Vegetation: Crop cover (sugarcane)

Parent material: Fine-textured sediments derived from limestone

Particle-size control section: 25 to 100 cm

Diagnostic features: Ochric epipedon at 0 to 22 cm; oxic horizon at 22 to 97 cm

Described and sampled by: D. Williams, L.H. Rivera, G. Acevedo, and W. Lynn on April 1, 1987

Notes: Matrix colors are for moist ped interiors.

Ap—0 to 22 cm; dark brown (7.5YR 3/4) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots throughout; 1 percent fine spherical iron-manganese masses; common fine quartz grains; few black charcoal fragments; mixing of B material with a lower pH; few fine soft masses of iron-manganese concentrations; common fine roots throughout; strongly acid; abrupt smooth boundary. 87P1463

Bo1—22 to 48 cm; strong brown (7.5YR 4/6) clay; weak medium and fine subangular blocky structure; friable, slightly sticky, moderately plastic; common fine roots throughout; few fine tubular pores; 15 percent discontinuous faint coatings on faces of peds; few old root channels; few fine quartz grains; few coatings on faces of peds; common fine roots throughout; neutral; gradual smooth boundary. 87P1464

Bo2—48 to 78 cm; strong brown (7.5YR 5/6) clay; weak medium and fine subangular blocky structure; friable, slightly sticky, moderately plastic; few fine roots throughout; few fine tubular pores; 15 percent discontinuous faint coatings on faces of peds; 1 percent fine spherical iron-manganese masses; 1 percent fine spherical clay bodies; few old root channels; few insect tunnels; few fine quartz grains; few fine concentrations of clay bodies; few fine soft masses of iron-manganese concentrations; few coatings on faces of peds; few fine roots throughout; neutral; gradual smooth boundary. 87P1465

Bo3—78 to 97 cm; strong brown (7.5YR 5/6) clay; few fine distinct red (2.5YR 4/6) redoximorphic features; weak medium and fine subangular blocky

structure; friable, slightly sticky, moderately plastic; few fine tubular pores; 15 percent discontinuous faint strong brown (7.5YR 5/6) coatings on faces of peds; few old root channels; few fine quartz grains; few coatings on faces of peds; neutral; clear smooth boundary. 87P1466

2Bw1—97 to 135 cm; strong brown (7.5YR 5/6) clay loam; few fine distinct red (2.5YR 4/6) redoximorphic features; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine tubular pores; 55 percent continuous distinct strong brown (7.5YR 5/6) coatings on all faces of peds; many fine unaltered clay fragments; few old root channels; few fine quartz grains; many coatings on vertical and horizontal faces of peds; neutral; gradual smooth boundary. 87P1467

2Bw2—135 to 167 cm; strong brown (7.5YR 5/6) clay loam; few fine distinct red (2.5YR 4/6) redoximorphic features; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine tubular pores; 55 percent continuous distinct strong brown (7.5YR 5/6) coatings on all faces of peds; many fine unaltered clay fragments; few old root channels; many coatings on vertical and horizontal faces of peds; neutral; clear smooth boundary. 87P1468

3Bw3—167 to 227 cm; strong brown (7.5YR 5/6) clay; few fine distinct red (2.5YR 4/6) features; weak medium angular blocky structure; firm, moderately sticky, moderately plastic; few fine tubular pores; 55 percent continuous distinct strong brown (7.5YR 5/6) coatings on all faces of peds; 10 percent small striated slickenside faces 3 to 8 cm across; many fine unaltered clay fragments; many coatings on vertical and horizontal faces of peds; neutral. 87P1469

Peñuelas Municipio

Montegrande: S86PR-111-001

Primary Characterization Data

Peñuelas Municipio, Puerto Rico

Sampled as: Montegrande; fine, montmorillonitic, isohyperthermic Udorthentic Chromusterts

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 298, Samples 86P 1755–1761

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
86P1755S	0- 22	Ap		42.8	32.3	24.9	19.9		23.8	8.5	5.7	6.1	4.8	4.5	3.8	1	1	--	21	2
86P1756S	22- 40	Bw1		49.2	25.5	25.3	25.3		19.6	5.9	4.5	5.5	5.6	5.8	3.9	1	--	--	22	1
86P1757S	40- 64	Bw2		65.4	21.9	12.7	37.8		17.8	4.1	2.9	2.9	2.5	2.7	1.7	TR	--	--	10	TR
86P1758S	64- 93	Bw3		66.2	23.4	10.4	32.4		18.5	4.9	2.3	2.1	1.7	2.1	2.2	12	1	--	20	13
86P1759S	93-125	Bw4		55.8	27.2	17.0	26.8		21.1	6.1	4.4	4.2	3.2	3.0	2.2	2	TR	--	14	2
86P1760S	125-152	Bw5		50.3	28.8	20.9	20.3		22.7	6.1	5.0	4.3	2.8	3.6	5.2	2	1	--	18	3
86P1761S	152-190	Bw6		45.1	27.8	27.1	15.0		22.0	5.8	5.4	6.0	4.6	5.2	5.9	3	3	--	26	6

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT	<0.4MM	<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 22	1.51	0.142			3.5	0.4	0.1	0.94	0.47	54	28		1.37	1.69	0.072			28.4	20.2	0.11
22- 40	0.73	0.082			3.5	0.4	0.1	0.91	0.46				1.37	1.74	0.083			32.4	22.4	0.14
40- 64	0.45	0.063			3.5	0.4	0.1	0.69	0.39	73	48		1.30	1.84	0.122			36.8	25.7	0.14
64- 93	0.29	0.044			3.6	0.3	TR	0.62	0.38				1.34	1.85	0.104			35.7	25.2	0.13
93-125	0.16				3.6	0.3	TR	0.75	0.42				1.42	1.81	0.083			30.8	23.3	0.11
125-152	0.10				3.3	0.3	TR	0.86	0.43				1.48	1.77	0.060			28.3	21.8	0.09
152-190	0.06				3.3	0.3	0.3	0.92	0.45	58	34		1.33	1.66	0.074			30.8	20.5	0.13

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	(- -CEC- -)		EXCH	SAR	BASE		CO3 AS	RES.	CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION		CACO3	OHMS	GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	/CM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		PCT		<- -PCT ->			1:2	1:1
0- 22	27.2	9.0	0.1	0.3	36.6	6.9	43.5	40.3	TR		84	91						6.5	6.9
22- 40	29.8	11.5	0.7	0.3	42.3	7.5	49.8	45.0	1		85	94						6.4	7.0
40- 64	28.4	13.0	1.2	0.5	43.1	5.3	48.4	45.2	2	2	89	95					7.1	6.7	7.3
64- 93		12.1	2.0	0.2				41.0	4	4	100	100	1				7.7	7.7	8.0
93-125	31.0	12.3	2.5	0.2	46.0		46.0	41.6	4	4	100	100	TR	1800			7.7	7.5	7.9
125-152		12.1	2.5	0.2				43.2	4	4	100	100	2				7.7	7.6	7.9
152-190	28.5	11.4	2.2	0.2	42.3		42.3	41.6	4	4	100	100	TR				7.7	7.5	7.9

	(- - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -)																	PRED.	
																	TOTAL	ELEC.	ELEC.
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O		SALTS	COND.	COND.
DEPTH																	EST.	8A3a	8I
(CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A		8D5	MMHOS	MMHOS
	<- - - - - - - - - - - - - - - - - - MEQ / LITER - - - - - - - - - - - - - - - - - - ->														<- -PCT- ->			/cm	/cm
0- 22																			0.18
22- 40																			0.17
40- 64	1.2	0.6	2.1	TR	--	1.3	0.3	0.7				1.4	--	0.1	92.2		TR	0.43	0.33
64- 93	3.6	1.8	5.8	TR	--	2.0	0.3	5.1				3.9	--	--	89.7		0.1	1.19	0.75
93-125	3.5	1.9	7.0	TR	--	1.7	0.2	8.6				2.2	--	--	88.3		0.1	1.40	0.83
125-152	3.2	1.8	6.7	TR	--	1.7	0.2	9.8				0.5	--	--	81.7		0.1	1.36	0.75
152-190	3.4	1.9	6.6	TR	--	2.0	0.2	9.7				0.2	--	--	70.6		0.1	1.36	0.63

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           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
86P1755     TCLY  KK 2  VM 2  MT 2  MI 1  GE 1  KK 8                                  9.7              1.3
86P1757     TCLY  KK 3  VM 3  MT 2  QZ 1  GE 1  KK24  GItr                            9.7              1.1
86P1758     TCLY  KK 3  MT 3  VM 2  GE 2  MI 1  KK13  GItr                           10.3              1.1
86P1758     TCLY  QZ 1
86P1761     TCLY  VM 3  KK 3  MT 3  GE 2  QZ 1  KK26  GItr                           10.6              1.3

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    KK  kaolinite        VM  vermici-mica     MT  montmorillon     MI  mica            GE  goethite         QZ  quartz
    GI  gibbsite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Montegrande

NSSL pedon number: 86P0298

Pedon ID: S86PR-111-001

Field classification: Fine, montmorillonitic, isohyperthermic Udorthentic Chromusterts

Revised classification as of April 01, 2001: Very-fine, mixed, superactive, isohyperthermic Chromic Hapluderts

Location: Peñuelas Municipio, Puerto Rico; just north of Penueles, 100 meters northeast of Rio Guayames, 61 meters east on paved road at kilometer marker 0.4 on Highway 386, then 40 meters south; UTM Zone 19: 1,199,100 m northing and 740,740 m easting

Latitude: 18°04’05" north

Longitude: 67°43’32" west

Physiography: Hills

Geomorphic position: Summit crested hills; on lower third of component

Slope: 4 percent with a plane south aspect

Average annual precipitation: 1,500 mm; ustic moisture regime

Major Land Resource Area: 273—Semiarid Coastal Plains

Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C

Average soil temperature: Annual—29 °C; summer—31 °C; winter—28 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and very slow permeability

Vegetation: Guineagrass in pastureland and native pasture

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Alluvium from igneous-basic material

Diagnostic features: Mollic epipedon at 0 to 22 cm; cambic horizon at 22 to 190 cm

Map unit: MSC—Montegrande clay, 2 to 12 percent slopes

Described and sampled by: D. Williams, L.H. Rivera, J. Torres, G. Acevedo, and W. Lynn during February 1986

Notes: Weakly grooved slickensides occurred at 50 to 100 cm at another site. Soil temperature was 24.8 °C at a depth of 50 cm and 26.4 °C at 1.4 m.

Ap—0 to 22 cm; very dark grayish brown (10YR 3/2) clay; moderate fine subangular blocky structure parting to moderate medium subangular blocky; hard, very firm, sticky, plastic; common fine roots between peds; few very fine discontinuous tubular pores; few wormcasts; neutral; 1 percent igneous gravel; 1 percent igneous cobbles; few ant tunnels; clear smooth boundary. 86P1755

Bw1—22 to 40 cm; brown to dark brown (10YR 4/3) clay; weak coarse subangular blocky structure; hard, very firm, sticky, plastic; few fine roots throughout; few fine discontinuous tubular pores; many continuous distinct organic coatings on vertical and horizontal faces of peds; few wormcasts; 2 percent igneous gravel; neutral; clear wavy boundary. 86P1756

Bw2—40 to 64 cm; dark yellowish brown (10YR 4/4) clay; moderate coarse wedge structure parting to moderate medium angular blocky; very hard, very firm, very sticky, very plastic; few fine roots throughout; few very fine discontinuous tubular pores; many continuous prominent intersecting slickensides tilted at 45 degrees; few fine irregular carbonate nodules and few fine rounded iron-manganese concretions; 2 percent igneous gravel; dark coatings along root channels; neutral; clear wavy boundary. 86P1757

Bw3—64 to 93 cm; brown (7.5YR 5/4) clay; moderate coarse wedge structure parting to moderate medium angular blocky; very hard, very firm, very sticky, very plastic; few fine roots between peds; few very fine discontinuous tubular pores; many continuous prominent intersecting slickensides tilted at 45 degrees; few fine irregular carbonate nodules and few medium irregular carbonate nodules; 2 percent igneous gravel; few fine manganese concretions; mildly alkaline; clear wavy boundary. 86P1758

Bw4—93 to 125 cm; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; hard, very firm, sticky, plastic; few fine roots between peds; few very fine and fine discontinuous tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; few fine irregular carbonate concretions and few fine rounded iron-manganese concretions; 5 percent igneous cobbles; few root channels coated with dark material; mildly alkaline; gradual smooth boundary. 86P1759

Bw5—125 to 152 cm; brown (7.5YR 5/4) clay; few medium distinct redoximorphic features; weak medium subangular blocky structure; hard, very firm, sticky, plastic; few fine roots between peds; few very fine and fine discontinuous tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; 1 percent igneous cobbles; dark coatings along root channels; mildly alkaline; clear smooth boundary. 86P1760

Bw6—152 to 190 cm; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure parting to weak fine subangular blocky; hard, firm, slightly sticky, slightly plastic; many discontinuous prominent black stains on vertical and horizontal faces of peds; few fine irregular carbonate concretions and few fine rounded iron-manganese concretions; 1 percent igneous gravel; few soft masses of carbonates; mildly alkaline. 86P1761

Ponce Municipio

Yauco: S85PR-113-001

Primary Characterization Data

Ponce Municipio, Puerto Rico

Sampled as: Yauco; fine-silty, carbonatic, isohyperthermic Typic Calciustolls

SSL—Project: 86P 42, (CP86PR072) Caribbean National Forest

—Pedon 86P 224, Samples 86P 1332–1339

—General Methods: 1B1A, 2A1, 2B

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20-

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1) ->												<- PCT OF <75MM(3B1) ->				SOIL
86P1332S	0- 19	Ap1	47.3	36.4	16.3		6.9	22.9	13.5	8.4	3.5	1.9	1.4	1.1	TR	TR	1	9	1
86P1333S	19- 38	Ap2	49.3	36.6	14.1		7.5	23.1	13.5	8.2	3.0	1.2	1.0	0.7	TR	TR	1	7	1
86P1334S	38- 54	Bw	50.4	36.7	12.9		13.3	24.4	12.3	7.1	2.4	1.1	1.2	1.1	TR	--	--	6	TR
86P1335S	54- 77	Bk1	43.2	45.2	11.6		16.3	30.9	14.3	7.4	2.5	0.7	0.5	0.5	--	--	--	4	--
86P1336S	77-112	Bk2	29.8	43.2	27.0		10.7	27.0	16.2	15.5	7.4	2.2	1.2	0.7	--	--	--	11	--
86P1337S	112-142	Bk3	25.8	36.9	37.3		7.5	20.9	16.0	20.1	13.0	3.8	0.4	--	--	--	--	17	--
86P1338S	142-183	Bk4	25.5	31.7	42.8		8.3	18.1	13.6	21.8	16.4	3.7	0.7	0.2	--	--	--	21	--
86P1339S	183-200	Bk5	31.1	48.8	20.1		9.6	26.2	22.6	16.3	3.3	0.5	--	--	--	--	--	4	--

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 19	1.84	0.174			0.9	0.1		0.73	0.47	54	29		1.21	1.63	0.104			36.5	22.1	0.17
19- 38	1.59	0.159			0.9	0.1		0.70	0.48				1.25	1.71	0.109			33.9	23.9	0.12
38- 54	0.86	0.089			0.8	0.1		0.56	0.41	57	37		1.24	1.56	0.079			34.4	20.8	0.17
54- 77	0.70				0.6	0.1		0.44	0.43				1.17	1.30	0.036			30.6	18.7	0.14
77-112	0.34				0.7	TR		0.51	0.42				1.26	1.39	0.033			27.2	12.5	0.19
112-142	0.26				0.7	TR		0.59	0.45	36	17		1.28	1.39	0.028			23.3	11.6	0.15
142-183	0.30				0.7	TR		0.63	0.46				1.27	1.35	0.021			21.6	11.7	0.13
183-200	0.26				0.7	TR		0.62	0.47				1.27	1.40	0.033			27.1	14.7	0.16

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2	SAR 5E	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	PH SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - -	- - -	-MEQ / 100 G	- - -				- ->	PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 19		5.5	0.2	1.2				34.6	1	TR	100	100	32				7.5	7.6	7.8
19- 38		5.5	0.2	0.9				34.5	1	TR	100	100	36				7.5	7.7	7.9
38- 54		4.0	0.2	0.7				28.1	1	TR	100	100	46				7.6	7.7	8.2
54- 77		2.8	0.2	0.4				19.0	1	TR	100	100	61				7.6	7.7	8.2
77-112		2.6	0.2	0.4				15.3	2		100	100	63					7.7	8.3
112-142		2.4	0.2	0.3				15.3	2		100	100	59					7.8	8.4
142-183		2.7	0.3	0.4				16.0	2		100	100	60					7.8	8.3
183-200		3.4	0.3	0.4				19.2	1		100	100	54					7.8	8.3

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a	PRED. ELEC. COND. 8I
	<- - -	- - -	- - -	- - -	- - -	- - -	MEQ / LITER	- - -	- - -	- - -	- - -	- - -	- - -	- ->	<- -PCT-	->	MMHOS /cm	MMHOS /cm
0- 19	6.1	1.1	0.5	0.4	--	3.5	0.1	0.4				1.2	0.6	1.7	66.8	TR	0.78	0.42
19- 38	4.8	1.0	0.4	0.2	--	3.1	TR	0.6				2.1	0.1	--	70.1	TR	0.60	0.41
38- 54	3.3	0.6	0.6	0.1	--	2.4	0.1	0.8				0.8	0.2	TR	66.9	TR	0.46	0.29
54- 77	3.3	0.6	0.6	0.1	--	2.1	0.1	0.8				0.7	0.4	0.1	59.3	TR	0.46	0.26
77-112																		0.23
112-142																		0.19
142-183																		0.18
183-200																		0.20

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
86P1334      TCLY  MT 3  CA 3  KK 1              ----                                  6.9               1.0
86P1335      TCLY  CA 3  MT 2                    KK 2                                  5.6               0.9
86P1339      TCLY  CA 3  MT 2                    ----                                  8.4               1.5
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< - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE        ION <                      ><  - DTA - -><  - TGA - ->TOT RE<  - - - - - GRAIN COUNT - - - - - -><                >PRETA
                  < - - - - 7A2i - - - - -><  - 7A3b - ><  - 7A4b - ><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER      < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
86P1334      VFS                                                   24  QZ23  CA22  FK21  CB16  FP 8  AR 4
86P1334      VFS                                                       MI 3  OP 1  EP 1  GNtr  HNtr
86P1335      VFS                                                   19  CB30  CA25  QZ18  FK16  FP 4  AR 2
86P1335      VFS                                                       RA 1  EP 1  MI 1  BTtr  OWtr  PRtr
86P1339      VFS                                                   21  CA31  CB30  QZ18  FK10  FP 4  RA 3
86P1339      VFS                                                       AR 2  MI 1  BT 1  PRtr
FRACTION INTERPRETATION: TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION: MT montmorillon  CA calcite  KK  kaolinite QZ quartz  FK potas feldsp CB carb-aggrega  FP plag-feldspa  AR
wthr aggrega  MI mica  OP opaques  EP epidote  GN  garnet HN hornblende  RA resist-aggre BT biotite  OW oth-weath mn PR  pyroxene
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Yauco

NSSL pedon number: 86P0224

Pedon ID: S85PR-113-001

Field classification: Fine-silty, carbonatic, isohyperthermic Typic Calciustolls

Revised classification as of April 01, 2001: Fine-silty, carbonatic, isohyperthermic Vertic Calciustolls

Location: Ponce Municipio, Puerto Rico; Ponce Area; 0.8 km northeast of eastern edge of Central Mercedita, 15 meters south of road intersection

Latitude: 18°40’25" north

Longitude: 66°35’59" west

Elevation: 28 meters

Physiography: Terracettes in mountain valleys or canyons

Slope: 1 percent with a plane south aspect

Average annual precipitation: 1,000 mm; ustic moisture regime

Major Land Resource Area: 273—Semiarid Coastal Plains

Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C

Average soil temperature: Annual—29 °C; summer—31 °C; winter—28 °C

Drainage, runoff, and permeability: Well drained, slow runoff, and moderately slow permeability

Vegetation: Cropland, sugarcane

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Alluvium from mixed-calcareous material

Diagnostic features: Mollic epipedon at 0 to 38 cm; cambic horizon at 38 to 77 cm, calcic horizon at 77 to 142 cm

Described and sampled by: D. Williams, L.A. Daniels, G. Acevedo, and J. Torres during May 1985

Ap1—0 to 19 cm; silty clay, dark grayish brown (10YR 4/2) dry and very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; friable, very sticky, plastic; common very fine and common fine roots throughout; common very fine shell fragments; strongly effervescent with dilute HCl; abrupt smooth boundary. 86P1332

Ap2—19 to 38 cm; silty clay, 95 percent dark grayish brown (10YR 4/2) and 5 percent pale brown (10YR 6/3) dry and 95 percent very dark grayish brown (10YR 3/2) and 5 percent yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; firm, very sticky, plastic; common very fine and common fine roots throughout; common very fine shell fragments; the (10YR 5/4) color results from mixing by plowing; strongly effervescent with dilute HCl; abrupt smooth boundary. 86P1333

Bw—38 to 54 cm; silty clay, pale brown (10YR 6/3) dry and yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; firm, very sticky, plastic; few fine roots throughout; many very fine and common fine

interstitial and tubular pores; few irregular carbonate concretions; few medium and coarse pores filled with darker soil material; strongly effervescent with dilute HCl; clear smooth boundary. 86P1334

Bk1—54 to 77 cm; silty clay loam, very pale brown (10YR 8/3) dry and light yellowish brown (10YR 6/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very friable, sticky, plastic; few fine roots throughout; many very fine and common fine interstitial and tubular pores; few fine irregular carbonate concretions; few splotches of disseminated lime; few medium and coarse pores filled with darker soil material; violently effervescent with dilute HCl; clear smooth boundary. 86P1335

Bk2—77 to 112 cm; silt loam, very pale brown (10YR 8/4) dry and yellow (10YR 7/6) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; very friable, sticky, plastic; few fine roots throughout; common very fine and common fine interstitial and tubular pores; common rounded soft masses of carbonate; violently effervescent with dilute HCl; 10 percent soft masses of lime; gradual smooth boundary. 86P1336

Bk3—112 to 142 cm; silt loam, very pale brown (10YR 7/4) dry and yellow (10YR 7/6) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; very friable, sticky, plastic; few fine roots throughout; common very fine and common fine interstitial and tubular pores; common rounded soft masses of carbonate; violently effervescent with dilute HCl; 10 percent soft masses of lime; clear smooth boundary. 86P1337

Bk4—142 to 183 cm; loam, very pale brown (10YR 7/4) dry and brownish yellow (10YR 6/6) moist; weak coarse prismatic structure; very friable, slightly sticky, slightly plastic; few fine roots throughout; common very fine and common fine interstitial and tubular pores; common rounded soft masses of carbonate; violently effervescent with dilute HCl; 3 percent soft masses of lime; clear smooth boundary. 86P1338

Bk5—183 to 200 cm; silt loam, very pale brown (10YR 7/4) dry and brownish yellow (10YR 6/6) moist; weak medium subangular blocky structure; very friable, sticky, plastic; few fine roots throughout; common very fine and common fine interstitial and tubular pores; common rounded soft masses of carbonate; violently effervescent with dilute HCl; 3 to 5 percent soft masses of lime. 86P1339

Cortada: S86PR-113-003

Primary Characterization Data

Ponce Municipio, Puerto Rico

Sampled as: Cortada; fine-loamy, mixed, isohyperthermic Cumulic Haplustolls

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 301, Samples 86P 1776–1783

—General Methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
86P1776S	0- 11	Ap1		20.1	31.3	48.6	5.4		19.7	11.6	15.6	20.8	9.2	2.4	0.6	TR	--	--	33	--
86P1777S	11- 27	Ap2		19.9	32.3	47.8	4.8		20.6	11.7	16.1	21.1	8.2	1.9	0.5	TR	--	--	32	--
86P1778S	27- 52	Bw1		17.3	26.4	56.3	4.8		15.8	10.6	18.9	25.6	9.5	1.8	0.5	TR	--	--	37	--
86P1779S	52- 94	Bw2		22.2	35.8	42.0	4.9		21.9	13.9	19.4	19.6	2.6	0.4	--	TR	--	--	23	--
86P1780S	94-119	Bw3		30.5	46.1	23.4	5.2		30.2	15.9	12.3	7.5	2.6	1.0	--	--	--	--	11	--
86P1781S	119-152	Bw4		32.8	44.6	22.6	4.7		30.2	14.4	11.6	7.1	2.4	1.2	0.3	--	--	--	11	--
86P1782S	152-178	Bw5		20.4	32.8	46.8	4.1		20.1	12.7	15.9	18.6	7.2	2.8	2.3	1	--	--	32	1
86P1783S	178-210	Bw6		21.9	43.1	35.0			27.3	15.8	17.7	11.0	1.6	1.7	3.0	2	--	--	19	2

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c PCT	6B3a <2MM	6S3 PPM	6R3a <- PERCENT	6C2b OF	6G7a <2MM -->	6D2a	8D1	8D1	4F1 PCT	4F <0.4MM	4A3a <- - G/CC	4A1d - - ->	4A1h CM/CM	4D1	4B4 <- - -PCT	4B1c OF	4B1c <2MM	4B2a - ->	4C1 CM/CM
0- 11	1.05	0.087			2.4	0.1	0.1	1.96	0.72	38	15		1.48	1.64	0.035			21.0	14.5	0.10
11- 27	0.93	0.075			2.2	0.1	0.1	2.01	0.78				1.51	1.67	0.034			19.6	15.5	0.06
27- 52	0.63	0.062			2.3	0.1	0.1	2.32	0.87				1.47	1.62	0.033			19.0	15.0	0.06
52- 94	0.72	0.068			2.1	0.1	0.1	2.01	0.81	45	21		1.38	1.59	0.048			23.2	18.0	0.07
94-119	1.21				1.9	0.1	0.1	1.58	0.70				1.31	1.57	0.062			25.3	21.3	0.05
119-152	0.97				1.7	0.1	0.1	1.60	0.65				1.33	1.63	0.070			25.2	21.2	0.05
152-178	0.33				1.9	0.1	0.1	1.99	0.78	40	18		1.44	1.55	0.025			22.7	16.0	0.10
178-210	0.24							1.70	0.76				1.44	1.55	0.025			24.1	16.6	0.11

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM	ACID- ITY	(- -CEC- -) SUM CATS	NH4- OAC	EXCH NA	SAR	BASE SATURATION SUM	NH4OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	CASO4 AS GYPSUM <2MM	<20MM	(- - - -PH - - -) SAT PASTE	CACL2 .01M	H2O
DEPTH (CM)	5B5a 6N2e	5B5a 6O2d	5B5a 6P2b	5B5a 6Q2b	BASES	6H5a	5A3a	5A8b	5D2 PCT	5E	5C3 <- -PCT- >	5C1	6E1g PCT	6E4	6F1a <- -PCT ->	6F4	8C1b	8C1f 1:2	8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->																		
0- 11		8.2	0.6	1.3				39.4	1	1	100	100	2				7.7	7.6	8.0
11- 27		8.8	0.8	0.8				40.0	2	2	100	100	2				7.8	7.7	8.3
27- 52		9.4	1.2	0.4				40.1	3	2	100	100	3				7.8	7.8	8.4
52- 94		10.1	1.4	0.4				44.7	3	3	100	100	3				7.8	7.7	8.4
94-119		10.2	1.5	0.4				48.3	3	3	100	100	2	1800			7.8	7.7	8.3
119-152		11.0	1.5	0.5				52.4	2	2	100	100	2				7.6	7.7	8.1
152-178		9.4	1.2	0.3				40.5	3	3	100	100	2				7.7	7.7	8.2
178-210		10.5	1.1	0.3				37.3	2	2	100	100	10				7.8	7.8	8.3

	(- - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. 8A3a	ELEC. COND. 8I
DEPTH (CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS /cm	MMHOS /cm
	<- - - - - - - - - - - - - - - - - - - MEQ / LITER - - - - - - - - - - - - - - - - - ->														<- -PCT- ->			
0- 11	5.2	1.9	2.2	0.4	--	4.7	0.2	0.8				1.4	0.1	2.5	43.6	TR	0.96	0.43
11- 27	2.4	1.0	2.3	0.2	--	4.1	0.1	0.7				0.7	--	--	46.5	TR	0.58	0.33
27- 52	1.8	0.8	2.5	0.1	--	3.8	0.1	0.4				0.8	--	--	45.2	TR	0.51	0.31
52- 94	1.3	0.5	2.4	TR	--	3.2	0.1	0.3				0.6	--	--	53.2	TR	0.42	0.31
94-119	2.0	0.8	3.7	0.1	--	3.0	0.1	1.5				1.5	0.4	TR	60.1	TR	0.68	0.35
119-152	2.4	0.9	3.1	0.1	--	3.1	0.2	0.8				1.7	0.6	0.1	64.7	TR	0.66	0.42
152-178	2.8	1.1	3.6	0.1	--	2.6	0.2	1.3				1.7	0.5	0.6	51.3	TR	0.77	0.33
178-210	2.5	1.2	3.0	0.1	--	2.3	0.1	0.7				2.4	--	1.2	54.7	TR	0.70	0.34

```
                < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE            ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                    < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER          <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
86P1776          TCLY  MT 3  KK 2                    KK 6        KK12  GI 7               7.9               0.9
86P1779          TCLY  MT 3  KK 2  MI 1              KK 7                                 8.0               0.6
86P1782          TCLY  MT 3  KK 2  MI 1              KK 5                                 7.7               0.6
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< - - - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - ->
                FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE            ION <                      ><  - DTA - -><  - TGA - ->TOT RE<  - - - - - GRAIN COUNT - - - - - -><                >PRETA
                    < - - - - 7A2i - - - - -><  - 7A3b - ><  - 7A4b - ><  - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER          < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
86P1779          VFS                                                    5  AR59  FK15  FP13  OP 5  BT 2  OW 2
86P1779          VFS                                                       EP 2  CA 1  HN 1
86P1782          VFS                                                    5  AR58  FP18  FK11  OP 4  OW 3  BT 2
86P1782          VFS                                                       CA 2  HN 1  CD 1  EP 1
FRACTION INTERPRETATION: TCLY  Total Clay, <0.002mm           VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    MT  montmorillon     KK  kaolinite        GI  gibbsite         MI  mica             AR  wthr aggrega     FK  potas feldsp
    FP  plag-feldspa     OP  opaques          BT  biotite          OW  oth-weath mn     EP  epidote          CA  calcite
    HN  hornblende       CD  chalcedony
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Cortada
NSSL pedon number: 86P0301
Pedon ID: S86PR-113-003
Field classification: Fine-loamy, mixed, isohyperthermic Cumulic Haplustolls
Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Cumulic Haplustolls
Location: Ponce Municipio, Puerto Rico; 21 km east of Ponce, 0.3 km north on Highway 536 from junction with Highway 1 and 46 meters west of road
Latitude: 17°59’36" north
Longitude: 66°26’21" west
Elevation: 10 meters
Physiography: Flood plain on coastal plains
Slope: 1 percent with a plane south aspect
Average annual precipitation: 890 mm; ustic moisture regime
Major Land Resource Area: 273—Semiarid Coastal Plains
Depth to water table: 264 cm; apparent
Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C
Average soil temperature: Annual—29 °C; summer—31 °C; winter—28 °C
Drainage, runoff, and permeability: Well drained, slow runoff, and moderate permeability
Vegetation: Unspecified crop in irrigated cropland
Erosion: Slight
Particle-size control section: 25 to 100 cm
Parent material: Alluvium from igneous-basic material
Diagnostic features: Mollic epipedon at 0 to 178 cm
Map unit: Ct—Cortada silty clay loam
Described and sampled by: D. Williams, L.H. Rivera, J. Torres, G. Acevedo, and W. Lynn during February 1986
Notes: Matrix colors are for moist interior peds.

Ap1—0 to 11 cm; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots throughout; few wormcasts; slightly effervescent with dilute HCl; mildly alkaline; abrupt smooth boundary. 86P1776

Ap2—11 to 27 cm; very dark grayish brown (10YR 3/2) silt loam; weak coarse subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine discontinuous tubular pores; very few patchy faint organic coatings on faces of peds; few wormcasts and few fine rounded carbonate concretions; few very fine shell fragments; slightly effervescent with dilute HCl; moderately alkaline; clear smooth boundary. 86P1777

Bw1—27 to 52 cm; loam, dark brown (10YR 3/3) crushed interior; weak coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots throughout; few fine discontinuous tubular pores; very few patchy

faint organic coatings on faces of peds; few wormcasts; few very fine shell fragments; few fine rounded carbonate concretions and few fine rounded soft masses of carbonate; strongly effervescent with dilute HCl; moderately alkaline; gradual wavy boundary. 86P1778

Bw2—52 to 94 cm; silt loam, dark brown (10YR 3/3) crushed interior; weak coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common fine discontinuous tubular pores; very few patchy faint organic coatings on faces of peds; few wormcasts; few fine rounded carbonate concretions and few fine rounded soft masses of carbonate; few very fine shell fragments; strongly effervescent with dilute HCl; moderately alkaline; clear smooth boundary. 86P1779

Bw3—94 to 119 cm; very dark brown (10YR 2/2) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; hard, firm, sticky, plastic; common fine discontinuous tubular pores; common root channels or worm holes; few fine irregular soft masses of carbonate; few shell fragments; slightly effervescent with dilute HCl; mildly alkaline; gradual wavy boundary. 86P1780

Bw4—119 to 152 cm; very dark brown (10YR 2/2) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; hard, firm, sticky, plastic; common fine discontinuous tubular pores; common root channels; few irregular soft masses of carbonate; slightly effervescent with dilute HCl; moderately alkaline; clear smooth boundary. 86P1781

Bw5—152 to 178 cm; loam, dark brown (10YR 3/3) crushed interior; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots; common fine discontinuous tubular pores; very few patchy distinct organic coatings in root channels and/or pores; common root channels or worm holes; common irregular soft masses of carbonate; slightly effervescent with dilute HCl; moderately alkaline; clear smooth boundary. 86P1782

Bw6—178 to 254 cm; dark yellowish brown (10YR 3/4) loam (sampled at 178 to 210 cm); weak medium subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; common fine discontinuous tubular pores; very few patchy distinct organic coatings in root channels and/or pores; common irregular soft masses of carbonate and few rounded carbonate concretions; few channels filled with dark material; few dark concretions; strongly effervescent with dilute HCl; moderately alkaline; abrupt smooth boundary. 86P1783

2C—254 to 284 cm; very dark brown (10YR 2/2) loamy coarse sand; loose; 7 percent igneous gravel.

Constancia: S86PR-113-004

Primary Characterization Data

Ponce Municipio, Puerto Rico

Sampled as: Constancia; fine-loamy, mixed, isohyperthermic Typic Calciustolls

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 302, Samples 86P 1784–1791

—General Methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
86P1784S	0- 15	Ap		32.4	50.9	16.7	5.9		36.7	14.2	9.0	5.1	1.0	0.6	1.0	1	TR	--	9	1
86P1785S	15- 34	Bw1		31.3	50.6	18.1	5.5		36.7	13.9	10.0	5.7	1.0	0.7	0.7	1	TR	--	9	1
86P1786S	34- 54	Bw2		27.8	48.9	23.3	6.7		31.8	17.1	13.9	5.1	1.4	1.4	1.5	2	TR	--	11	2
86P1787S	54- 83	Bk1		21.8	43.4	34.8	6.4		25.7	17.7	21.9	6.9	1.2	1.8	3.0	2	TR	--	15	2
86P1788S	83-103	Bk2		17.8	43.6	38.6	5.0		26.0	17.6	21.7	9.1	1.4	2.0	4.4	11	TR	--	26	11
86P1789S	103-124	Bk3		19.0	51.4	29.6	4.8		30.8	20.6	14.9	5.4	1.8	2.3	5.2	11	3	--	27	14
86P1790S	124-150	Bk4		14.6	39.5	45.9	3.7		24.0	15.5	16.9	14.8	4.3	2.9	7.0	9	TR	--	35	9
86P1791S	150-190	C		12.0	28.4	59.6	3.9		17.1	11.3	24.2	24.9	3.1	2.5	4.9	5	2	--	40	7

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c PCT	6B3a <2MM	6S3 PPM	6R3a <- PERCENT	6C2b	6G7a OF	6D2a <2MM -->	8D1	8D1	4F1 PCT <0.4MM	4F	4A3a <- - G/CC	4A1d	4A1h - - ->	4D1 CM/CM	4B4 <- - -PCT OF	4B1c <2MM	4B1c	4B2a - ->	4C1 CM/CM
0- 15	1.79	0.128			1.4	0.1	0.1	1.17	0.58	47	22		1.29	1.59	0.072			31.1	18.8	0.16
15- 34	1.33	0.102			1.5	0.1	0.1	1.13	0.65				1.37	1.64	0.062			27.5	20.2	0.10
34- 54	0.50	0.045			1.5	0.1	0.1	0.90	0.63				1.44	1.59	0.033			24.4	17.5	0.10
54- 83	0.31	0.028			1.5	0.1	TR	0.94	0.65				1.39	1.49	0.023			24.5	14.1	0.14
83-103	0.24				1.6	0.1	TR	1.23	0.71				1.35	1.42	0.016			27.0	12.7	0.18
103-124	0.23				1.8	0.1	0.1	1.30	0.77				1.32	1.47	0.034			31.0	14.6	0.20
124-150	0.16				1.7	0.1	0.1	1.58	0.82	36	12		1.46	1.53	0.015			23.6	12.0	0.16
150-190	0.14				1.6	0.1	TR	2.06	0.94				1.36	1.41	0.012			19.8	11.3	0.11

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- ITY	(- -CEC- -) SUM CATS	NH4- OAC	EXCH NA	SAR	BASE SATURATION SUM	NH4OAC	CARBONATE AS CACO3 <2MM	<20MM	CASO4 AS GYPSUM <2MM	<20MM	(- - - -PH - - -) SAT PASTE	CACL2 .01M	H2O
DEPTH (CM)	5B5a 6N2e	5B5a 6O2d	5B5a 6P2b	5B5a 6Q2b		6H5a	5A3a	5A8b	5D2 PCT	5E	5C3 <- -PCT- >	5C1	6E1g <- -PCT ->	6E4	6F1a <- -PCT ->	6F4	8C1b	8C1f 1:2	8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->																		
0- 15		5.5	0.1	0.5				38.0	TR	TR	100	100	2				7.6	7.5	8.0
15- 34		5.3	0.2	0.4				35.4	TR	1	100	100	2				7.6	7.6	8.1
34- 54		6.1	0.3	0.3				25.1	1	1	100	100	9				7.9	7.8	8.3
54- 83		6.2	0.3	0.2				20.4	1	1	100	100	12				8.1	7.8	8.3
83-103		5.5	0.3	0.1				21.9	1		100	100	8					8.0	8.3
103-124		5.0	0.3	0.1				24.7	1		100	100	10					8.0	8.3
124-150		4.6	0.3	0.1				23.1	1		100	100	12					7.9	8.3
150-190		3.6	0.3	0.1				24.7	1		100	100	7					7.7	8.2

	(- - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	ELEC. COND. 8A3a	PRED. ELEC. COND. 8I
DEPTH (CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS /cm	MMHOS /cm
	<- - - - - - - - - - - - - - - - - - - MEQ / LITER ->														<- -PCT- ->			
0- 15	5.5	1.2	0.8	0.1	--	6.1	0.3	0.4				0.5	--	--	58.7	TR	0.69	0.42
15- 34	4.0	0.8	0.8	0.1	--	4.5	0.3	0.2				0.3	--	TR	59.6	TR	0.52	0.39
34- 54	2.7	0.6	0.8	TR	--	2.8	0.3	0.2				0.5	--	TR	58.4	TR	0.39	0.30
54- 83	2.3	0.6	0.7	--	--	2.1	0.2	0.3				0.9	--	TR	58.7	TR	0.37	0.26
83-103																		0.23
103-124																		0.23
124-150																		0.22
150-190																		0.21

```
           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DSC - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
86P1784     TCLY  MT 3  KK 2  MI 1              KK 3                                  8.7               1.1
86P1786     TCLY  MT 3  KK 2  MI 1              KK 3                                  9.0               1.0
86P1790     TCLY  MT 3  KK 2  VM 2  MI 1        KK 2  GItr                            9.9               0.9
           < - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - -><  - 7A3b - ><  - 7A4b - ><  - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
86P1786     VFS                                                   14  AR53  FP15  FK12  OP 8  QZ 6  BT 3
86P1786     VFS                                                       CA 1  AM 1  PR 1  OW 1
86P1790     VFS                                                   12  AR59  FK12  QZ11  FP 8  CA 4  BT 2
86P1790     VFS                                                       HN 2  OW 1  PR 1  RA 1  POtr
FRACTION INTERPRETATION: TCLY  Total Clay, <0.002mm           VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    MT  montmorillon     KK  kaolinite        MI  mica            AR  wthr aggrega     FP  plag-feldspa     FK  potas feldsp
    OP  opaques          QZ  quartz           BT  biotite         CA  calcite         AM  amphibole        PR  pyroxene
    OW  oth-weath mn     VM  vermici-mica     HN  hornblende      RA  resist-aggre     PO  plant opal       GI  gibbsite

RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Constancia[11]
NSSL pedon number: 86P0302
Pedon ID: S86PR-113-004
Field classification: Fine-loamy, mixed, isohyperthermic Aeric Calciustolls
Series classification: Fine, smectitic, isohyperthermic Aeric Calciaquolls
Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Typic Endoaquolls
Location: Ponce Municipio, Puerto Rico; 0.8 km south of Highway 1 on paved road and 0.5 km east on Calle No. 2 and 0.5 km south of Calle No. 2, about 61 meters east; UTM Zone 19: 1,1910,30 m northing and 755,080 meters easting
Major Land Resource Area: 273—Semiarid Coastal Plains
Latitude: 17°59’38" north
Longitude: 66°35’27" west
Elevation: 5 meters
Physiography: Flood plain on coastal plains
Slope: 1 percent with a plane north aspect
Average annual precipitation: 760 mm; ustic moisture regime
Depth to water table: 250 cm; apparent
Average air temperature: Annual—26 °C; summer—28 °C; winter—24 °C
Average soil temperature: Annual—29 °C; summer—31 °C; winter—28 °C
Drainage and runoff: Somewhat poorly drained and slow runoff
Vegetation: Sugarcane in cropland
Surface stoniness: Class 0
Parent material: Alluvium from igneous-basic material over alluvium from limestone material
Particle-size control section: 25 to 100 cm
Diagnostic features: Mollic epipedon at 0 to 34 cm; cambic horizon at 34 to 150 cm; calcic horizon at 54 to 124 cm
Map unit: Ct—Constancia silty clay
Described and sampled by: D. Williams, L.H. Rivera, J. Torres, G. Acevedo, and W. Lynn during February 1986
Notes: Grayer colors observed at a depth of 230 cm. Bottom of auger was at 330 cm.

Ap—0 to 15 cm; very dark brown (10YR 2/2) silty clay; weak medium subangular blocky structure parting to weak fine subangular blocky; very hard, firm, sticky, plastic; common fine and few medium roots throughout; few fine irregular carbonate concretions; few old roots; very slightly effervescent with dilute HCl; 1 percent limestone gravel; clear smooth boundary. 86P1784

Bw1—15 to 34 cm; very dark brown (10YR 2/2) silty clay; weak medium subangular blocky structure parting to weak fine subangular blocky; very hard, firm, sticky, plastic; few fine roots throughout; few fine discontinuous tubular

[11] The moisture regime of this soil could be udic or aquic but is included with the dry soils of Puerto Rico.

pores; common continuous faint organic coatings on faces of peds; few fine irregular carbonate concretions; few old roots; slightly effervescent with dilute HCl; 1 percent limestone cobbles; gradual boundary. 86P1785

Bw2—34 to 54 cm; yellowish brown (10YR 5/4) silty clay loam; few medium distinct and common fine distinct redoximorphic features; weak medium subangular blocky structure; hard, friable, sticky, plastic; few fine and few medium roots throughout; few fine discontinuous tubular pores; many continuous distinct organic coatings on vertical and horizontal faces of peds; few fine irregular carbonate concretions; few old roots; violently effervescent with dilute HCl; gradual boundary. 86P1786

Bk1—54 to 83 cm; dark grayish brown (10YR 4/2) silt loam; common fine distinct redoximorphic features; weak coarse subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; few fine and few medium roots throughout; few fine discontinuous tubular and few medium discontinuous tubular pores; few patchy faint organic coatings in root channels and/or pores; common medium irregular carbonate concretions and few medium irregular soft masses of carbonate; few old roots; violently effervescent with dilute HCl; gradual boundary. 86P1787

Bk2—83 to 103 cm; dark grayish brown (10YR 4/2) silt loam; common fine distinct redoximorphic features; weak coarse subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine and few medium discontinuous tubular pores; few patchy faint organic coatings in root channels and/or pores; common medium irregular carbonate concretions and few medium irregular soft masses of carbonate; few old roots; violently effervescent with dilute HCl; clear smooth boundary. 86P1788

Bk3—103 to 124 cm; dark grayish brown (10YR 4/2) silt loam; common fine distinct and few fine distinct redoximorphic features; weak coarse subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine discontinuous tubular pores; few patchy faint organic coatings in root channels and/or pores; few medium irregular carbonate concretions and few fine rounded iron-manganese concretions; few old roots; few very coarse carbonate concretions; violently effervescent with dilute HCl; clear smooth boundary. 86P1789

Bk4—124 to 150 cm; yellowish brown (10YR 5/6) silt loam; common fine distinct redoximorphic features; weak coarse subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; few fine discontinuous tubular pores; few patchy faint organic coats in root channels and/or pores; few fine rounded iron-manganese concretions and few medium irregular soft masses of carbonate; few old roots; strongly effervescent with dilute HCl; clear smooth boundary. 86P1790

C—150 to 190 cm; brown (10YR 5/3) sandy loam; few fine faint redoximorphic features; slightly hard, very friable, nonsticky, slightly plastic; few fine discontinuous tubular pores; few medium irregular soft masses of carbonate; slightly effervescent with dilute HCl. 86P1791

Sabana Grande Municipio

Fe: S61PR-121-001

Primary Characterization Data

Sabana Grande Municipio, Puerto Rico

Sampled as: Fe; fine, mixed, isohyperthermic Palleustollic Chromusterts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 525, Samples 40A 3912–3916

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1- TOTAL CLAY LT .002	-2- TOTAL SILT .002 -.05	-3- TOTAL SAND .05 -2	-4- CLAY FINE LT .0002	-5- CLAY CO3 LT .002	-6- SILT FINE .002 -.02	-7- SILT COARSE .02 -.05	-8- SAND VF .05 -.10	-9- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			PCT OF <2MM												PCT OF <75MM(3B1)				SOIL
40A3912S	0- 18	Ap	49.8	31.0	19.2		--	24.2	6.8	8.3	5.9	1.6	1.6	1.8	TRC	2C	--	13	2
40A3913S	18- 43	AC	53.8	30.9	15.3		2.0	21.1	9.8	7.0	4.6	1.3	1.4	1.0	TRC	2C	--	10	2
40A3914S	43- 71	C1Cs	55.5	32.8	11.7		2.0	19.7	13.1	6.1	3.3	0.9	0.9	0.5	--C	--C	--	6	--
40A3915S	71-107	C2	54.4	33.0	12.6		3.0	19.7	13.3	6.5	3.3	0.9	1.1	0.8	--C	--C	--	6	--
40A3916S	107-142	C3	49.1	30.2	20.7		2.0	23.8	6.4	7.8	6.1	2.0	2.6	2.2	1C	5C	--	18	6

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	PERCENT OF <2MM						PCT <0.4MM		G/CC			CM/CM	PCT OF <2MM				CM/CM
0- 18	2.09	0.192			2.2			0.71	0.39									31.1	19.6	
18- 43	0.76	0.066			1.7			0.62	0.41			1.63		1.87		19.3		33.6	21.8	
43- 71	0.28	0.025			1.4			0.58	0.42			1.48		1.84		27.7		35.5	23.1	
71-107	0.16				1.2			0.59	0.42										23.0	
107-142	0.10				1.2			0.63	0.44			1.56		1.88		24.6		28.9	21.4	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACIDITY 6H5a	6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5A3b	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	PH SAT PASTE 8C1g	CACL2 .01M 8C1f	8C1f 1:2
	MEQ / 100 G									PCT		PCT		PCT		PCT				
0- 18		11.3	2.2	1.0					35.5	4		100	41	2		--		7.5		
18- 43		18.0	14.3	0.6					33.6	26		100	98	7		--		8.0		
43- 71		21.9	24.6	0.8					32.1	30		100	100	7		1		8.2		
71-107		21.8	23.1	0.8					32.1	28		100	100	9		TR		8.3		
107-142		19.3	21.9	0.8					30.7	36		100	100	8		--		8.3		

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	ELEC. COND. MMHOS /cm	PRED. ELEC. COND. MMHOS /cm
	MEQ / LITER											PCT			
0- 18			7.9	0.2								85.6	0.1	1.4	
18- 43			52.0	0.1	--	3.0		41.4	19.2			110.0	0.5	5.6	
43- 71			138.0	0.2	--	1.4		80.1	128.0			108.0	1.3	14.9	
71-107			124.0	0.2	--	1.2		73.0	99.9			115.0	1.3	13.5	
107-142			101.0	0.1	--	1.4		64.5	58.8			106.0	0.9	10.6	

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY (peak size)	THERMAL DTA (Percent)	THERMAL TGA (Percent)	ELEMENTAL SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN (mg/g)	INTERPRETATION
40A3912	TCLY	VM 5 CL 2 MT 2 KK 2											

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:

VM vermici-mica CL chlorite MT montmorillon KK kaolinite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

KAOL = Kaolinitic CMIX = Mixed - Clay SMIX = Mixed - Sand

Narrative Pedon Description

Pedon: Fe

NSSL pedon number: 40A525

Pedon ID: S61PR-121-001

SSIR #12 pedon ID: S61PR-14-1

Field classification: Fine, mixed, isohyperthermic Palleustollic Chromusterts

Revised classification as of April 01, 2001: Fe; fine, smectitic, isohyperthermic Sodic Haplusterts

Location: Sabana Grande Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 2.5 km south of kilometer marker 11.7, Highway 117, about 38 meters south of hedge, 15 meters east of big cerezo tree, on the farm of Santos Lugo; aerial photograph GS-LR-4-40

Latitude: 18°01’04" north

Longitude: 66°57’46" west

Vegetation: Pajon grass, paraguita grass, rayo or aroma bushes, and other weeds in pastureland

Slope and landform: Nearly level, less than 2 percent slope, toward south on low depressional fan; 9 meters above sea level

Drainage, runoff, and permeability: Moderately well drained to somewhat poorly drained, slow runoff, and very slow permeability

Parent material: Alluvial or valley fill material from soils derived from acid volcanic and limestone rocks

Described and sampled by: R.B. Grossman and soil survey field party on March 14, 1961

Notes: When sampled, the Ap and AC horizons were estimated at below field capacity and the C horizons were estimated at field capacity. Cracks extended to a depth of 43 cm when sampled. Subgroup classification based on columnar structure was observed in a nearby pedon under drier conditions than those when this pedon was sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; dark reddish brown (5YR 3/2) clay; strong very coarse prismatic structure parting to moderate medium to coarse blocky; very hard, firm, sticky, plastic; common fine roots; calcareous; clear to abrupt, wavy to irregular boundary. 40A3912

AC—18 to 43 cm; clay, dark reddish brown (5YR 3/2) with tongues of dark reddish brown (5YR 3/3); massive when wet, on drying strong very coarse prismatic structure parting to weak coarse angular blocky; very hard, extremely firm, sticky, plastic; many pressure faces; trace of fine gravel and sand grains; common fine roots; strongly effervescent with dilute HCl; some small aggregates of lime; clear smooth boundary. 40A3912

C1cs—43 to 71 cm; dark reddish (5YR 3/3) clay; massive when wet, on drying weak medium angular blocky structure; common slickensides less than 7.5 cm; firm, slightly sticky, plastic; a few gypsum crystals; few fine roots; trace

of fine gravel and sand grains; strongly effervescent with dilute HCl; clear smooth boundary. 40A3912

C2—71 to 107 cm; dark reddish gray (5YR 4/2) clay; massive when wet, on drying breaks to weak fine angular blocky structure; few to common slickensides and pressure faces; firm, slightly sticky, plastic; a few gypsum crystals; few fine roots; 5 percent gravel; no clay films; strongly effervescent with dilute HCl; arbitrary boundary. 40A3912

C3—107 to 142 cm; dark reddish gray (5YR 4/2) clay; massive when wet, on drying breaks to weak fine angular blocky structure; few slickensides; common pressure faces; no clay films; firm, slightly sticky, plastic; no roots or pores; 10 percent fine gravel-sized subangular volcanic fragments; strongly effervescent with dilute HCl. 40A3912

Descalabrado: S61PR-121-002

Primary Characterization Data

Sabana Grande Municipio, Puerto Rico

Sampled as: Descalabrado; clayey, mixed, isohyperthermic Lithic Haplustolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 556, Samples 40A 4086–4089

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						( ) - - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				SOIL
40A4086S	0- 13	A		44.3	37.4	18.3			29.5	7.9	4.1	4.4	2.3	4.0	3.5	2C	10C	--		24	12
40A4087S	13- 25	B		44.2	37.1	18.7			30.2	6.9	4.2	4.6	1.8	3.8	4.3	2C	11C	--		26	13
40A4088S	25- 46	C														--	--	--			--
40A4089S	46- 0	R														--	--	--			--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)				(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)					WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 13	1.68	0.177			1.9			0.87	0.41										18.0	
13- 25	1.07	0.126			1.7			0.82	0.43										18.9	
25- 46																				
46- 0																				

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS		CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM		.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -				-MEQ / 100 G - - - - - - - - - - - - ->							<- - - - -PCT - - - ->							1:2	1:1
0- 13	35.3	5.5	0.1	0.5	41.4	5.1		46.5	38.7			89	100	--						6.8
13- 25	34.9	4.1	0.2	0.4	39.6	4.4		44.0	36.3			90	100	--						7.0
25- 46																				
46- 0																				

Narrative Pedon Description

Pedon: Descalabrado

NSSL pedon number: 40A556

Site ID: S61PR-121-002

SSIR #12 pedon ID: S61PR-14-8

Field classification: Clayey, mixed, isohyperthermic Lithic Haplustolls

Revised classification as of April 01, 2001: Clayey, mixed, isohyperthermic Lithic Haplustolls

Location: Sabana Grande Municipio, Lajas Valley, Puerto Rico; Suroeste Soil Conservation District; 0.5 km north of Highway 117, kilometer marker 8.5, 91 meters northwest of secondary road, 84 meters southeast of main irrigation canal; aerial photograph GS-LR-6-80

Latitude: 18°02’39" north

Longitude: 66°59’00" west

Vegetation: Pajon and other grasses and weeds in pastureland

Slope: Strongly sloping (15 percent); on southwest-facing side slope of a low hill

Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability

Parent material: Stratified volcanic mudstone and volcanic flow of andesitic or basaltic composition

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, and J.E. Trigo on March 20, 1961

Notes: When sampled, the soil was dry and plants were near wilting point.

A—0 to 13 cm; dark brown (10YR 3/3) gravelly clay loam; moderate fine subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, slightly plastic; few to common fine roots; neutral; clear smooth boundary. 40A4086

B—13 to 25 cm; dark brown (7.5YR 3/2) 50 percent gravelly clay and 50 percent fine gravel; gravel is massive, pockets of soil appear to have weak fine subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few roots; spots of calcareous lime; neutral; wavy irregular boundary. 40A4087

C—25 to 46 cm; mixed volcanic, mudstone, and limestone rock with pockets of clayey material similar to that of the B horizon and occasional seams of secondary carbonates; mildly alkaline. 40A4088

R—46 cm; hard volcanic rock that cannot be broken easily with a spade. 40A4089

Yauco Municipio

Malaya: S01PR-153-002

Primary Characterization Data

Yauco Municipio, Puerto Rico

Sampled as: Malaya; clayey, mixed, superactive, isohyperthermic, shallow Typic Eutrudepts

SSL—Project: 1P 166, (CP01PR157) San Germán Area Soil Survey

—Pedon: 1P1037, Samples 1P 5270–5272

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND -2	CLAY FINE .0002	CLAY CO3 LT .002	SILT FINE .02-.05	SILT COARSE .05-.10	SAND VF .10-.25	SAND F .25-.50	SAND M .5-1	SAND C -2	SAND VC -5	COARSE FRACS (MM) 2-5	COARSE FRACS (MM) 5-20	COARSE FRACS (MM) .1-75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
1P5270S	0- 10	A	52.6	34.2	13.2		27.0	7.2	4.0	5.6	3.1	0.5	TR	--	--	--	9	--
1P5271S	10- 25	Bw	42.2	28.5	29.3	--	22.7	5.8	5.0	8.3	8.6	6.2	1.2	--	--	--	24	--
1P5272S	25- 35	Cr												--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4b <2MM	EXTR P 6S3e PPM	TOTAL S 6R3d <- PERCENT	EXTRACTABLE FE 6C2h OF	EXTRACTABLE AL 6G7g <2MM -->	EXTRACTABLE MN 6D2g	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A5 <- - G/CC	BULK DENSITY 1/3 BAR 4A1d - -	BULK DENSITY OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM -	WATER CONTENT 15 BAR 4B2a ->	WRD WHOLE SOIL 4C1 CM/CM
0- 10		0.342		0.04	3.2	0.4	0.1	1.12	0.55			1.10	1.57	0.126				38.5	28.9	0.11
10- 25		0.148		0.02	2.9	0.3	0.1	1.33	0.62			1.08	1.47	0.108				40.4	26.0	0.16
25- 35																				

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6B5a 6N2i	MG 6B5a 6O2h	NA 6B5a 6P2f	K 6B5a 6Q2f	SUM BASES	ACID-ITY 6H5a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1h	CARBONATE AS CACO3 <20MM 6E4b	CASO4 AS GYPSUM <2MM 6F1a	CASO4 AS GYPSUM <20MM 6F4	PH SAT PASTE 8C1b	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->|										<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 10	43.0	3.7	0.3	0.6	47.6	9.7	57.3	58.9	1		83	81						5.9	6.2
10- 25		2.5	0.3	0.5				56.3	1	TR	100	100	4				7.0	7.1	7.3
25- 35																			

DEPTH (CM)	NA PYROPHOSPHATE EXTRACTABLE C 6A5a	FE 6C8c	AL 6G1z	FE+AL DI-CI FE+AL	FE+AL PCT CLAY	AL+C PCT CLAY	INDEX OF ACCUM
	<- PCT OF <2MM ->			(- -DIVIDED BY- -)			
0- 10		TR	0.1	TR	--		
10- 25		TR	TR				
25- 35							

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY peak size	THERMAL DTA 7A6b	THERMAL TGA 7A4c	SiO2	AL2O3	Fe2O3	ELEMENTAL MgO 7C4a	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN 7D2	INTER PRETA TION
		< - - - - - - - - - - - - -

Narrative Pedon Description

Pedon: Malaya[12]
NSSL pedon number: 1P1037
Pedon ID: S01PR-153-002
Field classification: Clayey, mixed, superactive, isohyperthermic, shallow Typic Eutrudepts
Location: Yauco Municipio, Puerto Rico
Major Land Resource Area: 270—Humid Mountains and Valleys
Latitude: 18°05’00.50" north
Longitude: 66°52’00.31" west
Elevation: 134 meters
Geomorphic setting: Backslope
Slope: 40 percent with an aspect of 180 degrees; linear upslope and linear across the slope
Drainage: Well drained
Described and sampled by: J.L. Lugo and S. Rios on November 2, 2000

A—0 to 10 cm; brown (10YR 4/3) clay loam, dark grayish brown (10YR 4/2) dry; 35 percent clay; moderate fine and medium granular structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine irregular and common very fine and fine vesicular pores; slightly acid; clear smooth boundary. 01P5270

Bw—10 to 25 cm; brown (10YR 4/3) silty clay loam, dark grayish brown (10YR 4/2) dry; 40 percent clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; common very fine and fine roots; common fine irregular and common fine and medium tubular pores; 15 percent rock fragments; slightly acid; abrupt wavy boundary. 01P5271

Cr1—25 to 35 cm; highly fractured calcareous tuffaceous rock. 01P5272

Cr2—35 cm; semiconsolidated calcareous tuffaceous rock; strong effervescence with dilute HCl. Not sampled.

[12] This soil is now thought to have an ustic moisture regime.

San Anton: S85PR-153-001

Primary Characterization Data

Yauco Municipio, Puerto Rico

Sampled as: San Anton; fine, mixed, isohyperthermic Cumulic Haplustolls

SSL—Project: 86P 42, (CP86PR072)

—Pedon: 86P 223, Samples 86P 1325–1331

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .05-.05	-3-- TOTAL SAND -2	-4-- TOTAL FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE LT .002	-7-- SILT COARSE .02-.05	-8-- SAND VF .05-.10	-9-- SAND F .10-.25	-10- SAND M .25-.50	-11- SAND C .5-1	-12- SAND VC 1-2	-13- COARSE FRACS (MM) 2-5	-14- COARSE FRACS (MM) 5-20	-15- COARSE FRACS (MM) 20-75	-16- >2MM WEIGHT .1-75	-17- >2MM WEIGHT 75	-18- >2MM WEIGHT WHOLE SOIL	-19- >2MM WT % OF SOIL	-20-
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->							
86P1325S	0- 20	Ap	34.8	35.3	29.9	13.0		23.5	11.8	8.3	11.0	7.3	2.6	0.7	TR	TR	--		22	TR		
86P1326S	20- 33	A	37.0	40.2	22.8	14.1		26.7	13.5	7.5	8.8	4.6	1.3	0.6	TR	--	--		15	--		
86P1327S	33- 60	Bw1	37.8	42.8	19.4	14.1		29.1	13.7	6.9	7.1	3.8	1.3	0.3	TR	--	--		12	--		
86P1328S	60- 79	Bw2	40.0	37.7	22.3	16.4		26.0	11.7	6.4	8.1	5.5	2.0	0.3	TR	--	--		16	--		
86P1329S	79-103	Bw3	22.0	17.8	60.2	11.5		11.0	6.8	10.2	26.0	15.1	7.1	1.8	TR	--	--		50	TR		
86P1330S	103-138	Bw4	25.1	28.4	46.5	13.2		16.2	12.2	19.1	23.2	3.5	0.7	--	--	--	--		27	--		
86P1331S	138-177	Bw5	22.8	26.2	51.0	11.5		13.9	12.3	21.1	25.6	4.2	0.1	--	--	--	--		30	--		

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF	DITH-CIT EXTRACTABLE MN 6D2a <2MM -->	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC -	BULK DENSITY 1/3 BAR 4A1d	COLE OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT	WATER CONTENT 1/10 BAR 4B1c OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	1.39	0.122			2.0	0.1		1.22	0.60	55	28		1.29	1.59	0.072			31.7	20.8	0.14
20- 33	1.14	0.104			2.2	0.2		1.19	0.68				1.26	1.64	0.092			33.4	25.1	0.10
33- 60	1.02	0.102			2.3	0.2		1.18	0.65				1.24	1.62	0.093			33.2	24.6	0.11
60- 79	1.05	0.106			2.2	0.2		1.15	0.60	59	31		1.24	1.64	0.098			33.8	24.1	0.12
79-103	0.56				1.7	0.1		1.34	0.68				1.41	1.58	0.039			23.9	15.0	0.13
103-138	0.67				1.9	0.1		1.36	0.69				1.25	1.48	0.058			31.5	17.3	0.18
138-177	0.58				2.2	0.1		1.48	0.77				1.21	1.39	0.047			29.8	17.6	0.15

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3 <- -PCT- >	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g <- -PCT ->	CARBONATE AS CACO3 <20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a <- -PCT ->	CASO4 AS GYPSUM <20MM 6F4	PH SAT PASTE 8C1b	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->																		
0- 20		26.0	0.2	0.9		3.0		42.4	TR	TR		100	1				7.5	7.4	7.6
20- 33		28.8	0.2	0.6		3.4		43.9	TR	TR		100	1				7.6	7.4	7.8
33- 60	18.9	28.5	0.2	0.6	48.2	4.4	52.6	44.6	1	TR	92	100	TR				7.5	7.2	7.7
60- 79		28.6	0.2	0.5		3.6		46.0	1	TR		100	1				7.6	7.5	7.9
79-103	12.1	18.4	0.2	0.3	31.0	2.5	33.5	29.5	1		93	100	TR					7.1	7.7
103-138	13.1	21.7	0.3	0.3	35.4	2.8	38.2	34.1	1		93	100	TR					7.0	7.6
138-177	15.0	20.8	0.2	0.3	36.3	2.6	38.9	33.7	1		93	100	TR					7.0	7.6

DEPTH (CM)	CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a	PRED. ELEC. COND. 8I
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm
0- 20	3.8	7.3	0.5	0.3	--	3.9	0.1	0.6				1.0	1.2	4.3	65.4	TR	1.16	0.51
20- 33	1.4	2.8	0.4	0.1	--	3.6	TR	0.4				0.5	--	--	69.9	TR	0.42	0.29
33- 60	1.1	2.3	0.4	0.1	--	2.8	0.1	0.3				0.4	--	--	67.7	TR	0.35	0.25
60- 79	1.4	2.5	0.5	0.1	--	3.3	0.1	0.2				0.5	--	--	69.5	TR	0.40	0.29
79-103																		0.17
103-138																		0.16
138-177																		0.14

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size			THERMAL DSC 7A6 Percent				ELEMENTAL TGA 7A4b Percent									EGME 7C3	INTER RETN 7D2	PRETA TION
86P1328	TCLY	MT 4	KK 2	GI 1		KK 3							14.3				0.7			
86P1331	TCLY	MT 4	KK 2			KK 3							14.3				0.6			

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
86P1328     VFS                                                   75  CD59  QC14  MI11  FD 5  AR 5  AM 3
86P1328     VFS                                                       OP 2  PR 1  GStr  POtr
86P1331     VFS                                                   78  CD66  QC10  MI 7  AR 5  FD 3  AM 3
86P1331     VFS                                                       PR 3  OP 2  GS 1  POtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    MT  montmorillon     KK  kaolinite        GI  gibbsite         CD  chalcedony       QC  clay-coat qz     MI  mica
    FD  feldspar         AR  wthr aggrega     AM  amphibole        OP  opaques          PR  pyroxene         GS  glass
    PO  plant opal
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: San Anton
NSSL pedon number: 86P0223
Pedon ID: S85PR-153-001
Field classification: Fine, mixed, isohyperthermic Cumulic Haplustolls
Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Vertic Haplustolls
Location: Yauco Municipio, Lajas Valley, Puerto Rico; 73 meters east of kilometer marker 24.9 on Highway 116 and 6 meters north of field trail
Latitude: 17°59’55" north
Longitude: 67°53’25" west
Elevation: 18 meters
Physiography: Flood plain in mountain valleys or canyons
Slope: 1 percent; plane
Average annual precipitation: 1,000 mm; ustic moisture regime
Major Land Resource Area: 273—Semiarid Coastal Plains
Average air temperature: Annual—26 °C; summer—27 °C; winter—23 °C
Average soil temperature: Annual—29 °C; summer—30 °C; winter—28 °C
Drainage, runoff, and permeability: Well drained, slow runoff, and moderately slow permeability
*Vegetation: C*ropland
Surface stoniness: Class 0
Erosion: Slight
Particle-size control section: 25 to 100 cm
Parent material: Alluvium from mixed material
Diagnostic features: Mollic epipedon at 0 to 177 cm
Described and sampled by: D. Williams, L. A. Daniels, G. Acevedo, and J. Torres during May 1985

Ap—0 to 20 cm; silty clay, dark grayish brown (10YR 4/2) dry and very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; friable, sticky, plastic; common very fine and few fine roots throughout; mildly alkaline; clear smooth boundary. 86P1325

A—20 to 33 cm; silty clay, dark grayish brown (10YR 4/2) dry and very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate fine subangular blocky; friable, sticky, plastic; few very fine roots throughout; few very fine interstitial and tubular pores; many continuous distinct coatings on vertical and horizontal faces of peds; mildly alkaline; clear smooth boundary. 86P1326

Bw1—33 to 60 cm; silty clay, dark grayish brown (10YR 4/2) dry and dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; firm, sticky, plastic; few very fine roots throughout; few very fine interstitial and tubular pores; many continuous distinct coatings on vertical and horizontal faces of peds; mildly alkaline; clear smooth boundary. 86P1327

Bw2—60 to 79 cm; silty clay, dark grayish brown (10YR 4/2) dry and dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; firm, sticky, plastic; few very fine roots throughout; few very fine tubular pores; many continuous distinct coatings on vertical and horizontal faces of peds; mildly alkaline; abrupt smooth boundary. 86P1328

Bw3—79 to 103 cm; sandy clay loam, dark grayish brown (10YR 4/2) dry and very dark grayish brown (10YR 3/2) moist; lower 5 cm is sandy loam; weak coarse prismatic structure; very friable, slightly sticky, slightly plastic; few very fine roots throughout; few very fine and few fine interstitial and tubular pores; common discontinuous faint coatings on vertical and horizontal faces of peds; mildly alkaline; abrupt smooth boundary. 86P1329

Bw4—103 to 138 cm; clay loam, brown to dark brown (10YR 4/3) dry and dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; friable, sticky, plastic; few very fine roots throughout; common fine and common very fine interstitial and tubular pores; common discontinuous faint coatings on vertical and horizontal faces of peds; mildly alkaline; gradual smooth boundary. 86P1330

Bw5—138 to 177 cm; loam, brown to dark brown (10YR 4/3) dry and dark brown (10YR 3/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few very fine roots throughout; common fine and common very fine interstitial and tubular pores; common discontinuous faint coatings on vertical and horizontal faces of peds; mildly alkaline. 86P1331

Chapter 4

Soils of the Humid Zones of Puerto Rico

Soils of the humid zones of Puerto Rico cover much of the main island. These soils have udic or aquic moisture regimes and isohyperthermic soil temperature regimes. The dominant soil orders for this zone are Oxisols, Mollisols, Ultisols, and Alfisols. This chapter is composed of three parts. The first two parts describe soils sampled for special projects in which reports, publications, or both resulted from concerted research. The third part is a collection of the remaining soils sampled and described in the humid zones of Puerto Rico.

Part 1: Barranquitas Municipio in East-Central Puerto Rico

A small watershed near Barranquitas in east-central Puerto Rico was studied during the 1950s and 1960s. It is a landscape of contrasting geomorphology and soils. Part of the watershed lies at the headwaters of the Río Frío and is upstream from a 200-meter high set of rapids or nickpoints cut into hard rock. The hard rock probably protected the upstream area from deep stream trenching and thus preserved much of the old landscape. The following data are from this watershed.

Barranquitas Municipio

Comerio: S59PR-019-003

Primary Characterization Data

Barranquitas Municipio, Puerto Rico

Sampled as: Comerio; clayey, oxidic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 594, Samples 40A 4341–4355

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002 <- - - - - - - - - - - - - - PCT OF <2MM	SILT .05 -.05	SAND -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - VF -.10 ( ) - - - - - - - - - - - - - -	(-SAND- - F .25 -.25	M .50 -.50	C -1	VC -2 ->	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5 <- PCT OF <75MM(3B1)->	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
40A4341S	0- 15	Ap		79.6	18.0	2.4			14.6	3.4	1.0	0.6	0.3	0.4	0.1	--C	--C	--	1	--
40A4342S	15- 30	B21		83.3	14.3	2.4			11.0	3.3	1.0	0.7	0.2	0.3	0.2	--C	--C	--	1	--
40A4343S	30- 46	B22		84.9	13.3	1.8			10.2	3.1	0.7	0.5	0.2	0.2	0.2	--C	--C	--	1	--
40A4344S	46- 63	B23		83.8	14.7	1.5			13.1	1.6	0.7	0.4	0.2	0.2	--	--C	--C	--	1	--
40A4345S	63- 89	B24		74.8	22.9	2.3			18.6	4.3	1.0	0.6	0.2	0.3	0.2	--C	--C	--	1	--
40A4346S	89-114	B25		68.9	26.6	4.5			22.0	4.6	1.9	1.2	0.5	0.7	0.2	--C	--C	--	3	--
40A4347S	114-142	B26		56.8	35.7	7.5			27.7	8.0	3.4	2.2	0.8	1.0	0.1	--C	--C	--	4	--
40A4348S	142-213	C1		48.6	40.4	11.0			30.4	10.0	5.3	3.2	1.1	1.2	0.2	--C	--C	--	6	--
40A4349S	213-274	C2		42.0	45.4	12.6			35.5	9.9	5.3	3.0	1.0	1.8	1.5	--C	--C	--	7	--
40A4350S	305-366	C3		34.8	45.4	19.8			33.4	12.0	8.7	6.3	2.0	2.2	0.6	--C	--C	--	11	--
40A4351S	366-457	C4		30.2	47.6	22.2			35.0	12.6	10.3	7.8	1.9	1.8	0.4	--C	--C	--	12	--
40A4352S	457-549	C5		29.6	49.6	20.8			37.6	12.0	9.3	7.0	1.9	2.0	0.6	--C	--C	--	11	--
40A4353S	549-610	C6		30.7	49.0	20.3			37.5	11.5	8.2	6.2	2.1	2.6	1.2	--C	--C	--	12	--
40A4354S	610-625	C7		28.4	48.6	23.0			36.7	11.9	9.5	7.2	2.2	2.7	1.4	--C	--C	--	13	--
40A4355S	0- 15	Ap		78.0	18.6	3.4			14.4	4.2	1.4	0.8	0.4	0.6	0.2	--C	--C	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	5.64	0.399			10.2			0.22	0.39			0.90		1.32		59.7		41.1	31.1	
15- 30	2.01	0.170			11.2			0.11	0.37			1.04		1.30		46.6		34.4	30.7	
30- 46	1.58	0.157			12.3			0.09	0.40			0.98		1.26		49.7			34.0	
46- 63	1.25	0.121			14.4			0.08	0.42			1.10		1.30		48.5		40.9	35.6	
63- 89	0.70	0.076			16.5			0.09	0.48			1.17		1.32		44.6		40.0	35.8	
89-114	0.35	0.036			17.6			0.11	0.48			1.19		1.37		49.2		36.6	33.2	
114-142	0.13				16.5			0.16	0.53			1.30		1.44		39.4			30.0	
142-213	0.16				16.1			0.20	0.61			1.30		1.42		36.7			29.6	
213-274	0.12				13.7			0.26	0.68										28.6	
305-366	0.08				13.6			0.31	0.82										28.6	
366-457	0.05				11.8			0.37	0.92										27.7	
457-549	0.02				12.6			0.35	0.92										27.2	
549-610	--				12.2			0.38	0.89										27.3	
610-625	--				11.5			0.42	0.92										26.0	
0- 15	4.97	0.370			10.5			0.21	0.37										28.5	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -				-MEQ /	100 G - - -		- - - - - - - -			<- - - -		-PCT - - - ->					1:2	1:1
0- 15	4.0	1.0	0.1	0.4	5.5	25.2	0.9	30.7	17.4	6.4	14	18	32				4.2		4.8
15- 30	0.8	0.1	0.1	0.1	1.1	19.8	1.4	20.9	9.0	2.5	56	5	12				4.1		4.6
30- 46	0.4	0.1	0.1	0.1	0.7	18.5	1.1	19.2	7.9	1.8	61	4	9				4.2		4.7
46- 63	TR	0.1	0.1	0.1	0.3	17.2	0.6	17.5	7.1	0.9	67	2	4				4.4		4.7
63- 89	TR	0.2	0.1	0.1	0.4	16.4	0.5	16.8	6.6	0.9	56	2	6				4.5		4.9
89-114	TR	--	0.1	TR	0.1	15.7	1.1	15.8	7.4	1.2	92	1	1				4.2		4.9
114-142	0.1	0.1	0.1	TR	0.3	15.4	2.5	15.7	8.9	2.8	89	2	3				3.9		4.9
142-213	0.1	0.1	0.1	TR	0.3	15.6	3.6	15.9	9.7	3.9	92	2	3				3.8		4.8
213-274	0.1	0.1	0.1	TR	0.3	15.7	5.5	16.0	10.9	5.8	95	2	3				3.7		4.7
305-366	0.2	0.3	0.1	TR	0.6	16.6	5.6	17.2	10.8	6.2	90	3	6				3.7		4.7
366-457	0.3	0.1	0.1	TR	0.5	16.9	6.3	17.4	11.1	6.8	93	3	5				3.7		4.6
457-549		0.1	0.1	TR	0.2	16.7	6.6	16.9	10.3	6.8	97	1	2				3.7		4.5
549-610	0.1	0.3	0.1	0.1	0.6	18.7	7.2	19.3	11.8	7.8	92	3	5		--		3.7		4.6
610-625	0.1	0.1	0.1	0.1	0.4	18.2	7.4	18.6	11.9	7.8	95	2	3				3.7		4.4
0- 15	2.2	0.7	0.1	0.2	3.2	25.4	1.4	28.6	16.3	4.6	30	11	20				4.1		4.7

Narrative Pedon Description

Pedon: Comerio (inactive series)
NSSL pedon number: 40A594
Pedon ID: S59PR-019-003
SSIR #12 pedon ID: S59-PR-10-3
Field classification: Clayey, oxidic, isohyperthermic Tropeptic Haplorthox
Revised classification as of April 01, 2001: Very-fine, ferruginous, isohyperthermic Humic Hapludox
Location: Torrecillas Soil Conservation District, Barranquitas Soil Study Area, Puerto Rico; about 1.1 km southeast of kilometer marker 9.7 on Highway 152 to house on north side of road, 46 meters north of house, and 84 meters north of driveway junction with road
Latitude: 18°14’21" north
Longitude: 66°16’18" west
Elevation: 591 ± 5 meters
Vegetation: Molasses grass and kudzu pasture; broken out of second-growth woodland four years previously and seeded to pasture; six hundred pounds per acre of 20 percent phosphate applied in 1957
Slope: 8 percent to the east
Parent material: Chloritized greenish black basaltic andesite flow breccia
Mineralogy: See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative.
Described and sampled by: R.A. Boccheciamp, K.W. Flach, R.E. Gierbolini, R.B. Grossman, and T.U. Yager on December 10, 1959

Ap—0 to 15 cm; brown to dark brown (7.5YR 4/2) clay; weak fine subangular blocky to granular structure; firm and friable, slightly sticky, plastic; very few sand-sized aggregates; clear wavy boundary. 40A4341

B21—15 to 30 cm; reddish brown (5YR 4/5) to brown (7.5YR 4/4) clay; moderate fine subangular blocky structure; firm and friable, slightly sticky, plastic; common very fine pores; common sand-sized aggregates; clear wavy boundary. 40A4342

B22—30 to 46 cm; yellowish red (5YR 4/6) clay; moderate fine angular and subangular blocky structure; firm and friable, slightly sticky, plastic; small pieces fail abruptly to semiplastically; few fine and common very fine pores; highly variable from ped to ped; very few sand-sized aggregates; roots weakly restricted to ped surfaces and pores and the walls of the passageways; roots show no alteration other than smearing of clay; clear wavy boundary. 40A4343

B23—46 to 63 cm; 75 percent red (2.5YR 4/6) to yellowish red (5YR 4/6) and 25 percent yellowish red (5YR 4/6) clay; weak and moderate fine angular and subangular blocky structure; firm and friable, slightly sticky, plastic; small pieces fail abruptly; weak pressure faces; few fine and common very fine pores; very few sand-sized aggregates; no roots below; gradual smooth boundary. 40A4344

B24—63 to 89 cm; red (2.5YR 3/6 to 4/6 to 5YR 4/6) clay; few fine faint redoximorphic features and some ped surfaces of yellowish red (5YR to 2.5YR 5/6); weak and moderate very fine and fine angular and subangular blocky structure; friable and firm; small pieces fail abruptly; pressure faces more distinct than in B23 horizon; few fine and common very fine pores (many tubular); very few sand-sized aggregates; clear smooth boundary. 40A4345

B25—89 to 114 cm; dark red (2.5YR 3/6) clay; ped surfaces, especially the major ones, are commonly yellowish red (2.5YR to 5YR 5/6) and have few fine distinct redoximorphic features of the same color; weak and moderate very fine angular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly; common pressure faces; few fine pores; very few sand-sized aggregates; clear smooth boundary. 40A4346

B26—114 to 142 cm; dusky red (10R 3/4 to 4/4) silty clay loam; few yellowish red (5YR 5/6) ped surfaces; weak very fine angular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly; common pressure faces; few very fine pores; very few sand-sized aggregates; clear smooth boundary. 40A4347

C1—142 to 213 cm; dark red (7.5R 3/4) silty clay loam; some ped surfaces and common fine and medium distinct redoximorphic features of yellowish red (5YR 5/6); weak very fine angular blocky structure; firm, nonsticky, plastic; small pieces fail abruptly; common pressure faces; few very fine pores; very few sand-sized aggregates. 40A4348

C2—213 to 274 cm; dark reddish brown (2.5YR 3/4) silty clay loam; about 10 percent saprolite. 40A4349

C3—305 to 366 cm; dusky red (10R 3.5/4) silty clay loam; about 20 percent saprolite. 40A4350

C4—366 to 457 cm; dusky red (10R 3/4) fine silt loam; about 30 percent saprolite. 40A4351

C5—457 to 549 cm; dark reddish brown (2.5YR 3/5) fine silt loam; about 40 percent saprolite. 40A4352

C6—549 to 610 cm; dusky red (10R 3/3) fine silt loam; about 50 percent saprolite. 40A4353

C7—610 to 625 cm; dusky red (10R 3/3) fine silt loam; about 50 percent saprolite. 40A4354

Ap—0 to 15 cm; subsample taken a few meters away along pit face. 40A4355

Catalina: S59PR-019-007

Primary Characterization Data

Barranquitas Municipio, Puerto Rico

Sampled as: Catalina; clayey, oxidic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 593, Samples 40A 4327–4340

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				- PCT OF <2MM		(	) - - - - - - - - - - - -					<- PCT OF <75MM(3B1)->				SOIL
40A4327S	0- 15	Ap		75.8	18.2	6.0			13.9	4.3	2.2	1.7	0.7	0.9	0.5	--C	--C	--	4	--
40A4328S	15- 36	B21		82.1	13.0	4.9			9.4	3.6	1.8	1.4	0.6	0.8	0.3	--C	--C	--	3	--
40A4329S	36- 56	B22		82.3	13.5	4.2			10.3	3.2	1.5	1.2	0.5	0.8	0.2	--C	--C	--	3	--
40A4330S	56- 81	B23		75.4	19.7	4.9			15.6	4.1	1.9	1.3	0.5	0.7	0.5	--C	--C	--	3	--
40A4331S	81-109	B24		65.9	27.7	6.4			21.4	6.3	3.2	2.0	0.6	0.5	0.1	--C	--C	--	3	--
40A4332S	109-145	B25		59.6	33.8	6.6			26.6	7.2	3.6	1.9	0.4	0.5	0.2	--C	--C	--	3	--
40A4333S	145-183	B26		57.7	31.8	10.5			23.9	7.9	5.6	3.2	0.7	0.7	0.3	--C	--C	--	5	--
40A4334S	183-244	C1		67.9	23.2	8.9			16.3	6.9	3.3	2.4	0.9	1.3	1.0	--C	--C	--	6	--
40A4335S	244-305	C2		77.0	18.1	4.9			14.6	3.5	1.6	1.4	0.6	0.8	0.5	--C	--C	--	3	--
40A4336S	305-366	C3		62.1	31.0	6.9			24.8	6.2	3.4	2.3	0.6	0.5	0.1	--C	--C	--	3	--
40A4337S	366-427	C4		48.3	38.8	12.9			30.5	8.3	6.4	4.9	1.1	0.5	TR	--C	--C	--	6	--
40A4338S	493-579	C5		28.6	53.8	17.6			42.0	11.8	9.1	6.9	1.1	0.4	0.1	--C	--C	--	8	--
40A4339S	610-640	C6		26.3	54.4	19.3			40.8	13.6	10.5	6.7	1.1	0.7	0.3	--C	--C	--	9	--
40A4340S	0- 15	Ap		75.2	19.0	5.8			14.4	4.6	2.4	1.7	0.7	0.7	0.3	--C	--C	--	3	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	3.84	0.324			10.5			0.21	0.41			1.04		1.33		45.8		38.9	30.9	
15- 36	1.25	0.144			10.6			0.11	0.39			1.00		1.33		44.4		41.2	32.3	
36- 56	0.86	0.110			12.6			0.09	0.39			1.13		1.33		43.5		40.0	32.4	
56- 81	0.56	0.076			13.2			0.10	0.43			1.26		1.39		38.5		35.4	32.1	
81-109	0.42	0.054			13.2			0.13	0.46			1.28		1.42		38.6		37.2	30.5	
109-145	0.23	0.030			12.6			0.15	0.48			1.39		1.48		33.5		34.5	28.5	
145-183	0.17				12.2			0.15	0.52			1.36		1.45		34.1			29.8	
183-244	0.28				10.1			0.10	0.42										28.4	
244-305	0.28				15.7			0.09	0.45										34.3	
305-366	0.22				19.2			0.15	0.53										33.1	
366-427	0.18				16.1			0.23	0.65										31.3	
493-579	0.06				14.8			0.45	0.88										25.3	
610-640	0.07				14.8			0.49	0.93										24.5	
0- 15	4.08	0.337			10.2			0.25	0.40										30.2	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -				-MEQ /	100 G	- - -	- - - - - - - -			->	<- - - -	-PCT	- - - ->					1:2	1:1
0- 15	5.8	1.0	0.1	0.3	7.2	21.9	0.3	29.1	16.2	7.5	4	25	44					4.3		5.1
15- 36	1.5	0.4	TR	0.1	2.0	17.7	0.7	19.7	8.8	2.7	26	10	23					4.2		4.8
36- 56	1.0	0.6	TR	0.1	1.7	14.6	0.7	16.3	7.7	2.4	29	10	22					4.2		4.9
56- 81	0.4	0.6	TR	TR	1.0	14.1	1.3	15.1	7.7	2.3	57	7	13					4.0		5.0
81-109	0.1	0.5	TR	TR	0.6	14.4	2.2	15.0	8.4	2.8	79	4	7					3.9		5.0
109-145	TR	0.4	TR	0.1	0.5	15.1	3.4	15.6	8.9	3.9	87	3	6					3.8		5.0
145-183	TR	0.4	TR	0.1	0.5	14.9	3.3	15.4	8.4	3.8	87	3	6					3.8		4.8
183-244	0.4	0.4	0.1	0.1	1.0	13.6	1.7	14.6	6.8	2.7	63	7	15					3.9		4.9
244-305	0.6	0.4	0.1	TR	1.1	15.6	1.3	16.7	6.8	2.4	54	7	16					4.0		4.9
305-366	1.3	0.4	0.1	0.1	1.9	16.2	2.8	18.1	9.4	4.7	60	10	20					3.8		4.8
366-427	3.2	0.4	0.1	0.1	3.8	14.2	2.9	18.0	10.9	6.7	43	21	35					3.8		4.8
493-579	0.6	0.4	0.1	TR	1.1	17.5	8.4	18.6	12.8	9.5	88	6	9					3.6		4.6
610-640	0.9	0.3	0.1	TR	1.3	17.5	7.9	18.8	12.8	9.2	86	7	10					3.7		4.7
0- 15	4.1	0.9	0.1	0.6	5.7	23.4	0.6	29.1	18.8	6.3	10	20	30					4.2		5.0

Narrative Pedon Description

Pedon: Catalina

NSSL pedon number: 40A0593

Pedon ID: S59PR-019-007

SSIR #12 pedon ID: S59PR-10-7

Field classification: Clayey, oxidic, isohyperthermic Tropeptic Haplorthox

Revised classification as of March 01, 2001: Very-fine, ferruginous, isohyperthermic Typic Hapludox

Location: Barranquitas Soil Study Area, Puerto Rico; about 0.4 km southeast of kilometer marker 9.7 on Highway 152 to junction with a private road, 135 meters south of private road junction with main road; 87 meters east of S59PR-10-4

Latitude: 18°14’30" north

Longitude: 66°16’54" west

Elevation: 605 meters

Slope: 10 percent with an aspect of 180 degrees

Vegetation: Molasses grass

Particle-size control section: 25 to 100 cm

Described and sampled by: R.A. Boccheciamp, K.W. Flach, R.E. Gierbolini, R.B. Grossman, and T.U. Yager on December 15, 1959

Notes: Coatings in the B21 and B22 horizons may be clay films, but it is doubtful. Weak slickensides have not been previously seen in a similar soil. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; dark reddish brown (5YR 3/3) clay; weak fine subangular blocky structure and massive; firm, slightly sticky, moderately plastic; common medium and coarse and common very fine pores; small pieces fail semiplastically; common sand-sized aggregates; abrupt smooth boundary. 40A4327

B21—15 to 36 cm; dark reddish brown (2.5YR 3/4) and reddish brown (2.5YR 4/3) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; common coarse and common very fine pores; small pieces fail abruptly; common sand-sized aggregates; abundant reflective or pressure surfaces; probably no clay films; occasional piece of charcoal; clear smooth boundary. 40A4328

B22—36 to 56 cm; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm, slightly sticky, moderately plastic; common fine and common very fine pores with macro-pore and ped surfaces slightly lower in chroma and perhaps yellower in hue; small pieces fail abruptly; few sand-sized aggregates; common weak reflective or pressure surfaces; clear smooth boundary. 40A4329

B23—56 to 81 cm; dark red (2.5YR 3/6) clay; weak and moderate fine subangular blocky structure; firm, slightly sticky, moderately plastic; common fine and

many very fine pores; 30 percent pressure faces; small pieces fail abruptly; very few sand-sized aggregates; striations on a few prominent structural planes; gradual smooth boundary. 40A4330

B24—81 to 109 cm; red (2.5YR 4/6) silty clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; common fine and many very fine pores; 30 percent pressure faces; small pieces fail abruptly; very few sand-sized aggregates; occasional fine-gravel sized piece of saprolite; breakable by hand; common reflective or pressure surfaces; gradual smooth boundary. 40A4331

B25—109 to 145 cm; reddish brown (2.5YR 4/4) silty clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; common fine and many very fine pores; 30 percent pressure faces; firmer than superjacent horizon; very few sand-sized aggregates; common weak reflective or pressure surfaces; occasional saprolite pebbles similar to those in B24; clear wavy boundary. 40A4332

B26—145 to 183 cm; red (2.5YR 4/6) silty clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; common fine and common very fine pores; patchy faint clay films and 30 percent pressure faces; small pieces fail abruptly; very few sand-sized aggregates; common weak reflective or pressure surfaces; arbitrary boundary. 40A4333

C1—183 to 244 cm; yellowish red (5YR 4/6) silty clay; 30 percent reddish brown; less than 2 percent saprolite; examined by auger. 40A4334

C2—244 to 305 cm; yellowish red (5YR 4/6) and red (2.5YR 4/6) silty clay; 30 percent yellowish red (5YR 4/6); less than 2 percent saprolite; examined by auger. 40A4335

C3—305 to 366 cm; red (2.5YR 4/6) silty clay; 10 percent saprolite; examined by auger. 40A4336

C4—366 to 427 cm; weak red (10R 4/4) silty clay loam; 20 percent saprolite; examined by auger. 40A4337

C5—493 to 579 cm; saprolite that was examined by auger. 40A4338

The zone from 579 to 610 cm was not sampled.

C6—610 to 640 cm; saprolite that was examined by auger. 40A4339

Ap—0 to 15 cm; subsample of first horizon taken several decimeters away along the pit face. 40A4340

Catalina: S59PR-019-008

Primary Characterization Data

Barranquitas Municipio, Puerto Rico

Sampled as: Catalina; clayey, oxidic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 166, Samples 40A 1218–1227

—General methods: 1B1A, 2A1, 2B

SAMPLE NO. (-1-)	DEPTH (CM) (-2-)	HORIZON (-3-)	TOTAL CLAY LT .002 (-4-)	TOTAL SILT .002 -.05 (-5-)	TOTAL SAND .05 -2 (-6-)	CLAY FINE LT .0002 (-7-)	CLAY CO3 LT .002 (-8-)	SILT FINE .002 -.02 (-9-)	SILT COARSE .02 -.05 (-10-)	SAND VF .05 -.10 (-11-)	SAND F .10 -.25 (-12-)	SAND M .25 -.50 (-13-)	SAND C .5 -1 (-14-)	SAND VC 1 -2 (-15-)	COARSE FRACS WEIGHT 2 -5 (-16-)	WEIGHT 5 -20 (-17-)	WEIGHT 20 -75 (-18-)	WEIGHT .1- 75 (-19-)	(>2MM) WT % OF WHOLE SOIL (-20-)
			<- PCT OF <2MM ( ) ->												<- PCT OF <75MM(3B1)->				
40A1218S	0- 15	Ap	77.1	17.6	5.3			14.3	3.3	2.2	1.7	0.6	0.5	0.3	--C	--C	--	3	--
40A1219S	15- 33	B21	76.8	17.2	6.0			13.6	3.6	2.6	2.0	0.7	0.6	0.1	--C	--C	--	3	--
40A1220S	33- 51	B22	83.9	13.0	3.1			11.6	1.4	1.5	1.0	0.3	0.2	0.1	--C	--C	--	2	--
40A1221S	51- 86	B23	83.2	14.9	1.9			12.6	2.3	0.9	0.6	0.2	0.2	TR	--C	--C	--	1	--
40A1222S	86-115	B24	70.4	23.9	5.7			19.2	4.7	2.4	1.9	0.6	0.6	0.2	--C	--C	--	3	--
40A1223S	115-150	B25	52.7	35.7	11.6			28.3	7.4	4.5	4.3	1.3	1.2	0.3	--C	--C	--	7	--
40A1224S	150-185	C1	48.4	36.6	15.0			28.0	8.6	6.0	5.4	1.7	1.5	0.4	--C	--C	--	9	--
40A1225S	185-215	C2	46.1	36.2	17.7			28.2	8.0	6.0	6.2	2.5	2.3	0.7	--C	--C	--	12	--
40A1226S	215-305	C3	44.2	46.2	9.6			38.4	7.8	4.8	3.3	0.8	0.6	0.1	--C	--C	--	5	--
40A1227S	305-335	C4	42.2	44.3	13.5			34.4	9.9	5.8	3.9	1.2	1.6	1.0	--C	--C	--	8	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	AL 6G7a <2MM	MN 6D2a -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	4.30	0.370			9.4			0.27	0.41			0.96		1.23		51.8		41.8	31.9	
15- 33	1.75	0.179			9.8			0.14	0.44			1.07		1.34		49.3		40.3	33.6	
33- 51	0.70	0.109			10.1			0.09	0.43			1.06		1.31		48.9		43.7	35.7	
51- 86	0.50	0.080			11.5			0.09	0.41			1.11		1.33		47.2		42.1	34.2	
86-115	0.25	0.039			14.8			0.11	0.43			1.42		1.52		31.6		35.1	30.0	
115-150	0.16				14.3			0.16	0.52			1.40		1.52		31.4		32.6	27.4	
150-185	0.12				14.0			0.18	0.54			1.41		1.52		32.0		34.9	26.2	
185-215	0.13				13.2			0.19	0.58										26.7	
215-305	0.06				12.8			0.20	0.62										27.3	
305-335	0.05				14.3			0.19	0.66										27.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									- - ->	<- - - - -PCT		- - - ->					1:2	1:1
0- 15	8.3	1.5	0.1	0.9	10.8	19.7		30.5	20.5			35	53				5.0		5.6
15- 33	1.8	0.2	TR	0.5	2.5	18.8	0.3	21.3	10.6	2.8	11	12	24				4.6		4.7
33- 51	1.4	0.2	TR	0.1	1.7	15.2	0.1	16.9	7.5	1.8	6	10	23				4.8		4.8
51- 86	0.5	0.6	TR	TR	1.1	13.4	0.6	14.5	7.7	1.7	35	8	14				4.3		5.0
86-115	0.1	0.1	TR	TR	0.2	13.4	1.2	13.6	7.6	1.4	86	1	3				4.2		5.1
115-150	TR	0.2	TR	TR	0.2	14.1	2.3	14.3	8.4	2.5	92	1	2				3.9		5.1
150-185	0.1	0.1	0.1	TR	0.3	14.1	3.3	14.4	8.9	3.6	92	2	3				3.8		4.9
185-215	0.1	0.1	0.1	TR	0.3	14.1	3.5	14.4	8.7	3.8	92	2	3				3.8		4.7
215-305	0.1	0.2	0.1	TR	0.4	12.8	4.2	13.2	8.8	4.6	91	3	5				3.8		4.9
305-335	0.1	0.1	0.1	TR	0.3	13.4	3.6	13.7	7.9	3.9	92	2	4				3.8		4.8

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY (peak size)		THERMAL DTA (Percent)	THERMAL TGA (Percent)	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN (mg/g)	INTERPRETATION
40A1218	TCLY	VR 2		KK30	GI15									
40A1220	TCLY	GE 2	VR 2	KK35	GI25									
40A1224	TCLY			KK40										

```
           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                       ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - -      - - - - -><  -      - -><  -      - -><  - - - - - - - -       - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
40A1218     MS                            GI 5
40A1218     FS                            GI 5
40A1218     VFS                           GI 5
40A1218     CSi   QZ 2                    GI 5
40A1218     GRVL                          GI 5
40A1224     MS                            KK40
40A1224     FS                            KK40
40A1224     VFS                           KK40
40A1224     CSi   QZ 3                    KK40
40A1224     GRVL                          KK40
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            MS    Medium Sand, 0.25-0.5mm         FS    Fine Sand, 0.1-0.25mm
    VFS   Very Fine Sand, 0.05-0.10mm     CSi   Coarse Silt, 0.02-0.05mm
MINERAL INTERPRETATION:
    VR  vermiculite      QZ  quartz           KK  kaolinite        GI  gibbsite         GE  goethite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
```

Narrative Pedon Description

Pedon: Catalina
NSSL pedon number: 40A166
Pedon ID: S59PR-019-008
SSIR #12 pedon ID: S59PR-10-8
Field classification: Clayey, oxidic, isohyperthermic Tropeptic Haplorthox
Revised classification as of March 01, 2001: Very-fine, ferruginous, isohyperthermic Typic Hapludox
Location: Torrecillas Soil Conservation District, Barranquitas Soil Study Area, Puerto Rico; 14 meters east of field road and 143 meters at kilometer marker 8.8 on Highway 152; about 49 meters to the north of pedon number S59PR-10-9
Latitude: 18°14’21" north
Longitude: 66°17’02" west
Elevation: 585 ± 5 meters
Slope: 8 percent south slope; 91 meters above where the slope levels out
Vegetation: Native pasture
Parent material: Chloritized greenish-black basaltic andesite flow breccia
Described and sampled by: R.A. Boccheciamp, K.W. Flach, R.E. Gierbolini, R.B. Grossman, and T.U. Yager on December 16, 1959
Notes: A few pieces of charcoal occur in the Ap horizon. Nearly all pores appear tubular. Few sand-sized quartz crystals or angular grains, some up to 3 mm across, occur in the C2, C3, and C4 horizons. Apparently, the auger cut a quartz vein. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; 90 percent dark reddish brown (5YR 3/3) and 10 percent reddish brown (2.5YR 4/4) clay; massive in upper part to weak fine granular structure in lower part; friable, slightly sticky, plastic; many sand-sized aggregates; abundant roots; abrupt smooth boundary. 40A1218

B21—15 to 33 cm; dark reddish brown (2.5YR 3/4) clay; moderate medium and fine angular and subangular blocky structure; firm, slightly sticky, plastic; small pieces fail semiplastically to abruptly; few fine and common very fine pores (less than in B22 horizon); many soft black sand-sized aggregates; common roots; clear boundary. 40A1219

B22—33 to 51 cm; dark reddish brown (2.5YR 3/4) clay; some ped surfaces having slightly lower chroma; weak and moderate medium and fine subangular and angular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly to semiplastically; few fine and common very fine pores; few sand-sized aggregates; no reflection or pressure surfaces; common roots; clear wavy boundary. 40A1220

B23—51 to 86 cm; reddish brown (2.5YR 5/4) clay; few reddish brown (2.5YR 4/4) ped surfaces; weak fine angular and subangular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly; few fine pores and common very fine pores; very few sand-sized aggregates; common moderate reflective

or pressure surfaces with a few surfaces striated; possibly a few thin patchy clay films; very few roots; clear smooth boundary. 40A1221

B24—86 to 115 cm; dark reddish brown (2.5YR 3/4 to 4/4) clay; weak fine angular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly; few fine and many very fine pores; very few sand-sized aggregates; common moderate reflective or pressure surfaces with a few surfaces striated and possibly some thin patchy clay films; few roots; gradual boundary. 40A1222

B25—115 to 150 cm; dark reddish brown (2.5YR 3/4) fine silty clay loam; weak fine angular blocky structure; firm, nonsticky, plastic; small pieces fail abruptly; few fine and common very fine pores; very few sand-sized aggregates; common moderate reflective or pressure surfaces with a few surfaces striated and possibly some thin patchy clay films; very few roots; clear smooth boundary. 40A1223

C1—150 to 185 cm; dark reddish brown (2.5YR 3/4) silty clay loam; 2 percent saprolite; weak fine angular blocky structure; firm, nonsticky, plastic; small pieces fail abruptly; many fine and common very fine pores; common weak reflective or pressure surfaces; possibly some thin patchy clay films; very few sand-sized quartz grains; arbitrary boundary. 40A1224

C2—185 to 215 cm; dark reddish brown (2.5YR 3/4) to dark red (2.5YR 3/6) silty clay loam; 25 percent saprolite; firm, nonsticky, plastic; arbitrary boundary. 40A1225

C3—215 to 305 cm; 75 percent (composite) dusky red (10R 3/4) and dark reddish brown (2.5YR 3/4) silty clay loam saprolite with strong brown (7.5YR 5/8) and gray splotches; firm, nonsticky, plastic; arbitrary boundary. 40A1226

C4—305 to 335 cm; dusky red (10R 3/4), reddish brown (2.5YR 3/4), and dark gray (10YR 4/1) silty clay loam saprolite with common and occasional splotches of strong brown (7.5YR 5/8) and white; firm, nonsticky, plastic. 40A1227

Comerio: S59PR-019-009

Primary Characterization Data

Barranquitas Municipio, Puerto Rico

Sampled as: Comerio; clayey, oxidic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 595, Samples 40A 4356–4367

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-		-	- - - -)	(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -					PCT OF <2MM		(	) - - - - - - - - - - - -				<- PCT OF <75MM(3B1)->				SOIL
40A4356S	0- 18	Ap		66.7	21.8	11.5			15.0	6.8	4.0	3.3	1.4	2.0	0.8	--C	--C	--	7	--
40A4357S	18- 33	B21		76.8	14.6	8.6			9.3	5.3	3.0	2.4	1.0	1.3	0.9	--C	--C	--	6	--
40A4358S	33- 53	B22		79.1	13.9	7.0			9.2	4.7	2.4	1.9	0.8	1.1	0.8	--C	--C	--	5	--
40A4359S	53- 81	B23		78.9	13.7	7.4			9.4	4.3	2.4	2.0	1.0	1.2	0.8	--C	--C	--	5	--
40A4360S	81-112	B24		76.8	17.5	5.7			14.1	3.4	1.8	1.5	0.6	0.9	0.9	--C	--C	--	4	--
40A4361S	112-150	B25		69.2	24.6	6.2			19.8	4.8	2.2	1.9	0.8	0.9	0.4	--C	--C	--	4	--
40A4362S	150-183	B26		68.2	25.9	5.9			21.3	4.6	2.4	1.9	0.6	0.6	0.4	--C	--C	--	3	--
40A4363S	183-213	C1		59.4	35.0	5.6			28.7	6.3	3.1	1.8	0.4	0.3	--	--C	--C	--	2	--
40A4364S	213-274	C2		51.7	40.7	7.6			32.7	8.0	4.4	2.4	0.4	0.2	0.2	--C	--C	--	3	--
40A4365S	274-320	C3		49.1	42.5	8.4			34.6	7.9	4.5	2.5	0.6	0.5	0.3	--C	--C	--	4	--
40A4366S	320-335	C4		39.0	50.2	10.8			42.0	8.2	5.5	2.9	0.7	0.8	0.9	--C	--C	--	5	--
40A4367S	0- 18	Ap		67.2	21.2	11.6			15.6	5.6	3.6	3.0	1.3	2.2	1.5	--C	--C	--	8	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	4.27	0.340			9.0			0.28	0.43			1.06		1.32		47.2		37.0	28.4	
18- 33	1.51	0.150			10.9			0.12	0.43			1.20		1.46		41.9		39.1	32.7	
33- 53	1.08	0.120			12.6			0.10	0.43			1.13		1.40		51.0		39.7	33.9	
53- 81	0.68	0.080			12.6			0.10	0.41			1.28		1.41		41.1		36.4	32.7	
81-112	0.54	0.060			14.4			0.09	0.45			1.19		1.42		49.8		37.0	34.6	
112-150	0.36	0.040			14.4			0.09	0.46			1.32		1.42		38.0		32.5	31.9	
150-183	0.16				14.8			0.12	0.45			1.38		1.48		35.5		33.2	30.8	
183-213	0.18				17.0			0.14	0.49										29.1	
213-274	0.15				15.2			0.19	0.54										28.0	
274-320	0.10				14.0			0.21	0.55										27.1	
320-335	0.13				12.6			0.25	0.69										27.1	
0- 18	4.65	0.350			9.6			0.32	0.42										28.2	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.	COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1g	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - - -	-PCT	- - - ->					1:2	1:1
0- 18	6.2	1.0	0.1	0.6	7.9	21.0	0.2	28.9	19.0	8.1	2	27	42				4.4		5.0
18- 33	1.2	0.3	TR	0.1	1.6	15.9	1.3	17.5	9.5	2.9	45	9	17				4.0		4.7
33- 53	0.8	0.1	TR	0.1	1.0	15.4	0.9	16.4	8.1	1.9	47	6	12				4.2		4.9
53- 81	0.5	0.1	TR	0.1	0.7	13.9	1.1	14.6	7.5	1.8	61	5	9				4.2		4.9
81-112	0.3	0.2	TR	0.1	0.6	16.2	0.7	16.8	7.1	1.3	54	4	8				4.3		4.7
112-150	0.1	0.1	TR	TR	0.2	15.9	1.1	16.1	6.5	1.3	85	1	3				4.1		4.7
150-183	0.1	0.1	TR	TR	0.2	15.9	2.0	16.1	7.9	2.2	91	1	3				3.9		4.7
183-213	0.1	0.3	TR	TR	0.4	16.2	3.8	16.6	8.6	4.2	90	2	5				3.8		4.7
213-274	TR	0.3	TR	TR	0.3	16.1	4.4	16.4	9.6	4.7	94	2	3				3.8		4.7
274-320	TR	0.3	TR	0.1	0.4	16.4	5.6	16.8	10.5	6.0	93	2	4				3.7		4.7
320-335	TR	0.4	0.1	0.1	0.6	15.4	5.5	16.0	9.8	6.1	90	4	6				3.7		4.4
0- 18	6.7	1.1	0.1	0.4	8.3	21.6	0.4	29.9	21.3	8.7	5	28	39				4.5		5.1

Narrative Pedon Description

Pedon: Comerio (inactive series)
NSSL pedon number: 40A595
Pedon ID: S59PR-019-009
SSIR #12 pedon ID: S59PR-10-9
Field classification: Clayey, oxidic, isohyperthermic Tropeptic Haplorthox
Revised classification as of April 01, 2001: Very-fine, ferruginous, isohyperthermic Typic Kandiudox
Location: Torrecillas Soil Conservation District, Barranquitas Soil Study Area, Puerto Rico; 49 meters south of pedon number S59PR-10-8 and about 35 meters southeast of the house reached by the lane that meets Highway 152 at kilometer marker 8.8
Latitude: 18°14’19" north
Longitude: 66°17’02" west
Elevation: 582 ± 5 meters
Slope: 9 percent to the southeast
Vegetation: Native pasture
Parent material: Chloritized greenish-black basaltic andesite flow breccia
Described and sampled by: R.A. Boccheciamp, K.W. Flach, R.E. Gierbolini, R.B. Grossman, and T.U. Yager on December 16, 1959
Notes: A few pebbles up to 50 to 75 mm across occur below a depth of 81 cm. The pebbles consist of clusters of quartz crystals that appear to have grown inward toward a common center. These pebbles are probably remnants of a quartz vein. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; dark brown (7.5YR 4/2) clay; moderate very fine subangular blocky structure; firm, nonsticky, plastic; common pieces of charcoal; common roots; abrupt wavy boundary. 40A4356

B21—18 to 33 cm; reddish brown (5YR 5/4) clay; reddish brown (5YR 4/4) ped surfaces; moderate fine angular and subangular blocky structure; firm, slightly sticky, plastic; small pieces fail semiplastically; few fine and common very fine pores; many sand-sized aggregates; few quartz grains; clear smooth boundary. 40A4357

B22—33 to 53 cm; yellowish red (5YR 5/6) clay; common reddish brown (5YR 5/4) ped surfaces; moderate fine angular and subangular blocky structure; firm, slightly sticky, plastic; small pieces fail semiplastically; few fine and very fine pores; common sand-sized aggregates; few roots; gradual smooth boundary. 40A4358

B23—53 to 81 cm; yellowish red (5YR 4/6 to 5/6) clay; few reddish brown (5YR 4/4) ped surfaces; common fine faint strong brown (7.5YR 5/6) redoximorphic features; weak and moderate angular and subangular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly; few fine and common very fine pores; few sand-sized aggregates; few sand-sized angular grains of quartz

or chert; few very weak reflective or pressure surfaces; few roots; clear smooth boundary. 40A4359

B24—81 to 112 cm; yellowish red (5YR 4/6) clay to silty clay loam; 20 percent red (2.5YR 4/6) to yellowish red (5YR 4/6) redoximorphic features; many medium distinct strong brown (7.5YR 5/6) redoximorphic features; weak fine angular blocky structure; firm, slightly sticky, plastic; small pieces fail abruptly; few fine and common very fine pores; common sand-sized aggregates; common sand-sized angular grains of quartz or chert; common reflective or pressure surfaces with an occasional striated surface; very few roots; gradual boundary. 40A4360

B25—112 to 150 cm; yellowish red (5YR 4/6) to red (2.5YR 4/6) fine silty clay loam; common medium distinct strong brown (7.5YR 5/6) redoximorphic features; weak very fine angular blocky structure; firm, nonsticky, plastic; small pieces fail abruptly; few very fine pores; very few sand-sized aggregates; common angular quartz or chert grains up to 5 mm in diameter; common reflective or pressure surfaces; some weak patchy clay films; no roots; clear wavy boundary. 40A4361

B26—150 to 183 cm; red (2.5YR 4/6) fine silty clay loam; common medium distinct strong brown (7.5YR 5/6) redoximorphic features; weak very fine angular blocky structure; firm, nonsticky, plastic; small pieces fail abruptly; few very fine pores; very few sand-sized aggregates; occasional sand-sized angular grains of quartz or chert; common reflective surfaces with some surfaces weakly striated; weak patchy clay films; arbitrary boundary. 40A4362

C1—183 to 213 cm; red (10YR 4/6) silty clay loam; arbitrary boundary. 40A4363

C2—213 to 274 cm; red (10YR 4/6) silty clay loam; arbitrary boundary. 40A4364

C3—274 to 320 cm; 50 to 75 percent dusky red (10R 3/4) silty clay loam saprolite; arbitrary boundary. 40A4365

C4—320 to 335 cm; more than 75 percent dark reddish brown (2.5YR 3/4) silty clay loam saprolite; common sand-sized quartz grains. 40A4366

Ap—0 to 18 cm; subsample of first horizon taken a few meters away along the pit face. 40A4367

Part 2: The Luquillo Long-Term Ecological Research Grid

The Luquillo Long-Term Ecological Research (LTER) Grid is in the western part of the Caribbean National Forest and the Luquillo Experimental Forest in Puerto Rico. It lies within the Río Grande Municipio. The LTER Grid has an area of 16 hectares, or about 40 acres. It is 320 meters from west to east and 500 meters from south to north. The elevation ranges from about 333 meters above sea level where the Toronja Creek exits the LTER Grid to 428 meters on the southeast corner (grid coordinate 17.01.11).

Relief of the soils ranges from gently sloping to very steep. About 95 percent of the soils are on uplands. The soils on the stream channels along Toronja and La Prieta Creeks make up 0.82 hectares (5.1 percent of the LTER Grid) and range from gently sloping to moderately steep. Extensive faulting of the bedrock has occurred in a few areas.

The LTER Grid has been woodland since the first settlement. Charcoal production was of some economic importance in the Caribbean National Forest and Luquillo Experimental Forest, and remnants of this activity remain. Since 1989, many kinds of research have been initiated on the LTER Grid. The soil survey of the area was another important step in collecting baseline resource information for researchers.

The following soil survey laboratory data and descriptions are from soils that were described in 1993.

The Luquillo LTER Grid, Río Grande Municipio

Zarzal: S93PR-119-001

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Hapludox

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 431, Samples 93P 3289–3294

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.05	SILT COARSE .05 -.10	SAND VF .10 -.25	SAND F .25 -.50	SAND M .5 -1	SAND C 1 -2	SAND VC 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
93P3289H	2- 0	Oi												--	--	--		--
93P3290S	0- 5	AB	78.0	18.5	3.5	29.5	17.7	0.8	1.3	0.9	0.5	0.5	0.3	TR	TR	--	2	--
93P3291S	5- 23	Bo1	72.2	25.0	2.8	24.0	23.4	1.6	1.3	0.8	0.4	0.2	0.1	--	TR	--	1	TR
93P3292S	23- 60	Bo2	54.5	41.0	4.5	13.6	37.5	3.5	2.4	1.4	0.4	0.2	0.1	--	--	--	2	--
93P3293S	60-100	Bo3	46.0	46.1	7.9	11.2	39.9	6.2	3.7	2.6	1.2	0.3	0.1	--	--	--	4	--
93P3294S	100-120	BC	39.1	47.8	13.1	7.5	42.0	5.8	5.3	5.0	2.2	0.6	TR	TR	TR	--	8	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF	DITH-CIT EXTRACTABLE MN 6D2a <2MM -->	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A5 <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	COLE OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
2- 0	39.3	1.894																	66.9	
0- 5	5.91	0.491			9.6	0.9	TR	0.37	0.45				1.05	1.37	0.093			48.4	34.8	0.14
5- 23	2.57	0.212			9.2	0.9	TR	0.25	0.46				1.17	1.39	0.059			41.4	33.3	0.09
23- 60	1.16	0.123			8.3	0.7	TR	0.30	0.54				1.15	1.39	0.065			43.5	29.6	0.16
60-100	0.94	0.104			5.4	0.5	TR	0.52	0.61				1.10						27.9	
100-120	0.46	0.075			7.9	0.6	TR	0.38	0.65										25.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	pH CACL2 .01M 8C1f	pH H2O 8C1f 1:2	1:1
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																		
2- 0	33.7	14.3	2.1	2.5	52.6	85.5		138.1	100.3			38	52						
0- 5	1.3	3.0	0.4	0.3	5.0	29.0	4.5	34.0	28.8	9.5	47	15	17				3.9	4.5	
5- 23	0.1	1.5	0.3	0.2	2.1	21.2	7.6	23.3	17.9	9.7	78	9	12				3.9	4.6	
23- 60	--	0.4	0.2	0.1	0.7	18.7	11.3	19.4	16.2	12.0	94	4	4				3.8	4.6	
60-100	0.1	0.2	0.2	0.3	0.8	20.9	11.9	21.7	23.7	12.7	94	4	3				3.9	4.5	
100-120	0.1	0.1	0.2	0.2	0.6	20.6	11.1	21.2	15.0	11.7	95	3	4				3.9	4.5	

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY 7A6b	X-RAY 7A4c	THERMAL DTA Percent	THERMAL TGA Percent	CLAY MINERALOGY (<.002mm) SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	ELEMENTAL 7C3 mg/g	EGME RETN 7D2	INTER PRETA TION
93P3290	TCLY	KK 3	GE 2 HE 1 QZ 1				23.0	15.7							KAOL
93P3292	TCLY	KK 3	GE 2 HE 1				25.0	17.2			0.2				KAOL
93P3293	TCLY	KK 3	GE 2 HE 1 QZ 1		KK62	GI 4	24.0	15.7			0.1				KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite QZ quartz GI gibbsite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based on TGA on 93P3293 which supports GE 9 and HE 8

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	EXTRACTION AL 6G12b	PHOSPHOUS RET 6S4	PHOSPHOUS CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2 m m	->	<- P P M	->	< - - - - - - - - - - - P E R C E N T						o f	< 2 m m	- - - - - - -			><20mm	<PCT>
93P3289	1	0.14	0.38	TR	0.15				39.46											28	
93P3290	2	0.19	1.01	TR	0.34	66		2.1	6.84			47.1									
93P3291	3	0.08	0.55	TR	0.23	59		0.2	2.69			41.2									
93P3292	4	0.04	0.22	TR	0.19	54		TR	1.20			37.6									
93P3293	5	0.03	0.15	TR	0.19	56		--	1.06			36.7									
93P3294	6	0.02	0.10	TR	0.24	56		--	0.54												

Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 93P431

Pedon ID: S93PR-119-001

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Kandiudox

Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Vertic Dystrudepts

Location: 91 cm east and 196 cm north of 08.03.32 (47.3 m north and 1590.9 m east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,334.3 meters easting and 2,028,241 meters northing

Latitude: 18°19’27.6" north

Longitude: 65°48’54.0" west

Elevation: 394 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 60 percent, convex, 25 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 9 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 100 cm

Map unit: 1E2—Zarzal clay, 30 to 60 percent slopes, very bouldery

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 23, 1993

Notes: Site is 6 meters from site 2. There is evidence of charcoal in the upper 60 cm, suggesting the possibility of an ancient fire. One large decayed root observed to depth of observation. The soil temperature was 20.5 °C at a depth of 50 cm.

Oi—2 to 0 cm; very dark brown (10YR 2/2) fibric material; very friable; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3289

AB—0 to 5 cm; brown (7.5YR 5/4) clay; common medium faint reddish yellow (7.5YR 6/6) redoximorphic features; moderate medium subangular blocky structure; friable; common medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; few distinct very dark grayish brown (10YR 3/2) organic coatings throughout; very strongly acid; clear smooth boundary. 93P3290

Bo1—5 to 23 cm; reddish brown (7.5YR 6/6) clay; common medium faint reddish yellow (7.5YR 6/8) redoximorphic features; moderate medium subangular blocky structure; friable; common fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; very strongly acid; clear smooth boundary. 93P3291

Bo2—23 to 60 cm; yellowish red (5YR 5/6) clay; common medium distinct red (2.5YR 4/6) redoximorphic features; moderate medium subangular blocky structure; friable; common medium and common fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; very strongly acid; clear smooth boundary. 93P3292

Bo3–60 to 100 cm; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots throughout; estimated bulk density of 1.1 g cm^{-3}; very strongly acid; clear smooth boundary. 93P3293

BC—100 to 120 cm; 50 percent yellow (10YR 7/6) and 50 percent yellowish red (5YR 5/6) clay; moderate coarse subangular blocky structure; friable; estimated bulk density of 1.1 g cm^{-3}; slightly acid. 93P3294

Cristal: S93PR-119-002

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Cristal; clayey, kaolinitic, isohyperthermic Aquic Haplohumults

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 432, Samples 93P 3295–3300

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .05-.05	-3-- TOTAL SAND -2	-4-- TOTAL FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE LT .002	-7-- SILT COARSE .02-.02	-8-- SAND VF .05-.05	-9-- SAND F .10-.10	-10- SAND M .25-.25	-11- SAND C .5-.50	-12- SAND VC 1-1	-13- COARSE FRACS (MM) 2-2	-14- WEIGHT 5-5	-15- WEIGHT 20-20	-16- WEIGHT .1-75	-17- WEIGHT 75-75	-18- WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->					
93P3295H	1- 0	Oi													--	--	--			--
93P3296S	0- 8	AB	75.4	18.5	6.1	30.7		16.1	2.4	2.1	1.7	0.9	0.8	0.6	2	1	--		7	3
93P3297S	8- 30	Bt1	74.9	21.0	4.1	27.0		19.2	1.8	1.6	1.2	0.5	0.4	0.4	TR	--	--		2	--
93P3298S	30- 50	Bt2	78.2	16.9	4.9	32.1		14.9	2.0	1.7	1.3	0.6	0.5	0.8	4	TR	--		7	4
93P3299S	50- 90	Bt3	44.9	44.7	10.4	11.0		38.5	6.2	4.9	3.7	1.3	0.4	0.1	--	--	--		5	--
93P3300S	90-130	BC	38.0	51.8	10.2	9.0		44.7	7.1	5.6	3.2	1.1	0.2	0.1	--	--	--		5	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM	EXTRACTABLE MN 6D2a -->	CEC 8D1	15 BAR 8D1	LIMITS - LL 4F1 PCT	LIMITS - PI 4F <0.4MM	FIELD MOIST 4A5 <-	1/3 BAR 4A1d G/CC	OVEN DRY 4A1h - ->	WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4 <-	1/10 BAR 4B1c -PCT	1/3 BAR 4B1c OF	15 BAR 4B2a <2MM	WHOLE SOIL 4C1 - -> CM/CM
1- 0	46.8	1.818																	91.8	
0- 8	4.49	0.377			6.3	0.6	--	0.38	0.52				0.77	1.31	0.191			82.1	39.1	0.33
8- 30	2.68	0.257			8.4	0.8	--	0.26	0.53				0.81	1.30	0.171			76.1	39.5	0.30
30- 50	2.74	0.280			8.0	0.7	--	0.28	0.51				0.84	1.28	0.148			75.5	39.5	0.30
50- 90	0.49	0.080			6.4	0.6	TR	0.31	0.66				1.04	1.25	0.063			52.9	29.5	0.24
90-130	0.13	0.054			6.2	0.5	TR	0.39	0.67				1.30						25.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - -> <- - - - -PCT - - - ->																1:2	1:1
1- 0	49.9	15.6	0.8	2.7	69.0	120.4		189.4	128.3			36	54					
0- 8	2.0	1.8	0.2	0.3	4.3	25.2	5.0	29.5	28.7	9.3	54	15	15				3.8	4.3
8- 30	2.0	1.9	0.2	0.1	4.2	18.2	5.7	22.4	19.5	9.9	58	19	22				4.0	4.4
30- 50	0.8	1.3	0.2	0.4	2.7	19.6	6.2	22.3	21.6	8.9	70	12	12				3.9	4.4
50- 90	0.3	0.7	0.2	TR	1.2	17.3	8.9	18.5	14.0	10.1	88	6	9				4.0	4.8
90-130	TR	0.9	0.3	0.1	1.3	17.4	10.4	18.7	15.0	11.7	89	7	9				4.0	4.8

INTER SAMPLE NUMBER	ION	FRACT X-RAY 7A2i peak size						THERMAL DTA Percent				TGA		SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	ELEMENTAL 7C3 Percent							EGME RETN 7D2 mg/g	PRETA TION
93P3296	TCLY	KK 3	GE 2	HE 1	GI 1										24.0	15.7			0.1										KAOL
93P3298	TCLY	KK 3	GE 2	LE 2	HE 1	QZ 1									25.0	17.2													KAOL
93P3299	TCLY											KK60	GE10																KAOL
93P3300	TCLY	KK 3	GE 2	HE 1											25.0	15.7			0.1										KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite GI gibbsite LE lepidocrocit QZ quartz

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3299 which also supports GE 10 and HE 7

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2 m m	->	<- P P M	->	< - - - - - - - - - - P E R C E N T					o f	< 2 m m	- - - - - - -	- - ->			><20mm	<PCT>
93P3295	1	0.07	0.20	TR	0.06				46.51											16	
93P3296	2	0.14	0.95	TR	0.20	56		1.8	4.50			49.8									
93P3297	3	0.11	0.78	TR	0.21	56		2.4	2.68			52.1									
93P3298	4	0.10	1.03	TR	0.26	53		1.3	2.76			51.2									
93P3299	5	0.03	0.19	TR	0.20	56		0.6	0.54			41.0									
93P3300	6	0.03	0.17	TR	0.22	54		0.4	0.22												

Narrative Pedon Description

Pedon: Cristal

NSSL pedon number: 93P432

Pedon ID: S93PR-119-002

Field classification: Clayey, mixed, isohyperthermic Aquic Haplohumults

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Aquic Hapludox

Location: 1 cm east and 203 cm north of 08.03.33 (52.03 m north and 150.01 m east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,333.4 meters easting and 2,028,245.7 meters northing

Latitude: 18°19’27.6" north

Longitude: 65°48’54.0" west

Elevation: 393 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 21 percent, plane, 280 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Somewhat poorly drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 15 percent

Erosion: Slight

Particle-size control section: 8 to 90 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 8 cm; argillic horizon at 8 to 90 cm

Map unit: Inclusion to 6D4—Prieto clay, 15 to 35 percent slopes, rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 23, 1993

Notes: Site is 6 meters from site 1. This site is part of a toposequence to document soil pedon variability within short distances. Xiaoming Zou from the University of Puerto Rico assisted in sampling this soil. It rained hard during the description and sampling phase. The soil temperature was 20 °C at a depth of 50 cm.

Oi—1 to 0 cm; very dark grayish brown (10YR 3/2) fibric material; very friable; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3295

AB—0 to 8 cm; yellowish brown (10YR 5/6) clay; common fine distinct reddish yellow (7.5YR 6/6) redoximorphic features; moderate medium subangular blocky structure; friable; common fine roots throughout; estimated bulk

density of 1.3 g cm^{-3}; few distinct very dark grayish brown (10YR 3/2) organic coatings throughout; very strongly acid; clear wavy boundary. 93P3296

Bt1—8 to 30 cm; brownish yellow (10YR 6/6) clay; common medium prominent light brownish gray (2.5YR 6/2) iron depletions and many fine faint strong brown (7.5YR 5/6) redoximorphic features; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; clay films on faces of peds; common coarse very dark grayish brown (10YR 3/2) wormcasts throughout; very strongly acid; clear wavy boundary. 93P3297

Bt2—30 to 50 cm; brownish yellow (10YR 6/6) clay; few medium distinct grayish brown (2.5Y 5/2) iron depletions and few fine distinct strong brown (7.5YR 5/6) redoximorphic features; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; clay films on faces of peds; common coarse very dark grayish brown (10YR 3/2) wormcasts throughout; very strongly acid; clear smooth boundary. 93P3298

Bt3—50 to 90 cm; brownish yellow (10YR 6/6) clay; common fine faint light yellowish brown (10YR 6/4) and common fine distinct reddish yellow (7.5YR 6/6) redoximorphic features; weak fine and medium subangular structure; friable; estimated bulk density of 1.3 g cm^{-3}; clay films on faces of peds; very strongly acid; clear smooth boundary. 93P3299

BC—90 to 130 cm; yellowish red (5YR 5/6), red (2.5YR 4/6), and brownish yellow (10YR 6/6) clay; weak coarse subangular blocky structure; friable; estimated bulk density of 1.3 g cm^{-3}; slightly acid. 93P3300

Prieto: S93PR-119-003

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Prieto; very-fine, kaolinitic, isohyperthermic Aeric Tropaquepts

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 433, Samples 93P 3301–3306

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1-75	WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->				
93P3301H	1- 0	Oi													--	24	11		35
93P3302S	0- 6	AB	56.2	29.0	14.8	27.0		23.0	6.0	3.6	2.9	1.9	2.5	3.9	5	7	10	31	22
93P3303S	6- 23	Bg1	59.4	29.0	11.6	28.1		22.4	6.6	3.2	2.9	1.6	1.8	2.1	1	TR	--	9	1
93P3304S	23- 50	Bg2	62.5	31.0	6.5	14.0		26.5	4.5	2.4	1.5	0.9	0.8	0.9	TR	TR	--	4	TR
93P3305S	50-100	Bg3	44.2	50.4	5.4	23.5		43.8	6.6	3.2	1.5	0.4	0.2	0.1	--	--	--	2	--
93P3306S	100-130	Bg4	37.4	51.3	11.3	9.8		42.8	8.5	5.1	4.1	1.5	0.5	0.1	--	--	--	6	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	DITH-CIT - -) LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(RATIO/CLAY) FIELD MOIST 4A5	1/3 BAR 4A1d <- - G/CC	(ATTERBERG) OVEN DRY 4A1h - - ->	(- BULK DENSITY -) COLE WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c <- - -PCT	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
1- 0	48.3	1.410																	62.5	
0- 6	7.18	0.536			5.5	0.5	TR	0.58	0.67				0.63	1.26	0.234			107.4	37.6	0.41
6- 23	6.51	0.469			5.0	0.5	TR	0.58	0.61				0.75	1.25	0.185			84.6	36.4	0.36
23- 50	3.69	0.295			6.1	0.5	TR	0.46	0.58				0.78	1.21	0.157			78.1	36.4	0.32
50-100	0.50	0.092			5.8	0.5	TR	0.48	0.68				1.00	1.24	0.074			56.5	30.0	0.27
100-130	0.16	0.620			6.3	0.6	0.1	0.59	0.71				1.30						26.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																1:2	1:1
1- 0	52.5	13.7	1.6	2.5	70.3	75.5		145.8	95.1			48	74					
0- 6	6.4	2.6	0.4	0.3	9.7	25.7	1.5	35.4	32.5	11.2	13	27	30				4.3	5.0
6- 23	4.3	1.7	0.1	0.3	6.4	28.9	2.7	35.3	34.7	9.1	30	18	18				4.1	4.8
23- 50	4.3	1.9	0.1	0.3	6.6	22.3	3.8	28.9	29.0	10.4	37	23	23				3.9	4.3
50-100	1.8	1.8	0.2	0.3	4.1	14.1	6.5	18.2	21.0	10.6	61	23	20				4.1	5.0
100-130	0.9	2.6	0.2	0.3	4.0	14.7	6.5	18.7	21.9	10.5	62	21	18				4.1	4.9

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY					DTA 7A6b	TGA 7A4c	THERMAL Percent					SiO2	AL2O3	Fe2O3	ELEMENTAL Percent MgO	CaO	K2O	Na2O	EGME RETN mg/g	INTER PRETA TION 7D2
93P3304	TCLY	KK 3	GE 2	HE 1	GI 1	QZ 1									26.0	17.2						KAOL
93P3305	TCLY									KK62	GE 9											KAOL
93P3306	TCLY	KK 3	GE 2	HE 1											24.0	18.6			0.1			KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite GI gibbsite QZ quartz

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic

PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3305 which also supports GI 5 and HE 7

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2 m m	->	<- P P M	->	< - - - - - - - - - - P E R C E N T					o f	< 2 m m	- - - - - - -	- - ->			><20mm	<PCT>
93P3301	1	0.14	0.59	TR	0.08				43.55											31	
93P3302	2	0.24	1.99	TR	0.21	79		9.7	8.14			50.1									
93P3303	3	0.22	1.50	TR	0.24	75		8.4	6.35			47.6									
93P3304	4	0.23	2.00	TR	0.23	66		5.9	3.86			47.9									
93P3305	5	0.05	0.41	TR	0.16	54		4.3	0.57			42.7									
93P3306	6	0.04	0.24	TR	0.15	54		15.3	0.24												

Narrative Pedon Description

The Prieto series consists of very deep, poorly drained, moderately slowly permeable soils in concave mountain coves, in drainageways, and on hillslopes formed in residuum from volcaniclastic sandstone on the LTER Grid. Areas of this series occupy 0.89 ha, or 5.5625 percent of the LTER Grid. Slopes range from 3 to 30 percent. The mean annual precipitation is 3,500 mm, and the mean annual air temperature is 22 °C. The soils were classified as fine, mixed, nonacid, isohyperthermic Typic Tropaquepts. The revised classification, as of April 01, 2001, is very-fine, kaolinitic, acid, isohyperthermic Vertic Endoaquepts.

Prieto soils commonly are associated with small areas of Cristal and Zarzal soils that are in landform positions similar to those of the Prieto soils.

Typical pedon of Prieto clay from an area of map unit 6D4—Prieto clay, 15 to 35 percent slopes, rubbly; site identification S93PR-119-003; Major Land Resource Area 270; Río Grande Municipio, Puerto Rico; 208 cm west and 84 cm south of 08.03.33 (49.16 m north and 147.92 m east of 01.11.11) on the Luquillo LTER Grid; Caribbean National Forest; 18 degrees 19 minutes 27.6 seconds north, 65 degrees 48 minutes 54 seconds west; UTM Zone 20: 202,331.3 m easting and 2,028,194 m northing. This pedon was described and sampled by H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 24, 1993

Oi—1 to 0 cm; very dark grayish brown (10YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary.

AB—0 to 6 cm; grayish brown (2.5Y 5/2) clay; moderate medium subangular blocky structure; friable; common fine and common medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; few very dark grayish brown (10YR 3/2) organic coatings throughout; neutral; abrupt smooth boundary.

Bg1—6 to 23 cm; grayish brown (2.5Y 5/2) clay; common fine faint light olive brown (2.5Y 5/4) iron masses and common fine faint gray (N 5/0) iron depletions; weak coarse subangular blocky structure; friable; common fine and common medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; many coarse very dark grayish brown (10YR 3/2) wormcasts throughout; neutral; clear smooth boundary.

Bg2—23 to 50 cm; grayish brown (2.5Y 5/2) clay; common fine faint olive (5Y 5/4) iron masses and common fine faint gray (N 5/0) iron depletions; weak coarse subangular blocky structure; friable; common fine roots throughout; estimated bulk density of 1.3 g cm^{-3}; many coarse gray (N 5/0) and many coarse light olive brown (2.5Y 5/4) wormcasts throughout; neutral; clear smooth boundary.

Bg3—50 to 100 cm; gray (5Y 6/1) clay; common fine faint olive gray (5Y 5/2) iron masses; weak coarse subangular blocky structure; friable; estimated bulk density of 1.3 g cm^{-3}; few prominent red (2.5YR 4/6) coatings in root channels and pores; many coarse gray (N 5/0) and many coarse olive gray (5Y 5/2) wormcasts throughout; neutral; clear smooth boundary.

Bg4—100 to 130 cm; greenish gray (5GY 6/1) clay; common fine distinct olive gray (5Y 5/2) iron masses; weak coarse subangular blocky structure; friable;

estimated bulk density of 1.3 g cm^{-3}; few prominent red (2.5YR 4/6) coatings in root channels and pores; many coarse gray (N 5/0) and many coarse greenish gray (5GY 5/1) wormcasts throughout; neutral.

The thickness of the solum ranges from 60 to 180 cm. Reaction ranges from slightly acid to moderately acid throughout. The content of rock fragments ranges from 0 to 10 percent throughout.

The A horizon is neutral or has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 3 or less. It is clay loam or clay.

The Bg horizon has hue of 2.5Y to 5GY, value of 5 to 8, and chroma of 1 or 2. It is clay loam or clay.

The C horizon, where present, has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8. It is clay loam or clay.

Zarzal: S93PR-119-004

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Kandiudox
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 434, Samples 93P 3307–3312
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	TOTAL CO3 LT .002	CLAY FINE .002 -.02	SILT COARSE .02 -.05	SILT VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	>2MM WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->				
93P3307H	1- 0	Oi													--	--	--		--
93P3308S	0- 8	AB	66.0	23.8	10.2	33.6		16.9	6.9	3.7	3.4	1.7	0.8	0.6	--	--	--	6	--
93P3309S	8- 20	Bo1	71.4	19.6	9.0	35.5		14.2	5.4	3.5	2.7	1.1	0.9	0.8	TR	--	--	5	TR
93P3310S	20- 53	Bo2	71.7	19.8	8.5	32.6		15.0	4.8	3.2	2.7	1.3	0.9	0.4	TR	--	--	5	--
93P3311S	53-100	Bo3	68.6	23.7	7.7	22.1		18.7	5.0	3.2	2.7	1.0	0.5	0.3	--	--	--	4	--
93P3312S	100-130	BC	49.6	41.1	9.3	12.7		33.0	8.1	4.4	3.1	1.1	0.5	0.2	--	--	--	5	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a OF	EXTRACTABLE MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	(RATIO/CLAY) 15 BAR	(ATTERBERG) LL 4F1 PCT	(ATTERBERG) PI 4F <0.4MM	(BULK DENSITY) FIELD MOIST 4A5 <-	(BULK DENSITY) 1/3 BAR 4A1d G/CC	COLE OVEN DRY 4A1h -	COLE WHOLE SOIL 4D1 -> CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM	WRD WHOLE SOIL 4C1 - -> CM/CM
1- 0	48.2	1.894																		69.7	
0- 8	7.28	0.696			5.8	0.7	TR	0.46	0.60				0.70	0.98	0.119				57.5	39.6	0.13
8- 20	3.21	0.301			5.9	0.7	--	0.22	0.51				0.98	1.31	0.101				52.7	36.7	0.16
20- 53	1.79	0.180			8.4	0.9	--	0.17	0.51				1.00	1.35	0.105				55.2	36.7	0.19
53-100	0.77	0.115			10.1	1.0	--	0.19	0.54				0.99	1.27	0.087				54.6	36.7	0.18
100-130	0.34	0.070			9.3	0.8	0.1	0.29	0.60				1.10							29.9	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- -MEQ / 100 G										<-	-PCT	->				1:2	1:1
1- 0	56.2	15.3	2.7	3.6	77.8	58.1		135.9	96.9			57	80					
0- 8	2.8	11.5	0.5	0.4	15.2	29.7	2.7	44.9	30.6	17.9	15	34	50				4.0	4.5
8- 20	1.1	8.6	0.2	--	9.9	20.3	4.7	30.2	15.4	14.6	32	33	64				3.9	4.3
20- 53	1.0	8.1	0.2	--	9.3	16.8	5.1	26.1	12.2	14.4	35	36	76				4.0	4.6
53-100	1.0	8.1	0.2	--	9.3	15.3	5.4	24.6	13.0	14.7	37	38	72				4.1	4.8
100-130	1.0	7.9	0.2	0.1	9.2	18.1	9.6	27.3	14.4	18.8	51	34	64				4.0	4.8

SAMPLE NUMBER	FRACT ION 7A2i <- - -> peak size	X-RAY				THERMAL DTA 7A6b	THERMAL TGA 7A4c	CLAY MINERALOGY (<.002mm) ELEMENTAL SiO2 7C3	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN 7D2 mg/g	INTER PRETA TION
						Percent		Percent								
93P3310	TCLY	KK 3	GE 2	QZ 1					26.0	18.6			0.2			KAOL
93P3311	TCLY						KK62	GE16								KAOL
93P3312	TCLY	KK 3	GE 2	HE 1	QZ 1				25.0	15.7			0.1			KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite QZ quartz GI gibbsite HE hematite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3311 which also supports GI 4 and HE 4

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2 m m	->	<- P P M	->	< - - - - - - - - - - P E R C E N T					o f	< 2 m m	- - - - - - -	- - ->			><20mm	<PCT>
93P3307	1	0.17	0.30	TR	0.10				41.59											26	
93P3308	2	0.23	1.37	TR	0.23	62		3.6	9.43			50.2									
93P3309	3	0.13	1.18	TR	0.25	60		0.5	3.45			45.7									
93P3310	4	0.06	0.50	TR	0.23	56		TR	1.84			43.8									
93P3311	5	0.03	0.13	TR	0.18	59		TR	0.84			44.8									
93P3312	6	0.02	0.12	TR	0.25	66		0.1	0.38			38.3									

Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 93P434

Pedon ID: S93PR-119-004

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Kandiudox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Humic Xanthic Eutrudox

Location: 40 cm south and 43 cm west of 09.02.11 (19.6 meters north and 159.57 meters east of 01.11.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,343 meters easting and 2,028,213 meters northing

Latitude: 18°19’26.7" north

Longitude: 65°48’56.6" west

Elevation: 395 meters

Physiography: Mountainside in mountains

Geomorphic position: Side slope

Slope: 23 percent, convex, 300 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

*Major Land Resource Area: 2*70—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderately slow permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 20 percent

Erosion: Slight

Particle-size control section: 8 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 8 cm; oxic horizon at 8 to 100 cm

Map unit: 1D4—Zarzal clay, 15 to 30 percent slopes, rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 23, 1993

Notes: Site is typical for the Zarzal series. Additional documentation performed via tape recorder. Charcoal fragments occupy 1 percent of the Bo2 horizon and about 2 percent of the Bo3 horizon.

Oi—1 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3307

AB—0 to 8 cm; brown (7.5YR 5/4) clay; common fine faint brown (7.5YR 4/4) redoximorphic features; moderate fine and medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; few distinct very dark grayish brown (10YR 3/2) organic coatings throughout; clear wavy boundary. 93P3308

Bo1—8 to 20 cm; reddish brown (7.5YR 6/6) clay; common medium distinct brownish yellow (10YR 6/6) and few fine faint strong brown (7.5YR 6/6) redoximorphic features; moderate medium subangular blocky structure; friable; common fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear wavy boundary. 93P3309

Bo2—20 to 53 cm; brownish yellow (10YR 6/6) clay; common fine distinct reddish yellow (7.5YR 6/6) and common fine distinct strong brown (7.5YR 5/6) redoximorphic features; moderate medium subangular blocky structure; friable; common fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear wavy boundary. 93P3310

Bo3—53 to 100 cm; brownish yellow (10YR 6/6) clay; few medium prominent reddish brown (2.5YR 4/4) redoximorphic features; moderate medium subangular blocky structure; friable; common very fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear wavy boundary. 93P3311

BC—100 to 130 cm; yellowish red (5YR 5/6) clay; common medium faint yellowish red (5YR 4/6) and common medium prominent brownish yellow (10YR 6/6) redoximorphic features; moderate fine and medium subangular blocky structure; friable; common very fine roots throughout; estimated bulk density of 1.1 g cm^{-3}. 93P3312

Cristal: S93PR-119-005

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Cristal; very-fine, kaolinitic, isohyperthermic Lithic Kandiudox

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 435, Samples 93P 3313–3316

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - -

Narrative Pedon Description

Pedon: Cristal

NSSL pedon number: 93P435

Pedon ID: S93PR-119-005

Field classification: Very-fine, kaolinitic, isohyperthermic Lithic Kandiudox

Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Aquic Dystric Eutrudepts

Location: 187 cm east and 37 cm north of 03.08.43 (150 meters north and 56.87 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,240.3 meters easting and 2,028,334 meters northing

Latitude: 18°19’30.7" north

Longitude: 65°49’0.07" west

Elevation: 371 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 20 percent plane 280 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 30 percent

Erosion: Slight

Particle-size control section: 25 to 60 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 60 cm; lithic contact at 60 cm

Map unit: 4D4—Cristal clay, 15 to 30 percent slopes, rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 23, 1993

Notes: Site is 10 to 20 meters away from the walk tower. The lithic contact is probably a subterranean boulder.

Oi—3 to 0 cm; black (10YR 2/1) fibric material; loose; common large (7-cm diameter) live roots on surface; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3313

AB—0 to 7 cm; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; few distinct very dark brown (10YR 2/2) organic coatings throughout; 1 percent fragments 20 to 75 mm in diameter; clear smooth boundary. 93P3314

Bo1—7 to 28 cm; yellowish brown (10YR 5/6) clay; common fine faint yellowish brown (10YR 5/8) redoximorphic features; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; common coarse dark yellowish brown (10YR 4/4) wormcasts throughout; clear smooth boundary. 93P3315

Bo2—28 to 60 cm; yellowish brown (10YR 5/6) clay; common fine prominent light gray (10YR 7/1) iron depletions; moderate medium subangular blocky structure; friable; common very fine and fine roots throughout; 1 percent of the lateral area and 1 percent of the total volume is krotovinas; estimated bulk density of 1.1 g cm^{-3}; few coarse dark yellowish brown (10YR 4/4) wormcasts throughout; clear smooth boundary. 93P3316

R—60 cm; unweathered bedrock. Not sampled.

Prieto: S93PR-119-006

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Prieto; fine, mixed, nonacid, isohyperthermic Typic Tropaquepts

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 436, Samples 93P 3317–3321

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -2	TOTAL FINE .0002	CLAY CO3 .002	SILT FINE -.02	SILT COARSE -.05	SAND VF -.10	SAND F -.25	SAND M -.50	SAND C -1	SAND VC -2	COARSE FRACS (MM) WEIGHT >2MM -5	-20	-75	75	WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM (3B1)				
93P3317H	1- 0	Oi													--	--	--		--
93P3318S	0- 8	AB	44.8	33.8	21.4	16.7	22.0	11.8	8.2	7.7	2.8	1.5	1.2	5	6	5	27	16	
93P3319S	8- 31	Bog	46.3	33.4	20.3	16.7	22.9	10.5	8.2	7.0	2.8	1.3	1.0	2	TR	--	14	2	
93P3320S	31- 95	Bo	33.2	42.5	24.3	7.2	29.9	12.6	9.3	8.9	4.0	1.3	0.8	TR	1	--	16	1	
93P3321S	95-120	BC	33.6	41.8	24.6	10.2	30.4	11.4	9.0	8.6	4.1	2.0	0.9	1	1	--	17	2	

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A5	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
1- 0	45.5	1.858																	68.2	
0- 8	3.02	0.330			5.3	0.5	0.1	0.57	0.61				0.90	1.35	0.133			62.2	27.3	0.29
8- 31	2.24	0.233			5.6	0.5	0.2	0.52	0.61				1.07	1.37	0.085			47.0	28.1	0.20
31- 95	0.34	0.063			5.0	0.4	0.2	1.01	0.74				1.27	1.45	0.045			33.6	24.4	0.12
95-120	0.21	0.049			6.2	0.5	0.1	0.94	0.83				1.00						28.0	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G					- - - - - - - - - - - ->					<- - - - -PCT			- - - ->			1:2	1:1
1- 0																		
0- 8	4.3	16.8	0.3	--	21.4	17.7	TR	39.1	25.7			55	83				5.0	5.3
8- 31	4.0	17.0	0.3	--	21.3	16.0	0.1	37.3	24.2	21.4	TR	57	88				4.9	5.2
31- 95	4.4	25.5	0.4	--	30.3	11.9		42.2	33.5			72	90				5.6	6.2
95-120	4.6	26.9	0.6	--	32.1	9.4		41.5	31.5			77	100				5.7	6.4

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	7A6b	7A4c	THERMAL DTA	TGA	SiO2	AL2O3	Fe2O3	ELEMENTAL MgO	CaO	K2O	Na2O	7C3	EGME RETN 7D2	INTER PRETA TION
	<- -	peak size			Percent					Percent					<mg/g>	
93P3319	TCLY	KK 3	GE 2	HE 1	VR 1				22.0	13.7		0.1				KAOL
93P3320	TCLY						KK55	GE 8								KAOL
93P3321	TCLY	KK 3	GE 2	HE 1	VR 1	MI 1			25.0	15.7		0.1				KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite VR vermiculite GI gibbsite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic

PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3320 which also supports GI 3 and HE 8

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CONT <5mm 8F1	AGGRT STABL 4G1
			<- P C T	o f	< 2 m m	-><- P P M		->	< - - - - - - - - - - P E R C E N T						
93P3317	1								39.62						16
93P3318	2	0.13	1.33	TR	0.27	58		4.0	3.51			36.8			
93P3319	3	0.13	1.40	TR	0.25	62		5.5	2.35			35.6			
93P3320	4	0.06	0.57	TR	0.16	41			0.38			32.0			
93P3321	5	0.06	0.35	TR	0.13	46			0.24			34.4			

SAMPLE NO.	HZ NO	<- - PIPETTE - - CLAY	SILT	SAND	><- HYDROMETER - - CLAY	SILT	SAND ->	SML	<20mm	>2mm
		<- - - 3A1c - - -			><- - -			- - -		
93P3317	1									
93P3318	2									
93P3319	3									
93P3320	4									
93P3321	5									

Narrative Pedon Description

Pedon: Prieto

NSSL pedon number: 93P436

Pedon ID: S93PR-119-006

Field classification: Fine, mixed, nonacid, isohyperthermic Typic Tropaquepts

Revised classification as of April 01, 2001: Very-fine, mixed, active, nonacid, isohyperthermic Vertic Epiaquepts

Location: 180 cm north and 50 cm west of 06.11.11 (201.8 meters north and 99.5 meters east of 01.11.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,282.9 meters easting and 202,282.9 meters northing

Latitude: 18°19’32.7" north

Longitude: 65°48’59.0" west

Elevation: 370 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 18 percent, convex, 315 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: 8 cm

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Poorly drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 50 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 8 cm; cambic horizon at 8 to 120 cm

Map unit: 6D5—Prieto clay, 15 to 30 percent slopes, very rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, John Davis, and B.C. Dubee on February 24, 1993

Notes: Site is 5 meters from a stream that is south-southwest of pedon. The exposed gley colors fade with exposure to air. Pedon has an epiaquic water table.

Oi—1 to 0 cm; very dark grayish brown (10YR 3/2) fibric material; loose; common live roots 2 to 4 cm in diameter on top of horizon, abrupt broken boundary. 93P3317

AB—0 to 8 cm; pale brown (10YR 6/3) clay; common fine distinct reddish yellow (7.5YR 6/6) and few medium prominent gray (N 5/0) iron depletions; weak fine and medium subangular blocky structure; friable; common very fine and fine roots throughout; estimated bulk density of 1.3 g cm^{-3}; few prominent very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2) organic coatings throughout; clear smooth boundary. 93P3318

Bog—8 to 31 cm; olive gray (5Y 5/2) clay; common fine faint olive gray (5Y 4/2) and common medium prominent strong brown (7.5YR 5/6) redoximorphic features; common fine prominent gray (N 5/0) iron depletions; moderate medium subangular blocky structure; friable; common very fine, fine, and medium roots throughout; 2 percent of the lateral area and 2 percent of the total volume is krotovinas; estimated bulk density of 1.3 g cm^{-3}; few prominent strong brown (7.5YR 5/6) coatings throughout; common coarse very dark brown (10YR 2/2) wormcasts throughout; clear smooth boundary. 93P3319

Bo—31 to 95 cm; reddish yellow (7.5YR 6/6) clay; common medium distinct yellow (2.5Y 7/6) redoximorphic features; moderate fine and medium subangular blocky structure; friable; common very fine, fine, and medium roots throughout; 1 percent of the lateral area and 1 percent of the total volume is krotovinas; estimated bulk density of 1.3 g cm^{-3}; few coarse very dark brown (10YR 2/2) wormcasts throughout; clear smooth boundary. 93P3320

BC—95 to 120 cm; 90 percent strong brown (7.5YR 5/6) and 10 percent light gray (10YR 7/2) clay; common medium faint reddish yellow (7.5YR 6/6) and common medium faint strong brown (7.5YR 5/8) redoximorphic features; weak fine and medium subangular blocky structure; friable; common very fine and medium roots throughout; 1 percent of the lateral area and 1 percent of the total volume is krotovinas; estimated bulk density of 1.0 g cm^{-3}; few irregular very dark brown (10YR 2/2) soft masses of iron-manganese throughout. 93P3321

Cristal: S93PR-119-007

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Cristal; clayey, mixed, isohyperthermic Aquic Haplohumults
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 437, Samples 93P 3322–3328
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C -1	SAND VC -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
93P3322H	1- 0	Oi													--	--	--		--
93P3323S	0- 8	A/B	54.1	32.5	13.4	27.7	23.6	8.9	4.1	4.0	2.2	1.5	1.6	--	10	19	36	29	
93P3324S	8- 19	Bo1	57.0	30.9	12.1	29.4	23.2	7.7	4.4	3.6	1.6	1.1	1.4	2	2	2	13	6	
93P3325S	19- 25	Bo2	55.5	31.5	13.0	31.0	24.3	7.2	4.5	4.1	2.3	1.4	0.7	TR	TR	--	8	TR	
93P3326S	25- 55	BC1	53.2	35.7	11.1	26.2	27.6	8.1	5.3	3.8	1.3	0.5	0.2	--	--	--	6	--	
93P3327S	55- 90	BC2	38.6	43.2	18.2	25.4	33.3	9.9	7.2	6.0	3.0	1.6	0.4	--	--	--	11	--	
93P3328S	90-125	BC3	34.7	45.3	20.0	10.0	37.3	8.0	5.7	6.0	3.8	3.3	1.2	--	TR	--	14	TR	

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM -->	EXTRACTABLE MN 6D2a	CEC 8D1	15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A5 <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM - ->	WRD WHOLE SOIL 4C1 CM/CM
1- 0	56.1	1.866																	79.5	
0- 8	4.48	0.549			5.0	0.6	TR	0.53	0.61				0.56	1.07	0.213			112.1	33.2	0.41
8- 19	3.30	0.347			5.7	0.7	TR	0.33	0.55				0.70	1.12	0.166			84.6	31.3	0.37
19- 25	2.30	0.256			6.1	0.8	TR	0.31	0.54				1.04	1.48	0.125			56.2	29.9	0.27
25- 55	0.95	0.121			6.4	0.8	TR	0.29	0.57				1.08	1.34	0.075			49.0	30.3	0.20
55- 90	0.31	0.062			6.0	0.8	0.2	0.42	0.77				1.11	1.21	0.029			42.3	29.8	0.14
90-125	0.18	0.048			5.3	0.6	0.3	0.56	0.81				1.00						28.0	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																1:2	1:1
1- 0	67.8	22.9	2.3	4.9	97.9	50.5		148.4	105.3			66	93					
0- 8	4.4	3.3	0.7	0.5	8.9	23.8	1.3	32.7	28.9	10.2	13	27	31				4.5	5.2
8- 19	2.0	2.1	0.2	0.1	4.4	21.7	4.2	26.1	18.8	8.6	49	17	23				4.0	4.3
19- 25	2.1	2.4	0.2	0.1	4.8	17.8	3.7	22.6	17.0	8.5	44	21	28				4.2	4.6
25- 55	1.2	1.8	0.5	--	3.5	17.1	5.2	20.6	15.6	8.7	60	17	22				4.2	5.0
55- 90	1.0	1.8	0.6	0.1	3.5	18.6	6.5	22.1	16.2	10.0	65	16	22				4.2	5.3
90-125	1.7	3.6	0.7	--	6.0	19.0	5.6	25.0	19.3	11.6	48	24	31				4.3	5.4

SAMPLE NUMBER	FRACT ION < 7A2i	X-RAY				DTA	THERMAL	TGA		SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	RETN	PRETA TION
	<- - ><- - - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- -><mg/g><- - >																	
93P3324	TCLY	KK 3	GE 2	HE 1	QZ 1						25.0	13.4						KAOL
93P3326	TCLY	KK 3	GE 2	HE 1							27.0	13.9			0.1			KAOL
93P3327	TCLY								KK67	GE10								KAOL
93P3328	TCLY	KH 3	GE 2								27.0	11.7			0.1			HALL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite QZ quartz GI gibbsite KH halloysite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic HALL = Halloysitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3327 which also supports GI 3 and HE 4

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	EXTRACTION AL 6G12b	PHOSPHOUS RET 6S4	PHOSPHOUS CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL <5mm <- - PIPETTE - - ><- HYDROMETER - > CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	AGGRT STABL CONT 8F1	4G1
		<- P C T o f < 2 m m ->				<- P P M ->			< - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - - >											<20mm>	<PCT>
93P3322	1	0.28	0.09	TR	0.06				49.01											12	
93P3323	2	0.14	1.25	TR	0.35	81		15.1	7.02			41.1									
93P3324	3	0.16	1.27	TR	0.54	60		2.2	3.73			38.0									
93P3325	4	0.07	0.58	TR	0.26	62		1.9	2.67			36.7									
93P3326	5	0.04	0.28	TR	0.27	63		2.2	1.03			36.2									
93P3327	6	0.04	0.26	TR	0.29	70		3.0	0.36			35.0									
93P3328	7	0.05	0.35	TR	0.29	75		4.1	0.22			35.4									

Narrative Pedon Description

Pedon: Cristal

NSSL pedon number: 93P437

Pedon ID: S93PR-119-007

Field classification: Clayey, mixed, isohyperthermic Aquic Haplohumults

Revised classification as of April 01, 2001: Very-fine, isotic, isohyperthermic Aquandic Dystrudepts

Location: 200 cm south and 50 cm west of 12.10.33 (188 meters north and 229.5 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,412.9 meters easting and 202,412.9 meters northing

Latitude: 18°19’33.5" north

Longitude: 65°48’55.4" west

Elevation: 394 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 5 percent, convex, 310 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 25 percent

Erosion: Slight

Particle-size control section: 8 to 58 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 8 cm; argillic horizon at 8 to 58 cm

Map unit: 4C4—Cristal clay, 3 to 15 percent slopes, rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 24, 1993

Notes: Numerous living earthworms were in the upper part of the soil profile. The BC2 horizon was split for sampling at a depth of 90 cm.

Oi—1 to 0 cm; very dark brown (10YR 2/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3322

AB—0 to 8 cm; yellowish brown (10YR 5/6) gravelly clay; few fine faint strong brown (7.5YR 5/6) redoximorphic features and few fine distinct light brownish gray (10YR 6/2) iron depletions; moderate fine and medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; few distinct very dark brown (10YR 2/2) coatings in root channels and/or pores; 20 percent gravel (mostly in upper part); clear wavy boundary. 93P3323

Bo1—8 to 19 cm; yellowish brown (10YR 5/8) clay; common fine distinct light brownish gray (10YR 6/2) iron depletions; moderate medium subangular structure; friable; common fine roots throughout; estimated bulk density of 1.3 g cm^{-3}; few coarse light olive brown (2.5Y 5/3) wormcasts throughout; clear wavy boundary. 93P3324

Bo2—19 to 25 cm; yellowish brown (10YR 5/8) clay; common fine distinct light brownish gray (10YR 6/2), common medium distinct light gray (N 7/0), and common medium distinct light olive brown (2.5Y 5/3) iron depletions; moderate medium subangular blocky structure; friable; estimated bulk density of 1.3 g cm^{-3}; few distinct yellowish red (5YR 5/6) coatings on faces of peds; few coarse light olive brown (2.5Y 5/3) wormcasts throughout; clear wavy boundary. 93P3325

BC1—25 to 55 cm; yellowish brown (10YR 5/8) clay; many fine prominent white (10YR 8/1) iron depletions; moderate fine prismatic structure; friable; estimated bulk density of 1.0 g cm^{-3}; few distinct strong brown (7.5YR 5/6) coatings on faces of peds; common medium irregular very dark gray (10YR 2/2), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/6) soft masses of iron-manganese throughout; clear wavy boundary. 93P3326

BC2—55 to 90 cm; pale yellow (2.5Y 7/3), yellowish brown (10YR 5/8), dark brown (7.5YR 3/4), and black (N 2/0) silty clay loam; weak coarse prismatic structure; friable; estimated bulk density of 1.0 g cm^{-3}. The horizon was split for sampling. 93P3327

BC3—90 to 125 cm; pale yellow (2.5Y 7/3), yellowish brown (10YR 5/8), dark brown (7.5YR 3/4), and black (N 2/0) silty clay loam; weak coarse prismatic structure; friable; estimated bulk density of 1.0 g cm^{-3}. 93P3328

Zarzal: S93PR-119-008

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Kandiudox
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 438, Samples 93P 3329–3334
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS WEIGHT 2 -5	-17- COARSE FRACS WEIGHT 5 -20	-18- COARSE FRACS WEIGHT 20 -75	-19- COARSE FRACS WEIGHT .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- - - PCT OF <2MM (3A1)											- - ->	<- PCT OF <75MM(3B1) ->				
93P3329H	1- 0	Oi													--	--	--		--
93P3330S	0- 5	A	62.9	26.0	11.1	36.6		20.6	5.4	4.1	3.7	1.9	0.9	0.5	--	--	--	7	--
93P3331S	5- 18	Bo1	56.1	22.5	21.4	31.3		17.1	5.4	3.9	2.9	2.1	4.5	8.0	--	1	--	18	1
93P3332S	18- 45	Bo2	63.6	22.2	14.2	36.7		16.7	5.5	3.8	3.1	2.1	2.8	2.4	--	--	--	10	--
93P3333S	45- 80	Bo3	63.8	23.5	12.7	32.0		17.4	6.1	4.0	3.1	1.9	1.7	2.0	1	--	--	10	1
93P3334S	80-120	BC	45.5	22.9	31.6	19.4		17.9	5.0	4.1	5.7	5.0	6.4	10.4	2	7	--	34	9

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	(ATTERBERG) LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A5	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
1- 0	49.7	1.971																	90.0	
0- 5	7.19	0.605			5.4	0.8	TR	0.42	0.57				0.58	1.07	0.226			90.5	35.8	0.32
5- 18	3.48	0.347			5.6	0.8	TR	0.33	0.52				0.89	1.20	0.105			50.8	29.4	0.19
18- 45	2.20	0.216			6.4	0.7	TR	0.20	0.48				1.07	1.39	0.091			43.7	30.4	0.14
45- 80	1.08	0.134			8.6	1.1	TR	0.15	0.47				1.11	1.39	0.078			44.1	30.0	0.16
80-120	0.23	0.068			9.4	1.1	0.2	0.24	0.61				1.10						27.9	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									- - - - - - - - - - - ->	<- - - - -PCT		- - - ->				1:2	1:1
1- 0	41.5	16.3	2.2	1.8	61.8	72.3		134.1	99.0			46	62					
0- 5	2.1	2.6	0.6	0.1	5.4	24.8	2.3	30.2	26.6	7.7	30	18	20				4.2	4.8
5- 18	0.7	1.4	0.3	0.1	2.5	19.7	2.9	22.2	18.6	5.4	54	11	13				4.2	4.6
18- 45	0.2	0.3	0.2	--	0.7	18.5	3.6	19.2	12.6	4.3	84	4	6				4.1	4.6
45- 80	0.1	TR	0.2	TR	0.3	16.0	2.9	16.3	9.4	3.2	91	2	3				4.2	4.8
80-120	0.7	1.3	0.3	TR	2.3	15.3	1.9	17.6	11.1	4.2	45	13	21				4.4	5.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i peak size	THERMAL DTA 7A6b Percent	THERMAL TGA 7A4c Percent	ELEMENTAL SiO2 7C3 Percent	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTERPRETATION
93P3332	TCLY	KK 3 GE 2 HE 1				28.0	14.3			0.1			KAOL
93P3333	TCLY			KK57 GE10									KAOL
93P3334	TCLY	KK 3 GE 2 HE 1				27.0	15.7						KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3333 which also supports HE 6

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CONT <5mm 8F1	AGGRT STABL 4G1
			<- P C T	o f	< 2 m m	-><- P P M		-><- - - - - - - - - - P E R C E N T							
										<- - - PIPETTE - - ><- HYDROMETER - >					
										CLAY 3A1c	SILT - - ->	SAND	CLAY <- - -	SILT SML	SAND - - ->
										o f < 2 m m - - - - - - - -					
93P3329	1	0.08	0.26	TR	0.09				42.96						23
93P3330	2	0.21	1.59	TR	0.36	68		1.8	8.16			44.2			
93P3331	3	0.16	1.26	TR	0.30	68		0.4	4.39			35.8			
93P3332	4	0.11	1.04	TR	0.34	64		0.2	2.45			35.5			
93P3333	5	0.04	0.24	TR	0.24	62		TR	1.29			34.1			
93P3334	6	0.04	0.23	TR	0.24	69		1.3	0.34			31.4			

><20mm><PCT>

Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 93P438

Pedon ID: S93PR-119-008

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Kandiudox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Humic Hapludox

Location: 75 cm south and 5 cm east of 16.04.22 (64.25 meters north and 304.95 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,488.3 meters easting and 2,028,252 meters northing

Latitude: 18°19’28.4" north

Longitude: 65°48’48.6" west

Elevation: 394 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 36 percent, plane, 350 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, rapid runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 50 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 90 cm

Map unit: 1E4—Zarzal clay, 30 to 60 percent slopes, rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 25, 1993

Notes: No rock fragments were observed in the soil. Many tabonuco (*Dacryodes excelsa*) trees surrounded this site.

Oi—1 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3329

A—0 to 5 cm; brown (7.5YR 4/4) clay; moderate fine and medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; few distinct dark brown (7.5YR 3/2) organic coatings throughout; clear smooth boundary. 93P3330

Bo1—5 to 18 cm; strong brown (7.5YR 5/6) clay; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear smooth boundary. 93P3331

Bo2—18 to 45 cm; strong brown (7.5YR 5/6) clay; many fine prominent yellowish red (5YR 5/8) redoximorphic features; weak medium subangular blocky structure; friable; few fine and medium and common coarse roots throughout; estimated bulk density of 1.1 g cm^{-3}; gradual smooth boundary. 93P3332

Bo3—45 to 80 cm; strong brown (7.5YR 5/6) clay; many fine distinct yellowish red (5YR 5/8) redoximorphic features; weak medium subangular blocky structure; friable; few fine and medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; gradual smooth boundary. 93P3333

BC—80 to 120 cm; strong brown (7.5YR 5/6) gravelly clay; few medium distinct pale yellow (2.5Y 7/3) iron depletions; weak coarse subangular blocky structure; friable; estimated bulk density of 1.1 g cm^{-3}; common fine irregular very dark brown (10YR 2/2) soft masses of iron-manganese throughout; 15 percent gravel. 93P3334

Coloso: S93PR-119-009

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Coloso; fine, mixed, nonacid, isohyperthermic Aeric Tropic Fluvaquents
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 439, Samples 93P 3335–3339
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SILT VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	>2MM .1- 75	% OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
93P3335H	1- 0	Oi													--	16	41		57
93P3336S	0- 6	A	54.6	24.9	20.5	29.0		16.2	8.7	7.7	6.4	3.0	1.7	1.7	--	2	--	15	2
93P3337S	6- 20	Bw	55.8	24.2	20.0	28.6		16.7	7.5	6.9	6.7	3.3	1.9	1.2	--	--	--	13	--
93P3338S	20- 55	Bg1	52.3	26.3	21.4	23.1		17.5	8.8	7.9	8.2	3.3	1.5	0.5	2	TR	--	15	2
93P3339S	55-100	Bg2	52.3	29.9	17.8	21.1		21.3	8.6	7.1	6.9	2.4	0.9	0.5	TR	1	2	13	3

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT OF <2MM -->	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT <0.4MM	ATTERBERG PI 4F	BULK DENSITY FIELD MOIST 4A5 <- - G/CC - - ->	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF <2MM - ->	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
1- 0	51.6	2.072																	100.9	
0- 6	5.36	0.466			6.0	0.7	TR	0.43	0.57				0.79	1.37	0.199			71.0	31.3	0.31
6- 20	3.34	0.324			5.9	0.7	TR	0.35	0.54				0.82	1.32	0.172			67.8	30.4	0.31
20- 55	1.93	0.185			6.2	0.8	TR	0.32	0.58				0.96	1.40	0.133			54.9	30.5	0.23
55-100	0.76	0.105			5.8	0.6	TR	0.37	0.59				1.03	1.20	0.052			51.5	31.1	0.21

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																1:2	1:1
1- 0																		
0- 6	4.0	2.7	0.4	0.3	7.4	21.3	1.4	28.7	23.7	8.8	16	26	31				4.4	5.0
6- 20	2.3	2.3	0.3	0.2	5.1	25.1	3.4	30.2	19.3	8.5	40	17	26				4.2	4.6
20- 55	2.9	3.2	0.2	0.1	6.4	17.7	3.5	24.1	16.8	9.9	35	27	38				4.3	4.8
55-100	4.8	5.0	0.3	0.2	10.3	11.7	2.7	22.0	19.3	13.0	21	47	53				4.3	5.0

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size				THERMAL DTA 7A6b Percent				THERMAL TGA 7A4c Percent				ELEMENTAL 7C3 Percent SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTER PRETA TION
93P3337	TCLY	KK 4	GE 2	LE 1	HE 1										24.0	15.7						KAOL
93P3339	TCLY	KK 4	GE 2	HE 1						KK63	GE 9				26.0	15.7			0.1			KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite LE lepidocrocit HE hematite GI gibbsite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3339 which also supports GI 5 and HE 7

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b <- P C T	SI 6V2b	AL 6G12b o f < 2 m m ->	PHOSPHOUS RET 6S4 <- P P M	CITR- ACID 6S5 ->	KCL MN 6D3b	TOTAL C 6A2d	WATER CONTENT 0.06 BAR 4B1c <- - - - - - - - - - - - P E R C E N T	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	WATER DISPERSIBLE PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY SML	SILT	SAND	MIN SOIL CONT 8F1 <20mm	AGGRT STABL 4G1 <PCT>
93P3335	1								44.51											46	
93P3336	2	0.06	0.12	TR	0.04	71		2.6	5.72			39.1									
93P3337	3	0.13	1.21	TR	0.30	68		1.5	3.71			36.4									
93P3338	4	0.09	0.90	TR	0.27	64		3.6	1.83			35.6									
93P3339	5	0.06	0.47	TR	0.22	56		4.6	0.80			36.4									

Narrative Pedon Description

The Coloso series consists of very deep, somewhat poorly drained, slowly permeable soils formed in stratified alluvial sediments in the stream channels along the Toronja and La Prieta Creeks on the LTER Grid. Areas of this series occupy 0.11 ha, or 0.6875 percent of the LTER Grid. Slopes range from 3 to 15 percent. The mean annual precipitation is 3,500 mm, and the mean annual air temperature is 22 °C. The soils were classified as fine, mixed, nonacid, isohyperthermic Aeric Tropic Fluvaquents. The revised classification as of April 01, 2001, is very-fine, kaolinitic, acid, isohyperthermic Vertic Endoaquepts.

Coloso soils commonly are associated with small areas of Fluvaquents that are in similar landform positions.

Typical pedon of Coloso clay from an area of map unit 5C3—Coloso clay, 3 to 15 percent slopes, frequently flooded, extremely bouldery; site identification S93PR-119-009; Major Land Resource Area 270; Río Grande Municipio, Puerto Rico; 170 cm north and 170 cm east of 13.07.24 (136.7 m north and 246.7 m east of 01.01.11) on the Luquillo LTER Grid; Caribbean National Forest; 18 degrees 19 minutes 30.6 seconds north, 64 degrees 48 minutes 38.8 seconds west; UTM Zone 20: 202,430.1 m easting and 2,028,330 m northing. This pedon was described and sampled by H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 25, 1993.

Oi—1 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary.

A—0 to 6 cm; 70 percent brown (7.5YR 4/4) and 30 percent brown (7.5YR 4/2) clay; weak fine and medium granular structure; friable; many very fine to medium roots throughout; estimated bulk density of 1.0 g cm^{-3}; clear smooth boundary.

Bw—6 to 20 cm; strong brown (7.5YR 5/6) clay; weak medium subangular blocky structure; friable; many fine and medium roots throughout; estimated bulk density of 1.0 g cm^{-3}; common coarse dark grayish brown (2.5Y 4/2) wormcasts throughout; clear smooth boundary.

Bg1—20 to 55 cm; greenish gray (5BG 5/1), strong brown (7.5YR 5/6), and yellowish red (5YR 5/8) clay; many coarse distinct gray (5Y 5/1) iron depletions; weak medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; very few prominent brown (7.5YR 4/2) organic coatings in root channels and/or pores and very few prominent black (N 2/0) organic coatings in root channels and/or pores; few coarse dark red (10R 3/6) wormcasts throughout and few coarse yellowish red (5YR 5/8) wormcasts throughout; 1 percent gravel; abrupt smooth boundary.

Bg2—55 to 100 cm; greenish gray (5BG 5/1), strong brown (7.5YR 5/6), and yellowish red (5YR 5/8) clay; many coarse distinct gray (5Y 5/1) iron depletions; weak coarse subangular blocky structure; friable; few fine and few medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; very few prominent dark red (10R 3/6) coatings in root channels and/or pores; common

coarse dark red (10R 3/6) and common coarse yellowish red (5YR 5/8) wormcasts throughout; 1 percent gravel.

The thickness of the solum ranges from 25 to 100 cm. The content of rock fragments ranges from 0 to 10 percent throughout. Reaction is moderately acid or slightly acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is silty clay loam, silty clay, or clay.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 6. It is silty clay or clay.

The Bg or Cg horizon, where present, has hue of 10YR to 5BG, value of 4 to 7, and chroma of 1 or 2 and is mottled. The Bg and Cg horizons are silty clay or clay.

Zarzal: S93PR-119-011

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Kandiudox
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 441, Samples 93P 3342–3346
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE -.05	VF -.10	(- - - - - -SAND- - - - - -) F -.25	M -.50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - -5	-20	-75	75	WT .1- % OF WHOLE SOIL
			<- - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
93P3342S	0- 5	A	76.4	19.4	4.2	30.1		15.5	3.9	1.7	1.4	0.6	0.3	0.2	--	--	--	2	--
93P3343S	5- 37	Bo1	68.0	24.9	7.1	24.5		19.6	5.3	3.1	2.2	0.8	0.5	0.5	TR	TR	--	4	--
93P3344S	37- 57	Bo2	56.0	34.2	9.8	17.0		27.8	6.4	4.3	2.9	1.3	0.8	0.5	--	--	--	5	--
93P3345S	57- 75	Bo3	51.2	38.5	10.3	14.0		30.1	8.4	4.5	3.5	1.4	0.6	0.3	--	--	--	6	--
93P3346S	75-150	BC	48.2	41.5	10.3	12.6		34.9	6.6	4.8	3.8	1.4	0.3	TR	--	--	--	5	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B4a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN <2MM --> 6D2a	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A5 <-	1/3 BAR 4A1d G/CC -	COLE OVEN DRY 4A1h ->	(- - -WATER CONTENT - -) WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4 <-	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM -	15 BAR 4B2a ->	WRD WHOLE SOIL 4C1 CM/CM
0- 5	3.97	0.447			8.8	1.1	TR	0.31	0.46				0.79	1.17	0.140			57.5	35.4	0.17
5- 37	2.13	0.213			8.5	1.0	TR	0.23	0.49				1.04	1.32	0.083			47.6	33.3	0.15
37- 57	0.82	0.105			8.9	1.0	TR	0.23	0.60				1.04	1.23	0.058			47.2	33.5	0.14
57- 75	0.34	0.072			8.5	0.9	TR	0.25	0.62				1.02	1.20	0.056			46.7	31.8	0.15
75-150	0.14	0.053			8.1	0.8	TR	0.28	0.63				1.10						30.5	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 5	2.0	2.2	0.3	0.3	4.8	22.6	2.9	27.4	23.4	7.7	38	18	21				1:2 4.1	1:1 4.4
5- 37	0.5	1.2	0.2	--	1.9	28.1	5.2	30.0	15.8	7.1	73	6	12				4.1	4.9
37- 57	0.1	0.7	0.2	TR	1.0	17.5	6.0	18.5	12.8	7.0	86	5	8				4.2	5.0
57- 75	TR	0.4	0.2	0.1	0.7	17.6	7.3	18.3	12.9	8.0	91	4	5				4.2	5.0
75-150	0.3	0.2	0.2	--	0.7	17.8	8.9	18.5	13.6	9.6	93	4	5				4.2	5.0

| SAMPLE NUMBER | FRACT ION < - - - - - - 7A2i <- - - - - peak size - - - - - | X-RAY - - - - - -><- - - - - - - - - - - - - -

Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 93P441

Pedon ID: S93PR-119-011

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Kandiudox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Hapludox

Location: 70 cm north and 190 cm east of 13.12.34 (235.7 meters north and 251.9 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,431.5 meters easting and 2,028,414 meters northing

Latitude: 18°19’33.4" north

Longitude: 65°48’53.1" west

Elevation: 393 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 77 percent, plane, 170 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 9 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 75 cm

Map unit: 1E2—Zarzal clay, 30 to 60 percent slopes, very bouldery

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 25, 1993

Notes: Tabonuco and palm trees were at the site. Areas of bare soil are exposed and rotational slump features can be observed down the slope. Area was correlated as Zarzal-Cristal complex, 20 to 60 percent slopes (rubbly), in the correlation for the Caribbean National Forest signed during 1992.

A—0 to 5 cm; reddish brown (5YR 4/4) clay; weak fine granular blocky structure; friable; many fine and few medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear smooth boundary. 93P3342

Bo1—5 to 37 cm; yellowish red (5YR 4/6) and red (2.5Y 4/6) clay; moderate medium subangular blocky structure; friable; common fine and few medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; common coarse reddish brown (5YR 4/4) wormcasts throughout; clear smooth boundary. 93P3343

Bo2—37 to 57 cm; yellowish red (5YR 4/6) clay; common medium prominent yellow (10YR 6/8) and common fine prominent red (2.5YR 4/6) dendritic redoximorphic features throughout; moderate medium subangular blocky structure; friable; common fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; few prominent gray (N 4/0) coatings in root channels and/or pores; common coarse reddish brown (5YR 4/4) wormcasts throughout; clear smooth boundary. 93P3344

Bo3—57 to 75 cm; brownish yellow (10YR 6/8), yellowish red (5YR 4/6), and red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable; few fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; few distinct strong brown (7.5YR 5/6) coatings in root channels and/or pores; clear smooth boundary. 93P3345

BC—75 to 150 cm; 47 percent yellowish red (5YR 4/6), 47 percent red (2.5YR 4/6), and 6 percent light gray (10YR 7/1) clay; weak coarse subangular blocky structure; friable; estimated bulk density of 1.1 g cm^{-3}. 93P3346

Coloso: S93PR-119-012

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Coloso; fine, mixed, nonacid, isohyperthermic Aeric Tropic Fluvaquents
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 442, Samples 93P 3347–3353
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
93P3347H	1- 0	Oi													--	--	--		--
93P3348S	0- 10	A	29.4	37.2	33.4	9.3		26.3	10.9	10.7	12.8	6.4	2.7	0.8	--	--	--	23	--
93P3349S	10- 26	Bw1	31.7	38.2	30.1	9.7		27.2	11.0	9.8	11.2	5.3	2.7	1.1	1	TR	--	21	1
93P3350S	26- 38	Bw2	36.7	38.6	24.7	11.6		28.9	9.7	10.4	8.3	3.5	1.7	0.8	TR	TR	--	14	TR
93P3351S	38- 49	Bw3	40.0	38.5	21.5	12.9		28.7	9.8	9.8	8.7	2.2	0.6	0.2	--	--	--	12	--
93P3352S	49- 70	Bg	40.2	39.1	20.7	13.6		29.5	9.6	9.4	7.9	2.2	0.8	0.4	TR	--	--	11	TR
93P3353S	70- 95	Cg	39.8	38.0	22.2	11.5		28.7	9.3	8.3	7.9	3.1	1.7	1.2	--	7	--	20	7

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A5	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
1- 0	44.1	1.963																	124.4	
0- 10	3.06	0.256			4.9	0.5	0.1	1.28	0.88				1.30						26.0	
10- 26	2.03	0.201			5.3	0.5	0.1	1.07	0.81				1.65	1.20	0.056			43.3	25.6	0.29
26- 38	2.01	0.211			5.2	0.4	0.1	0.86	0.75				0.90	1.19	0.097			57.1	27.7	0.26
38- 49	2.12	0.224			5.5	0.5	0.1	0.71	0.74				0.82	1.10	0.103			62.3	29.6	0.27
49- 70	1.98	0.196			5.3	0.4	0.1	0.77	0.70				1.01	1.27	0.079			51.6	28.0	0.24
70- 95	1.26	0.145			4.4	0.3	0.2	0.68	0.68				1.30						27.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																	
1- 0																		
0- 10	15.9	11.1	1.9	0.3	29.2	14.9		44.1	37.5			66	78				5.1	5.4
10- 26	13.9	9.8	0.4	0.4	24.5	16.6	0.4	41.1	33.9	24.9	2	60	72				4.9	5.3
26- 38	11.7	8.7	0.4	0.3	21.1	17.9	0.8	39.0	31.6	21.9	4	54	67				4.7	5.1
38- 49	9.6	7.3	0.3	0.1	17.3	17.9	0.8	35.2	28.4	18.1	4	49	61				4.6	5.4
49- 70	12.2	9.1	0.4	TR	21.7	17.3	0.6	39.0	30.9	22.3	3	56	70				4.7	5.0
70- 95	9.6	7.1	0.3	0.1	17.1	18.6	0.9	35.7	27.0	18.0	5	48	63				4.7	5.4

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - ELEMENTAL - - - - - - -><- -> EGME INTER
SAMPLE        ION <                            ><- DTA - -><- TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><- 7A6b - ><- 7A4c - ><- - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - Percent - - - - - - -><- -><mg/g><- - >
93P3350      TCLY  KK 3  VR 2  GE 2  HE 1  LE 1                                23.0  15.7              0.1                   KAOL
93P3350      TCLY  MT 1
93P3351      TCLY                                          KK62  GE 9                                                        KAOL
93P3352      TCLY  KK 3  VR 2  GE 2  HE 1  MT 1             KK56  GE 8        23.0  15.7              0.1                   KAOL
93P3352      TCLY  LE 1
93P3353      TCLY  KK 3  VR 2  GE 1  MT 1                                     22.0  15.7              0.1                   KAOL
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    KK  kaolinite        VR  vermiculite      GE  goethite         HE  hematite         LE  lepidocrocit     MT  montmorillon
    GI  gibbsite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):
    KAOL = Kaolinitic
PEDON MINERALOGY
    BASED ON SAND/SILT:
    BASED ON CLAY: Kaolinitic
    FAMILY MINERALOGY: Kaolinitic
    COMMENTS:
         Kaolinitic based of TGA on 93P3351 and 93P3352; 93P3351 also supports GI and HE 8; 93P3352 also supports GI 6 and HE 9
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             ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
              DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO        <- P C T  o f < 2 m m -><- P P M  -><- - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - -><20mm><PCT>
93P3347  1                                          39.81                                                                  21
93P3348  2  0.10  0.66   TR   0.21    46              3.00
93P3349  3  0.14  1.10   TR   0.25    49         3.6  1.95
93P3350  4  0.18  1.67   TR   0.25    59         2.7  1.91
93P3351  5  0.17  2.04   TR   0.27    59         5.3  2.10
93P3352  6  0.17  1.71   TR   0.27    56         6.6  1.97
93P3353  7  0.24  3.05   TR   0.48    84        26.5  1.27
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Narrative Pedon Description

Pedon: Coloso

NSSL pedon number: 93P442

Pedon ID: S93PR-119-012

Field classification: Fine, mixed, nonacid, isohyperthermic Aeric Tropic Fluvaquents

Revised classification as of April 01, 2001: Very-fine, mixed, active, isohyperthermic Aquertic Eutrudepts

Location: 300 cm east and 200 cm north of 07.15.44 (297 meters north and 138 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,321.4 meters easting and 2,028,476 meters northing

Latitude: 18°19’37.3" north

Longitude: 65°48’58.4" west

Elevation: 369 meters

Physiography: Hanging valley in mountains

Geomorphic position: Toeslope of an interfluve

Slope: 3 percent, plane, 40 degrees

Average annual precipitation: 2,355 mm; aquic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Somewhat poorly drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 5 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Moderately weathered alluvium from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 100 cm

Map unit: 5C3—Coloso clay, frequently flooded, 3 to 15 percent slopes, extremely bouldery

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 26, 1993

Notes: Abundant *Heilaconia* fronds were at the site. Pedon was described on 2/25/93 and sampled on 2/26/93. There is a vernal pool 3 meters south of the site. The lower bulk density of the first two mineral horizons is suspected to be the result of aggregated porosity of open faunal casts.

Oi—1 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3347

A—0 to 10 cm; brown (7.5YR 5/4) clay; weak fine and medium granular structure; friable; many fine and medium and common coarse roots throughout; estimated bulk density of 1.0 g cm^{-3}; 1 percent gravel; clear smooth boundary. 93P3348

Bw1—10 to 26 cm; strong brown (7.5YR 4/6) clay; moderate fine and medium subangular blocky structure; friable; many fine and medium roots throughout; estimated bulk density of 1.0 g cm^{-3}; 1 percent gravel; clear smooth boundary. 93P3349

Bw2—26 to 38 cm; strong brown (7.5YR 4/6) clay; few distinct grayish brown (2.5Y 5/2) iron depletions; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; 1 percent gravel; clear smooth boundary. 93P3350

Bw3—38 to 49 cm; strong brown (7.5YR 4/6) clay; many fine prominent red (2.5YR 4/6) redoximorphic features; many fine prominent gray (5Y 5/1) iron depletions; moderate medium subangular blocky structure; friable; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; 1 percent gravel; clear smooth boundary. 93P3351

Bg—49 to 70 cm; greenish gray (5GY 5/1) clay; many coarse prominent dark red (2.5YR 3/6) and yellowish red (5YR 5/6) redoximorphic features; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; few prominent yellowish red (5YR 4/6) coatings in root channels; many coarse olive gray (5Y 5/2), olive (5Y 5/4), red (2.5Y 4/6), and greenish gray (5GY 5/1) wormcasts throughout; 1 percent gravel; clear smooth boundary. 93P3352

Cg—70 to 150 cm; greenish gray (5GY 5/1) clay; many coarse prominent dark red (2.5YR 3/6) and yellowish red (5YR 5/6) redoximorphic features; massive; friable, slightly sticky, slightly plastic; estimated bulk density of 1.3 g cm^{-3}; few prominent yellowish red (5YR 4/6) coatings in pores; many coarse reddish gray (5YR 5/2), reddish brown (5YR 5/4), red (2.5Y 4/6), and greenish gray (5GY 5/1) wormcasts throughout; 1 percent gravel. 93P3352

Zarzal: S93PR-119-013

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Kandiudox

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 443, Samples 93P 3354–3359

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05 -.05	TOTAL SAND -2	TOTAL FINE LT .0002	CLAY CO3 .002	SILT FINE -.02	SILT COARSE -.05	SAND VF -.10	SAND F -.25	SAND M -.50	SAND C -1	SAND VC -2	COARSE FRACS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1- 75	WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM (3B1)				
93P3354H	1- 0	Oi													--	--	--		--
93P3355S	0- 5	A	66.6	23.5	9.9	29.2	18.8	4.7	3.1	2.7	1.5	1.2	1.4	--	1	--	8		1
93P3356S	5- 32	Bo1	68.3	22.3	9.4	31.7	18.8	3.5	3.0	2.7	1.3	1.2	1.2	--	TR	--	6		--
93P3357S	32- 56	Bo2	71.2	20.5	8.3	33.4	16.9	3.6	2.7	2.5	1.5	1.0	0.6	TR	--	--	6		--
93P3358S	56-100	Bo3	75.2	17.5	7.3	41.4	14.9	2.6	2.8	2.1	1.1	0.8	0.5	1	--	--	5		1
93P3359S	100-120	Bo4	71.0	19.6	9.4	29.6	16.5	3.1	2.5	2.6	1.7	1.6	1.0	TR	--	--	7		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3b <- PERCENT OF <2MM -->	EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	CEC 8D1	15 BAR 8D1	(RATIO/CLAY) LIMITS LL 4F1 PCT <0.4MM	ATTERBERG PI 4F	BULK DENSITY FIELD MOIST 4A5 <- G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
1- 0	57.7	2.731																	65.2	
0- 5	3.66	0.518			5.9	0.9	0.1	0.32	0.46				0.90	1.26	0.118			54.6	30.3	0.22
5- 32	2.83	0.333			6.1	0.9	0.1	0.21	0.43				1.02	1.42	0.117			50.5	29.4	0.22
32- 56	1.00	0.156			6.2	1.0	0.1	0.13	0.43				1.05	1.32	0.079			45.0	30.6	0.15
56-100	0.69	0.126			7.3	1.0	TR	0.12	0.43				1.10						32.4	
100-120	0.18	0.089			8.9	1.0	0.1	0.12	0.46				1.10						32.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- MEQ / 100 G										<- PCT							
1- 0																		
0- 5	5.0	2.8	0.3	0.3	8.4	21.3	0.8	29.7	21.3	9.2	9	28	39				4.3	4.4
5- 32	1.6	0.9	0.2	0.1	2.8	18.1	1.6	20.9	14.0	4.4	36	13	20				4.3	4.5
32- 56	0.7	0.5	0.2	0.1	1.5	16.3	1.4	17.8	9.3	2.9	48	8	16				4.4	5.0
56-100	0.5	0.5	0.2	0.1	1.3	16.3	2.0	17.6	8.8	3.3	61	7	15				4.3	5.0
100-120	0.3	0.5	0.2	TR	1.0	16.0	2.3	17.0	8.8	3.3	70	6	11				4.3	4.9

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size					THERMAL DTA 7A6b Percent		TGA 7A4c		ELEMENTAL SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
93P3357	TCLY	KK 3	GE 2	GI 1	HE 1	QZ 1						29.0	12.0			0.1			KAOL
93P3358	TCLY								KK69	GE11									KAOL
93P3359	TCLY	KK 3	GE 2	HE 1								29.0	12.3			0.1			KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite GI gibbsite HE hematite QZ quartz

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic

PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3358 which also supports GI 5 and HE 2

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - > CLAY 3A1c	SILT	SAND	< - HYDROMETER - > CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
		<- P C T o f < 2 m m ->					<- P P M ->		< - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - >											<20mm	<PCT>
93P3354	1								48.75											10	
93P3355	2	0.11	0.56	TR	0.30	59		5.2	5.35												
93P3356	3	0.08	0.53	TR	0.31	60		2.5	3.11												
93P3357	4	0.03	0.12	TR	0.28	69		1.0	1.08												
93P3358	5	0.03	0.12	TR	0.27	65		0.5	0.80												
93P3359	6	0.02	0.09	TR	0.27	69		0.3	0.34												

Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 93P443

Pedon ID: S93PR-119-013

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Kandiudox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Inceptic Hapludox

Location: 150 cm south of 11.16.44 (313.5 meters north and 215 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,598.4 meters easting and 2,028,507 meters northing

Latitude: 18°19’36.4" north

Longitude: 65°48’58.4" west

Elevation: 378 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 13 percent, plane, 0 degrees (north)

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 22 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 120 cm

Map unit: 1C4—Zarzal clay, 3 to 15 percent slopes, rubbly

Described and sampled by: H.R. Mount, W. Lynn, R. Vick, J. Davis, and B.C. Dubee on February 25, 1993

Notes: Many *cecropia* and palms were in area. Leaf litter was collected for total carbon and organic matter content.

Oi—1 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3354

A—0 to 5 cm; brown (7.5YR 4/3) clay; moderate fine and medium granular structure; friable; many very fine and fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear smooth boundary. 93P3355

Bo1—5 to 32 cm; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; friable; common very fine, fine, and medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; common coarse dark brown (7.5YR 3/2) and dark yellowish brown (10YR 4/4) wormcasts throughout; gradual smooth boundary. 93P3356

Bo2—32 to 56 cm; strong brown (7.5YR 5/6) clay; many coarse distinct yellowish red (5YR 5/6) redoximorphic features; moderate medium subangular blocky structure; friable; few very fine and fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; common coarse dark yellowish brown (10YR 4/4) wormcasts throughout; common fine irregular black (10YR 2/1) soft masses of iron-manganese throughout; clear smooth boundary. 93P3357

Bo3—56 to 100 cm; strong brown (7.5YR 5/8) clay; many coarse distinct yellowish red (5YR 5/6) redoximorphic features; few fine faint light gray (10YR 7/1) iron depletions; moderate medium subangular blocky structure; friable; few very fine and fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; gradual smooth boundary. 93P3358

Bo4—100 to 120 cm; strong brown (7.5YR 5/8) clay; many coarse distinct yellowish red (5YR 5/6) redoximorphic features; few fine faint light gray (10YR 7/1) iron depletions; weak coarse subangular blocky structure; friable; few fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; abrupt smooth boundary. 93P3359

Cr—120 to 125 cm; brownish yellow (10YR 6/6) weathered bedrock; common fine prominent light gray (10YR 7/1) iron depletions; rigid; estimated bulk density of 1.1 g cm^{-3}. Not sampled.

Cristal: S93PR-119-014

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Cristal; clayey, mixed, isohyperthermic Aquic Haplohumults
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 444, Samples 93P 3360–3364
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SILT VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	>2MM WT .1- 75	% OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
93P3360H	1- 0	Oi													--	--	--		--
93P3361S	0- 6	A	69.9	27.2	2.9	31.1		24.7	2.5	1.1	1.0	0.8	0.4	0.2	--	TR	--	2	TR
93P3362S	6- 22	Bt1	69.0	27.8	3.2	30.1		24.2	3.6	1.3	1.0	0.5	0.3	0.1	1	1	7	11	9
93P3363S	22- 38	Bt2	73.6	23.8	2.6	31.6		21.3	2.5	1.2	0.7	0.4	0.3	TR	--	--	--	1	--
93P3364S	38- 70	Bt3/4	72.2	24.6	3.2	29.2		21.4	3.3	1.5	0.8	0.4	0.3	0.2	--	--	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT OF <2MM -->	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT <0.4MM	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A5 <- - G/CC - - ->	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF <2MM - ->	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
1- 0	56.6	2.361																60.3	
0- 6	4.82	0.513			4.6	0.8	TR	0.30	0.46				0.72	1.03	0.127		62.8	32.0	0.22
6- 22	3.52	0.368			4.3	0.8	TR	0.22	0.47				0.91	1.24	0.105		54.1	32.6	0.19
22- 38	2.85	0.290			5.8	0.9	TR	0.18	0.46				1.01	1.29	0.085		49.0	34.0	0.15
38- 70	1.37	0.185			5.5	0.8	TR	0.16	0.47				1.00	1.29	0.089		54.3	33.7	0.21

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->											<- - - - -PCT - - - ->					1:2	1:1
1- 0																		
0- 6	2.6	2.4	0.4	0.3	5.7	27.5	3.4	33.2	21.1	9.1	37	17	27				4.1	4.2
6- 22	0.7	1.4	0.4	0.1	2.6	24.1	3.8	26.7	15.2	6.4	59	10	17				4.2	4.5
22- 38	0.5	7.9	0.4	--	8.8	20.1	3.4	28.9	13.2	12.2	28	30	67				4.2	4.6
38- 70	0.3	7.5	0.2	--	8.0	19.7	3.3	27.7	11.4	11.3	29	29	70				4.2	4.8

SAMPLE NUMBER	FRACT ION 7A2i <- - peak size - - ->	FRACT ION 7A2i <- - Percent - - ->	FRACT ION 7A2i <- - Percent - - ->	FRACT ION 7A2i <- - Percent - - ->	FRACT ION 7A2i <- - Percent - - ->	THERMAL DTA 7A6b <- - - ->	THERMAL TGA 7A4c <- - - ->	ELEMENTAL SiO2 7C3 <- - Percent - - ->	ELEMENTAL AL2O3 7C3 <- - Percent - - ->	ELEMENTAL Fe2O3 7C3 <- - Percent - - ->	ELEMENTAL MgO 7C3 <- - Percent - - ->	ELEMENTAL CaO 7C3 <- - Percent - - ->	ELEMENTAL K2O 7C3 <- - Percent - - ->	ELEMENTAL Na2O 7C3 <- - Percent - - ->	EGME RETN 7D2 <mg/g>	INTER PRETA TION
93P3362	TCLY	KK 4	GE 2	GI 2	VR 1	QZ 1			26.0	10.6			0.1			KAOL
93P3364	TCLY	KK 3	GE 2	GI 1			KK66	GE 9	28.0	12.2			0.1			KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite GI gibbsite VR vermiculite QZ quartz
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3364 which also supports GI 7 and HE 4

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b <- P C T	OXALATE EXTRACTION SI 6V2b	OXALATE EXTRACTION AL 6G12b	PHOSPHOUS RET 6S4	PHOSPHOUS CIT-ACID 6S5 <- P P M ->	KCL MN 6D3b	TOTAL C 6A2d <- - - - - - - - - - - - P E R C E N T	WATER CONTENT 0.06 BAR 4B1c	WATER CONTENT 1- BAR 4B1a	WATER CONTENT 2- BAR 4B1a	WATER CONTENT 15 BAR 4B2b	WATER DISPERSIBLE PIPETTE CLAY <- - - 3A1c	WATER DISPERSIBLE PIPETTE SILT - - ->	WATER DISPERSIBLE PIPETTE SAND <- - - SML	WATER DISPERSIBLE HYDROMETER CLAY - - ->	WATER DISPERSIBLE HYDROMETER SILT	WATER DISPERSIBLE HYDROMETER SAND - - ->	MIN SOIL CONT 8F1 <20mm	AGGRT STABL <5mm 4G1 <PCT>
93P3360	1								49.21											9	
93P3361	2	0.14	0.67	TR	0.44	67		2.2	5.41												
93P3362	3	0.11	0.69	TR	0.43	69		0.7	3.61												
93P3363	4	0.08	0.49	TR	0.34	63		0.8	2.73												
93P3364	5	0.04	0.19	TR	0.28	62		0.9	1.39												

Narrative Pedon Description

The Cristal series consists of very deep, moderately well drained to somewhat poorly drained, moderately slowly permeable soils on upland side slopes and ridges on the LTER Grid. Areas of this series occupy 3.53 ha, or 22.0625 percent of the LTER Grid. These soils formed in clayey residuum of volcaniclastic sandstone origin. Slopes range from 3 to 60 percent. The mean annual precipitation is 3,500 mm, and the mean annual temperature is 22 °C. The soils were classified as clayey, mixed, isohyperthermic Aquic Haplohumults. The revised classification, as of April 01, 2001, is very-fine, kaolinitic, isohyperthermic Aquic Hapludox.

Cristal soils commonly are associated with Prieto and Zarzal soils on adjacent uplands.

Typical pedon of Cristal clay from an area of map unit 4C2—Cristal clay, 3 to 15 percent slopes, very bouldery; site identification S93PR-119-014; Major Land Resource Area 270; Río Grande Municipio, Puerto Rico; 162 cm west of 13.20.43 (390 m north and 253.38 m east of 01.01.11) on the Luquillo LTER Grid; Caribbean National Forest; 18 degrees 19 minutes 38.7 seconds north, 65 degrees 48 minutes 52.9 seconds west; UTM Zone 20: 202,436.8 m easting and 2,028,538 m northing. This pedon was described by H.R. Mount and B.C. Dubee on February 25, 1993.

Oi—1 to 0 cm; very dark brown (10YR 2/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary.

A—0 to 6 cm; dark yellowish brown (10YR 4/4) clay; moderate fine and medium subangular blocky structure; friable; common very fine and fine and few medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; clear smooth boundary.

Bt1—6 to 22 cm; yellowish brown (10YR 5/6) clay; few fine distinct grayish brown (2.5Y 5/2) iron depletions; moderate medium subangular blocky structure; friable; few very fine and fine and few medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; few distinct strong brown (7.5YR 5/6) clay films throughout; many coarse black (10YR 2/1) wormcasts throughout; clear smooth boundary.

Bt2—22 to 38 cm; yellowish brown (10YR 5/6) clay; common medium distinct grayish brown (2.5Y 5/2) iron depletions; moderate medium subangular blocky structure; friable; few very fine and fine and few medium roots throughout; estimated bulk density of 1.3 g cm^{-3}; few distinct strong brown (7.5YR 5/6) clay films throughout; many coarse black (10YR 2/1) wormcasts throughout; clear smooth boundary.

Bt3—38 to 52 cm; yellowish brown (10YR 5/6) clay; many medium distinct grayish brown (2.5Y 5/2) and few fine distinct light gray (10YR 7/1) iron depletions; moderate medium subangular blocky structure; friable; few fine roots throughout; estimated bulk density of 1.3 g cm^{-3}; common distinct strong brown (7.5YR 5/6) clay films throughout; many coarse black (10YR 2/1) and common coarse brownish yellow (10YR 6/6) wormcasts throughout; clear smooth boundary.

Bt4—52 to 150 cm; yellowish brown (10YR 5/6) clay; many medium distinct grayish brown (2.5Y 5/2) iron depletions; moderate medium subangular blocky structure; friable; few fine roots throughout; estimated bulk density of 1.3 g cm^{-3}; common distinct strong brown (7.5YR 5/6) clay films throughout; common coarse black (10YR 2/1) and common coarse brownish yellow (10YR 6/6) wormcasts throughout.

The thickness of the solum ranges from 75 to 200 cm. Reaction ranges from strongly acid to extremely acid throughout. The content of rock fragments ranges from 0 to 20 percent throughout.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 to 4. It is clay loam or clay.

The Bt horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. It is silty clay loam, silty clay, or clay.

The C horizon, where present, has multiple colors with hue of 7.5YR or 5GY, value of 4 to 6, and chroma of 1 to 8. It is clay loam or silty clay loam.

Zarzal: S93PR-119-015

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico

Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Kandiudox

SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station

—Pedon: 93P 445, Samples 93P 3365–3370

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002	-2-- SILT .002 -.05	-3-- SAND .05 -2	-4-- FINE CLAY LT .0002	-5-- CO3 CLAY LT .002	-6-- FINE SILT .002 -.02	-7-- COARSE SILT .02 -.05	-8-- VF SAND .05 -.10	-9-- F SAND .10 -.25	-10- M SAND .25 -.50	-11- C SAND .5 -1	-12- VC SAND 1 -2	-13- WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
93P3365H	1- 0	Oi													6	--	--		6
93P3366S	0- 5	A	69.6	23.0	7.4	33.7		19.8	3.2	2.6	2.5	1.0	0.6	0.7	--	1	--	6	1
93P3367S	5- 30	Bo1	67.4	23.4	9.2	27.5		20.2	3.2	3.0	3.3	1.5	0.7	0.7	--	--	--	6	--
93P3368S	30- 48	Bo2	65.5	25.2	9.3	23.4		20.4	4.8	4.1	2.9	1.3	0.6	0.4	--	--	--	5	--
93P3369S	48-110	Bo3	63.5	25.9	10.6	19.0		20.5	5.4	4.3	3.7	1.6	0.7	0.3	--	--	--	6	--
93P3370S	110-155	Bo4	61.8	25.4	12.8	17.3		20.7	4.7	4.1	3.9	1.9	1.7	1.2	--	--	--	9	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	(ATTERBERG) LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A5	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
1- 0	56.2	1.952																	80.7	
0- 5	5.93	0.670			6.0	0.9	0.2	0.40	0.49				0.84	1.14	0.107			49.1	34.3	0.12
5- 30	3.05	0.365			6.5	1.0	0.2	0.26	0.47				0.98	1.28	0.093			52.2	31.8	0.20
30- 48	1.10	0.156			8.8	1.1	0.3	0.17	0.48				1.05	1.30	0.074			45.1	31.6	0.14
48-110	0.36	0.094			8.6	1.1	0.4	0.16	0.49				1.09	1.25	0.047			45.5	31.0	0.16
110-155	0.17	0.065			8.7	1.0	0.2	0.20	0.50				1.10						30.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	NH4OAC EXTRACTABLE BASES MG 5B5a 6O2d	NH4OAC EXTRACTABLE BASES NA 5B5a 6P2b	NH4OAC EXTRACTABLE BASES K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->				1:2	1:1
1- 0																		
0- 5	1.8	10.0	0.6	0.2	12.6	27.4	2.8	40.0	27.5	15.4	18	32	46				4.1	4.2
5- 30	0.4	8.3	0.4	--	9.1	24.3	3.5	33.4	17.4	12.6	28	27	52				4.2	4.6
30- 48	0.3	8.7	0.4	--	9.4	21.2	2.4	30.6	10.9	11.8	20	31	86				4.3	5.0
48-110	0.2	8.1	0.3	--	8.6	19.1	2.8	27.7	10.4	11.4	25	31	83				4.3	5.1
110-155	0.6	9.1	0.4	0.1	10.2	16.0	2.7	26.2	12.1	12.9	21	39	84				4.4	5.3

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6b (Percent)	THERMAL TGA 7A4c (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
93P3367	TCLY	KK 4 GE 2 GI 1 HE 1 VR 1				25.0	13.4			0.1			KAOL
93P3367	TCLY	QZ 1											
93P3369	TCLY			KK56 GE14									KAOL
93P3370	TCLY	KK 3 GE 2 HE 1 VR 1				28.0	14.3			0.1			KAOL

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite GI gibbsite HE hematite VR vermiculite QZ quartz

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):
KAOL = Kaolinitic

PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Kaolinitic
FAMILY MINERALOGY: Kaolinitic
COMMENTS:
Kaolinitic based of TGA on 93P3369 which also supports GI 2 and HE 1

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - ><- HYDROMETER - -> CLAY 3A1c	SILT	SAND	CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m ->				<- P P M ->		<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -												><20mm><PCT>
93P3365	1								50.55												9
93P3366	2	0.14	0.73	TR	0.36	67		13.3	7.19												
93P3367	3	0.10	0.70	TR	0.36	68		6.4	3.62												
93P3368	4	0.04	0.25	TR	0.28	72		5.0	1.18												
93P3369	5	0.03	0.23	TR	0.31	71		4.4	0.40												
93P3370	6	0.03	0.24	TR	0.26	67		2.5	0.25												

Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 93P445

Pedon ID: S93PR-119-015

Field classification: Very-fine, kaolinitic, isohyperthermic Typic Kandiudox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Eutrudox

Location: 160 cm south and 50 cm west of 16.23.33 (448.4 meters north and 309.5 meters east of 01.01.11) on the Luquillo LTER Grid, Caribbean National Forest, Puerto Rico; UTM Zone 20: 202,492.9 meters easting and 2,028,642 meters northing

Latitude: 18°19’40.9" north

Longitude: 65°48’51.0" west

Elevation: 372 meters

Physiography: Mountainside in mountains

Geomorphic position: Backslope of a side slope

Slope: 12 percent, plane, 180 degrees

Microrelief: Tree-throw features with no pattern; microelevation of 15 cm

Average annual precipitation: 2,355 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Depth to water table: No water table observed.

Average air temperature: Annual—22.6 °C; summer—24.0 °C; winter—21.0 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderate permeability

Vegetation: Tabonuco (*Dacryodes excelsa*) forest used for tropical research

Surface stoniness: 20 percent

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Strongly weathered residuum from volcaniclastic sandstone

Diagnostic features: Ochric epipedon at 0 to 5 cm; oxic horizon at 5 to 155 cm

Map unit: 1C4—Zarzal clay, 3 to 15 percent slopes, rubbly

Described and sampled by: H.R. Mount, B.C. Dubee, R. Vick, and W. Lynn on February 25 and 26, 1993

Notes: Many palms were at the site. One live tubular root, which was 8 cm in diameter and 1 cm thick (saucer shaped), was found in the A horizon. A large wind-throw feature was 5 meters west of the pit.

Oi—1 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 90 percent rubbed; abrupt smooth boundary. 93P3365

A—0 to 5 cm; brown (7.5YR 4/4) clay; weak fine and medium granular structure; friable; many very fine and fine and common medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear smooth boundary. 93P3366

Bo1—5 to 30 cm; strong brown (7.5YR 5/6) clay; weak medium subangular blocky structure; friable; common very fine and fine, few medium, and common coarse roots throughout; estimated bulk density of 1.1 g cm^{-3}; many coarse

black (N 2/0) wormcasts throughout; many medium irregular black (10YR 2/1) soft masses of iron-manganese throughout; clear smooth boundary. 93P3367

Bo2—30 to 48 cm; strong brown (7.5YR 5/6) clay; weak medium subangular blocky structure; friable; common very fine and fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; many coarse dark brown (7.5YR 3/2) and black (N 2/0) wormcasts throughout; many medium irregular black (10YR 2/1) soft masses of iron-manganese throughout; clear smooth boundary. 93P3368

Bo3—48 to 110 cm; 80 percent brown (7.5YR 5/4) and 20 percent light brown (7.5YR 6/3) clay; common fine prominent light gray (10YR 7/1) iron depletions; weak medium subangular blocky structure; friable; few very fine and fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; many medium irregular black (10YR 2/1) soft masses of iron-manganese throughout; clear smooth boundary. 93P3369

BC—110 to 155 cm; 60 percent reddish brown (5YR 4/4), 30 percent red (2.5YR 4/6), and 10 percent light brown (7.5YR 6/3) clay; common fine prominent light gray (10YR 7/1) iron depletions; weak coarse subangular blocky structure; friable; few very fine and fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; common fine irregular black (10YR 2/1) soft masses of iron-manganese throughout. 93P3370

Zarzal: S93PR-119-016

Primary Characterization Data

The Luquillo LTER, Río Grande Municipio, Puerto Rico
Sampled as: Zarzal; very-fine, kaolinitic, isohyperthermic Typic Kandiudox
SSL—Project: 93P 76, (CP93PR117) Luquillo LTER at El Verde Station
—Pedon: 93P 446, Samples 93P 3371–3375
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	(- -CLAY- -) FINE LT .0002	CO3 LT .002	(- -SILT- -) FINE .02 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	% OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
93P3371H	2- 0	Oi													--	--	--		--
93P3372S	0- 4	A	65.8	25.4	8.8	26.2		20.2	5.2	3.8	3.2	1.0	0.5	0.3	--	3	--	8	3
93P3373S	4- 30	Bo1	66.5	25.0	8.5	24.9		20.4	4.6	4.4	3.0	0.8	0.2	0.1	--	--	--	4	--
93P3374S	30- 52	Bo2	69.6	25.9	4.5	25.3		22.7	3.2	2.5	1.5	0.4	0.1	TR	--	--	--	2	--
93P3375S	52-150	Bo3	74.0	22.9	3.1	24.8		20.1	2.8	1.9	1.0	0.2	TR	--	--	--	--	1	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A5 <- - G/CC	1/3 BAR 4A1d - -	COLE OVEN DRY 4A1h - ->	WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
2- 0	52.9	2.369																	69.5	
0- 4	4.71	0.501			5.7	0.9	0.1	0.28	0.48			0.87	1.22	0.118			54.5	31.3	0.20
4- 30	3.19	0.368			5.6	0.9	0.1	0.21	0.46			0.98	1.31	0.102			50.2	30.7	0.19
30- 52	1.28	0.183			6.1	0.9	0.1	0.15	0.47			1.05	1.27	0.065			47.1	32.4	0.15
52-150	0.72	0.138			5.9	0.9	TR	0.13	0.44			1.10						32.5	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR (- - - -CEC - - -) ITY 6H5a	AL 6G9c	SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
2- 0	70.4	40.1	2.9	2.9	116.3	67.5		183.8	114.4			63	100					
0- 4	0.8	9.0	0.5	0.2	10.5	24.5	4.3	35.0	18.7	14.8	29	30	56				4.0	4.0
4- 30	0.4	8.5	0.4	TR	9.3	21.1	3.7	30.4	13.8	13.0	28	31	67				4.1	4.3
30- 52	0.4	8.5	0.5	0.1	9.5	14.9	1.7	24.4	10.5	11.2	15	39	90				4.4	5.0
52-150	0.5	8.9	0.4	TR	9.8	12.5	1.1	22.3	9.3	10.9	10	44	100				4.5	5.2

| SAMPLE NUMBER | FRACT ION | < - - - - - - - - - - - - - - -

Narrative Pedon Description

The Zarzal series consists of very deep, moderately well drained, moderately slowly permeable soils on mountainsides in uplands. These soils formed in residuum from sandstone volcaniclastics on the LTER Grid. Areas of this series occupy 10.76 ha, or 67.25 percent of the LTER Grid. Slopes range from 3 to 60 percent. The mean annual precipitation is about 3,500 mm, and the mean annual temperature is about 22 degrees C. The soils were classified as very-fine, kaolinitic, isohyperthermic Typic Kandiudox. The revised classification, as of April 01, 2001, is very-fine, kaolinitic, isohyperthermic Humic Eutrudox.

Zarzal soils commonly are associated with small areas of Cristal and Prieto soils that are in landform positions similar to those of the Zarzal soils.

Typical pedon of Zarzal clay from an area of map unit 1C2—Zarzal clay, 3 to 15 percent slopes, very bouldery; site identification S93PR-119-016; Major Land Resource Area 270; Río Grande Municipio, Puerto Rico; 200 cm south and 100 cm east of 11.23.12 (443 m north and 201 m east of 01.01.11) on the Luquillo LTER Grid; Caribbean National Forest; 18 degrees 19 minutes 40.8 seconds north, 65 degrees 48 minutes 55 seconds west; UTM Zone 20: 202,384.4 m easting and 2,028,637 m northing. This pedon was described by H.R. Mount and B.C. Dubee on February 26, 1993.

Oi—2 to 0 cm; dark brown (7.5YR 3/2) fibric material; loose; 95 percent fiber unrubbed, 80 percent rubbed; abrupt smooth boundary.

A—0 to 4 cm; brown (7.5YR 4/4) clay; moderate medium subangular blocky structure; friable; many very fine and fine, common medium, and common coarse roots throughout; estimated bulk density of 1.1 g cm^{-3}; clear smooth boundary.

Bo1—4 to 30 cm; strong brown (7.5YR 5/6) clay; moderate and strong medium subangular blocky structure; friable; common very fine and fine and few medium roots throughout; estimated bulk density of 1.1 g cm^{-3}; few faint strong brown (7.5YR 5/8) clay films on faces of peds; many coarse black (10YR 2/1) wormcasts throughout; clear smooth boundary.

Bo2—30 to 52 cm; strong brown (7.5YR 5/6) clay; many medium distinct red (2.5YR 4/6) iron masses; moderate and strong medium subangular blocky structure; friable; few fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; many coarse brown (7.5YR 4/4) wormcasts throughout; common fine irregular black (10YR 2/1) soft masses of iron-manganese throughout; clear smooth boundary.

Bo3—52 to 150 cm; strong brown (7.5YR 5/6) clay; many medium distinct red (2.5YR 4/6) iron masses and common fine distinct light gray (10YR 7/1) iron depletions; moderate medium subangular blocky structure; friable; few fine roots throughout; estimated bulk density of 1.1 g cm^{-3}; common fine irregular black (10YR 2/1) soft masses of iron-manganese throughout.

The thickness of the solum and the depth to bedrock are more than 150 cm. The content of rock fragments ranges 0 to 15 percent in the solum. Reaction is

slightly acid or moderately acid in the A horizon and strongly acid to very strongly acid in the B horizon.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. It is mucky clay or clay.

The Bo horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. It is clay.

The Bw horizon, where present, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. It is clay. Because of poor dispersion, the measured content of clay ranges from 25 to 45 percent.

The Cr horizon, where present, is weathered sandstone materials with igneous pebbles.

Part 3: Other Humid Areas

This section presents data and descriptions for 87 additional soils of the humid zones of Puerto Rico. In order of frequency, the soil orders that were sampled include Oxisols, Ultisols, Mollisols, Inceptisols, Alfisols, Histosols, Vertisols, and Spodosols.

Data are arranged by municipio. The number of pedons for each municipio is as follows:

Municipio	Number of pedons	Municipio	Number of pedons
Adjuntas	2	Maricao	2
Aguadilla	3	Mayagüez	6
Aibonito	1	Moca	2
Añasco	7	Morovis	2
Arecibo	8	Naranjito	2
Barranquitas	2	Patillas	1
Cabo Rojo	2	Río Grande	4
Camuy	1	San Germán	5
Corozal	1	San Juan	2
Gurabo	2	Toa Alta	1
Hormigueros	2	Toa Baja	1
Humacao	3	Utuado	3
Isabela	3	Vega Alta	2
Las Piedras	1	Vega Baja	4
Luquillo	1	Yabucoa	10
Manati	1		

Adjuntas Municipio

Rio Lajas: S73PR-001-005

Primary Characterization Data

Adjuntas Municipio, Puerto Rico

Sampled as: Rio Lajas

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1265, Samples 40A 9627–9634

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002	-2-- SILT .002 -.05	-3-- SAND .05 -2	-4-- FINE LT .0002	-5-- CO3 LT .002	-6-- FINE .002 -.02	-7-- COARSE .02 -.05	-8-- VF .05 -.10	-9-- F .10 -.25	-10- M .25 -.50	-11- C .5 -1	-12- VC 1 -2	-13- 2 -5	-14- 5 -20	-15- 20 -75	-16- .1- 75	-17- % OF WHOLE SOIL
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)					
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->					
40A9627S	0- 28	Ap	1.2	6.8	92.0	--		4.4	2.4	3.5	24.0	43.7	20.7	0.1	--	--	--	88	--
40A9628S	28- 43	A12	1.6	8.8	89.6			5.6	3.2	4.1	25.8	41.9	17.7	0.1	--	--	--	85	--
40A9629S	43- 66	A13	1.6	9.5	88.9	0.4		6.0	3.5	3.7	26.6	42.0	16.5	0.1	--	--	--	85	--
40A9630S	66- 92	B21t	6.0	9.1	84.9	2.8		5.6	3.5	3.9	26.3	39.0	15.7	--	--	--	--	81	--
40A9631S	92-124	B22t	10.0	8.6	81.4	4.8		5.6	3.0	5.3	27.7	36.1	12.3	--	--	--	--	76	--
40A9632S	124-163	B23t	9.6	9.8	80.6	5.6		6.4	3.4	4.6	28.8	34.9	12.3	--	--	--	--	76	--
40A9633S	163-195	B24t	15.2	14.4	70.4	13.6		10.8	3.6	4.1	22.4	32.2	11.6	0.1	--	--	--	66	--
40A9634S	195-220	B25t	20.1	9.9	70.0	13.7		6.8	3.1	4.3	22.8	31.9	10.9	0.1	--	--	--	66	--

DEPTH (CM)	C 6A1c PCT	N 6B3a <2MM	P 6S3 PPM	S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	- LIMITS - LL 4F1 PCT	PI 4F <0.4MM	FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - - ->	WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WHOLE SOIL 4C1 CM/CM
0- 28	0.16				0.6	TR			1.67					1.51			1.4		2.0	
28- 43	0.15				0.6	TR			1.13					1.57			3.8		1.8	
43- 66	0.17				0.6	TR			1.13					1.56			3.7		1.8	
66- 92	0.05				0.8	0.1			0.47					1.59			4.3		2.8	
92-124	0.11				0.9	0.1			0.36					1.60			6.1		3.6	
124-163	0.09				1.0	0.1			0.42					1.67			6.0		4.0	
163-195	0.11				1.4	0.1		0.42	0.47					1.82			12.6		7.2	
195-200					1.6	0.1		0.31	0.36										7.3	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - -> <- - - - -PCT - - - ->																	1:2	1:1
0- 28	1.0	0.4	0.1	0.8	2.3	--		2.3				100					5.7	5.7	6.5
28- 43	0.7	0.2	0.1	1.1	2.1	--		2.1				100					5.3	5.8	6.6
43- 66	0.8	0.2	0.1	1.0	2.1	--		2.1				100					5.1	5.1	6.3
66- 92	1.1	0.4	0.1	0.4	2.0	--		2.0				100					5.2	5.5	6.5
92-124	1.6	0.6	0.1	0.4	2.7	--		2.7				100					5.6	6.0	7.3
124-163	9.8	0.8	0.1	0.3	11.0	--		11.0				100					7.2	7.3	8.2
163-195	4.9	0.8	0.1	0.6	6.4	--		6.4	6.4			100	100				6.4	6.9	7.8
195-200									6.3								6.0	6.4	7.4

Narrative Pedon Description

Pedon: Rio Lajas
NSSL pedon number: 40A1265
Pedon ID: S73PR-001-005
Series classification: Mixed, isohyperthermic Psammentic Paleudalfs
Revised classification as of March 01, 2001: Mixed, isohyperthermic Psammentic Paleudalfs
Pedon purpose: Full pedon description
Location: Camuy Municipio, Puerto Rico; Atlantico Soil Conservation District; Arecibo Soil Survey Area; 0.8 km west of the municipal cemetery
Latitude: Unknown
Longitude: Unknown
Geomorphic setting: Hill in a valley
Elevation: 25 meters
Slope: 3 percent
Drainage: Somewhat poorly drained
Vegetation: Redtop and dropseed
Particle-size control section: 66 to 100 cm
Described and sampled by: L.H. Rivera on November 8, 1973
Notes: The B22t horizon ranges from 30 to 50 cm in thickness. Where the upper boundary of the B22t horizon is in contact with the A13 horizon, the boundary is abrupt and wavy. There are isolated pockets of material similar to the B21t within the B22t, B23t, and B24t horizons. Dimensions of the pockets range from 13 by 20 cm to 50 by 20 cm. The pockets occupy about 10 percent of the 3 horizons and might be a result of disturbances.

Ap—0 to 28 cm; dark reddish brown (5YR 3/3) sand; single grain; loose, nonsticky, nonplastic; many fine roots; slightly acid; clear smooth boundary. 40A9627

A12—28 to 43 cm; dark reddish brown (5YR 3/4) sand; single grain; loose, nonsticky, nonplastic; common fine roots; slightly acid; gradual smooth boundary. 40A9628

A13—43 to 66 cm; dark reddish brown (5YR 3/4) sand; 4 to 14 inch in thickness, thickest where upper boundary of the B2t horizon is concave; single grain; loose, nonsticky, nonplastic; common fine roots; areas of lamellae about 2 to 6 cm apart and 5 mm thick; lamellae are wavy and have the same color and texture as the B2t horizon; slightly acid; clear wavy boundary. 40A9629

B21t—66 to 92 cm; dark reddish brown (2.5YR 3/4) sandy loam; continuous through 80 percent of pedon, ranging from 0 to 11 inches in thickness; single grain; friable, hard when dry, nonsticky, nonplastic; few fine roots; neutral; gradual wavy boundary. 40A9630

B22t—92 to 124 cm; dark red (2.5YR 3/6) sandy loam; massive; friable, hard when dry, slightly sticky, nonplastic; few fine roots; neutral; gradual wavy boundary. 40A9631

B23t—124 to 163 cm; dark red (2.5YR 3/6) and red (2.5YR 4/6) sandy loam; massive; friable, hard when dry, slightly sticky, nonplastic; few fine roots; neutral; gradual wavy boundary. 40A9632

B24t—163 to 195 cm; red (2.5YR 4/6) and dark red (2.5YR 3/6) sandy clay; weak medium subangular blocky structure; friable, hard when dry, slightly sticky, slightly plastic; strong effervescence. 40A9633

B25t—195 to 200 cm; dark red (2.5YR 3/6) and red (2.5YR 4/6) sandy clay; weak medium subangular blocky structure; friable, hard when dry, slightly sticky, slightly plastic; strong effervescence. 40A9634

Alonso: S73PR-001-001

Primary Characterization Data

Adjuntas Municipio, Puerto Rico

Sampled as: Alonso

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1261, Samples 40A 9601–9607

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND -2	FINE .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .02	COARSE .05	(- - - - - -SAND- - - - - -) VF .10	F .25	M .5	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				
40A9601S	0- 15	AP	70.8	22.3	6.9	27.6		18.2	4.1	2.3	1.7	0.9	1.0	1.0	--	--	--	5	--
40A9602S	15- 41	Bt1	75.5	19.7	4.8	31.1		15.8	3.9	2.0	1.4	0.6	0.6	0.2	--	--	--	3	--
40A9603S	41- 64	Bt2	70.2	25.4	4.4	28.0		20.6	4.8	2.1	1.2	0.4	0.4	0.3	--	--	--	2	--
40A9604S	64- 81	Bt3	74.0	20.5	5.5	31.1		16.7	3.8	2.1	1.7	0.7	0.7	0.3	--	--	--	3	--
40A9605S	81-119	Bt4	55.5	36.0	8.5	16.8		25.1	10.9	5.5	2.3	0.4	0.2	0.1	--	--	--	3	--
40A9606S	114-135	BC	67.0	27.9	5.1	23.2		21.0	6.9	2.8	1.2	0.4	0.4	0.3	--	--	--	2	--
40A9607S	135-152	C	33.2	41.1	25.7	8.6		25.8	15.3	13.5	8.6	1.9	1.4	0.3	--	--	--	12	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	COLE OVEN DRY 4A1h	WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
										PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	3.29				8.9	0.8		0.28	0.40				1.64	1.72	--			12.0	28.4	
15- 41	1.10				9.1	0.8		0.20	0.40				1.46	1.66	--			27.0	30.4	
41- 64	0.71				8.3	0.8		0.19	0.42				1.60	1.74	--			22.0	29.7	
64- 81	1.31				8.9	0.8		0.19	0.40				1.59	1.75	--			22.2	29.6	
81-119	0.35				9.0	0.8		0.28	0.57	68	23		1.57	1.77	--			23.4	31.4	
114-135	0.41				8.7	0.7		0.20	0.44				1.71	1.85	--			19.0	29.3	
135-152	0.16				6.2	0.8		0.45	0.83				1.73	1.87	--			17.8	27.5	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	(- - - -PH - - -) SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G					- - - - - - - - - ->				PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 15	2.1	0.4	0.1	0.8	3.4	27.5	5.7	30.9	19.5	1		11	17						3.6	3.6
15- 41	0.1	0.2	0.1	0.2	0.6	18.0	5.5	18.6	14.8	1		3	4						3.6	4.1
41- 64	0.8	0.3	TR	0.2	1.3	16.6	5.8	17.9	13.3	TR		7	10						3.1	3.6
64- 81	0.9	0.2	TR	0.3	1.4	20.0	6.3	21.4	14.1	TR		7	10						3.8	3.8
81-119	0.4	0.6	0.1	0.3	1.4	18.7	7.3	20.1	15.4	1	1	7	9					4.6	4.0	4.4
114-135	0.6	0.6	0.1	0.2	1.5	16.2	6.2	17.7	13.7	1	3	8	11						4.0	4.3

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - -MEQ / LITER											- - - - - - - - - - ->	<- -PCT- ->		
0- 15															
15- 41															
41- 64															
64- 81															
81- 119	0.8	0.3	0.5	TR	--	--		--	0.5		1.9	76.1	TR	0.2	
114- 135	33.3	12.7	14.8	0.2	--	--		18.6	40.8		6.2	630.0	2.1	4.5	
135- 152															

Narrative Pedon Description
Pedon: Alonso
NSSL pedon number: 40A1261
Pedon ID: S73PR-001-001
Field classification: None given
Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Oxic Dystrudepts
Location: Adjuntas Municipio, Puerto Rico; Sur Soil Conservation District, Puerto Rico; 15 meters east of kilometer marker 67.0 on Highway 135
Latitude: Unknown
Longitude: Unknown
Slope: 48 percent
Average air temperature: Annual—24.4 °C
Average annual precipitation: 2,159 mm
Drainage: Well drained
Geographically associated soils: Consumo, Daguey, Humatas, and Morado
Vegetation: Coffee plantation
Particle-size control section: 15 to 65 cm
Diagnostic features: Umbric epipedon at 0 to 41 cm; argillic horizon at 15 to 119 cm
Described and sampled by: L.H. Rivera and F. Beinroth on June 1, 1973

Ap—0 to 15 cm; very dark grayish brown (10YR 3/2) clay; weak medium subangular blocky structure parting to granular; firm, slightly sticky, moderately plastic; many fine roots; very strongly acid; clear smooth boundary. 40A9601

Bt1—15 to 41 cm; very dark grayish brown (10YR 3/2) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; many fine roots; 10 percent faint clay films; very strongly acid; clear wavy boundary. 40A9602

Bt2—41 to 64 cm; dark reddish brown (2.5YR 3/4) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; 75 percent faint clay films; very strongly acid; clear wavy boundary. 40A9603

Bt3—64 to 81 cm; dark reddish brown (2.5YR 3/4) clay; moderate fine subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; 10 percent faint clay films; very strongly acid; clear wavy boundary. 40A9604

Bt4—81 to 119 cm; dark reddish brown (5YR 3/3) clay; 3 percent medium distinct dark red (2.5YR 3/6) redoximorphic features; weak fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; 10 percent faint clay films; very strongly acid; clear wavy boundary. 40A9605

BC—114 to 135 cm; dark red (2.5YR 3/6) and dark reddish brown (5YR 3/3) clay; weak fine subangular blocky structure; friable, slightly sticky, moderately plastic; 15 percent saprolite; very strongly acid; gradual wavy boundary. 40A9606

C—135 to 152 cm; very dark gray (5YR 3/1) and white (5YR 8/1) clay; reddish brown (5YR 4/3) and red (2.5YR 4/6) redoximorphic features; massive; friable, slightly sticky, moderately plastic; 90 percent saprolite; very strongly acid. 40A9607

Aguadilla Municipio

Matanzas: S61PR-005-001

Primary Characterization Data

Aguadilla Municipio, Puerto Rico

Sampled as: Matanzas; clayey, oxidic, isohyperthermic Tropeptic Eutrorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 590, Samples 40A 4311–4313

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- COARSE FRACS (MM) WEIGHT 5 -20	-15- COARSE FRACS (MM) WEIGHT 20 -75	-16- COARSE FRACS (MM) WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
40A4311S	0- 36	A1	51.5	36.3	12.2			28.3	8.0	3.2	4.2	2.1	2.4	0.3	--C	--C	--	9	--
40A4312S	36- 69	B21	83.0	13.2	3.8			11.4	1.8	1.5	1.5	0.5	0.3	--	--C	--C	--	2	--
40A4313S	69- 99	B22	87.0	9.8	3.2			8.3	1.5	1.2	1.3	0.6	0.1	--	--C	--C	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	EXTR TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM -->	EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 36	2.84	0.292			10.6			0.29	0.51			1.28		1.42		31.5			26.2	
36- 69	1.03	0.155			11.5			0.10	0.33			1.26		1.34		30.6			27.3	
69- 99	0.55	0.133			11.1			0.08	0.32			1.20		1.26		31.2			28.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1d	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 36		1.2	0.1	0.2		4.3			14.9				10	1					7.4
36- 69		0.4	TR	0.1	0.5	4.3		4.8	8.4			10	6	TR					7.5
69- 99	8.2	--	--	--	8.2	4.8		13.0	7.1			63	100	--					7.4

Narrative Pedon Description

Pedon: Matanzas

NSSL pedon number: 40A0590

Pedon ID: S61PR-005-001

SSIR #12 pedon ID: S61PR-6-2

Field classification: Clayey, oxidic, isohyperthermic Tropeptic Eutrorthox

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Lithic Eutrudox

Location: Aguadilla Municipio; Noreste Soil Conservation District, Puerto Rico; roadbank on south side of Highway 2 and 50 steps east of kilometer marker 125.0

Latitude: Unknown

Longitude: Unknown

Parent material: Fine-textured sediments derived from limestone

Particle-size control section: 25 to 100 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, and G.D. Smith on March 15, 1961

Notes: Carbonates occur at depths ranging from 30 cm to greater than 183 cm within a 30-meter stretch of road bank. The most common depth is 91 cm. Morphology of the A1 horizon is similar to comparable depth in pedons S59PR-10-4 and S59PR-10-6 in the Barranquitas Soil Study Area. The B21 horizon is more sticky than in the Catalina soil in the Barranquitas Soil Study Area. Fine granules in channels are similar to those observed in pedons S59PR-10-4 and S59PR-10-6 in the Barranquitas Soil Study Area.

A1—0 to 36 cm; dark reddish brown (2.5YR 3/4) clay; moderate fine subangular blocky structure; firm; 30 percent pressure faces; small pieces fail abruptly; abrupt boundary. 40A4311

B21—36 to 69 cm; dusky red (10R 3/4) clay; weak medium subangular blocky structure parting to moderate very fine and fine granular; friable, slightly sticky, moderately plastic; many medium pores; 10 percent pressure faces. 40A4312

B22—69 to 99 cm; dark red (2.5YR 3/6) silty clay; weak coarse subangular blocky structure parting to moderate very fine granular; friable, slightly sticky; small pieces fail abruptly; very scarce to no clay films; abrupt boundary. 40A4313

Jobos-like: S87PR-007-001

Primary Characterization Data

Aguadilla Municipio, Puerto Rico

Sampled as: Jobos-like; fine, kaolinitic, isohyperthermic Aquic Paleudalfs

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 292, Samples 87P 1448–1457

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS WEIGHT 2 -5	5 -20	20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
87P1448S	0- 15	Ap1	6.0	4.4	89.6	3.9		1.7	2.7	9.9	54.1	24.1	1.4	0.1	TR	--	--	80	TR
87P1449S	15- 26	Ap2	12.2	5.3	82.5	9.0		2.2	3.1	14.0	47.2	19.6	1.5	0.2	TR	TR	--	68	TR
87P1450S	26- 59	Bt1	53.4	6.1	40.5	42.4		2.6	3.5	5.0	22.7	11.8	1.0	--	TR	--	--	35	--
87P1451S	59- 83	Bt2	51.0	5.9	43.1	43.0		4.0	1.9	4.5	24.0	13.2	1.2	0.2	TR	--	--	39	--
87P1452S	83-127	Bt3	47.3	6.1	46.6	39.4		3.9	2.2	8.7	22.7	13.9	1.3	--	TR	--	--	38	TR
87P1453S	127-153	Bt4	45.9	7.4	46.7	37.8		4.7	2.7	5.1	26.5	14.0	1.1	--	--	--	--	42	--
87P1454S	153-200	Bt5	33.6	5.7	60.7	29.9		3.2	2.5	6.4	34.3	18.2	1.8	--	--	--	--	54	--
87P1455S	200-220	Bw1	37.1	6.3	56.6			3.4	2.9	5.7	31.4	17.6	1.9	--	TR	--	--	51	--
87P1456S	220-250	Bw2	40.0	11.3	48.7			6.8	4.5	6.6	26.5	13.6	1.8	0.2	TR	TR	--	42	--
87P1457S	80-110	BtS SAT	19.3	7.2	73.5	17.1		4.6	2.6	9.0	44.0	18.9	1.3	0.3	1	TR	--	65	1

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 15	0.86	0.067			0.5	0.1	--	0.37	0.45				1.43	1.45	0.005			6.1	2.7	0.05
15- 26	0.66	0.057			0.9	0.1	--	0.27	0.33				1.51	1.52	0.002			4.4	4.0	0.01
26- 59	0.24	0.031			3.7	0.4	--	0.18	0.31	49	32		1.65	1.77	0.024			21.0	16.7	0.07
59- 83	0.14	0.021			3.1	0.3	--	0.19	0.30				1.81	1.89	0.015			15.3	15.3	
83-127	0.10				3.2	0.3	--	0.19	0.32				1.65	1.86	0.041			21.6	15.2	0.11
127-153	0.01				3.3	0.2	--	0.20	0.33				1.82	1.95	0.023			15.5	15.2	0.01
153-200	0.03				1.5	0.1	--	0.22	0.34	33	22		1.81	1.90	0.016			15.5	11.4	0.07
200-220	0.03				3.0	0.2	--	0.22	0.36										13.2	
220-250	0.06				11.3	0.5	TR	0.17	0.39										15.6	
80-110	0.08				1.3	0.1	--	0.20	0.36				1.88	1.92	0.007			9.9	7.0	0.05

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->					1:2	1:1
0- 15	1.0	0.3	0.1	TR	1.4	4.1	0.3	5.5	2.2	1.7	18	25	64				3.9	4.1	4.6
15- 26	0.8	0.3	--	--	1.1	5.1	0.9	6.2	3.3	2.0	45	18	33				3.7	4.0	4.6
26- 59	3.6	1.2	0.1	--	4.9	10.1	2.7	15.0	9.7	7.6	36	33	51				3.6	4.1	4.7
59- 83	5.6	2.1	0.1	TR	7.8	7.2	1.1	15.0	9.6	8.9	12	52	81				3.7	4.3	4.8
83-127	5.2	3.2	0.2	--	8.6	6.3	0.4	14.9	9.2	9.0	4	58	93				3.9	4.4	4.9
127-153	4.4	4.2	0.2	TR	8.8	4.8	0.1	13.6	9.4	8.9	1	65	94				3.9	4.4	5.0
153-200	3.2	3.5	0.2	TR	6.9	3.3	--	10.2	7.4			68	93				4.0	4.6	5.2
200-220	3.6	3.9	0.3	TR	7.8	5.1	--	12.9	8.1			60	96				4.3	4.8	5.5
220-250	3.1	3.2	0.2	TR	6.5	4.3	--	10.8	6.8			60	96				4.8	5.1	5.6
80-110	2.1	1.4	0.1	--	3.6	2.6	--	6.2	3.8			58	95				4.1	4.5	5.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)			THERMAL DSC 7A6 (Percent)		THERMAL TGA 7A4b (Percent)		ELEMENTAL 7C3 (Percent) SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
87P1450	TCLY	KK 5	GE 2	MI 1	KK75	GI 1	KK54	GI 2			9.9			0.8			
87P1451	TCLY	KK 5	GE 2	MI 1	KK79	GI 1					7.6			0.7			
87P1454	TCLY	KK 5	MI 1	GE 1	KK73	GItr					6.0			0.7			

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           < - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                       ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - - 7A2i - - - - -><  - 7A3b - -><  - 7A4b - -><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
87P1450     FS                                                   100  QZ94  FE 6  FK 1  MGtr
87P1454     FS                                                    97  QZ97  FK 3  FEtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            FS    Fine Sand, 0.1-0.25mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         MI  mica             GI  gibbsite         QZ  quartz           FE  iron oxides
    FK  potas feldsp     MG  magnetite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Jobos-like

NSSL pedon number: 87P0292

Pedon ID: S87PR-007-001

Field classification: Fine, kaolinitic, isohyperthermic Aquic Paleudalfs

Revised classification as of March 01, 2001: Fine, kaolinitic, isohyperthermic Plinthaquic Paleudalfs

Location: Aguadilla Municipio, Puerto Rico; Noroeste Soil and Water Conservation District; 2.7 km northeast on Highway 459 from junction with Highway 110, about 0.7 km north on paved road, and 61 meters east in a pasture

Latitude: 18°30’07" north

Longitude: 67°04’52" west

Elevation: 71 meters

Physiography: Hillside or mountainside on coastal plains

Geomorphic position: On middle third of component

Slope: 3 percent with a convex east aspect

Average annual precipitation: 1,400 mm; udic moisture regime

Major Land Resource Area: 272—Humid Coastal Plains

Average air temperature: Annual—25 °C; summer—27 °C; winter—24 °C

Average soil temperature: Annual—28 °C; summer—30 °C; winter—27 °C

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and moderately slow permeability

Vegetation: Guineagrass in pastureland

Erosion: Slight

Particle-size control section: 26 to 76 cm

Parent material: Residuum from limestone-sandstone material

Diagnostic features: Ochric epipedon at 0 to 26 cm; argillic horizon at 26 to 127 cm

Described and sampled by: D. Williams, W. Lynn, and G. Acevedo during April 1987

Notes: Soil matrix colors are for moist interior peds.

Ap1—0 to 15 cm; brown to dark brown (10YR 4/3) loamy sand; moderate fine granular structure; loose, very friable, nonsticky, nonplastic; many fine roots throughout; strongly acid; abrupt smooth boundary. 87P1448

Ap2—15 to 26 cm; dark brown (10YR 3/3) sandy loam; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; many fine roots throughout; few medium rounded ironstone nodules; very strongly acid; clear wavy boundary. 87P1449

Bt1—26 to 59 cm; strong brown (7.5YR 5/6) clay; many medium distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate fine subangular blocky; very hard, very firm, sticky, plastic; common fine roots between peds; few fine tubular pores; common continuous prominent clay films on vertical and horizontal faces of peds; few fine rounded plinthite segregations; very strongly acid; gradual wavy boundary. 87P1450

Bt2—59 to 83 cm; strong brown (7.5YR 5/6) clay; common medium distinct redoximorphic features; moderate coarse prismatic structure parting to moderate medium subangular blocky; very hard, very firm, sticky, plastic; few fine roots between peds; few fine tubular pores; common continuous prominent clay films on vertical and horizontal faces of peds; few medium rounded ironstone nodules and few fine rounded plinthite segregations; reddish clay films in pores of white redoximorphic features; very strongly acid; gradual wavy boundary. 87P1451

Bt3—83 to 127 cm; strong brown (7.5YR 5/8) clay; many coarse distinct and common medium distinct redoximorphic features; moderate coarse prismatic structure parting to moderate medium subangular blocky; very hard, very firm, sticky, plastic; few fine roots between peds; few fine tubular pores; common continuous prominent clay films on horizontal faces of peds; very strongly acid; gradual wavy boundary. 87P1452

Bt4—127 to 153 cm; strong brown (7.5YR 5/8) clay loam; common coarse distinct and few medium distinct redoximorphic features; weak coarse prismatic structure; very hard, friable, sticky, plastic; few fine tubular pores; common distinct clay films on horizontal faces of peds and common distinct organic coatings on horizontal faces of peds; very strongly acid; gradual wavy boundary. 87P1453

Bt5—153 to 200 cm; 60 percent strong brown (7.5YR 5/8) and 40 percent white (10YR 8/1) clay loam; few medium distinct redoximorphic features; weak coarse prismatic structure; very hard, friable, sticky, plastic; few fine tubular pores; common distinct organic coatings on horizontal faces of peds; very strongly acid; gradual smooth boundary. 87P1454

Bw1—200 to 220 cm; 60 percent white (10YR 8/1) and 40 percent strong brown (7.5YR 5/8) sandy clay loam; few fine distinct redoximorphic features; weak coarse prismatic structure; very hard, friable, sticky, plastic; strongly acid; gradual wavy boundary. 87P1455

Bw2—220 to 250 cm; strong brown (7.5YR 5/8) sandy clay loam; common fine distinct redoximorphic features; massive; very hard, friable, sticky, plastic; strongly acid. 87P1456

Bw—80 to 110 cm; subsample; strong brown (7.5YR 5/8) sandy loam occurring as pockets in the Bt horizon; common medium distinct redoximorphic features; moderate coarse prismatic structure; very hard, friable, slightly sticky, slightly plastic; few fine roots throughout; common fine tubular pores; common continuous distinct clay films on horizontal faces of peds; very strongly acid; clear smooth boundary. 87P1457

Matanzas: S87PR-007-002

Primary Characterization Data

Aguadilla Municipio, Puerto Rico

Sampled as: Matanzas; clayey, oxidic, isohyperthermic Tropeptic Eutrorthox

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 293, Samples 87P 1458–1462

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.05	TOTAL SAND -2	TOTAL FINE .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS (MM) 2-5	COARSE FRACS (MM) 5-20	COARSE FRACS (MM) .1-75	COARSE FRACS (MM) 75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
87P1458S	0- 10	Ap	68.0	9.8	22.2	41.0		5.6	4.2	3.9	10.9	6.0	1.2	0.2	TR	TR	--	18	TR
87P1459S	10- 34	Bo1	68.2	12.0	19.8	35.3		8.5	3.5	3.4	9.7	5.7	1.0	--	--	--	--	16	--
87P1460S	34- 63	Bo2	73.6	9.8	16.6	47.0		5.7	4.1	3.2	8.5	4.2	0.7	--	--	--	--	13	--
87P1461S	63-105	Bo3	84.0	4.4	11.6	53.4		1.8	2.6	2.3	5.7	2.9	0.7	--	--	--	--	9	--
87P1462S	105-140	Bo4	83.8	4.3	11.9	53.7		1.7	2.6	2.3	6.1	2.9	0.6	--	--	--	--	10	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM	EXTRACTABLE MN 6D2a -->	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <-	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 10	2.90	0.361			8.2	0.7	0.2	0.31	0.33				1.26	1.49	0.057			31.5	22.3	0.12
10- 34	1.21	0.205			8.3	0.7	0.2	0.18	0.31				1.37	1.52	0.035			28.2	21.4	0.09
34- 63	0.78	0.166			8.4	0.7	0.1	0.13	0.30	46	22		1.28	1.38	0.025			28.5	22.3	0.08
63-105	0.49	0.152			8.6	0.7	0.1	0.11	0.28				1.28	1.36	0.020			30.0	23.6	0.08
105-140	0.40				9.6	0.7	TR	0.11	0.28	48	22		1.34	1.46	0.029			30.2	23.3	0.09

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 10	19.5	2.7	TR	0.9	23.1	6.4		29.5	21.0			78	100	--			6.4	6.8	7.2
10- 34	11.0	1.5	--	0.3	12.8	5.5		18.3	12.1			70	100	TR			6.5	6.9	7.4
34- 63	9.0	1.6	--	0.2	10.8	5.7		16.5	9.6			65	100	--			6.4	6.8	7.3
63-105	7.0	1.6	--	TR	8.6	5.6		14.2	9.0			61	96	--			6.3	6.6	7.0
105-140	7.9	1.3	--	--	9.2	5.2		14.4	9.4			64	98	TR			6.3	6.7	7.2

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size	X-RAY 7A6 peak size	X-RAY 7A4b peak size	THERMAL DSC Percent	THERMAL TGA Percent	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTER PRETA TION
		< - - - - - - 7A2i - - - - - ->	< - 7A6 - >	< - 7A4b - >	< - - - - - - - - - - Percent - - - ->	< - - - - - - - - - - Percent - - - - - - - ->				7C3					
87P1459	TCLY	KK 3	GE 2	HE 2	VR 1	KK69	GI 1	KK50	GI 3			15.7		0.4	
87P1460	TCLY	KK 3	GE 2	HE 2	VR 1	KK73	GI 2					15.7		0.4	
87P1462	TCLY	KK 4	VM 1	GE 1		KK76	GI 1					15.7		0.4	

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i Peak Size	THERMAL DTA	THERMAL TGA	TOT RE Percent	OPTICAL GRAIN COUNT 7B1a	OPTICAL Percent	INTER PRETA TION
87P1460	FS				99	QZ95 FE 3 EP 1 MG 1		

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm FS Fine Sand, 0.1-0.25mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite VR vermiculite GI gibbsite QZ quartz
FE iron oxides EP epidote MG magnetite VM vermici-mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Matanzas

NSSL pedon number: 87P0293

Pedon ID: S87PR-007-002

Field classification: Clayey, oxidic, isohyperthermic Tropeptic Eutrorthox

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Rhodic Eutrudox

Location: Aguadilla Municipio, Puerto Rico; Noroeste Soil and Water Conservation District; 0.8 km north of Highway 107 from junction with Highway 458, about 1.1 km west of paved road, and 30.5 meters east in a pasture

Latitude: 18°27’58" north

Longitude: 67°09’48" west

Elevation: 38 meters

Physiography: Mountain valleys or canyons

Geomorphic position: Toeslope of a side slope; on middle third of component

Slope: 3 percent with a plane west aspect

Major Land Resource Area: 272—Humid Coastal Plains

Average air temperature: Annual—25 °C; summer—27 °C; winter—24 °C

Average soil temperature: Annual—28 °C; summer—30 °C; winter—27 °C

Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability

Vegetation: Guineagrass in pastureland

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Residuum from dolomite material

Diagnostic features: Ochric epipedon at 0 to 10 cm; oxic horizon at 10 to 140 cm; lithic contact at a depth of 140 cm

Described and sampled by: D. Williams, G. Acevedo, and W. Lynn during April 1987

Notes: Soil matrix colors are for moist interior peds.

A—0 to 10 cm; dark reddish brown (2.5YR 3/4) clay; weak fine granular structure; very hard, firm, sticky, plastic; many fine roots throughout; few fine tubular pores; neutral; abrupt smooth boundary. 87P1458

Bo1—10 to 34 cm; dark red (10R 3/6) clay; weak coarse prismatic structure parting to weak fine subangular blocky parting to weak fine granular; very hard, firm, sticky, plastic; common fine roots throughout; few fine tubular pores; many continuous faint coatings on vertical and horizontal faces of peds; very strongly alkaline; clear smooth boundary. 87P1459

Bo2—34 to 63 cm; dark red (10R 3/6) clay; weak coarse prismatic structure parting to weak fine subangular blocky parting to weak fine granular; hard, friable, sticky, plastic; few fine roots throughout; common fine tubular pores; common discontinuous faint coatings on vertical and horizontal faces of peds; mildly alkaline; gradual boundary. 87P1460

Bo3—63 to 105 cm; dark red (10R 3/6) clay; weak fine subangular blocky structure; hard, friable, sticky, plastic; few fine roots throughout; common fine tubular pores; common discontinuous faint coatings on vertical and horizontal faces of peds; mildly alkaline; gradual boundary. 87P1461

Bo4—105 to 140 cm; dark red (10R 3/6) clay; weak fine subangular blocky structure; hard, friable, sticky, plastic; few fine roots throughout; common fine tubular pores; common discontinuous faint coatings on vertical and horizontal faces of peds; neutral; mildly alkaline (pH 4.); abrupt boundary. 87P1462

R—140 cm; hard limestone bedrock ranging from 82 to 175 cm in thickness. Not sampled.

Coto: S63PR-005-001

Primary Characterization Data

Aguadilla Municipio, Puerto Rico

Sampled as: Coto; clayey, kaolinitic, isohyperthermic Tropeptic Halorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 597, Samples 40A 4377–4384

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4377S	0- 23	Ap		61.1	7.9	31.0			4.4	3.5	7.9	16.6	5.2	1.3	TR	--C	--C	--	23	--
40A4378S	23- 36	B21		66.6	6.0	27.4			3.1	2.9	7.0	14.8	4.7	0.9	TR	--C	--C	--	20	--
40A4379S	36- 48	B22		70.4	5.3	24.3			2.4	2.9	6.1	13.2	3.9	0.9	0.2	--C	--C	--	18	--
40A4380S	48- 66	B23		72.5	5.0	22.5			2.9	2.1	5.8	12.1	3.6	0.9	0.1	--C	--C	--	17	--
40A4381S	66- 94	B24		74.2	5.8	20.0			3.4	2.4	4.8	11.0	3.5	0.7	TR	--C	--C	--	15	--
40A4382S	94-124	B25		69.9	9.3	20.8			6.6	2.7	5.4	11.2	3.3	0.7	0.2	--C	--C	--	15	--
40A4383S	124-178	B26		57.8	13.1	29.1			7.8	5.3	8.4	15.3	4.4	0.9	0.1	--C	--C	--	21	--
40A4384S	178-594	B27		56.1	18.1	25.8			11.0	7.1	9.3	11.7	3.5	1.1	0.2	--C	--C	--	16	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 23	2.75	0.270			7.6			0.19	0.33			1.35	1.38	1.51	--	28.0		26.9	20.0	0.10
23- 36	1.37	0.144			7.5			0.11	0.32			1.40	1.41	1.48	--	26.0		26.7	21.6	0.07
36- 48	0.84	0.129			8.7			0.08	0.33			1.36	1.38	1.44	--	26.7		27.5	23.0	0.06
48- 66	0.57	0.120			9.0			0.08	0.34			1.19	1.21	1.28	--	31.0		35.2	24.7	0.13
66- 94	0.41	0.109			9.5			0.07	0.34			1.17	1.19	1.24	--	32.9		32.7	25.2	0.09
94-124	0.22				9.6			0.07	0.32			1.54	1.53	1.55	--	24.4		25.3	22.6	0.04
124-178	0.17				9.2			0.07	0.35			1.55	1.54	1.56	--	23.5		25.2	20.5	0.07
178-594	0.18				11.8			0.09	0.44										24.7	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- - - - -PCT - - - ->								1:2	1:1
0- 23	3.8	1.8	0.1	0.6	6.3	15.9		22.2	11.6			28	54					4.8		5.5
23- 36	1.2	0.6	0.1	0.4	2.3	15.3	0.8	17.6	7.5	3.1	26	13	31					4.2		4.9
36- 48	0.9	0.6	0.1	0.4	2.0	13.3	0.7	15.3	5.8	2.7	26	13	34					4.3		4.8
48- 66	1.9	0.7	0.1	0.4	3.1	12.0	0.2	15.1	5.6	3.3	6	21	55					4.6		5.0
66- 94	1.7	0.6	0.1	0.3	2.7	10.7	0.1	13.4	5.5	2.8	4	20	49					5.1		5.3
94-124	1.7	0.5	0.1	0.1	2.4	9.8	0.1	12.2	4.6	2.5	4	20	52					5.5		5.3
124-178	1.0	0.6	0.1	0.1	1.8	10.2	0.1	12.0	4.0	1.9	5	15	45					5.2		5.0
178-594	0.4	0.8	TR	0.1	1.3	12.6	0.2	13.9	4.8	1.5	13	9	27					4.6		4.7

Narrative Pedon Description

Pedon: Coto

NSSL pedon number: 40A0597

Pedon ID: S63PR-005-001

SSIR #12 pedon ID: S63PR-6-2

Field classification: Clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Hapludox

Location: Puerto Rico; 11 km east from the town of Aguadilla, 6 km southwest of Isabela, 61 meters south of kilometer marker 120-15 on Highway 2; aerial photograph GS-LR-5-94

Latitude: 18°27’07" north

Longitude: 67°06’57" west

Geomorphic position: Alluvial fan in limestone hills

Slope: 3 percent with an aspect of 0° (north)

Average annual precipitation: 1,270 mm

Drainage: Well drained

Vegetation: Grass and herbaceous cover

Particle-size control section: 25 to 100 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, R.E. Gierbolini, and J. Torres-Mas on September 26, 1963

Notes: The B27 horizon was sampled with an auger. The Ap, B22, and B24 horizons were sampled for the Bureau of Public Roads. The soil was at field capacity when sampled. Reaction was determined by Soiltex. Red redoximorphic concentrations in the B25, B26, and B27 horizons tend to be in horizontal bands.

Ap—0 to 23 cm; brown (7.5YR 4/4) clay; moderate fine subangular blocky structure; firm, hard, slightly sticky, slightly plastic; many fine roots; moderately acid; clear smooth boundary. 40A4377

B21—23 to 36 cm; reddish brown (5YR 4/4) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; discontinuous clay films; 1 percent fine black (10YR 2/1) dark nodules; very strongly acid; clear smooth boundary. 40A4378

B22—36 to 48 cm; yellowish red (5YR 4/6) clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail abruptly upon slight pressure; common fine roots; common fine pores; 10 percent patchy clay films; 1 percent fine black (10YR 2/1) dark nodules; very strongly acid; clear smooth boundary. 40A4379

B23—48 to 66 cm; strong brown (7.5YR 5/8) silty clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail abruptly upon slight pressure; common fine roots; many fine pores; 10 percent patchy clay films; 1 percent fine black (10YR 2/1) dark nodules; very strongly acid; clear smooth boundary. 40A4380

B24—66 to 94 cm; strong brown (7.5YR 5/8) silty clay; weak medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail abruptly upon slight pressure; common fine roots; common fine pores; patchy clay films; 1 percent fine black (10YR 2/1) dark nodules; very strongly acid; clear smooth boundary. 40A4381

B25—94 to 124 cm; strong brown (7.5YR 5/8) clay loam; 1 percent fine distinct red (2.5YR 4/8) redoximorphic features; weak medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; 10 percent clay films; many fine quartz grains; very strongly acid; gradual smooth boundary. 40A4382

B26—124 to 178 cm; strong brown (7.5YR 5/8) clay loam; 3 percent fine and medium distinct red (5R 4/8) redoximorphic features; weak medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; 10 percent patchy clay films; many fine quartz grains; very strongly acid. 40A4383

B27—178 to 107 cm; auger sample of strong brown (7.5YR 5/8) clay loam; 3 percent medium distinct red (7.5R 4/8) redoximorphic features; massive; slightly sticky, slightly plastic; very strongly acid. 40A4384

Aibonito Municipio

Aibonito: S59PR-009-001

Primary Characterization Data

Aibonito Municipio, Puerto Rico

Sampled as: Aibonito; clayey, mixed, isohyperthermic Orthoxic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 574, Samples 40A 4197–4204

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.05	SILT COARSE .05 -.10	SAND VF .10 -.25	SAND F .25 -.50	SAND M .5 -1	SAND C 1 -2	SAND VC 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
40A4197S	0- 18	Ap	48.8	47.1	4.1		41.8	5.3	1.5	1.0	0.4	0.6	0.6	--C	--C	--	3	--
40A4198S	18- 28	B&A	60.6	36.6	2.8		33.1	3.5	0.9	0.8	0.2	0.4	0.5	--C	--C	--	2	--
40A4199S	28- 56	B21t	73.0	24.4	2.6		22.0	2.4	0.9	0.5	0.2	0.5	0.5	--C	--C	--	2	--
40A4200S	56- 81	B22t	68.8	28.7	2.5		26.6	2.1	0.9	0.5	0.2	0.4	0.5	--C	--C	--	2	--
40A4201S	81-109	B3	59.7	36.0	4.3		31.6	4.4	1.9	1.0	0.3	0.6	0.5	--C	--C	--	2	--
40A4202S	109-165	C1	54.4	38.8	6.8		33.6	5.2	2.4	1.5	0.5	1.0	1.4	--C	--C	--	4	--
40A4203S	165-264	C2	53.5	39.0	7.5		33.4	5.6	2.5	1.6	0.6	1.3	1.5	--C	--C	--	5	--
40A4204S	264-279	C3	49.1	43.0	7.9		36.0	7.0	2.9	2.0	0.7	1.3	1.0	--C	--C	--	5	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF	DITH-CIT EXTRACTABLE MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 18	3.47	0.253			2.8			0.32	0.40			1.27		1.34		26.6		30.2	19.3	
18- 28	1.77	0.144			4.3			0.25	0.40			1.30		1.40					24.4	
28- 56	1.13	0.108			6.8			0.24	0.42			1.38		1.56		34.0		37.4	30.6	
56- 81	0.76	0.078			6.2			0.23	0.42			1.34		1.50		33.7		36.2	28.8	
81-109	0.45	0.058			6.0			0.22	0.37			1.42		1.54		29.0		33.2	22.1	
109-165	0.25				6.0			0.24	0.41			1.44		1.54		28.0		32.9	22.1	
165-264	0.26				6.0			0.22	0.39			1.62		1.68		21.2		28.6	20.9	
264-279	0.18				6.0			0.25	0.41			1.53		1.60		24.8		22.2	20.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 18	2.1	1.4	0.2	0.4	4.1	18.8	3.0	22.9	15.4	7.1	42	18	27				3.5		4.5
18- 28	1.0	0.7	0.1	0.2	2.0	21.4	7.7	23.4	15.3	9.7	79	9	13				3.3		4.4
28- 56	0.5	0.8	0.1	0.2	1.6	24.7	10.5	26.3	17.7	12.1	87	6	9				3.2		4.3
56- 81	0.1	0.5	0.1	0.2	0.9	21.6	10.0	22.5	15.7	10.9	92	4	6				3.3		4.3
81-109	TR	0.5	0.1	0.1	0.7	18.6	9.3	19.3	13.3	10.0	93	4	5				3.3		4.3
109-165	TR	0.7	0.1	0.1	0.9	17.6	9.1	18.5	13.0	10.0	91	5	7				3.3		4.4
165-264	0.1	0.3	0.1	0.1	0.6	16.6	9.0	17.2	12.0	9.6	94	3	5				3.2		4.4
264-279	0.1	0.5	0.1	0.1	0.8	16.1	8.5	16.9	12.1	9.3	91	5	7				3.4		4.2

Narrative Pedon Description

Pedon: Aibonito

NSSL pedon number: 40A0574

Pedon ID: 59PR-009-001

SSIR #12 pedon ID: S59PR-10-10

Field classification: Clayey, mixed, isohyperthermic Orthoxic Tropohumults

Revised classification as of April 01, 2001: Very-fine, mixed, subactive, isohyperthermic Typic Haplohumults

Location: Aibonito, Puerto Rico; kilometer marker 2.37 on Highway 162, east road cut

Latitude: 18°08’08" north

Longitude: 66°17’14" west

Elevation: 640 meters

Slope: 25 percent with an aspect of 180 degrees

Geomorphic position: Low rounded hills

Vegetation: Native pasture of matojo, St. Augustinegrass, and grama amarga and a few weeds

Parent material: Residuum or local colluvium derived from volcanic siltstones or sandstones

Particle-size control section: 27 to 77 cm

Described and sampled by: R.A. Boccheciamp, K.W. Flach, R.E. Gierbolini, R.B. Grossman, and T.U. Yager on December 17, 1959

Notes: The color of the Ap horizon extends along ped faces throughout the B2 horizon and into the upper part of the B3 horizon. The ped faces in the B horizon seem to consist of illuvial material, but this material does not look like clay skins or slickensides; in the B horizon, cracks between peds are at least 0.6 cm wide. The erosion at the site was slight, ground water was deep, and the moisture content at sampling was less than one-fourth field capacity. Matrix colors are for ped exteriors. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; dark grayish brown (10YR 4/2) silty clay; moderate very fine and fine subangular blocky structure; friable, very hard, slightly sticky, moderately plastic; no macro pores in peds; the horizon extends in narrow tongues between peds into the B&A horizon. 40A4197

B&A—18 to 28 cm; strong brown (7.5YR 5/6) clay; blanched silt-rich areas occur on ped surfaces; few fine distinct yellowish red (5YR 4/6) redoximorphic features; moderate medium prismatic structure parting to weak and moderate coarse angular blocky; extremely firm, moderately sticky, very plastic; common; gradual smooth boundary. 40A4198

B21t—28 to 56 cm; brown (7.5YR 4/4 and 5/4), yellowish brown (10YR 5/4), brown (10YR 4/3), and dark grayish brown (10YR 4/2) clay; few fine distinct yellowish red (5YR 4/6) redoximorphic features; strong coarse prismatic structure parting to moderate medium prismatic parting to weak coarse angular blocky; extremely firm, moderately sticky, very plastic; no macro pores in

peds; roots restricted to ped faces; no slickensides; few sand-sized grains, possibly chert; gradual wavy boundary. 40A4199

B22t—56 to 81 cm; yellowish brown (10YR 5/6 and 5/4) and brown (7.5YR 5/4 and 4/4) clay; many medium prominent reddish brown (2.5YR 4/4) redoximorphic features; strong coarse prismatic structure parting to moderate medium prismatic parting to weak coarse angular blocky; some prism faces extend into the upper part of the B3 horizon; extremely firm, moderately sticky, very plastic; no macro pores in peds; roots restricted to ped faces; no slickensides; few sand-sized grains, possibly chert; gradual wavy boundary. 40A4200

B3—81 to 109 cm; strong brown (7.5YR 5/6) clay; 1 percent medium prominent white (10YR 8/1), many medium prominent yellowish brown (10YR 5/6), and many medium prominent red (2.5YR 4/6) redoximorphic features; weak medium subangular blocky structure; gradual wavy boundary. 40A4201

C1—109 to 165 cm; red (2.5YR 4/6) and strong brown (7.5YR 5/6) silty clay; common medium prominent white (10YR 8/1) redoximorphic features; massive; very firm, moderately sticky, moderately plastic; gradual smooth boundary. 40A4202

C2—165 to 264 cm; 50 percent red (2.5YR 4/6) and 50 percent yellowish red (5YR 5/6) clay; few white (5YR 8/1) redoximorphic features; extremely firm; the red material commonly is directly next to the white redoximorphic features; evidence of rock structure is present. 40A4203

C3—264 to 279 cm; 50 percent red (2.5YR 4/6) and 50 percent yellowish red (5YR 5/6) clay; few white (5YR 8/1) redoximorphic features; extremely firm; the red material commonly is directly next to the white redoximorphic features; evidence of rock structure is present; split from above for sampling purposes. 40A4204

Añasco Municipio

Mani-like: S87PR-007-004

Primary Characterization Data

Añasco Municipio, Puerto Rico

Sampled as: Mani-like; fine, mixed, isohyperthermic Aeric Tropaquepts

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 295, Samples 87P 1476–1484

—General methods: 1B1A, 2A1, 2B

SAMPLE NO. -1--	DEPTH (CM) -2--	HORIZON -3--	TOTAL CLAY LT .002 -4--	TOTAL SILT .002 -.05 -5--	TOTAL SAND .05 -2 -6--	CLAY FINE LT .0002 -7--	CLAY CO3 LT .002 -8--	SILT FINE .002 -.02 -9--	SILT COARSE .02 -.05 -10-	SAND VF .05 -.10 -11-	SAND F .10 -.25 -12-	SAND M .25 -.50 -13-	SAND C .5 -1 -14-	SAND VC 1 -2 -15-	COARSE FRACS WEIGHT 2 -5 -16-	WEIGHT 5 -20 -17-	WEIGHT 20 -75 -18-	.1- 75 -19-	(>2MM) WT % OF WHOLE SOIL -20-
			<- - - - - - - - - - - - -	PCT OF <2MM	(3A1)	- - - -								->	<- PCT OF <75MM(3B1)->				SOIL
87P1476S	0- 13	Ap1	52.9	37.3	9.8	20.8		28.9	8.4	3.8	3.1	1.7	0.6	0.6	TR	TR	--	6	TR
87P1477S	13- 28	Ap2	56.6	36.2	7.2	21.6		29.9	6.3	2.9	2.3	1.3	0.5	0.2	TR	--	--	4	--
87P1478S	28- 38	Bw1	59.7	34.7	5.6	20.0		29.4	5.3	2.1	1.2	1.1	0.9	0.3	TR	--	--	3	--
87P1479S	38- 48	Bw2	67.7	30.1	2.2	22.3		27.7	2.4	0.9	0.6	0.4	0.3	--	--	--	--	1	--
87P1480S	48- 70	Bw3	56.2	39.6	4.2	16.5		35.7	3.9	1.8	1.2	0.5	0.5	0.2	--	--	--	2	--
87P1481S	70- 92	Bw4	48.7	45.1	6.2	14.7		36.7	8.4	3.0	1.6	0.9	0.5	0.2	--	--	--	3	--
87P1482S	92-114	Bw5	35.5	39.8	24.7	9.7		28.9	10.9	11.0	7.5	3.9	1.8	0.5	--	--	--	14	--
87P1483S	114-148	Bw6	28.5	36.7	34.8	7.2		26.8	9.9	15.2	9.4	6.9	2.8	0.5	--	--	--	20	--
87P1484S	148-200	2Bg	58.8	36.8	4.4	17.8		33.6	3.2	1.9	1.6	0.7	0.2	--	--	--	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 13	2.15	0.166			4.6	0.1	0.1	0.42	0.48				1.27	1.48	0.052			34.1	25.3	0.11
13- 28	1.29	0.123			4.9	0.7	0.1	0.36	0.48				1.23	1.48	0.064			37.6	27.0	0.13
28- 38	0.80	0.092			4.9	0.7	0.2	0.33	0.46				1.16	1.51	0.092			44.3	27.7	0.19
38- 48	0.51	0.064			4.5	0.7	0.1	0.31	0.44	84	51		1.12	1.48	0.097			47.2	29.6	0.20
48- 70	0.33				5.7	0.7	0.1	0.35	0.53				1.12	1.35	0.064			44.5	30.0	0.16
70- 92	0.26				5.1	0.7	0.1	0.39	0.60	72	38		1.14	1.31	0.047			44.1	29.1	0.17
92-114	0.23				6.4	1.3	0.3	0.57	0.72				1.06	1.25	0.057			47.3	25.5	0.23
114-148	0.13				6.3	1.5	0.3	0.75	0.83				1.12	1.23	0.032			43.7	23.7	0.22
148-200	0.24				2.5	1.5	0.1	0.42	0.51	69	37		1.09	1.43	0.095			49.9	29.8	0.22

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->					1:2	1:1
0- 13	4.3	2.2	0.4	0.3	7.2	23.2	6.6	30.4	22.2	13.8	48	24	32				3.2	3.7	4.0
13- 28	8.9	4.0	0.3	0.2	13.4	17.5	2.3	30.9	20.5	15.7	15	43	65				3.4	4.1	4.4
28- 38	13.4	5.9	0.7	0.2	20.2	9.5	--	29.7	19.8			68	100				4.6	5.1	5.4
38- 48	13.0	7.0	0.7	0.2	20.9	6.0		26.9	20.7			78	100				5.3	5.9	6.2
48- 70	14.3	6.9	0.5	0.2	21.9	5.4		27.3	19.7			80	100				5.6	6.2	6.6
70- 92	12.6	7.5	0.5	0.2	20.8	5.1		25.9	19.2			80	100				5.7	6.3	6.8
92-114	11.6	8.0	0.5	0.2	20.3	5.9		26.2	20.4			77	100				5.7	6.3	6.9
114-148	11.5	8.7	0.5	0.2	20.9	6.0		26.9	21.4			78	98				5.6	6.3	6.9
148-200	13.5	10.3	0.5	0.2	24.5	4.6		29.1	24.7			84	99	--			5.4	6.3	7.0

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)			THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	Al2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
87P1478	TCLY	KK 3	MI 2	GE 2	KK58 GI 1				11.3			1.2			
87P1479	TCLY	KK 3	GE 2	MI 2	KK55 GI 2	KK43 GI 2			10.9			1.3			
87P1481	TCLY	KK 3	GE 2	MI 2	KK61 GI 1				12.9			1.1			
87P1484	TCLY	KK 3	MI 2	GE 2	KK60 GItr				7.4			1.2			

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
87P1481     VFS   QZ 4  FD 2  GE 2  HE 1                            94  KK43  FE40  QZ11  TA 5  FK 2  POtr
87P1481     VFS                                                     MGtr
87P1484     VFS   QZ 5  KK 2  FD 2                                  94  KK72  FE21  TA 3  FK 1  CL 1  QZ 1
87P1484     VFS                                                     GStr  POtr  MGtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    KK  kaolinite        MI  mica            GE  goethite         GI  gibbsite         QZ  quartz           FD  feldspar
    HE  hematite         FE  iron oxides     TA  talc             FK  potas feldsp     PO  plant opal       MG  magnetite
    CL  chlorite         GS  glass
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Mani-like

NSSL pedon number: 87P0295

Pedon ID: S87PR-007-004

Field classification: Fine, mixed, isohyperthermic Aeric Tropaquepts

Revised classification as of March 01, 2001: Fine, mixed, semiactive, isohyperthermic Fluvaquentic Eutrudepts

Location: Añasco Municipio, Puerto Rico; Oeste Soil and Water Conservation District; 2.4 km south on Highway 2 from junction with Highway 109 (kilometer marker 147.6) and 0.6 km east on a field road, 6 meters north of the road

Latitude: 18°15’31" north

Longitude: 67°09’23" west

Elevation: 4 meters

Physiography: Coastal plains

Slope: 1 percent with a plane north aspect

Major Land Resource Area: 272—Humid Coastal Plains

Depth to water table: 195 cm; apparent

Average air temperature: Annual—24 °C; summer—25 °C; winter—22 °C

Average soil temperature: Annual—27 °C; summer—28 °C; winter—25 °C

Drainage, runoff, and permeability: Poorly drained, slow runoff, and slow permeability

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Alluvium from breccia-bas material

Vegetation: Sugarcane in cropland

Diagnostic features: Ochric epipedon at 0 to 28 cm; cambic horizon at 28 to 200 cm

Described and sampled by: D. Williams, L.H. Rivera, W. Lynn, and G. Acevedo during April 1987

Notes: Matrix colors are for moist ped interiors.

Ap1—0 to 13 cm; brown to dark brown (10YR 4/3) silty clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; many fine and common medium roots throughout; few fine tubular pores; few patchy distinct coatings in root channels and/or pores; yellowish brown along root channels; few fine rounded iron-manganese concretions; common charcoal fragments; extremely acid; abrupt smooth boundary. 87P1476

Ap2—13 to 28 cm; 80 percent brown to dark brown (10YR 4/3) and 20 percent yellowish brown (10YR 5/6) silty clay; weak medium subangular blocky structure; firm, sticky, plastic; common fine and common medium roots throughout; few fine tubular pores; few patchy distinct coatings in root channels and/or pores; yellowish brown along root channels; few charcoal fragments; few fine rounded iron-manganese concretions; very strongly acid; abrupt smooth boundary. 87P1477

Bw1—28 to 38 cm; 60 percent brown to dark brown (10YR 4/3) and 35 percent yellowish brown (10YR 5/6) clay; common medium distinct redoximorphic features; weak medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine tubular pores; few patchy distinct coatings in root channels and/or pores; common fine rounded iron-manganese concretions and few medium rounded iron-manganese concretions; moderately acid; clear wavy boundary. 87P1478

Bw2—38 to 48 cm; light gray to gray (5Y 6/1) clay; many medium distinct and common medium distinct redoximorphic features; weak medium subangular blocky structure; very firm, sticky, plastic; few fine and few medium roots throughout; few fine tubular pores; few patchy distinct coatings in root channels and/or pores; common medium rounded iron-manganese concretions; few old root channels; slightly acid; clear wavy boundary. 87P1479

Bw3—48 to 70 cm; 60 percent yellowish brown (10YR 5/6) and 40 percent light gray to gray (5Y 6/1) clay; weak coarse prismatic structure; firm, sticky, plastic; few fine tubular pores; few patchy prominent coatings on vertical faces of peds and few patchy prominent coatings in root channels and/or pores; few old roots; few old root channels filled with dark material; common medium rounded iron-manganese concretions; slightly acid; gradual smooth boundary. 87P1480

Bw4—70 to 92 cm; 60 percent yellowish brown (10YR 5/6) and 40 percent light gray to gray (5Y 6/1) clay; weak coarse prismatic structure; firm, sticky, plastic; few fine tubular pores; few patchy prominent coatings on vertical faces of peds and few patchy prominent coatings in root channels and/or pores; few old roots; few old root channels filled with dark material; common medium rounded iron-manganese concretions; slightly acid; clear smooth boundary. 87P1481

Bw5—92 to 114 cm; 70 percent yellowish brown (10YR 5/6) and 30 percent light gray to gray (5Y 6/1) silty clay; weak coarse prismatic structure; friable, slightly sticky, slightly plastic; few fine tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; dark material along old root channels; few old roots; common medium rounded iron-manganese concretions; neutral; clear smooth boundary. 87P1482

Bw6—114 to 148 cm; yellowish brown (10YR 5/6) loam; many medium distinct redoximorphic features; weak coarse prismatic structure; friable, slightly sticky, slightly plastic; few fine tubular pores; gray along old root channels; few old roots; many medium rounded iron-manganese concretions and common very coarse rounded iron-manganese concretions; neutral; abrupt smooth boundary. 87P1483

2Bg—148 to 200 cm; light gray (5Y 7/1) clay; common medium distinct redoximorphic features; weak medium prismatic structure; very firm, very sticky, very plastic; few fine tubular pores; common discontinuous distinct coatings on faces of peds; few medium irregular soft masses of iron-manganese; few old root channels; neutral. 87P1484

Daguey: S87PR-007-005

Primary Characterization Data

Añasco Municipio, Puerto Rico
Sampled as: Daguey; clayey, oxidic isohyperthermic Typic Kandihumults
SSL—Project: 87P 65, (CP87PR108)
—Pedon: 87P 296, Samples 87P 1485–1491
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
87P1485S	0- 23	Ap	66.1	27.2	6.7	25.7		21.1	6.1	3.3	2.0	0.8	0.4	0.2	TR	TR	--	3	TR
87P1486S	23- 48	Bt1	76.8	20.9	2.3	30.4		16.4	4.5	1.4	0.7	0.2	--	--	TR	--	--	1	--
87P1487S	48- 88	Bt2	75.7	22.7	1.6	29.9		18.7	4.0	1.2	0.4	--	--	--	--	--	--	TR	--
87P1488S	88-118	Bt3	66.9	29.8	3.3	23.1		24.0	5.8	2.3	0.9	0.1	--	--	--	--	--	1	--
87P1489S	118-147	Bt4	65.4	31.6	3.0	21.2		26.7	4.9	2.2	0.7	0.1	--	--	TR	--	--	1	--
87P1490S	147-205	Bt5	63.0	34.0	3.0	17.9		29.4	4.6	2.2	0.8	--	--	--	--	--	--	1	--
87P1491S	205-270	Bw	62.0	34.8	3.2	15.0		29.4	5.4	2.9	--	0.2	0.1	--	--	--	--	TR	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	2.18	0.218			6.0	1.5	0.5	0.24	0.41				1.19	1.39	0.053			35.9	27.3	0.10
23- 48	0.99	0.136			6.0	1.5	0.3	0.16	0.41				1.17	1.39	0.059			39.8	31.4	0.10
48- 88	0.50	0.079			6.3	1.5	0.1	0.15	0.43	76	33		1.19	1.37	0.048			40.5	32.5	0.10
88-118	0.24	0.042			6.4	1.5	TR	0.18	0.47				1.24	1.39	0.039			38.9	31.3	0.09
118-147	0.14				5.9	1.5	TR	0.18	0.47				1.28	1.42	0.035			37.3	30.8	0.08
147-205	0.12				5.8	0.3	TR	0.21	0.52				1.21	1.36	0.040			42.2	32.5	0.12
205-270	0.12				5.3	0.1	TR	0.21	0.51	79	32		1.17	1.31	0.038			45.6	31.5	0.17

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->< - - - - -PCT - - - ->																	1:2	1:1
0- 23	2.0	0.7	--	0.3	3.0	20.4	2.9	23.4	16.0	5.9	49	13	19				3.7	4.1	4.5
23- 48	2.6	0.6	--	0.1	3.3	16.1	1.9	19.4	12.2	5.2	37	17	27				3.8	4.2	4.8
48- 88	2.5	0.6	--	0.1	3.2	12.9	2.8	16.1	11.6	6.0	47	20	28				3.8	4.3	5.0
88-118	2.2	0.9	--	0.1	3.2	12.9	4.2	16.1	12.2	7.4	57	20	26				3.8	4.3	4.9
118-147	1.5	1.4	--	0.1	3.0	11.5	4.0	14.5	11.8	7.0	57	21	25				3.8	4.3	5.1
147-205	1.8	1.3	--	0.1	3.2	13.1	6.2	16.3	13.5	9.4	66	20	24				3.7	4.2	5.0
205-270	0.9	0.7	TR	0.1	1.7	14.7	7.7	16.4	13.0	9.4	82	10	13				3.7	4.1	5.0

SAMPLE NUMBER	< - CLAY MINERALOGY (<.002mm) -> FRACT < - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - - -><- -> EGME INTER ION < ><- DSC - -><- TGA - -> SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O < > RETN PRETA < - - - - - - 7A2i - - - - - -><- 7A6 - ><- 7A4b - ><- - - - - - - - - - 7C3 - - - - - - - - -><> 7D2 TION <- - ><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- -><mg/g><- - >	FRACT ION	X-RAY peak size				THERMAL Percent		ELEMENTAL Percent SiO2	Fe2O3	MgO	CaO	K2O	Na2O	EGME	INTER RETN	PRETA TION
87P1486	TCLY	KK 3	GE 2	VR 1	KK72	GItr		10.4				0.4				
87P1487	TCLY	KK 3	GE 2	HE 2	VR 1	KK78	GItr	KK56	GI 1	11.7				0.5		
87P1491	TCLY	KK 4	GE 2	MI 2	HE 1	KK80	GItr			9.7				0.8		

SAMPLE NUMBER	< - SAND - SILT MINERALOGY (2.0-0.002mm) -> FRACT < - - - - - - X-RAY - - -><- - - THERMAL - - - -><- - - - - - - - OPTICAL - - - - - - - - -><>INTER ION < ><- DTA - -><- TGA - ->TOT RE< - - - - - - GRAIN COUNT - - - - - -><>PRETA < - - - - - 7A2i - - - - -><- 7A3b - ><- 7A4b - ><- - - - - - - - - - 7B1a - - - - - - - - -><> TION <- -><- - - Peak Size - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- - - - - - - - -><- - >	FRACT ION	X-RAY Peak Size				THERMAL Percent		OPTICAL Percent							
87P1487	VFS	QZ 4	KK 2	HE 2			92	FE35	QZ31	MG15	KK 8	TA 7	PO 3		
87P1487	VFS							CL 1	GStr						

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite GI gibbsite QZ quartz HE hematite
FE iron oxides MG magnetite TA talc PO plant opal CL chlorite GS glass
MI mica
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Daguey

NSSL pedon number: 87P0296

Pedon ID: S87PR-007-005

Field classification: Clayey, oxidic isohyperthermic Typic Kandihumults

Revised classification as of March 01, 2001: Very-fine, mixed, isohyperthermic Typic Hapludox

Location: Añasco Municipio, Puerto Rico; Noroeste Soil and Water Conservation District; 1.1 km east on Highway 110 from junction with Highway 2, about 1.1 km north on paved road, and 0.3 km northeast on paved road

Latitude: 18°19’39" north

Longitude: 67°08’15" west

Elevation: 150 meters

Physiography: Hillside or mountainside in hills

Geomorphic position: Summit crested hills; on middle third of component

Slope: 12 percent with a convex southwest aspect

Major Land Resource Area: 270—Humid Mountains and Valleys

Average air temperature: Annual—24 °C; summer—25 °C; winter—22 °C

Average soil temperature: Annual—27 °C; summer—28 °C; winter—25 °C

Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability

Vegetation: Sour grass in pastureland

Erosion: Slight

Particle-size control section: 23 to 73 cm

Parent material: Residuum from igneous-granite material

Diagnostic features: Ochric epipedon at 0 to 23 cm; argillic horizon at 23 to 200 cm

Described and sampled by: D. Williams, L.H. Rivera, W. Lynn, and G. Acevedo during April 1987

Notes: Matrix colors are for moist ped interiors.

Ap—0 to 23 cm; dark reddish brown (5YR 3/3) clay; weak medium subangular blocky structure; friable, sticky, plastic; many fine roots throughout; few black shiny masses; few insect casts; extremely acid; clear smooth boundary. 87P1485

Bt1—23 to 48 cm; reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, slightly sticky, plastic; common fine roots throughout; few fine tubular pores; many continuous distinct clay films on faces of peds; few fine rounded soft masses of iron-manganese; few old roots; very strongly acid; clear smooth boundary. 87P1486

Bt2—48 to 88 cm; red (2.5YR 4/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, slightly sticky, plastic; few fine roots throughout; few fine tubular pores; many continuous distinct clay films on faces of peds; few insect tunnels filled with material

from the A horizon; few old roots; very strongly acid; gradual wavy boundary. 87P1487

Bt3—88 to 118 cm; red (2.5YR 4/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, slightly sticky, plastic; few fine roots throughout; few fine tubular pores; many continuous distinct clay films on faces of peds; few root channels; few yellowish brown weathered fragments of saprolite; very strongly acid; gradual wavy boundary. 87P1488

Bt4—118 to 147 cm; red (2.5YR 4/6) clay; moderate medium subangular blocky structure parting to moderate fine angular blocky; firm, slightly sticky, plastic; few fine roots throughout; few fine tubular pores; many continuous distinct clay films on faces of peds; 4 to 5 percent yellowish brown weathered fragments of saprolite; very strongly acid; gradual wavy boundary. 87P1489

Bt5—147 to 205 cm; red (2.5YR 4/6) clay; few fine distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate fine angular blocky; firm, slightly sticky, plastic; few fine roots throughout; few fine tubular pores; many continuous distinct clay films on faces of peds; redoximorphic features along root channels; 20 percent yellowish brown weathered fragments of saprolite; very strongly acid; clear smooth boundary. 87P1490

Bw—205 to 270 cm; red (2.5YR 4/6) clay; 20 to 30 percent of volume has rock structure and is dark red (2.5YR 3/6), yellowish red (10YR 5/6), and very pale brown (10YR 8/3); weak coarse prismatic structure parting to weak medium subangular blocky; firm, slightly sticky, plastic; few fine roots throughout; few fine tubular pores; many continuous distinct clay films on vertical faces of peds; very strongly acid. 87P1491

Daguey: S61PR-011-001

Primary Characterization Data

Añasco Municipio, Puerto Rico

Sampled as: Daguey; very-fine, kaolinitic, isohyperthermic Inceptic Hapludox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 579, Samples 40A 4237–4242

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-		- - - -)		(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -			WT	
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -					PCT OF <2MM		(	) - - - - - - - - - - - -				<- PCT OF <75MM(3B1)->				SOIL
40A4237S	0- 15	Ap		61.0	33.3	5.7			29.8	3.5	2.4	2.5	0.6	0.2	--	--C	--C	--	3	--
40A4238S	15- 33	B21t		68.5	28.6	2.9			26.6	2.0	1.2	1.3	0.3	0.1	--	--C	--C	--	2	--
40A4239S	33- 48	B22t		71.6	26.8	1.6			25.7	1.1	0.7	0.6	0.2	0.1	--	--C	--C	--	1	--
40A4240S	48- 81	B23t		65.1	32.4	2.5			29.3	3.1	1.4	0.9	0.2	TR	--	--C	--C	--	1	--
40A4241S	81-109	B3		56.2	39.4	4.4			35.3	4.1	2.3	1.7	0.3	0.1	--	--C	--C	--	2	--
40A4242S	109-152	C		54.0	41.5	4.5			37.0	4.5	2.3	1.7	0.4	0.1	--	--C	--C	--	2	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT	<0.4MM	<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	3.75	0.327			6.9			0.33	0.46			1.06		1.33		43.8		44.0	28.2	
15- 33	1.16	0.110			6.5			0.20	0.42			1.22		1.38		35.5		38.9	28.6	
33- 48	0.63	0.067			6.9			0.20	0.42				1.20		--	39.8		39.7	30.0	0.12
48- 81	0.42	0.050			7.4			0.22	0.46			1.26		1.38		34.8		40.1	30.1	
81-109	0.29				6.7			0.26	0.50				0.12		--	40.7		39.6	28.0	0.01
109-152	0.22				6.7			0.26	0.51			1.24		1.31		35.8		40.0	27.8	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - - -	-PCT	- - - ->						1:2	1:1
0- 15	5.7	4.2	0.1	1.8	11.8	14.1	0.2	25.9	19.9	12.0	2	46	59					4.7		5.5
15- 33	2.6	2.2	0.1	1.6	6.5	13.1	1.4	19.6	13.5	7.9	18	33	48					3.9		4.9
33- 48	1.3	1.3	0.1	0.9	3.6	15.5	4.6	19.1	14.1	8.2	56	19	26					3.7		4.7
48- 81	0.8	1.4	0.1	0.4	2.7	17.2	7.5	19.9	14.5	10.2	74	14	19					3.6		4.6
81-109	0.8	1.3	0.1	0.2	2.4	17.0	9.0	19.4	14.4	11.4	79	12	17					3.6		4.6
109-152	0.6	1.1	0.1	0.2	2.0	18.7	10.0	20.7	14.2	12.0	83	10	14					3.6		4.6

Narrative Pedon Description

Pedon: Daguey

NSSL pedon number: 40A0579

Pedon ID: S61PR-011-001

SSIR #12 pedon ID: S61PR-8-3

Field classification: Clayey, mixed, isohyperthermic Orthoxic Tropohumults

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Inceptic Hapludox

Location: Añasco, Puerto Rico; Oeste Soil Conservation District; kilometer marker 11.0 on Highway 110, about 400 meters east on dirt road, 30.5 meters south of road; aerial photograph GS-LR-2-203

Latitude: Unknown

Longitude: Unknown

Geomorphic position: Upland

Slope: 18 percent with an aspect of 315 degrees (northwest); on dissected uplands

Vegetation: Native pasture and weeds

Drainage, runoff, and permeability: Well drained, medium runoff, medium internal drainage, and moderate permeability

Parent material: Residuum or very local colluvium from volcanic rocks

Particle-size control section: 15 to 65 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, L.H. Rivera, R.R. Gierbolini, W. Francia, D. Compton, and J. Trigo on December 18, 1961

Notes: Matrix colors are for moist ped exteriors. The Ap, B22t, and C horizons were sampled for the Bureau of Public Roads. Soils were slightly below field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; reddish brown (5YR 4/3) clay; few fine faint reddish brown (5YR 4/4) redoximorphic features; moderate fine and medium subangular blocky structure; friable, nonsticky, slightly plastic; many fine roots; abrupt smooth boundary. 40A4237

B21t—15 to 33 cm; red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, nonsticky, slightly plastic; small pieces fail semiplastically; common fine roots; few fine pores; patchy clay films; clear smooth boundary. 40A4238

B22t—33 to 48 cm; weak red (2.5YR 5/2) clay, red (2.5YR 4/6) interior; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; small pieces fail semiplastically; few fine roots; few fine pores; patchy clay films on faces of peds; gradual smooth boundary. 40A4239

B23t—48 to 81 cm; red (10R 4/6) clay; weak fine angular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail abruptly; few fine roots; few fine pores; patchy clay films; gradual smooth boundary. 40A4240

B3—81 to 109 cm; red (10R 4/6) clay; weak fine angular blocky structure; very friable, nonsticky, slightly plastic; small pieces fail abruptly; few fine roots; 1 percent clay films on vertical faces of peds; gradual wavy boundary. 40A4241

C—109 to 152 cm; very pale brown (10YR 7/4) clay loam, yellowish brown (10YR 5/8), red (2.5YR 4/6), dark red (2.5YR 3/6), and red (10R 4/6) rubbed; massive; very friable, nonsticky, nonplastic; few fine roots. 40A4242

Humatas: S61PR-011-002

Primary Characterization Data

Añasco Municipio, Puerto Rico

Sampled as: Humatas; clayey, mixed, isohyperthermic Typic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 570, Samples 40A 4168–4176

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4168S	0- 10	Ap		64.6	29.4	6.0			25.0	4.4	1.7	1.3	0.6	1.1	1.3	--C	--C	--	4	--
40A4169S	10- 23	B21t		69.4	28.1	2.5			24.3	3.8	1.5	0.7	0.2	0.1	--	--C	--C	--	1	--
40A4170S	23- 38	B22t		62.9	34.4	2.7			28.4	6.0	2.1	0.5	0.1	TR	--	--C	--C	--	1	--
40A4171S	38- 63	B23t		47.6	46.3	6.1			36.4	9.9	5.0	0.9	0.1	0.1	--	--C	--C	--	1	--
40A4172S	63- 81	B3		38.6	50.7	10.7			38.1	12.6	8.1	2.1	0.2	0.2	0.1	--C	--C	--	3	--
40A4173S	81-114	C1		33.7	51.0	15.3			37.5	13.5	11.1	3.2	0.4	0.4	0.2	--C	--C	--	4	--
40A4174S	114-152	C2		31.6	50.3	18.1			37.4	12.9	11.9	4.3	0.8	0.9	0.2	--C	--C	--	6	--
40A4175S	183-244	C3		27.0	51.9	21.1			38.7	13.2	9.0	4.8	1.5	2.2	3.6	--C	--C	--	12	--
40A4176S	244-305	C4														TRC	2C	--		2

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 10	4.90	0.430			8.1			0.38	0.50			0.89		1.10		63.3		47.5	32.1	
10- 23	2.00	0.211			8.4			0.25	0.45			1.06		1.42		49.8		39.8	31.4	
23- 38	1.16	0.121			8.0			0.25	0.50			1.16		1.40		43.3		39.0	31.4	
38- 63	0.59	0.067			7.7			0.31	0.63				1.10		--	46.5		36.7	30.1	0.07
63- 81	0.36	0.049			7.3			0.40	0.74			1.09		1.24		47.0		40.7	28.6	
81-114	0.31				7.3			0.48	0.83			1.04		1.14		48.9		39.6	28.0	
114-152	0.25				6.9			0.48	0.74			1.04		1.16		48.9		40.0	23.5	
183-244	0.10				8.1			0.52	0.90										24.3	
244-305	0.06				8.7														24.7	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - - -MEQ /					100 G	- - -	- - -	- - -	- ->	<- - - - -PCT		- - - ->						1:2	1:1
0- 10	2.4	1.5	0.1	0.4	4.4	31.5	4.0	35.9	24.7	8.4	48	12	18					3.9		4.6
10- 23	2.8	0.7	TR	0.1	3.6	23.2	5.4	26.8	17.6	9.0	60	13	20					3.7		4.7
23- 38	2.9	0.8	0.1	0.1	3.9	19.9	4.5	23.8	16.0	8.4	54	16	24					3.8		4.9
38- 63	1.1	0.5	0.1	0.1	1.8	19.9	7.0	21.7	14.7	8.8	80	8	12					3.8		5.0
63- 81	0.5	0.5	TR	0.2	1.2	21.3	9.1	22.5	15.4	10.3	88	5	8					3.8		4.9
81-114	0.7	0.3	TR	0.2	1.2	21.2	9.2	22.4	16.2	10.4	88	5	7					3.7		4.8
114-152	0.5	0.3	TR	0.2	1.0	21.5	10.0	22.5	15.1	11.0	91	4	7					3.7		4.8
183-244	0.1	0.3	TR	0.1	0.5	20.0	10.2	20.5	14.1	10.7	95	2	4					3.7		4.7
244-305	TR	0.3	TR	0.1	0.4	18.8	10.0	19.2	13.6	10.4	96	2	3					3.7		4.9

Narrative Pedon Description

Pedon: Humatas

NSSL pedon number: 40A0570

Pedon ID: S61PR-011-002

SSIR #12 pedon ID: S61PR-8-1

Field classification: Clayey, mixed, isohyperthermic Typic Tropohumults

Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Oxic Dystrudepts

Location: Añasco, Puerto Rico; Oeste Soil Conservation District; on Highway 406, near kilometer marker 2.45, about 200 meters on dirt road and 107 meters southwest of road; aerial photograph GS-LR-3-140

Latitude: Unknown

Longitude: Unknown

Vegetation: Native pasture and weeds; a few orange trees

Slope: 27 percent with an aspect of 225 degrees (southwest); on side slope in uplands

Drainage, runoff, and permeability: Well drained, medium runoff, medium internal drainage, and moderate permeability

Parent material: Residuum or very local colluvium from volcanic rocks

Particle-size control section: 10 to 60 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, and L.H. Rivera on December 5, 1961

Notes: The Ap, B22t, and C1 horizons were sampled for the Bureau of Public Roads. Soil was at field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 10 cm; brown (7.5YR 4/4) clay loam; few fine faint reddish brown (5YR 4/4) redoximorphic features; moderate fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; few fine charcoal fragments; clear smooth boundary. 40A4168

B21t—10 to 23 cm; yellowish red (5YR 5/6) clay; moderate fine subangular blocky structure; friable, nonsticky, slightly plastic; few fine black particles; small pieces fail semiplastically; many fine roots; few fine pores; clear smooth boundary. 40A4169

B22t—23 to 38 cm; red (2.5YR 5/8) clay; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail semiplastically; many fine roots; few fine pores; patchy clay films; clear smooth boundary. 40A4170

B23t—38 to 63 cm; red (2.5YR 5/6) clay; weak fine subangular blocky structure; friable, nonsticky, slightly plastic; small pieces fail semiplastically; few fine pores; black stains in root channels and/or pores; clear smooth boundary. 40A4171

B3—63 to 81 cm; red (2.5YR 5/6) clay; common fine faint yellow (10YR 8/6) redoximorphic features; weak fine and medium subangular blocky structure;

very friable, nonsticky, slightly plastic; small pieces fail abruptly; many fine pores; clear smooth boundary. 40A4172

C1—81 to 114 cm; brownish yellow (10YR 6/6) and red (2.5YR 5/6) clay; massive and weak; very friable, nonsticky, slightly plastic; fails abruptly; many fine pores; clear smooth boundary. 40A4173

C2—114 to 152 cm; brownish yellow (10YR 6/6) and red (2.5YR 5/6) silty clay saprolite; massive; very friable, nonsticky, slightly plastic. 40A4174

C3—183 to 244 cm; auger sample of red (2.5YR 5/6), dusky red (2.5YR 3/2), gray (N 6/0), and white (10YR 8/1) clay loam saprolite; massive; very friable, nonsticky, nonplastic; 1.5 to 1.8 meter depth discarded. 40A4175

C4—244 to 305 cm; auger sample. 40A4176

Morado: S61PR-011-003

Primary Characterization Data

Añasco Municipio, Puerto Rico

Sampled as: Morado; clayey, mixed, isohyperthermic Typic Eutropepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 535, Samples 40A 3977–3980

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						( ) - - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				SOIL
40A3977S	0- 18	Ap		32.0	48.4	19.6			38.7	9.7	7.1	6.9	2.4	2.0	1.2	--C	--C	--	12	--
40A3978S	18- 43	C1		28.7	45.1	26.2			35.4	9.7	9.8	9.8	3.4	2.3	0.9	--C	--C	--	16	--
40A3979S	43- 61	C2		26.4	47.7	25.9			37.9	9.8	9.4	9.4	3.7	2.8	0.6	--C	--C	--	16	--
40A3980S	61- 84	C3		12.7	46.7	40.6			35.6	11.1	11.2	14.3	7.0	6.4	1.7	--C	--C	--	29	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)				(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.69	0.160			3.8			0.93	0.61			1.22		1.44		39.1		34.2	19.5	
18- 43	0.46	0.042			4.1			1.00	0.71			1.25		1.39		36.2		30.0	20.4	
43- 61	0.26	0.026			3.5			0.97	0.69					1.40					18.3	
61- 84	0.06				3.0			1.94	0.95			1.56		1.64		24.1			12.1	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - - -				-MEQ / 100 G - - -			- - - - - - - - - ->				<- - - - -PCT - - - ->							1:2	1:1
0- 18	25.3	5.5	0.2	0.3	31.3	6.7		38.0	29.8			82	100					5.3		6.8
18- 43	21.4	4.7	0.3	0.1	26.5	7.3		33.8	28.8			78	92					4.6		6.2
43- 61	19.7	4.8	0.4	0.1	25.0	5.5		30.5	25.7			82	97					4.5		6.1
61- 84	18.7	4.6	0.4	0.1	23.8	4.4		28.2	24.7			84	96					4.2		6.1

Narrative Pedon Description

Pedon: Morado

NSSL pedon number: 40A535

Pedon ID: S61PR-011-003

SSIR #12 pedon ID: S61PR-8-2

Field classification: Clayey, mixed, isohyperthermic Typic Eutropepts

Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Dystric Eutrudepts

Location: Añasco, Puerto Rico; Oeste Soil Conservation District, Puerto Rico; kilometer marker 3.85 on Highway 406, about 500 meters on dirt road and 31 meters north of road; aerial photograph GS-LR-3-86

Latitude: Unknown

Longitude: Unknown

Vegetation: Pigeonpeas (gandures) with undergrowth of native pasture and weeds

Slope: 55 percent on a west aspect; in uplands

Drainage, runoff, and permeability: Well drained, medium internal drainage, rapid runoff, and moderate permeability

Parent material: Residuum or very local colluvium from volcanic rocks

Described and sampled by: R.B. Grossman, W.E. McKenzie, O.R. Carter, R.E. Gierbolini, and L.H. Rivera on December 6, 1961

Notes: Soil was at field capacity when sampled. The C2 and C3 horizons are weathered parent rock. Family texture is based on clay percentage estimated as 2.5 times the 15-bar water content. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; dark reddish gray (5YR 4/2) silty clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; small pieces fail semiplastically; clear smooth boundary. 40A3977

C1—18 to 43 cm; dark reddish gray (5YR 4/2) clay; few fine faint weak red, yellowish red, and reddish brown redoximorphic concentrations; massive parting to weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; small pieces fail semiplastically; gradual wavy boundary. 40A3978

C2—43 to 61 cm; variegated brown to dark brown (7.5YR 4/2), dark reddish gray (5YR 4/2), and dark gray (5YR 4/1) silty clay loam; massive; friable, slightly sticky, slightly plastic; few fine roots; clear wavy boundary. 40A3979

C3—61 to 84 cm; variegated brown to dark brown (7.5YR 4/2), dark reddish gray (5YR 4/2), and dark gray (5YR 4/1) silty clay loam; massive; friable, slightly sticky, slightly plastic; no roots. 40A3980

Lares: S63PR-011-001

Primary Characterization Data

Añasco Municipio, Puerto Rico

Sampled as: Lares; clayey, mixed, isohyperthermic Aquic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 573, Samples 40A 4190–4196

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -			WT	
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4190S	0- 23	Ap		49.1	40.5	10.4			31.9	8.6	5.1	2.8	0.8	0.9	0.8	--C	--C	--	5	--
40A4191S	23- 36	B1		51.8	37.5	10.7			29.2	8.3	4.7	3.1	1.0	1.1	0.8	--C	--C	--	6	--
40A4192S	36- 51	B2t		66.8	26.2	7.0	27.0		22.4	3.8	2.5	1.8	0.7	1.1	0.9	--C	--C	--	4	--
40A4193S	51- 74	B3		58.5	31.9	9.6			27.3	4.6	3.2	2.3	1.1	1.8	1.2	--C	--C	--	6	--
40A4194S	74-114	C1		54.8	29.2	16.0			23.8	5.4	3.9	3.8	1.9	2.8	3.6	TRC	2C	--	14	2
40A4195S	114-180	C2		52.4	32.0	15.6			26.4	5.6	4.4	3.9	1.9	2.9	2.5	1C	5C	--	17	6
40A4196S	180-203	C3		50.1	32.1	17.8			26.7	5.4	4.2	4.0	2.4	4.1	3.1	TRC	2C	--	15	2

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 23	1.64	0.155			3.8			0.45	0.47			1.18	1.32	1.45	--	40.3		28.6	23.0	0.07
23- 36	1.28	0.134			4.7			0.39	0.46			1.25	1.30	1.45	--	35.7		29.4	24.0	0.07
36- 51	0.84	0.083			5.6			0.25	0.42			1.13	1.18	1.35	--	44.1		38.0	28.1	0.12
51- 74	0.36	0.037			5.9			0.25	0.47			1.23	1.24	1.31	--	40.7		37.6	27.5	0.13
74-114	0.16				5.7			0.28	0.46				1.20						25.0	
114-180	0.08				5.1			0.32	0.47										24.4	
180-203	0.04				5.1			0.34	0.49										24.7	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- ITY	EXTR AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) KCL IN	CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G - - -		- - - - - - - - ->			<- - - - -		-PCT - - - ->					1:2	1:1
0- 23	6.1	1.5	0.1	0.4	8.1	26.6	5.8	34.7	21.9	13.9	42	23	37				3.3		4.3
23- 36	11.2	2.7	0.2	0.2	14.3	17.6	0.8	31.9	20.3	15.1	5	45	70				3.9		4.8
36- 51	11.6	3.4	0.2	0.1	15.3	11.7	0.1	27.0	16.5	15.4	1	57	93				4.7		5.3
51- 74	6.4	2.5	0.2	0.2	9.3	15.0	2.9	24.3	14.5	12.2	24	38	64				3.6		4.4
74-114	1.9	2.2	0.2	0.2	4.5	17.7	7.5	22.2	15.2	12.0	63	20	30				3.6		4.6
114-180	1.0	3.4	0.3	0.3	5.0	19.1	11.1	24.1	16.8	16.1	69	21	30				3.6		4.7
180-203	0.9	3.8	0.3	0.3	5.3	17.6	9.6	22.9	16.8	14.9	64	23	32				3.6		4.7

Narrative Pedon Description

Pedon: Lares

NSSL pedon number: 40A0573

Pedon ID: S63PR-011-001

SSIR #12 pedon ID: S63PR-8-2

Field classification: Clayey, mixed, isohyperthermic Aquic Tropohumults

Revised classification as of April 01, 2001: Very-fine, mixed, semiactive, isohyperthermic Aquic Hapludults

Location: Añasco, Puerto Rico; Oeste Soil Conservation District, Puerto Rico; 1.8 kilometers northwest from town of Añasco, 91 meters southeast of kilometer marker 143.6 on new Highway 2

Latitude: 18°17’46" north

Longitude: 67°09’30" west

Geomorphic position: Alluvial fan

Slope: 3 percent; on a terrace or alluvial fan

Vegetation: Sugarcane

Parent material: Sediments derived from volcanic rocks

Drainage: Moderately well drained

Particle-size control section: 35 to 50 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, L.H. Rivera, and R.E. Gierbolini on September 24, 1963

Notes: Soil was above field capacity when sampled. Free water was at a depth of 74 cm at the time of sampling. Reaction was determined by Soiltex. This site has been used for sugarcane for a very long time. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

A—0 to 23 cm; brown (10YR 4/3) silty clay; weak fine granular structure; friable, slightly hard, slightly sticky, slightly plastic; common fine roots; very strongly acid; clear smooth boundary. 40A4190

B1—23 to 36 cm; brown (10YR 5/3) and light yellowish brown (10YR 6/4) clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; 10 percent patchy clay films; 1 percent fine black (10YR 2/1) dark nodules; very strongly acid; clear smooth boundary. 40A4191

B2t—36 to 51 cm; light yellowish brown (10YR 6/4) clay; 1 percent fine distinct dark red (10R 3/6), 1 percent fine faint yellowish brown (10YR 5/6), and 3 percent fine faint very pale brown (10YR 7/3) redoximorphic features; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; continuous clay films; common fine and medium partially weathered rock fragments; strongly acid; clear smooth boundary. 40A4192

B3—51 to 74 cm; yellowish brown (10YR 5/6) clay; 1 percent fine distinct dark red (10R 3/6), 1 percent fine distinct red (10R 4/8), and 1 percent fine faint very pale brown (10YR 7/3) redoximorphic features; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; patchy

clay films on vertical faces of peds; many weathered rock fragments; few hard angular rock fragments; strongly acid; gradual smooth boundary. 40A4193

C1—74 to 114 cm; dark red (10R 3/6), greenish gray (5GY 6/1), and yellowish brown (10YR 5/6) clay, red (10R 5/6) crushed; massive; firm, slightly sticky, slightly plastic; 1 percent medium black (10YR 2/1) dark concretions; very strongly acid; gradual smooth boundary. 40A4194

C2—114 to 180 cm; auger sample of yellowish brown (10YR 5/6), greenish gray (5GY 6/1), and red (10R 4/6) clay; massive; friable, slightly sticky, slightly plastic; common fine rock fragments; weathered transported rock fragments of variegated colors; strongly acid. 40A4195

C3—180 to 203 cm; yellowish brown (10YR 5/6), red (10R 4/6), and greenish gray (5GY 6/1) clay; massive; friable, slightly sticky, slightly plastic; common fine rock fragments; weathered transported rock fragments of variegated colors; strongly acid. 40A4196

Toa: S63PR-011-002

Primary Characterization Data

Añasco Municipio, Puerto Rico

Sampled as: Toa; clayey, mixed, isohyperthermic Aquic Fluventic Hapludolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 545, Samples 40A 4021–4025

—General methods: 1B1A, 2A1, 2B

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20-

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	(- -CLAY- -) FINE LT .0002	CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
40A4021S	0- 18	Ap	30.8	54.1	15.1			33.8	20.3	10.6	2.8	0.5	0.7	0.5	--C	--C	--	4	--
40A4022S	18- 41	B21	29.5	54.0	16.5			33.5	20.5	12.0	2.9	0.5	0.6	0.5	--C	--C	--	4	--
40A4023S	28- 58	B22	30.7	52.3	17.0	6.8		31.4	20.9	13.0	3.1	0.4	0.4	0.1	--C	--C	--	4	--
40A4024S	58- 94	C1	30.0	53.1	16.9			31.6	21.5	13.1	3.7	0.1	TR	--	--C	--C	--	4	--
40A4025S	94-152	C2	28.2	49.3	22.5			30.7	18.6	16.2	5.9	0.3	0.1	TR	--C	--C	--	6	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 18	1.90	0.158			3.3			0.77	0.58			1.37	1.41	1.51	--	29.8		27.8	18.0	0.14
18- 41	0.98	0.095			3.3			0.82	0.60			1.56	1.54	1.65	--	23.2		24.4	17.6	0.10
28- 58	0.89	0.078			3.3			0.80	0.61			1.34	1.36	1.48	--	29.6		28.2	18.7	0.13
58- 94	0.39	0.047			3.3			0.70	0.63			1.42	1.43	1.51	--	25.3		24.7	18.8	0.08
94-152	0.28				3.7			0.73	0.66				1.40						18.7	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 18	11.8	5.7	0.1	1.0	18.6	15.4	0.5	34.0	23.7	19.1	3	55	78				3.9		4.9
18- 41	16.3	7.7	0.2	0.4	24.6	10.2		34.8	24.1			71	100				4.9		6.0
28- 58	17.7	7.9	0.2	0.4	26.2	8.4		34.6	24.7			76	100				5.1		6.2
58- 94	17.7	7.8	0.2	0.4	26.1	6.8		32.9	21.0			79	100	--			5.2		6.3
94-152	15.5	8.3	0.2	0.5	24.5	6.7		31.2	20.6			79	100	--			5.1		6.3

```
         < - - - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - ->
         FRACT < - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - - ELEMENTAL - - - - - - - - -><- -> EGME INTER
SAMPLE    ION  <                              >< - DTA - -><- - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <     > RETN PRETA
               < - - - - -         - - - - - -><-         - ><-        - ><- - - - - - - - - -        - - - - - - - - - -><     >      TION
NUMBER   <- - ><- - - - - peak size - - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - - -><- -><mg/g>< - >
40A4021   TCLY  KK 2  MI 2
```

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite   MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Toa
NSSL pedon number: 40A545
Pedon ID: S63PR-011-002
SSIR #12 pedon ID: S63PR-8-1
Field classification: Clayey, mixed, isohyperthermic Aquic Fluventic Hapludolls
Revised classification as of April 01, 2001: Fine, mixed, active, isohyperthermic Fluvaquentic Hapludolls
Location: Añasco, Puerto Rico; Oeste Soil Conservation District, Puerto Rico; 16 km north of the city of Mayagüez in the Añasco River Valley, 650 meters on dirt road west of kilometer marker 146.1 on Highway 2 and 23 meters south of dirt road
Latitude: 18°16’20" north
Longitude: 67°10’12" west
Slope: 2 percent; on a natural levee near the course of the Añasco River
Relief: Undulating or gently rolling
Drainage, runoff, and permeability: Moderately well drained, medium runoff, and moderate permeability
Vegetation: Cultivated; used for sugarcane
Parent material: Moderately fine-textured sediments derived from basic volcanic rocks
Depth to water table: 91 cm
Described and sampled by: R.B. Grossman, L.H. Rivera, and R.E. Gierbolini on September 23, 1963
Notes: The soil was above field capacity when sampled. Reaction was determined by Soiltex. The site of the pedon has been used for sugarcane for a long time. Scattered pottery fragments were found at depths of 50 cm and 84 cm. Several of the fragments at 50 cm have scribed bands. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 10 cm; dark brown (10YR 3/3) silty clay loam; weak medium granular structure; friable, slightly sticky, slightly plastic; common fine roots; few fine volcanic fragments; moderately acid; clear smooth boundary. 40A4021

B21—10 to 20 cm; dark brown (10YR 3/3) silty clay loam; weak fine and medium subangular blocky structure with thin patchy clay films on faces and root channels; firm, slightly sticky, slightly plastic; common fine roots; few fine pores; few fine black nodules; few fine volcanic fragments; moderately acid; clear smooth boundary. 40A4022

B22—20 to 33 cm; dark yellowish brown (10YR 4/3) silty clay loam; few fine faint brown (7.5YR 4/4) redoximorphic concentrations; weak medium subangular blocky structure with thin patchy clay films on faces and in roots channels; firm, slightly sticky, slightly plastic; few fine roots; common fine pores; few fine black concretions; slightly acid; clear smooth boundary. 40A4023

C1—33 to 53 cm; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and few medium pores; very few fine black concretions; slightly acid; clear smooth boundary. 40A4024

C2—53 to 76 cm; auger sample of brown (10YR 4/3) clay loam; massive; friable, slightly sticky, slightly plastic; very few fine concretions; slightly acid. 40A4025

Arecibo Municipio

Colinas: S73PR-001-007

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Colinas; fine-loamy, carbonatic, isohyperthermic Eutropeptic Rendolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1268, Samples 40A 9646–9649

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002 <- - - - - - - - - - - - - PCT OF <2MM	-2-- TOTAL SILT .002-.05	-3-- TOTAL SAND .05-2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002-.02	-7-- SILT COARSE .02-.05	-8-- SAND VF .05-.10	-9-- SAND F .10-.25	-10- SAND M .25-.50	-11- SAND C .5-1	-12- SAND VC 1-2	-13- COARSE FRACS (MM) 2-5	-14- COARSE FRACS (MM) 5-20	-15- COARSE FRACS (MM) 20-75	-16- >2MM .1-75	-17- WT % OF WHOLE SOIL (3B1)	-18-	-19-	-20-
				(- - -TOTAL - - -)		(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)			(>2MM)				
40A9646S	0- 20	Ap	31.6	22.3	46.1		15.6	6.7	5.3	8.6	6.8	11.5	13.9	--	--	--	41	--			
40A9647S	20- 36	B	29.4	33.1	37.5		26.6	6.5	5.6	7.4	5.4	9.8	9.3	--	--	--	32	--			
40A9648S	36- 53	C1	17.0	39.6	43.4		28.7	10.9	6.9	8.0	6.3	13.0	9.2	--	--	--	36	--			
40A9649S	53	C2												--	--	--		--			

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	EXTR TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) FE 6C2b OF	AL 6G7a <2MM -->	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	COLE OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF	1/10 BAR 4B1c <2MM	1/3 BAR 4B1c - ->	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
0- 20					2.2			0.81	0.57										17.9	
20- 36	0.87				0.7			0.23	0.50										14.7	
36- 53	0.34				0.2			0.15	0.56										9.5	
53																				

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	ACID- ITY 6H5a	6G9a	(- -CEC- -) SUM BASES 5A3a	NH4- OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM CATS 5C3 <- -PCT- >	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g <- -PCT ->	<20MM 8E1	CASO4 AS GYPSUM <2MM <20MM 8I <- -PCT ->	SAT PASTE 8C1d	(- - - -PH - - -) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G					- - - - - - - - - ->												
0- 20		1.6	0.4	0.3	--			25.6	2		100	9	62				7.2	7.6
20- 36		0.5	0.2	0.1	2.1			6.8	2	TR		12	88			7.4	7.3	7.9
36- 53		0.6	0.2	TR	2.2			2.6	8			31	97				7.4	8.1
53																		

DEPTH (CM)	(- - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	PRED. ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - -MEQ / LITER											<- -PCT- ->			
0- 20															
20- 36	6.8	0.2	0.6	TR	--	2.8		0.8	1.4		1.2	50.4	TR	0.8	
36- 53															
53															

Narrative Pedon Description

Pedon: Colinas
NSSL pedon number: 40A1268
Pedon ID: S73PR-001-007
Field classification: Fine-loamy, carbonatic, isohyperthermic Eutropeptic Rendolls
Revised classification as of March 01, 2001: Fine-loamy, carbonatic, isohyperthermic Typic Haprendolls
Location: Arecibo Municipio, Puerto Rico; Atlantico Soil Conservation District; 0.6 km northeast of farm gate on paved road that is 0.3 km north of kilometer marker 66.5 on Highway 2
Soil survey area: Arecibo
Latitude: Unknown
Longitude: Unknown
Slope: 25 percent
Drainage: Well drained
Vegetation: Grass and herbaceous cover
Particle-size control section: 25 to 53 cm
Described and sampled by: L.H. Rivera on November 28, 1973
Notes: Soil was sampled at one-half to three-fourths field capacity. Site was slightly eroded.

Ap—0 to 20 cm; very dark grayish brown (10YR 3/2) gravelly clay loam; weak fine granular structure; firm, slightly sticky, moderately plastic; many fine roots; 21 percent fine and medium fragments of limestone; violent effervescence with dilute HCl; clear smooth boundary. 40A9646

B—20 to 36 cm; dark grayish brown (10YR 4/2) gravelly clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; 21 percent fine fragments of limestone; violent effervescence with dilute HCl; clear smooth boundary. 40A9647

C1—36 to 53 cm; light yellowish brown (10YR 6/4) clay loam; massive; friable, nonsticky, slightly plastic; 3 percent fine fragments of limestone; violent effervescence with dilute HCl; gradual wavy boundary. 40A9648

C2—53 cm; fragments of limestone. 40A9649

Islote: S73PR-001-008

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Islote; fine, mixed, semiactive, isohyperthermic Typic Rhodudults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1271, Samples 40A 9659–9664

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A9659S	0- 20	Ap														--	--	--		--
40A9660S	20- 30	B1		51.2	15.6	33.2			9.9	5.7	1.9	7.1	12.3	9.8	2.1	--	--	--	31	--
40A9661S	30- 46	B21		60.0	13.6	26.4			8.3	5.3	2.2	5.1	8.7	8.6	1.8	--	--	--	24	--
40A9662S	46- 61	B22		58.6	13.0	28.4			8.7	4.3	2.3	4.9	8.7	10.6	1.9	--	--	--	26	--
40A9663S	61- 76	B3		61.2	9.3	29.5			5.8	3.5	2.2	3.7	5.5	14.7	3.4	--	--	--	27	--
40A9664S	76- 0	C														--	--	--		--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 20																				
20- 30	0.43				4.3	0.5		0.42												
30- 46	0.45				4.2	0.5		0.36												
46- 61	0.43				4.0	0.4		0.38												
61- 76	0.43				3.7	0.4		0.40												
76- 0																				

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->								1:2	1:1
0- 20																				
20- 30	12.4	--	1.1	1.0	14.5	8.1	TR	22.6	21.3			64	68					4.7	5.3	5.5
30- 46	12.6	4.4	1.3	0.8	19.1	4.5		23.6	21.6			81	88					5.4	6.1	6.4
46- 61	15.5	4.9	1.4	0.7	22.5	5.4		27.9	22.0			81	100					5.6	6.4	6.7
61- 76	0.3	4.8	1.5	0.8	7.4	5.4		12.8	24.6			58	30					5.9	6.6	6.9
76- 0																				

Narrative Pedon Description

Pedon: Islote
NSSL pedon number: 40A1271
Pedon ID: S73PR-001-008
Field classification: Fine, mixed, semiactive, isohyperthermic Typic Rhodudults
Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Humic Hapludults
Location: Arecibo Municipio, Puerto Rico; Arecibo Soil Survey Area; 100 meters south along dirt road from kilometer marker 7.85 on Highway 681 and 12 meters west from dirt road
Latitude: Unknown
Longitude: Unknown
Elevation: 33 meters
Slope: 3 percent
Average air temperature: Annual—25.6 °C
Average annual precipitation: 1,524 mm
Drainage: Well drained
Vegetation: Grass and herbaceous cover
Parent material: Fine-textured materials derived from calcareous sandstone
Particle-size control section: 25 to 76 cm
Described and sampled by: G. Acevedo on November 11, 1973

Ap—0 to 20 cm; dark brown (7.5YR 3/2) sandy clay loam; moderate fine granular structure; friable, nonsticky, slightly plastic; many fine roots; clear smooth boundary. 40A9659

B1—20 to 30 cm; 40 percent dark red (2.5YR 3/6) and 60 percent dark brown (7.5YR 3/2) clay; weak medium subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; patchy clay films; common fine white specks; clear smooth boundary. 40A9660

B21—30 to 46 cm; dark red (2.5YR 3/6) clay; moderate medium and coarse subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; patchy clay films; many white specks; gradual smooth boundary. 40A9661

B22—46 to 61 cm; dark red (2.5YR 3/6) clay; moderate coarse subangular blocky structure; firm, slightly sticky, moderately plastic; discontinuous clay films and 10 percent black stains; many white specks; clear smooth boundary. 40A9662

B3—61 to 76 cm; dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; firm, slightly sticky, moderately plastic; patchy clay films; many white specks; common fine sand grains; clear smooth boundary. 40A9663

C—76 cm; partially cemented calcareous sandstone that can be penetrated with a spade; slight effervescence with dilute HCl. 40A9664

Alonso: S88PR-001-001

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Alonso; clayey, mixed, isohyperthermic Humic Kandiudox

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 373, Samples 88P 1909–1917

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- WT % OF WHOLE SOIL
			<- - - - -	- - - -	- - - -	- - - -	PCT OF <2MM	(3A1) - - -	- - - -	- - - -	- - - -	- - - -	- - ->	<- PCT OF	<75MM(3B1)		->	
88P1909S	0- 17	Ap	69.1	25.6	5.3	32.9		19.3	6.3	1.6	1.5	0.9	0.7	0.6	TR	TR	--	4	TR
88P1910S	17- 43	Bo1	70.8	24.5	4.7	28.9		18.4	6.1	1.8	1.6	1.0	0.3	--	--	--	--	3	--
88P1911S	43- 67	Bo2	60.6	34.4	5.0	21.5		22.3	12.2	2.9	1.3	0.5	0.3	--	--	--	--	2	--
88P1912S	67-104	Bo3	61.9	31.4	6.7	20.0		23.9	7.5	4.2	1.9	0.4	0.2	--	--	--	--	2	--
88P1913S	104-145	Bo4	48.5	37.4	14.1	14.8		27.0	10.4	8.3	4.1	1.3	0.4	--	TR	--	--	6	--
88P1914S	145-168	Bw	55.5	32.5	12.0	16.7		23.5	9.0	5.6	3.1	1.7	1.0	0.6	--	--	--	6	--
88P1915S	168-189	BC	60.2	29.1	10.7	20.3		21.7	7.4	4.3	3.1	1.8	1.2	0.3	--	--	--	6	--
88P1916S	189-225	C	33.9	51.7	14.4	11.9		29.0	22.7	6.9	5.8	1.4	0.3	--	--	--	--	7	--
88P1917S	0- 0	SAPROLITE	14.9	31.7	53.4	6.9		16.5	15.3	17.1	16.0	13.5	6.3	0.5	--	30	27	73	57

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a OF <2MM	MN 6D2a -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1 PCT <0.4MM	PI 4F	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 17	2.23	0.218	75		8.8	0.6	TR	0.27	0.41				1.17	1.40	0.062			38.3	28.3	0.12
17- 43	1.17	0.114	1		8.5	0.6	TR	0.20	0.42									41.5	29.8	
43- 67	0.79	0.086	1		8.7	0.6	TR	0.22	0.50				1.19	1.43	0.063			39.2	30.3	0.11
67-104	0.37		1		8.5	0.5	TR	0.24	0.50				1.25	1.47	0.056			39.3	30.8	0.11
104-145	0.22		1		8.5	0.5	TR	0.27	0.70	73	38		1.13	1.29	0.045			45.4	34.0	0.13
145-168	0.13		2		9.1	0.5	TR	0.24	0.48				1.31	1.46	0.037			33.5	26.5	0.09
168-189	0.13		1		9.2	0.6	TR	0.20	0.43										26.1	
189-225	0.06		3		8.6	0.4	TR	0.49	0.73										24.7	
0- 0	0.08		1		5.5	0.3	0.1	1.49	1.12										16.7	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - -	- - - -	- - - -	- -MEQ /	100 G - -	- - - -	- - - -	- - - -	- - - -	- - ->	<- - - -	-PCT - -	- ->					1:2	1:1
0- 17	0.9	0.2	TR	0.4	1.5	26.5	8.5	28.0	18.7	10.0	85	5	8				3.2	3.5	3.7
17- 43	0.4	TR	0.1	0.4	0.9	20.3	8.8	21.2	14.1	9.7	91	4	6				3.6	3.8	4.1
43- 67	0.5	0.1	0.1	0.3	1.0	21.6	9.3	22.6	13.3	10.3	90	4	8				4.5	3.9	4.2
67-104	0.3	--	TR	0.6	0.9	19.8	9.5	20.7	14.7	10.4	91	4	6				3.7	3.9	4.1
104-145	0.5	--	TR	0.3	0.8	19.4	10.5	20.2	13.0	11.3	93	4	6				3.9	4.0	4.2
145-168	0.6	0.1	0.2	0.1	1.0	16.2	7.7	17.2	13.1	8.7	89	6	8				3.8	4.0	4.2
168-189	0.5	0.1	0.1	0.1	0.8	15.1	7.3	15.9	12.1	8.1	90	5	7				3.7	4.0	4.1
189-225	0.4	0.4	0.1	0.2	1.1	18.9	11.0	20.0	16.7	12.1	91	6	7				3.6	3.9	4.1
0- 0	1.3	8.6	0.1	0.2	10.2	16.7	7.0	26.9	22.2	17.2	41	38	46				3.7	4.2	5.0

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i peak size				THERMAL DTA 7A6 Percent	TGA 7A4b	ELEMENTAL 7C3 SiO2 Percent	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTERPRETATION
88P1910	TCLY	KK 3	HE 2	GE 1	MI 1				25.0	11.6			1.4			
88P1912	TCLY	KK 3	MI 2	HE 2	GE 1				25.0	10.9			1.6			
88P1916	TCLY	KK 3	MI 2	HE 2	GE 1				24.0	9.3			2.1			
88P1917	TCLY	KK 3	MI 2	HE 1					21.0	7.9			2.4			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite HE hematite GE goethite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN AGGRT PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY	SILT SML	SAND	SOIL CONT 8F1	STABL <5mm 4G1
			<- P C T o f < 2 m m ->				<- P P M ->		< - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - - >											<20mm>	<PCT>
88P1909	1	0.12	0.83	0.04	0.32	41			2.31												49
88P1910	2	0.05	0.39	0.04	0.35	54			1.28												
88P1911	3	0.05	0.45	0.04	0.40	60			0.88												
88P1912	4	0.03	0.30	0.04	0.37	58			0.30												
88P1913	5	0.03	0.38	0.04	0.37	59			0.31												
88P1914	6	0.02	0.33	0.04	0.29	48			0.22												
88P1915	7	0.02	0.31	0.04	0.26	48			0.25												
88P1916	8	0.02	0.26	0.04	0.30	58															
88P1917	9	0.03	0.24	0.07	0.37	59															

Narrative Pedon Description

Pedon: Alonso
NSSL pedon number: 88P0373
Pedon ID: S88PR-001-001
Field classification: Clayey, mixed, isohyperthermic Humic Kandiudox
Revised classification as of March 01, 2001: Very-fine, mixed, isohyperthermic Typic Hapludox
Location: Arecibo Municipio, Puerto Rico; 46 meters east of Highway 135 and 1.5 km east of Castaner
Latitude: 18°10’45" north
Longitude: 66°49’04" west
Elevation: 585 meters
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus; on lower third of component
Slope: 65 percent on a west aspect
Average annual precipitation: 250 cm; udic moisture regime
Major Land Resource Area: 270—Humid Mountains and Valleys
Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability
Vegetation: Crops on horticultural land
Erosion: Slight
Particle-size control section: 25 to 100 cm
Parent material: Local colluvium
Diagnostic features: Ochric epipedon at 0 to 17 cm; oxic horizon at 17 to 145 cm
Described and sampled by: D. Williams and G. Acevedo during February 1988
Notes: Matrix colors are for moist ped interiors.

A—0 to 17 cm; dark reddish brown (5YR 3/3) clay; moderate fine subangular blocky structure; friable, sticky, plastic; common fine roots throughout; extremely acid; clear smooth boundary. 88P1909

Bo1—17 to 43 cm; reddish brown (5YR 4/3) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, sticky, plastic; common fine roots throughout; few fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; extremely acid; gradual smooth boundary. 88P1910

Bo2—43 to 67 cm; reddish brown (5YR 4/3) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, sticky, plastic; common fine roots throughout; few fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; extremely acid; gradual smooth boundary. 88P1911

Bo3—67 to 104 cm; reddish brown (5YR 4/4) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, sticky, plastic; few fine roots throughout; few fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; extremely acid; clear wavy boundary. 88P1912

Bo4—104 to 145 cm; reddish brown (5YR 4/4) clay; moderate fine subangular blocky structure; friable, sticky, plastic; few fine roots throughout; few fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds and common continuous distinct pressure faces on vertical and horizontal faces of peds; few small saprolite fragments; coatings of dark reddish brown (5YR 3/3) on ped faces; extremely acid; clear smooth boundary. 88P1913

Bw—145 to 168 cm; 40 percent yellowish red (5YR 4/6) and 60 percent dark reddish brown (5YR 3/3) clay loam; moderate fine subangular blocky structure parting to moderate very fine subangular blocky; friable, sticky, plastic; few fine roots throughout; few fine tubular pores; common continuous distinct organic coatings on vertical and horizontal faces of peds; extremely acid; clear smooth boundary. 88P1914

BC—168 to 189 cm; dark red (2.5YR 3/6) clay loam; moderate fine subangular blocky structure; friable, sticky, plastic; extremely acid; clear smooth boundary. 88P1915

C—189 to 225 cm; dark reddish brown (5YR 3/2) loam; common medium distinct redoximorphic features; massive; very friable, slightly sticky, slightly plastic; extremely acid. 88P1916

Garrochales: S73PR-001-002

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Garrochales

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1262, Samples 40A 9608–9614

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A9608S	0- 20	Oap														--	--	--		--
40A9609S	20- 41	Oa2														--	--	--		--
40A9610S	41- 69	Oa3														--	--	--		--
40A9611S	67-117	Oa4														--	--	--		--
40A9612S	117-119	2C1														--	--	--		--
40A9613S	119-142	2LCaL														--	--	--		--
40A9614S	142-188	Oa5														--	--	--		--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 20	32.8												0.66	1.03		164.0		57.2		
20- 41	17.7												0.62	0.95		307.0		52.6		
41- 69	25.6												0.75	1.01		490.0		34.9		
67-117	8.90												0.71	1.08		693.0		40.8		
117-119																				
119-142	9.20																			
142-188	29.8																			

	(- NH4OAC EXTRACTABLE BASES -)					ACID-		(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY		SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH					BASES			CATS	OAC			SUM NH4OAC		<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - -			-MEQ / 100 G			- - - - - - - - - ->>			PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 20		26.0	12.0	1.5		27.7			206.0	2	7		100	1				6.8	6.2	6.2
20- 41	303.0	23.7	28.4	0.5	355.6	99.5		455.1	178.0	16	8	78	100	TR				4.5	4.5	4.6
41- 69																			2.6	2.7
67-117											7			TR				3.5	3.4	3.5
117-119																				
119-142																				
142-188	113.0	38.7	29.8	0.8	182.3	188.0		370.3	205.0	15		49	89	TR					4.0	3.9

	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - -)													PRED.	
													TOTAL	ELEC.	ELEC.
	CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	SALTS	COND.	COND.
DEPTH													EST.		
(CM)														MMHOS	MMHOS
	< - - - - - - - - - - - - - -					-MEQ / LITER		- - - - - - - - - - - - ->>				<- -PCT- ->>		/cm	/cm
0- 20	26.4	9.9	28.4	2.0	--	0.8		38.0	27.0		12.1	274.0	1.2	5.7	
20- 41	37.8	20.6	42.9	0.6	--	0.5		46.3	47.6		4.9	646.0	3.5	7.0	
41- 69															
67-117	32.5	25.5	38.7	0.2	--	--		39.7	58.4		3.2	947.0	5.3	7.3	
117-119															
119-142															
142-188															

Narrative Pedon Description

Pedon: Garrochales
NSSL pedon number: 40A1262
Pedon ID: S73PR-001-002
Field classification: None given
Revised classification as of March 01, 2001: Loamy, mixed, euic, isohyperthermic Terric Haplosaprists
Location: Atlantico Soil Conservation District, Puerto Rico; Cano Tiburones Area; 0.5 km east of junction with dirt road, 1.4 km north of kilometer marker 10.7 on Highway 682
Latitude: Unknown
Longitude: Unknown
Vegetation: Grass and herbaceous cover
Drainage: Poorly drained; aquic moisture regime
Parent material: Organic accumulations
Particle-size control section: 0 to 81 cm
Described and sampled by: L.H. Rivera on November 7, 1973

Oap—0 to 20 cm; black (N 2/0) muck; moderate fine granular structure; very friable, slightly sticky, slightly plastic; many fine roots; about 5 percent fiber, less than 5 percent rubbed; low mineral content; moderately acid; clear smooth boundary. 40A9608

Oa2—20 to 41 cm; muck, very dark brown (10YR 2/2) broken face and rubbed; friable, slightly sticky, slightly plastic; few fine roots; about 60 percent fiber and 10 percent rubbed layers of intact sedges that are almost completely destroyed upon rubbing; low mineral content; extremely acid; clear smooth boundary. 40A9609

Oa3—41 to 69 cm; muck, black (10YR 2/1) broken face and rubbed; massive; friable, slightly sticky, slightly plastic; about 40 percent fiber and 10 percent rubbed layers of intact sedges that are almost completely destroyed upon rubbing; low mineral content; strongly acid; abrupt smooth boundary. 40A9610

Oa4—67 to 117 cm; muck, very dark grayish brown (10YR 3/2) broken face and rubbed; massive; friable, slightly sticky, slightly plastic; about 60 percent fiber unrubbed, 15 percent rubbed; low mineral content; slightly acid; abrupt smooth boundary. 40A9611

2C1—117 to 119 cm; bluish gray (5B 5/1) silt loam; thin layer between the organic and marl layers. 40A9612

2LCaL—119 to 142 cm; light gray (10YR 7/1) silt loam (marl); massive; slightly sticky, slightly plastic; slight effervescence with dilute HCl; abrupt smooth boundary. 40A9613

Oa5—142 to 188 cm; muck, very dark grayish brown (10YR 3/2) broken face and rubbed color; massive; friable, slightly sticky, slightly plastic; about 60 percent fiber unrubbed, 15 percent rubbed; low mineral content; neutral. 40A9614

Tiburones: S73PR-001-004

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Tiburones

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1264, Samples 40A 9622–9626

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - -	- -SAND- -		- - - -)	(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A9622S	0- 23	Oap														--	--	--		--
40A9623S	23- 38	Oa2														--	--	--		--
40A9624S	38- 79	Oa3														--	--	--		--
40A9625S	79-107	Oa4														--	--	--		--
40A9626S	107-213	Oa5														--	--	--		--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 23	35.0												0.44	1.01	--	88.0		130.2	98.3	0.14
23- 38	36.5												0.35	0.91	--	176.0		153.5	141.4	0.04
38- 79	33.6												0.56	0.96	--	267.0		88.5	119.7	
79-107	25.4												0.61	1.04	--	255.0		74.0	126.4	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-		(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY		SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH					BASES			CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->									PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 23		36.9	10.1	1.1		16.1			246.0	1	4		20	4				7.0	7.1	7.3
23- 38		52.7	40.0	0.2	92.9	103.0		195.9	225.0	3	9	47	41					4.8	4.7	4.7
38- 79		55.6	48.4	0.2	104.2	127.0		231.2	220.0	7	11	45	47	TR				4.3	4.5	4.6
79-107		66.2	55.4	0.1		111.0			233.0	8	11		52	1				4.7	4.5	4.6
107-213		67.8	37.7	0.5		9.1			336.0	11			32	1					5.3	5.4

	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -)														PRED.
													TOTAL	ELEC.	ELEC.
	CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	SALTS	COND.	COND.
DEPTH													EST.		
(CM)														MMHOS	MMHOS
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - - ->											<- -PCT- ->		/cm	/cm
0- 23	81.4	31.6	32.7	1.7	--	6.5		41.2	70.2		27.8	225.0	1.5	8.5	
23- 38	36.0	27.5	53.2	0.1	--	1.6		55.6	54.3		6.0	621.0	3.8	7.9	
38- 79	42.1	42.7	72.7	0.1	--	1.3		81.0	70.7		7.3	451.0	3.5	9.8	
79-107	38.5	38.5	70.5	0.1	--	1.6		80.5	62.4		7.8	518.0	4.0	9.8	

Narrative Pedon Description

Pedon: Tiburones

NSSL pedon number: 40A1264

Pedon ID: S73PR-001-004

Revised classification as of March 01, 2001: Euic, isohyperthermic Typic Haplosaprists

Pedon purpose: Full pedon description

Location: Arecibo Municipio, Puerto Rico; Atlantico Soil Conservation District; Arecibo Soil Survey Area; Cano Tiburones Area; 0.2 km east of curve of dirt road, 2.1 km east of kilometer marker 10.7 on Highway 682

Latitude: Unknown

Longitude: Unknown

Geomorphic setting: Upland

Drainage: Poorly drained; aquic moisture regime

Described and sampled by: L.H. Rivera on November 7, 1973

Notes: Water table at 99 cm

Oap—0 to 23 cm; black (N 2/0) muck, black (N 2/0) broken face and rubbed; moderate medium granular structure; friable, slightly sticky, slightly plastic; many fine and common medium roots; less than 5 percent fiber; low mineral content; moderately acid; clear wavy boundary. 40A9622

Oa2—23 to 38 cm; black (N 2/0) muck, black (N 2/0) broken face and rubbed; weak coarse prismatic and moderate medium platy structure; friable, slightly sticky, slightly plastic; common fine and medium roots; some root channels have white fungi; less than 5 percent fiber; low mineral content; extremely acid; gradual wavy boundary. 40A9623

Oa3—38 to 79 cm; black (N 2/0) muck, black (N 2/0) broken face and rubbed; massive; friable, slightly sticky, slightly plastic; common fine roots; less than 5 percent fiber; low mineral content; very strongly acid; clear smooth boundary. 40A9624

Oa4—79 to 107 cm; 10 percent very dark brown (10YR 2/2) and 90 percent black (N 2/0) muck; massive; friable, slightly sticky, slightly plastic; few fine roots; slightly acid; gradual smooth boundary. 40A9625

Oa5—107 to 213 cm; very dark brown (10YR 2/2) muck, very dark brown (10YR 2/2) broken face and rubbed; massive; friable, slightly sticky, slightly plastic; neutral; less than 5 percent fiber; low mineral content. 40A9626

Islote: S89PR-013-001

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Islote; fine, mixed, isohyperthermic Mollic Hapludalfs

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 402, Samples 89P 2245–2250

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05 -.05	TOTAL SAND -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE LT .002 -.02	SILT COARSE .02 -.05	SILT VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
89P2245S	0- 11	Ap	15.4	21.7	62.9	11.7		15.0	6.7	2.7	15.0	33.6	10.6	1.0	TR	TR	--	60	--
89P2246S	11- 19	A	21.8	15.7	62.5	12.4		9.9	5.8	4.4	13.6	32.3	10.9	1.3	TR	--	--	58	--
89P2247S	19- 34	Bt1	53.8	11.6	34.6	42.2		7.9	3.7	3.5	7.6	17.5	5.2	0.8	--	--	--	31	--
89P2248S	34- 54	Bt2	53.2	12.0	34.8	42.0		7.9	4.1	3.1	9.2	15.3	6.5	0.7	TR	--	--	32	--
89P2249S	54- 76	Bt3	54.9	10.4	34.7	42.5		7.1	3.3	2.7	7.2	17.4	6.5	0.9	--	--	--	32	--
89P2250S	76- 86	Bt4	47.0	5.5	47.5	32.4		2.9	2.6	3.2	6.2	17.6	16.4	4.1	TR	--	--	44	TR

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM -->	EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 11	1.78	0.201						0.64	0.60				1.43	1.54	0.025			20.9	9.2	0.17
11- 19	1.07	0.096						0.50	0.45				1.57	1.65	0.017			17.4	9.7	0.12
19- 34	0.70	0.087						0.39	0.40				1.31	1.63	0.076			33.2	21.3	0.16
34- 54	0.40	0.059						0.40	0.40				1.44	1.76	0.069			27.4	21.5	0.09
54- 76	0.41							0.42	0.39				1.45	1.73	0.061			26.6	21.3	0.08
76- 86	0.58							0.47	0.40				1.39	1.64	0.057			29.7	18.8	0.15

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	CEC- SUM CATS 5A3a	CEC- NH4- OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	CARBONATE AS CACO3 <20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	CASO4 AS GYPSUM <20MM 6F4	PH SAT PASTE 8C1b	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->>											<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 11	8.3	2.1	0.5	0.7	11.6	4.1		15.7	9.9	4	2	74	100						6.0	6.5
11- 19	5.1	2.6	0.4	0.5	8.6	6.5	TR	15.1	10.8	4		57	80						5.0	5.7
19- 34	8.4	5.8	1.5	0.8	16.5	11.3	0.6	27.8	20.9	6	5	59	79						4.6	5.0
34- 54	11.3	5.4	2.5	0.6	19.8	7.2		27.0	21.3	9	7	73	93						5.7	6.2
54- 76	15.0	5.1	3.8	0.5	24.4	4.6		29.0	23.3	12	11	84	100			--			6.6	7.1
76- 86		4.8	4.9	0.5		1.8			22.1	17	12		100	2		--			7.7	8.1

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3a MMHOS /cm	PRED. ELEC. COND. 8I MMHOS /cm
	<- - - - - - - - - - - - - - - - - - - MEQ / LITER ->														<- -PCT- ->			
0- 11	4.6	2.3	3.3	1.0	--	6.4	0.3	2.3				1.6	--	--	39.6	TR	1.10	0.32
11- 19																		0.19
19- 34	0.5	0.3	3.0	0.1	--	0.2	0.2	1.4				1.6	--	--	91.1	TR	0.47	0.26
34- 54	0.8	0.3	5.2	0.1	--	0.5	0.4	2.3				2.2	--	--	95.6	TR	0.70	0.38
54- 76	0.8	0.3	8.5	--	--	0.7	0.3	4.6				3.1	--	--	102.1	0.1	1.03	0.55
76- 86	2.8	0.8	15.6	0.1	--	2.5	0.5	9.9				5.2	--	--	71.6	0.1	2.00	0.97

SAMPLE NUMBER	FRACT ION 7A2i	X-RAY peak size	X-RAY	X-RAY	X-RAY	X-RAY	THERMAL DTA 7A6 Percent	THERMAL TGA 7A4b Percent	ELEMENTAL SiO2 7C3	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN <mg/g>	INTER PRETA 7D2 TION
89P2247	TCLY	KK 3	MI 2	MT 2	VC 2	GE 2				21.0	11.2			1.6			
89P2247	TCLY	HE 1															
89P2248	TCLY	KK 3	MT 3	MI 2	VC 2	GE 2				20.0	10.7			1.5			
89P2248	TCLY	HE 1															
89P2250	TCLY	KK 3	MT 2	MI 2	VC 2	GE 2				19.0	10.3			1.4			
89P2250	TCLY	HE 2															

```
           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
89P2245     FS                                                    77  QI59  FD22  OP17  OT 1  ZR 1  HNtr
89P2245     FS                                                        PRtr
89P2248     FS                                                    80  QZ64  FD19  OP16  OT 1  ZRtr  BTtr
89P2248     FS                                                        FFtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            FS    Fine Sand, 0.1-0.25mm
MINERAL INTERPRETATION:
    QI  iron-coat qz     FD  feldspar         OP  opaques          OT  other            ZR  zircon           HN  hornblende
    PR  pyroxene         KK  kaolinite        MI  mica             MT  montmorillon     VC  verm-chlorit     GE  goethite
    HE  hematite         QZ  quartz           BT  biotite          FF  foraminifera
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9a  6V2   6G12  6S4   6S5   6D3   6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
89P2245  1  0.08  0.48  0.05  0.08                                    11.9                                                      22
89P2246  2  0.06  0.45  0.04  0.09              8.2                   12.2                                                      20
89P2247  3  0.05  0.34  0.06  0.21             11.8                   29.1
89P2248  4  0.04  0.18  0.08  0.17                                    27.8
89P2249  5  0.04  0.18  0.09  0.20                                    27.9
89P2250  6  0.08  0.16  0.09  0.18                                    24.0
```

Narrative Pedon Description

Pedon: Islote

NSSL pedon number: 89P0402

Pedon ID: S89PR-013-001

Field classification: Fine, mixed, isohyperthermic Mollic Hapludalfs

Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Abruptic Argiudolls

Location: Arecibo Municipio, Puerto Rico; Arecibo Soil Survey sheet 4; 8.4 km east on Highway 681 from junction with Highway 2 and 183 meters south of road; Arecibo quadrangle; UTM zone 19: 2,046,180 m northing and 749,200 m easting

Latitude: 18°29’33" north

Longitude: 66°38’23" west

Elevation: 3 meters

Physiography: Coastal plains

Slope: 1 percent with a plane north aspect

Major Land Resource Area: 272—Humid Coastal Plains

Drainage, runoff, and permeability: Somewhat poorly drained, very slow runoff, and slow permeability

Vegetation: Pangolagrass in pastureland

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 33 to 84 cm

Parent material: Residuum from sandstone-calcareous material

Weather station number: 0410

Geographically associated soils: Caracoles, Cataño, and Colinas

Diagnostic features: Ochric epipedon at 0 to 20 cm; argillic horizon at 20 to 86 cm; lithic contact at 86 cm

Described and sampled by: D. Williams and C.L. Santiago during February 1989

Notes: Depth to bedrock in pit ranges from 58 to 127 cm (mostly less than 100 cm).

Ap—0 to 11 cm; dark brown (10YR 3/3) sandy clay loam; friable, sticky, plastic; boundary not identified. 89P2245

A—11 to 19 cm; very dark grayish brown (10YR 3/2) sandy clay loam; friable, sticky, plastic; boundary not identified. 89P2246

Bt1—19 to 34 cm; 30 percent very dark grayish brown (10YR 3/2) and 70 percent brown to dark brown (7.5YR 4/4) clay; few fine distinct redoximorphic features; weak coarse prismatic structure parting to weak fine subangular blocky; firm, sticky, plastic; common fine roots throughout; few fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; common fine and medium rounded soft masses of iron-manganese; boundary not identified. 89P2247

Bt2—34 to 54 cm; reddish brown (5YR 4/4) clay; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, sticky, plastic;

common fine roots throughout; few fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few fine rounded iron-manganese concretions; common old root channels filled with dark material; few angular peds breaking at about 45 degrees with thin striations; boundary not identified. 89P2248

Bt3—54 to 76 cm; reddish brown (5YR 4/4) clay; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, sticky, plastic; few fine roots throughout; few fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few old root channels filled with dark material; boundary not identified. 89P2249

Bt4—76 to 86 cm; brown to dark brown (7.5YR 4/4) clay; weak fine and medium subangular blocky structure; friable; few fine roots throughout; few fine tubular pores; very few patchy faint coatings; few old root channels filled with dark material; boundary not identified. 89P2250

R—86 cm; bedrock. Not sampled.

Colinas: S73PR-091-002

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Colinas; coarse-loamy, carbonatic, isohyperthermic Typic Rendolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1269, Samples 40A 9650–9652

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05 -.05	SAND -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) WEIGHT 2 -5	5 -20	20 -75	WT .1- 75	% OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM					( ) - - - - - - - - - - - - - ->							<- PCT OF <75MM(3B1)->				
40A9650S	0- 18	Ap	31.7	31.3	37.0			25.3	6.0	4.9	11.4	8.3	8.8	3.6	--	--	--	32	--
40A9651S	18- 30	B	23.0	31.7	45.3			24.3	7.4	5.5	13.5	9.8	10.6	5.9	--	--	--	40	--
40A9652S	30-100	C	8.0	32.0	60.0			26.9	5.1	5.2	16.9	13.2	15.4	9.3	--	--	--	55	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - ->	COLE OVEN DRY 4A1h	WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 18	5.51				1.7			1.03	0.74										23.3	
18- 30	2.40				1.2			0.81	0.64	48	13								14.7	
30-100	0.24				TR			0.20	0.64	999	NP								5.1	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	6G9a	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	(- - - -PH - - -) SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G					- - - - - - - - - ->				PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 18		1.7	0.3	1.7		2.3			32.8	1			11	64					7.0	7.5
18- 30		0.3	0.2	0.2		--			18.6	1	TR	100	4	74				7.6	7.2	7.7
30-100		0.1	0.1	TR		--			1.6	5	TR	100	13	98				7.7	7.4	8.1

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER											<- -PCT- ->			
0- 18															
18- 30	9.4	0.1	0.5	0.1	--	4.7		3.0	0.9		2.0	54.1	TR	1.1	
30-100	5.8	TR	0.4	TR	--	2.1		--	0.5		2.1	35.5	TR	0.7	

Narrative Pedon Description

Pedon: Colinas
NSSL pedon number: 40A1269
Pedon ID: S73PR-091-002
Field classification: Coarse-loamy, carbonatic, isohyperthermic Typic Rendolls
Revised classification as of April 01, 2001: Coarse-loamy, carbonatic, isohyperthermic Typic Haprendolls
Location: Arecibo Municipio, Puerto Rico; Norte Soil Conservation District; Arecibo Soil Survey Area; 70 meters west of kilometer marker 6.4 on Highway 49
Latitude: Unknown
Longitude: Unknown
Elevation: 50 meters
Slope: 35 percent
Drainage: Well drained
Vegetation: Pangolagrass; grass and herbaceous cover
Parent material: Residuum from soft limestone
Described and sampled by: L.H. Rivera and G. Acevedo on November 28, 1973

Ap—0 to 18 cm; very dark grayish brown (10YR 3/2) clay loam; moderate fine and medium granular structure; friable, slightly sticky, slightly plastic; many fine roots; common fine and medium soft limestone fragments; slight effervescence with dilute HCl; clear smooth boundary. 40A9650

B—18 to 30 cm; brown (10YR 4/3) clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium soft limestone fragments; strong effervescence with dilute HCl; abrupt wavy boundary. 40A9651

C—30 to 100 cm; light gray (10YR 7/2) and very pale brown (10YR 7/3), massive, soft limestone; very friable, nonsticky, slightly plastic; many dead roots; violent effervescence with dilute HCl. 40A9652

Bayamón: S98PR-013-001

Primary Characterization Data

Arecibo Municipio, Puerto Rico

Sampled as: Bayamón; very-fine, kaolinitic, isohyperthermic Typic Hapludox

SSL—Project: 98P 95, (RP98PR141) Puerto Rico

—Pedon: 98P 558, Samples 98P 3276–3280

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	CLAY LT .002	SILT .05	SAND LT	FINE .002	CO3	FINE .05	COARSE .10	VF .25	F .50	M .1	C .2	VC 5	20	.1- 75	% OF 75	WHOLE SOIL
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	WT
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->			
98P3276S	0- 25	Ap	38.0	5.8	56.2	22.5		2.0	3.8	6.1	35.4	13.6	1.0	0.1	--	--	--	50 --
98P3277S	25- 81	Bo1	53.7	3.6	42.7	33.1		1.3	2.3	4.9	27.7	9.3	0.7	0.1	--	--	--	38 --
98P3278S	81-107	Bo2	65.9	4.8	29.3	34.5		2.0	2.8	4.5	17.9	6.1	0.8	TR	--	--	--	25 --
98P3279S	107-170	Bo3	69.9	9.6	20.5	30.6		5.6	4.0	3.2	11.2	4.8	1.2	0.1	--	--	--	17 --
98P3280S	170-224	Bo4	71.6	6.3	22.1	32.6		2.8	3.5	3.3	12.9	5.1	0.7	0.1	--	--	--	19 --

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3b PPM	TOTAL S 6R3c <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2f	AL 6G7e	MN 6D2e OF <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LL 4F1	PI 4F PCT <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A5 <- - G/CC -	1/3 BAR 4A1d	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c	1/3 BAR 4B1c -PCT OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 25		0.185			4.5	0.6	0.2	0.21	0.35				1.55	1.62	0.015			20.1	13.2	0.11
25- 81		0.125			5.6	0.7	0.1	0.08	0.34				1.41	1.49	0.019			24.0	18.2	0.08
81-107		0.127			7.4	0.8	0.1	0.09	0.33				1.42	1.50	0.018			25.0	21.5	0.05
107-170		0.097			8.7	0.9	0.1	0.08	0.31				1.56	1.60	0.008			24.6	21.7	0.05
170-224		0.101			8.9	0.9	0.1	0.08	0.29				1.48	1.53	0.011			25.7	20.9	0.07

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2f	MG 5B5a 6O2e	NA 5B5a 6P2c	K 5B5a 6Q2c	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->< - - - - -PCT - - - ->																	1:2	1:1
0- 25	2.4	0.3	--	0.8	3.5	11.1	2.0	14.6	7.9	5.5	36	24	44				3.9	4.2	4.7
25- 81	--	TR	--	0.6	0.6	9.8	4.7	10.4	4.5	5.3	89	6	13				3.7	3.9	4.3
81-107	2.4	TR	--	0.3	2.7	12.1	7.0	14.8	5.6	9.7	72	18	48				3.7	3.9	4.2
107-170	1.2	0.2	--	--	1.4	10.9	4.2	12.3	5.4	5.6	75	11	26				3.7	4.0	4.5
170-224	2.7	0.4	--	--	3.1	10.3	3.7	13.4	5.4	6.8	54	23	57				3.8	4.1	4.7

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i					THERMAL DTA 7A6b		TGA 7A4c						ELEMENTAL SiO2	AL2O3	Fe2O3	MgO 7C4a	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRETA TION
	<- -	peak size					Percent								Percent							<mg/g>	
98P3277	TCLY	KK 4	GE 2	HE 2	GI 1																		CMIX
98P3279	TCLY	KK 3	GE 2	HE 2																			CMIX
98P3280	TCLY	KK 4	HE 2	GE 2																			CMIX

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite GI gibbsite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
CMIX = Mixed - Clay
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Mixed
FAMILY MINERALOGY: Kaolinite
COMMENTS:
Sample 98P3280 Fine sand = ~90% Quartz, ~10% red clay aggregates and/or clay coated Quartz, and ~1% opaques.
Coarse Silt = ~20% Quartz, ~80% red clay aggregates and/or clay coated Quartz, ~1% opaques, and <1% Zircon.

		ACID	OXALATE	EXTRACTION		PHOSPHOUS		KCL	TOTAL	(- -WATER		CONTENT- -)		(- - - - WATER DISPERSIBLE - - - -)					MIN	AGGRT
		OPT	FE	SI	AL		CIT-	MN	C	0.06	1-	2-	15	<- - PIPETTE - - ><- HYDROMETER - >					SOIL	STABL
		DEN				RET	ACID			BAR	BAR	BAR	BAR	CLAY	SILT	SAND	CLAY	SILT	SAND	CONT	<5mm
SAMPLE	HZ	8J1c	6C9b	6V2b	6G12b	6S4d	6S5	6D3b	6A2e	4B1c	4B1a	4B1a	4B2b	<- - -	3A1c	- - ->	<- - -	SML	- - ->	8F1	4G1
NO.	NO		<- P C T	o f	< 2 m m	->	<- P P M	->	< - - -	- - - -	- - -	P E R C	E N T		o f	< 2 m m	- - -	- - -	- - ->	<20mm>	<PCT>
98P3276	1	0.10	0.18	0.04	0.13	30		8.2	1.65			15.7		15.2	11.6	73.2					74
98P3277	2	0.05	0.05	TR	0.14	39		1.9	0.55			20.4		1.0	33.0	66.0					
98P3278	3	0.06	0.05	TR	0.14	47		3.0	0.45			24.2		0.7	46.3	53.0					
98P3279	4	0.08	0.05	TR	0.12	48		5.3	0.26			23.7		0.7	40.7	58.6					
98P3280	5	0.03	0.05	TR	0.11	45		0.5	0.19			22.8		0.9	13.3	85.8					

Narrative Pedon Description

Pedon: Bayamón
NSSL pedon number: S98PR-013-001
Pedon ID: S98PR-013-001
Pedon type: Typical pedon for series
Field classification: Very-fine, kaolinitic, isohyperthermic Typic Hapludox
Revised classification as of April 01, 1998: Bayamón; fine, kaolinitic, isohyperthermic Typic Kandiudults
Location: Arecibo, Puerto Rico; 1.1 km southeast of Sabana Hoyos community from the intersection of Highways 2 and 639; 183 meters west of paved road
Latitude: 18°25’46" north
Longitude: 66°36’20" west
Major Land Resource Area: 272—Humid Coastal Plains
Elevation: 95 meters
Geomorphic position: Plains in a coastal plain
Slope: 3 percent with an aspect of 346 degrees; linear upslope and convex across the slope
Drainage: Well drained
Vegetation: Crop cover
Geographically associated soils: Almirante, Matanzas, Tanama, and Vega Alta
Particle-size control section: 25 to 102 cm
Diagnostic features: Oxic horizon at a depth of 25 to 224 cm
Described and sampled by: J.L. Lugo, C.L. Santiago, and G. Brannon on March 2, 1998

Ap—0 to 25 cm; dark reddish brown (5YR 3/4) clay loam, reddish brown (5YR 4/4) dry; moderate medium granular structure; firm, slightly hard, slightly sticky, slightly plastic; many very fine and fine roots throughout; few fine and many very fine tubular pores; strongly acid; clear smooth boundary. 98P3276

Bo1—25 to 81 cm; red (2.5YR 4/6) clay, red (2.5YR 4/6) dry; weak fine subangular blocky structure; firm, slightly hard, moderately sticky, moderately plastic; common very fine and fine roots throughout; many very fine and fine tubular pores; very strongly acid; gradual wavy boundary. 98P3277

Bo2—81 to 107 cm; red (2.5YR 4/6) clay, red (2.5YR 4/8) dry; 1 percent fine and medium prominent dark yellowish brown (10YR 4/6) and 5 percent fine and coarse prominent brownish yellow (10YR 6/8) redoximorphic features; weak fine subangular blocky structure; firm, slightly hard, moderately sticky, moderately plastic; common very fine and fine roots throughout; many very fine and fine interstitial pores; very strongly acid; clear wavy boundary. 98P3278

Bo3—107 to 170 cm; red (10R 4/8) clay, red (2.5YR 4/8) dry; massive; friable, slightly hard, slightly sticky, moderately plastic; few very fine to medium roots throughout; many fine and many very fine interstitial pores; very strongly acid; gradual wavy boundary. 98P3279

Bo4—170 to 224 cm; red (2.5YR 4/6) clay, red (2.5YR 4/6) dry; massive; friable, slightly hard, slightly sticky, moderately plastic; few very fine roots throughout; many very fine interstitial pores; very strongly acid. 98P3280

Barranquitas Municipio

Catalina: S81PR-003-001

Primary Characterization Data

Barranquitas Municipio, Puerto Rico

Sampled as: Catalina; clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 81P 75, (CP81PR160) Lajas Valley

—Pedon: 81P 322, Samples 81P 1660–1666

—General methods: 1B1A, 2A1, 2B

SAMPLE NO. -1--	DEPTH (CM) -2--	HORIZON -3--	TOTAL CLAY LT .002 -4--	TOTAL SILT .002 -.05 -5--	TOTAL SAND .05 -2 -6--	CLAY FINE LT .0002 -7--	CLAY CO3 LT .002 -8--	SILT FINE .002 -.02 -9--	SILT COARSE .02 -.05 -10-	SAND VF .05 -.10 -11-	SAND F .10 -.25 -12-	SAND M .25 -.50 -13-	SAND C .5 -1 -14-	SAND VC 1 -2 -15-	COARSE FRACS WEIGHT 2 -5 -16-	COARSE FRACS WEIGHT 5 -20 -17-	COARSE FRACS WEIGHT 20 -75 -18-	COARSE FRACS WEIGHT .1- 75 -19-	(>2MM) WT % OF WHOLE SOIL -20-
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
81P1660S	0- 20	Ap	65.6	27.2	7.2	15.6		21.7	5.5	3.2	2.5	0.8	0.5	0.2	--	--	--	4	--
81P1661S	20- 35	B21	64.0	28.5	7.5	14.1		23.5	5.0	3.4	2.5	0.9	0.4	0.3	--	--	--	4	--
81P1662S	35- 75	B22	63.6	31.9	4.5	14.7		27.2	4.7	2.3	1.4	0.5	0.2	0.1	--	TR	--	2	TR
81P1663S	75-113	B23	49.7	43.3	7.0	10.0		35.9	7.4	4.2	2.2	0.5	0.1	TR	--	--	--	3	--
84P1622S	75-113	B23 SAT	45.8	47.7	6.5	9.9		37.8	9.9	3.6	2.3	0.5	0.1	--	--	--	--	3	--
81P1664S	113-130	B3	40.6	43.1	16.3	10.9		33.9	9.2	8.5	5.9	1.5	0.4	TR	--	--	--	8	--
81P1665S	130-178	C	28.9	42.0	29.1	8.0		31.8	10.2	10.6	9.8	5.1	3.0	0.6	--	--	--	18	--

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	(ATTERBERG) LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 20	3.75	0.392			10.5	1.3	0.5	0.30	0.47	69	19		1.07	1.35	0.081		50.8	48.1	31.1	0.18
20- 35	2.69	0.290			11.1	1.4	0.5	0.28	0.50				1.09	1.38	0.082		49.0	47.8	32.2	0.17
35- 75	0.58	0.078			10.9	1.1	0.1	0.17	0.53	81	33		1.09	1.34	0.071		50.8	48.9	33.4	0.17
75-113	0.47				11.7	1.1	0.1	0.24	0.63				1.15	1.35	0.055		48.2	46.1	31.2	0.17
75-113 SAT	0.41				17.8	1.7	0.1	0.25	0.68				1.15	1.35	0.055		48.2	46.1	31.3	0.17
113-130	0.30				10.5	1.1	0.1	0.30	0.75				1.05	1.20	0.046		51.7	48.3	30.3	0.19
130-178	0.20				10.6	1.1	0.3	0.49	0.94	62	14		0.98	1.12	0.046		55.4	50.6	27.3	0.23

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH NAF 8C1d	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 20	7.4	2.0	TR	1.7	11.1	17.5	0.1	28.6	19.5	11.2	1	39	57	--			8.6	5.4	5.4
20- 35	7.5	0.7	TR	0.6	8.8	15.3		24.1	18.1			37	49				8.9	5.6	5.7
35- 75	1.7	0.3	TR	TR	2.0	14.8	1.8	16.8	10.6	3.8	47	12	19				9.6	5.3	5.2
75-113	0.5	0.4	TR	0.1	1.0	14.8	4.1	15.8	11.7	5.1	80	6	9				9.6	5.0	4.9
75-113 SAT	0.5	0.4	TR	--	0.9	15.6	3.9	16.5	11.3	4.8	81	5	8				9.6	4.7	4.8
113-130	0.3	0.7	0.1	0.1	1.2	17.0	5.6	18.2	12.2	6.8	82	7	10				9.7	5.0	5.0
130-178	0.4	0.8	0.1	0.1	1.4	17.5	8.2	18.9	14.1	9.6	85	7	10				9.7	4.9	4.9

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)				THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL SiO2 7C3 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
81P1660	TCLY	KK 4	GE 1	GI 1	CL 1	KK60	GI 3			17.2			0.3			
81P1661	TCLY	KK 4	GE 2	GI 1	CL 1	KK48	GI 2			18.6			0.2			
81P1662	TCLY	KK 4	GE 2	GI 1		KK47	GI 2			21.4			0.1			
81P1663	TCLY	KK 3	GE 2			KK34	GItr									
81P1664	TCLY	KK 3	GE 1			KK42	GItr									
81P1665	TCLY	KK 3	GE 2	GI 1		KK42	GI 1									

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite GI gibbsite CL chlorite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

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< - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
84P1622 SAT TCLY  KK 4  GE 3                    KK36  GItr                          22.9              0.1

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         GI  gibbsite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Catalina
NSSL pedon number: 84P0310
Pedon ID: S81PR-003-001
Field classification: Clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox
Revised classification as of March 01, 2001: Fine, kaolinitic, isohyperthermic Typic Hapludox
Location: Barranquitas, Puerto Rico; Highway 155; 200 meters south of km 8.8
Latitude: Unknown
Longitude: Unknown
Slope: 5 percent with an aspect of 180 degrees
Geomorphic position: On shoulder of a head slope of hillside or mountainside or deeply dissected plateaus
Vegetation: Grass and herbaceous cover
Parent material: Fine-textured residuum derived from very highly weathered volcanic rocks
Particle-size control section: 25 to 100 cm
Described and sampled by: G. Acevedo and L.H. Rivera on August 1, 1981
Notes: Matrix colors are for moist ped exteriors.

Ap—0 to 20 cm; dark reddish brown (2.5YR 3/4) clay; moderate fine subangular blocky structure; friable, slightly sticky, moderately plastic; many fine roots; strongly acid; clear smooth boundary. 81P1660

B21—20 to 35 cm; dark red (2.5YR 3/6) clay; moderate fine and medium subangular blocky structure; friable, slightly sticky, moderately plastic; common fine roots; many fine continuous tubular pores; strongly acid; gradual smooth boundary. 81P1661

B22—35 to 75 cm; red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; many fine continuous tubular pores; strongly acid; gradual smooth boundary. 81P1662

B23—75 to 113 cm; dark red (2.5YR 3/6) clay; moderate fine and medium subangular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; many fine continuous tubular pores; very strongly acid; gradual smooth boundary. 81P1663 and 84P1622

B3—113 to 130 cm; 5 percent brown (10YR 4/3), 5 percent dark reddish brown (5YR 2/2), and 85 percent yellowish red (5YR 4/6) clay; weak coarse subangular blocky structure; firm, moderately sticky, moderately plastic; very few to few fine roots; many fine continuous tubular pores; strongly acid; gradual smooth boundary. 81P1664

C—130 to 178 cm; 50 percent yellowish red (5YR 4/6), 20 percent brown (10YR 4/3), and 1 percent dark reddish brown (5YR 2/2) clay; massive; firm, moderately sticky, slightly plastic; very strongly acid. 81P1665

Humatas-like: S81PR-003-003

Primary Characterization Data

Barranquitas Municipio, Puerto Rico

Sampled as: Humatas-like; clayey, kaolinitic, isohyperthermic Typic Tropohumults

SSL—Project: 81P 75, (CP81PR160) Lajas Valley

—Pedon: 81P 324, Samples 81P 1685–1691

—General methods: 1B1A, 2A1, 2B

	-1--	-2-- -3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)				(>2MM)
SAMPLE NO.	DEPTH (CM)	HORIZON	CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	- - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1)											- - - - - - - - - - - - ->	<- PCT OF <75MM(3B1)->				
81P1685S	0- 23	Ap	70.8	25.8	3.4	19.4		23.0	2.8	1.4	1.1	0.6	0.2	0.1	TR	--	--	2	--
81P1686S	23- 52	Bt1	70.8	25.8	3.4	12.7		22.8	3.0	1.9	1.0	0.3	0.1	0.1	--	--	--	1	--
81P1687S	52- 73	Bt2	57.4	35.9	6.7	15.9		29.7	6.2	3.8	2.0	0.5	0.3	0.1	--	--	--	3	--
84P1623S	52- 73	Bt2 SAT	58.1	35.8	6.1	11.3		28.2	7.6	3.0	2.0	0.8	0.3	--	--	--	--	3	--
81P1688S	73- 94	Bt3	50.9	38.0	11.1	13.4		30.5	7.5	5.7	3.5	1.3	0.4	0.2	--	--	--	5	--
81P1689S	94-122	BC	40.5	44.2	15.3	8.8		35.9	8.3	7.6	5.2	1.9	0.5	0.1	--	--	--	8	--
81P1690S	122-154	C	42.2	40.4	17.4	8.0		33.4	7.0	6.1	4.7	3.2	2.8	0.6	--	--	--	11	--
81P1691S	0- 23	Ap													--	--	--		--

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 23	4.32	0.464			8.4	0.9	0.1	0.31	0.45	67	20		1.01	1.35	0.102		53.5	52.3	32.0	0.21
23- 52	1.03	0.105			9.0	1.0	TR	0.18	0.46				1.09	1.34	0.071		48.9	48.8	32.8	0.17
52- 73	0.62				7.4	0.8	0.1	0.25	0.56	73	31		1.08	1.31	0.066		48.0	47.7	32.0	0.17
52- 73 SAT	0.50				8.9	0.9	0.1	0.21	0.55	73	31		1.08	1.31	0.066		48.0	47.7	32.1	0.17
73- 94	0.46				8.3	0.9	0.1	0.27	0.62				1.06	1.23	0.051		47.2	46.2	31.3	0.16
94-122	0.35				6.4	0.7	TR	0.33	0.70				1.05	1.21	0.048		47.4	46.4	28.4	0.19
122-154	0.26				6.9	0.7	0.1	0.33	0.68		NP		0.96	1.12	0.053		54.7	53.3	28.7	0.24
0- 23																				

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) NAF 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									- - - - - - - - - - - ->	<- - - - - -PCT	- - - ->						1:2	1:1
0- 23	3.6	0.7	TR	0.3	4.6	24.6	4.3	29.2	21.9	8.9	48	16	21				8.4	4.1	4.1
23- 52	1.0	0.1	--	0.1	1.2	15.3	4.6	16.5	12.6	5.8	79	7	10				9.5	5.1	4.8
52- 73	0.5	0.1	--	0.1	0.7	13.9	5.9	14.6	14.3	6.6	89	5	5				9.8	5.3	4.9
52- 73 SAT	0.4	0.1	TR	TR	0.5	16.2	6.0	16.7	12.3	6.5	92	3	4				9.8	4.7	4.8
73- 94	0.4	0.1	TR	0.1	0.6	13.9	6.2	14.5	13.8	6.8	91	4	4				9.8	5.3	5.0
94-122	0.2	0.1	--	0.1	0.4	15.1	7.7	15.5	13.2	8.1	95	3	3				9.8	5.2	4.9
122-154	0.1	0.1	TR	0.1	0.3	16.0	8.4	16.3	13.8	8.7	97	2	2				9.8	5.0	4.8

SAMPLE NUMBER	< - - - CLAY MINERALOGY (<.002mm) - - - FRACTION	X-RAY 7A2i			THERMAL DTA 7A6	TGA 7A4b	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
		<- - >< - - - - - peak size			- - - - - - >< - - - Percent - - -		->< - - - - - - - - - Percent						- - - - - - - - - ->	< - - ><mg/g>	< - - >
81P1685	TCLY	KK 4	GE 1	VR 1	KK46	GItr			15.7			0.4			
81P1686	TCLY	KK 4	GE 1		KK57	GI 2			15.7			0.4			
81P1687	TCLY	KK 4	GE 1	GI 1	KK53	GI 2			14.0			0.6			
81P1688	TCLY	KK 4	GE 1		KK49	GI 2			15.7			0.5			
81P1689	TCLY	KK 4	GE 1		KK55	GI 1			13.7			0.7			
81P1690	TCLY	KK 4	GE 1	GI 1	KK48	GI 1			12.7			0.8			

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

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           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
84P1623     TCLY  KK 4  GE 2                    KK30  GI 1                          13.6              0.6

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         GI  gibbsite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Humatas-like
NSSL pedon number: 84P0311
Pedon ID: S81PR-003-003
Field classification: Clayey, kaolinitic, isohyperthermic Typic Tropohumults
Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Hapludox
Location: Barranquitas Municipio, Puerto Rico
Latitude: Unknown
Longitude: Unknown
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus
Geomorphic position: Backslope crested hills; on upper third of component
Slope: 35 percent on a west aspect
Drainage and permeability: Well drained and moderate permeability
Vegetation: Grasses for grazed rangeland
Parent material: Residuum from igneous-basalt material
Described and sampled by: G. Acevedo and L.H. Rivera during August 1981

Ap—0 to 23 cm; clay; weak fine subangular blocky structure; friable, sticky, slightly plastic; many fine roots; coatings on faces of peds; very strongly acid; clear smooth boundary. 81P1685

B21t—23 to 52 cm; clay; moderate medium subangular blocky structure; friable, sticky, plastic; few patchy clay films and patchy coatings on faces of peds; strongly acid; gradual smooth boundary. 81P1686

B22t—52 to 73 cm; clay; moderate fine subangular blocky structure; friable, sticky, plastic; few fine roots; few patchy clay films and patchy coatings on faces of peds; strongly acid; gradual smooth boundary. 81P1687 and 84P1623

B22t—73 to 94 cm; clay; weak fine subangular blocky structure; friable, sticky, plastic; very few fine roots; few patchy clay films and patchy coatings on faces of peds; very strongly acid; gradual smooth boundary. 81P1688

B3—94 to 122 cm; silty clay; weak fine subangular blocky structure; friable, sticky, slightly plastic; coatings on faces of peds; very strongly acid; gradual smooth boundary. 81P1689

C—122 to 154 cm; silty clay saprolite; massive; friable, sticky, slightly plastic; coatings on faces of peds; very strongly acid. 81P1620

Ap—0 to 23 cm; satellite sample. 81P1691

Cabo Rojo Municipio

Americus: S81PR-007-001

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Americus PR; coarse-loamy, kaolinitic, isohyperthermic Oxic Haplustults

SSL—Project: 81P 75, (CP81PR160) Lajas Valley

—Pedon: 81P 315, Samples 81P 1616–1621

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.05	SILT COARSE .05 -.10	SAND VF .10 -.25	SAND F .25 -.50	SAND M .5 -1	SAND C 1 -2	SAND VC 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
81P1616S	0- 15	Ap	4.9	1.9	93.2		0.8	1.2	6.1	50.5	27.6	8.7	0.3	--	--	--	87	--
81P1617S	15- 43	B1	9.7	1.1	89.2		0.4	0.7	6.5	43.7	31.7	7.0	0.3	TR	--	--	83	--
81P1618S	43- 64	B21	8.4	2.1	89.5		--	2.1	8.0	48.4	28.3	4.7	0.1	--	--	--	81	--
81P1619S	64-115	B22	13.3	2.5	84.2		0.8	1.7	7.8	43.1	28.2	5.0	0.1	--	--	--	76	--
81P1620S	115-151	B23	16.1	3.7	80.2		1.2	2.5	9.0	45.4	20.0	5.0	0.8	--	--	--	71	--
81P1621S	151-168	B24	16.1	1.7	82.2		1.2	0.5	7.0	39.9	27.6	7.1	0.6	TR	--	--	75	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a OF	EXTRACTABLE MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT	LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <-	BULK DENSITY 1/3 BAR 4A1d G/CC	BULK DENSITY OVEN DRY 4A1h -	COLE WHOLE SOIL 4D1 -> CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM	WRD WHOLE SOIL 4C1 - -> CM/CM
0- 15	0.38	0.038			0.8	0.1		0.33	0.39				1.68	1.68	--		7.3	5.7	1.9	0.06
15- 43	0.22	0.021			1.1	0.1		0.17	0.29				1.59	1.61	0.004		5.4	5.3	2.8	0.04
43- 64	0.15	0.013			1.1	0.1		0.12	0.26				1.61	1.65	0.008		5.2	4.5	2.2	0.04
64-115	0.17				1.6	0.1		0.13	0.26				1.65	1.65	--		9.4	7.5	3.5	0.07
115-151	0.17				1.9	0.1		0.14	0.29				1.57	1.62	0.011		8.9	6.4	4.7	0.03
151-168	0.13				1.8	0.1		0.14	0.28				1.68	1.71	0.006		9.2	6.8	4.5	0.04

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 15	1.0	0.3	TR	0.2	1.5	--		1.5	1.6			100	94				4.8	5.2	5.7
15- 43	0.9	0.3	TR	0.1	1.3	0.1		1.4	1.6			93	81				5.1	5.7	6.2
43- 64	0.7	0.2	TR	0.1	1.0	0.6		1.6	1.0			63	100				5.1	5.6	6.2
64-115	1.1	0.4	TR	0.1	1.6	0.2		1.8	1.7			89	94				5.2	5.9	6.3
115-151	1.5	0.5	TR	0.1	2.1	0.1		2.2	2.3			95	91				5.4	6.2	6.6
151-168	1.4	0.5	TR	0.1	2.0	0.1		2.1	2.2			95	91				5.4	6.2	6.5

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size	X-RAY 7A6 peak size	THERMAL DTA Percent	THERMAL TGA Percent	ELEMENTAL SiO2 7C3	ELEMENTAL AL2O3 7C3	ELEMENTAL Fe2O3 7C3	ELEMENTAL MgO 7C3	ELEMENTAL CaO 7C3	ELEMENTAL K2O 7C3	ELEMENTAL Na2O 7C3	EGME RETN 7D2 mg/g	INTER PRETA TION
81P1618	TCLY	KK 4	GE 1	KK31				13.3			0.4			
81P1619	TCLY	KK 5	MI 1	GE 1	KK42			14.3			0.7			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite MI mica
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Americus
NSSL pedon number: 81P0315
Pedon ID: S81PR-007-001
Field classification: Coarse-loamy, kaolinitic, isohyperthermic Oxic Haplustults
Series classification: Sandy, siliceous, thermic Rhodic Paleudults[1]
Revised classification as of March 01, 2001: Americus; sandy, kaolinitic, isohyperthermic Typic Kandiustalfs
Location: Cabo Rojo Municipio, Puerto Rico
Latitude: Unknown
Longitude: Unknown
Vegetation: Crop cover
Slope: 3 percent with an aspect of 0 degrees (north)
Drainage: Excessively drained
Described and sampled by: G. Acevedo and L.H. Rivera on August 1, 1981
Notes: Matrix colors are for moist ped exteriors.

Ap—0 to 15 cm; dark reddish brown (5YR 3/3) loamy sand; single grain; loose, nonsticky, nonplastic; moderately acid; clear smooth boundary. 81P1616

B1—15 to 43 cm; red (2.5YR 4/6) and dark reddish brown (2.5YR 3/4) loamy sand; weak fine massive and fine single grain; loose, nonsticky, nonplastic; slightly acid; clear wavy boundary. 81P1617

B21—43 to 64 cm; red (2.5YR 4/6) loamy sand; weak fine single grain; loose, nonsticky, nonplastic; slightly acid; gradual wavy boundary. 81P1618

B22—64 to 115 cm; dark red (2.5YR 3/6) sand; weak fine single grain; loose, nonsticky, nonplastic; slightly acid; gradual wavy boundary. 81P1619

B23—115 to 151 cm; dark red (2.5YR 3/6) sand; weak fine single grain; loose, nonsticky, nonplastic; slightly acid; gradual wavy boundary. 81P1620

B24—151 to 168 cm; dark red (2.5YR 3/6) sand; weak fine single grain; loose, nonsticky, nonplastic; slightly acid. 81P1621

[1] This soil is borderline to having an ustic moisture regime and should be reclassified. The pedon name was recently changed to Bahia.

Cabo Rojo-like: S87PR-007-008

Primary Characterization Data

Cabo Rojo Municipio, Puerto Rico

Sampled as: Cabo Rojo-like; very-fine, oxidic, isohyperthermic Typic Hapludalfs

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 299, Samples 87P 1506–1514

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	-1-- DEPTH (CM)	-2-- HORIZON	-3--	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS (MM) WEIGHT 2 -5	-17- WEIGHT 5 -20	-18- WEIGHT 20 -75	-19- WEIGHT .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
				<- - - -	- - - -	- - - -	- - - -	PCT OF <2MM	(3A1) - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - ->	<- PCT OF	<75MM(3B1)		->	
87P1506S	0- 28	A		58.2	21.9	19.9	26.4		16.4	5.5	3.6	5.1	3.1	3.5	4.6	8	13	6V	39	30
87P1507S	28- 55	Bt1		77.4	15.5	7.1	36.8		12.5	3.0	3.4	0.2	1.0	0.9	1.6	2	2	4V	11	8
87P1508S	55- 89	Bt2		70.3	23.7	6.0	28.8		19.0	4.7	3.0	2.0	0.6	0.3	0.1	--	TR	--	3	TR
87P1509S	89-116	Bt3		64.0	27.6	8.4	23.1		23.2	4.4	4.1	2.8	1.0	0.4	0.1	TR	TR	--	4	--
87P1510S	116-147	Bt4		57.7	33.7	8.6	17.9		28.4	5.3	4.6	2.7	1.0	0.3	--	--	--	--	4	--
87P1511S	147-203	Bt5		46.4	36.5	17.1	14.7		29.8	6.7	8.9	5.2	2.4	0.6	--	--	--	--	8	--
87P1512S	203-225	C1		41.3	43.8	14.9	11.7		36.4	7.4	6.8	5.2	2.2	0.7	--	--	--	--	8	--
87P1513S	225-245	C2		47.3	40.0	12.7	15.1		34.4	5.6	4.2	4.3	2.5	1.4	0.3	--	--	--	8	--
87P1514S	153-153	Bs-7														--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF <2MM	DITH-CIT EXTRACTABLE MN 6D2a -->	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1 PCT	(ATTERBERG) LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - - PCT	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c OF <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 28	1.68	0.164			8.9	0.8	0.3	0.29	0.38				1.24	1.39	0.032			32.7	22.4	0.11
28- 55	0.78	0.115			9.8	1.0	0.1	0.20	0.38				1.18	1.44	0.065			42.5	29.7	0.14
55- 89	0.38	0.070			9.8	0.8	TR	0.28	0.45	78	40		1.17	1.37	0.054			43.8	31.8	0.14
89-116	0.23	0.047			9.9	0.7	TR	0.35	0.49				1.18	1.35	0.046			44.5	31.5	0.15
116-147	0.12				8.6	0.6	TR	0.44	0.53				1.17	1.37	0.054			43.7	30.7	0.15
147-203	0.04				8.7	0.5	TR	0.61	0.63				1.16	1.37	0.057			45.6	29.3	0.19
203-225	0.06				5.1	0.2	0.1	0.80	0.67	65	33		1.20	1.44	0.063			42.9	27.5	0.18
225-245	0.02				4.2	0.2	0.1	0.94	0.64				1.20	1.66	0.114			42.7	30.4	0.15
153-153					8.1	0.5	TR												29.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - -	- - - -	- - - -	-MEQ /	100 G - -	- - - -	- - - -	- - - -	- - - -	- ->	<- - - -	-PCT -	- - ->					1:2	1:1
0- 28	2.5	1.7	TR	0.2	4.4	19.7	4.0	24.1	16.9	8.4	48	18	26				3.5	3.9	4.4
28- 55	7.5	4.5	TR	0.2	12.2	12.0	0.1	24.2	15.8	12.3	1	50	77				4.6	5.0	5.3
55- 89	6.6	9.3	0.1	0.2	16.2	13.5	0.7	29.7	19.9	16.9	4	55	81				4.1	4.6	5.0
89-116	2.7	12.0	0.2	0.2	15.1	16.3	2.4	31.4	22.1	17.5	14	48	68				3.7	4.3	4.9
116-147	1.4	15.3	0.5	0.2	17.4	13.8	2.4	31.2	25.2	19.8	12	56	69				3.7	4.3	5.0
147-203	0.8	19.1	1.1	0.3	21.3	12.4	1.7	33.7	28.2	23.0	7	63	76				3.6	4.4	5.4
203-225	1.2	25.3	2.2	0.2	28.9	9.5	0.5	38.4	33.2	29.4	2	75	87				3.7	4.6	5.6
225-245	1.8	34.3	3.5	0.3	39.9	10.2	0.4	50.1	44.5	40.3	1	80	90				3.4	4.5	5.5
153-153	1.1	18.6	0.8	0.2	20.7	13.5	2.4	34.2	28.2	23.1	10	61	73				3.6	4.4	5.2

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)						THERMAL DSC 7A6 (Percent)		THERMAL TGA 7A4b (Percent)		ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
87P1506	TCLY	KK 3	GE 2	VM 1	HE 1			KK43	GI 2					18.6			0.5			
87P1507	TCLY	KK 3	GE 2	VM 1	MI 1	HE 1		KK59	GI 3	KK45	GI 3			15.7			0.4			
87P1508	TCLY	KK 3	GE 2	HE 2	VM 1			KK54	GI 2					17.2			0.4			
87P1510	TCLY	KK 3	MM 2	GE 2				KK57	GI 1	KK41	GI 2			17.2			0.4			
87P1512	TCLY	KK 3	MM 3	GE 1				KK42	GItr					12.6			0.2			

```
           < - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
87P1508     VFS   KK 2  GE 2  QZ 2  HE 2                           97  FE47  KK36  MG11  QZ 3  FK 1  TA 1
87P1508     VFS   MG 1                                                GEtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         VM  vermici-mica     HE  hematite         GI  gibbsite         MI  mica
    QZ  quartz           MG  magnetite        FE  iron oxides      FK  potas feldsp     TA  talc            MM  mont-mica
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Cabo Rojo-like

NSSL pedon number: 87P0299

Pedon ID: S87PR-007-008

Field classification: Very-fine, oxidic, isohyperthermic Typic Hapludalfs

Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Oxic Argiudolls

Location: Cabo Rojo Municipio, Puerto Rico; Suroeste Soil and Water Conservation District; 2.25 km south on paved road from junction with Highway 102, about 1.9 km west of junction with Highway 102, and 61 meters north in a pasture

Latitude: 18°05’18" north

Longitude: 67°11’12" west

Elevation: 6 meters

Physiography: Coastal plains

Slope: 5 percent with a convex west aspect

Major Land Resource Area: 272—Humid Coastal Plains

Average air temperature: Annual—26 °C; summer—27 °C; winter—24 °C

Average soil temperature: Annual—29 °C; summer—30 °C; winter—27 °C

Drainage, runoff, and permeability: Well drained, moderate runoff, and slow permeability

Vegetation: Guineagrass in pastureland

Erosion: Slight

Particle-size control section: 28 to 78 cm

Parent material: Fine-textured sediments of mixed origin

Diagnostic features: Ochric epipedon at 0 to 28 cm; argillic horizon at 28 to 203 cm

Described and sampled by: D. Williams, W. Lynn, G. Acevedo, and L.H. Rivera during April 1987

Notes: Matrix colors are for moist ped interiors.

A—0 to 28 cm; dark reddish brown (5YR 3/3) clay; weak fine subangular blocky structure; hard, firm, sticky, plastic; many fine roots throughout; few fine tubular pores; few patchy distinct organic coatings in root channels and/or pores; extremely acid; 3 percent gravel, 2 percent cobbles, concentration of gravel at the base of the A horizon; clear wavy boundary. 87P1506

Bt1—28 to 55 cm; reddish brown (5YR 4/4) clay; weak medium subangular blocky structure parting to weak fine subangular blocky; hard, very firm, sticky, plastic; common fine roots throughout; few fine tubular pores; few patchy distinct clay films in root channels and/or pores and few patchy distinct clay films on faces of peds; few old roots; very strongly acid; 2 percent subrounded gravel; clear smooth boundary. 87P1507

Bt2—55 to 89 cm; reddish brown (5YR 4/4) clay; few fine distinct redoximorphic features; weak medium subangular blocky structure parting to weak fine subangular blocky; friable, slightly sticky, plastic; few fine roots throughout;

few old roots; few fine tubular pores; common discontinuous distinct clay films on faces of peds; strongly acid; clear smooth boundary. 87P1508

Bt3—89 to 116 cm; red (2.5YR 4/6) clay loam; common medium distinct and few fine distinct redoximorphic features; weak medium subangular blocky structure parting to weak fine subangular blocky; friable, slightly sticky, slightly plastic; few fine roots throughout; few old roots; few fine tubular pores; common discontinuous distinct clay films on faces of peds; few fine rounded iron-manganese concretions; very strongly acid; clear smooth boundary. 87P1509

Bt4—116 to 147 cm; reddish brown (5YR 4/4) clay loam; common medium distinct and few fine distinct redoximorphic features; weak coarse prismatic structure; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on faces of peds; few fine rounded iron-manganese concretions; few old roots; very strongly acid; clear wavy boundary. 87P1510

Bt5—147 to 203 cm; yellowish brown (10YR 5/6) clay loam; common medium distinct and few fine distinct redoximorphic features; weak coarse prismatic structure; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; few discontinuous distinct manganese or iron-manganese coatings on faces of peds and few discontinuous distinct clay films on faces of peds; few fine rounded iron-manganese concretions; few old roots; very strongly acid; clear wavy boundary. 87P1511

C1—203 to 225 cm; yellowish brown (10YR 5/4) clay loam; common medium distinct redoximorphic features; massive; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; few discontinuous distinct manganese or iron-manganese coatings on faces of peds and few discontinuous distinct clay films in root channels and/or pores; few fine rounded iron-manganese concretions; slightly acid; clear wavy boundary. 87P1512

C2—225 to 245 cm; light yellowish brown (2.5Y 6/4) clay loam; common medium distinct redoximorphic features; massive; firm, slightly sticky, slightly plastic; few fine tubular pores; common medium irregular soft masses of iron-manganese; slightly acid. 87P1513

Camuy Municipio

Espinosa: S89PR-027-001

Primary Characterization Data

Camuy Municipio, Puerto Rico

Sampled as: Espinosa; clayey, mixed, isohyperthermic Typic Paleudults

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 401, Samples 89P 2238–2244

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.02	SILT COARSE .05 -.05	SAND VF .10 -.10	SAND F .25 -.25	SAND M .50 -1	SAND C 1 -2	SAND VC 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
89P2238S	0- 13	Ap	9.4	10.7	79.9	6.9		6.1	4.6	12.7	24.5	31.8	10.8	0.1	--	TR	--	67	TR
89P2239S	13- 24	A	11.8	9.7	78.5	8.5		4.9	4.8	13.2	25.3	31.3	8.5	0.2	TR	--	--	65	TR
89P2240S	24- 45	Bt1	42.4	8.4	49.2	30.6		5.3	3.1	8.5	15.8	17.4	7.0	0.5	TR	--	--	41	--
89P2241S	45- 83	Bt2	49.2	8.4	42.4	30.5		4.5	3.9	3.7	12.6	18.1	7.5	0.5	TR	TR	--	39	--
89P2242S	83-106	Bt3	61.5	5.5	33.0	42.8		3.7	1.8	3.9	8.8	14.4	5.6	0.3	--	--	--	29	--
89P2243S	106-150	Bt4	65.7	4.6	29.7	44.5		3.3	1.3	3.7	7.9	13.1	4.8	0.2	--	--	--	26	--
89P2244S	150-183	Bt5	76.9	6.3	16.8	50.4		4.1	2.2	2.5	4.9	6.8	2.6	--	--	--	--	14	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	DITH-CIT EXTRACTABLE AL 6G7a <2MM	DITH-CIT EXTRACTABLE MN 6D2a -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	COLE OVEN DRY 4A1h - -	COLE WHOLE SOIL 4D1 -> CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	0.66	0.055			1.7	0.2	0.1	0.28	0.43				1.37	1.42	0.012			10.4	4.0	0.09
13- 24	0.37	0.038			2.2	0.2	0.2	0.21	0.36				1.69	1.72	0.006			8.7	4.2	0.08
24- 45	0.43	0.084			5.6	0.7	0.2	0.12	0.35				1.67	1.72	0.010			17.5	14.8	0.05
45- 83	0.25	0.070			6.0	0.7	0.1	0.12	0.34				1.55	1.61	0.013			20.6	16.7	0.06
83-106	0.19				7.9	0.9	0.1	0.11	0.31				1.58	1.68	0.021			23.5	19.0	0.07
106-150	0.14				8.3	0.9	TR	0.11	0.30				1.59	1.69	0.021			24.4	19.9	0.07
150-183	0.16				10.3	1.1	TR	0.12	0.31				1.51	1.62	0.024			28.1	23.7	0.07

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 13	1.0	0.1	0.1	0.5	1.7	4.4	0.7	6.1	2.6	2.4	29	28	65				3.8	3.9	4.2
13- 24	0.9	0.1	0.1	0.2	1.3	4.9	0.7	6.2	2.5	2.0	35	21	52				3.9	4.0	4.3
24- 45	0.8	0.1	0.1	0.2	1.2	10.5	2.0	11.7	5.0	3.2	63	10	24				3.6	3.9	4.3
45- 83	1.1	0.2	TR	0.2	1.5	9.7	1.5	11.2	5.7	3.0	50	13	26				3.7	3.9	4.3
83-106	1.2	0.4	TR	0.3	1.9	6.9	0.1	8.8	6.8	2.0	5	22	28				4.8	4.9	5.4
106-150	1.4	0.4	0.1	0.2	2.1	6.3	TR	8.4	7.3			25	29				5.1	5.0	5.4
150-183	6.4	1.9	0.1	0.1	8.5	6.8		15.3	9.2			56	92				5.3	5.2	5.6

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY 7A6	DTA 7A4b	TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRETA TION
	<- - ><- - - - -	- - - - -><- - -	THERMAL - - - -><- - - - - - -			ELEMENTAL - - - - - - - -><- ->							
								7C3 - - - - - - - - -><-					
89P2240	TCLY	KK 4	GE 3	HE 2	MI 1			23.0	15.7		0.4		
89P2242	TCLY	KK 4	GE 3	HE 2	MI 1			23.0	15.7		0.6		
89P2244	TCLY	KK 4	GE 3	HE 2	MI 1			28.0	17.2		0.4		

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

		ACID OPT DEN	OXALATE FE	EXTRACTION SI	AL	PHOSPHOUS RET	CIT- ACID	KCL MN	TOTAL C	(- -WATER 0.06 BAR	1- BAR	CONTENT- -) 2- BAR	15 BAR	(- - - - WATER DISPERSIBLE - - - -) CLAY	SILT	SAND	CLAY	SILT	SAND	MIN SOIL CONT	AGGRT STABL <5mm
SAMPLE NO.	HZ NO	8J	6C9a	6V2	6G12	6S4	6S5	6D3	6A2d	4B1c	4B1a	4B1a	4B2b	<- - - PIPETTE - - ><- - - 3A1c - - ->			<- - - HYDROMETER - - ->			8F1	4G1
			<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - ->																	<20mm>	<PCT>
89P2238	1	0.04	0.10	0.02	0.05			9.4				5.1									17
89P2239	2	0.04	0.10	0.02	0.05			13.6				5.6									1
89P2240	3	0.04	0.15	0.03	0.14			20.4				17.2									
89P2241	4	0.04	0.07	0.03	0.11			14.8				18.0									
89P2242	5	0.03	0.07	0.04	0.10			1.9				21.4									
89P2243	6	0.04	0.07	0.04	0.09			0.9				21.7									
89P2244	7	0.09	0.08	0.05	0.10							25.9									

Narrative Pedon Description

Pedon: Espinosa
NSSL pedon number: 89P0401
Pedon ID: S89PR-027-001
Field classification: Clayey, mixed, isohyperthermic Typic Paleudults
Revised classification as of April 01, 2001: Fine, mixed, isohyperthermic Typic Kandiudults
Location: Camuy Municipio, Puerto Rico; Arecibo Soil Survey sheet 1; 3.4 km south-southeast on Highway 119 from junction with Highway 2 and 46 meters east of road
USGS 7.5-minute quadrangle: Camuy
Latitude: 18°27’34" north
Longitude: 66°52’23" west
Elevation: 112 meters
Physiography: Coastal plains
Geomorphic position: Summit interfluve; on upper third of component
Slope: 2 percent with a south aspect
Major Land Resource Area: 272—Humid Coastal Plains
Drainage and runoff: Well drained and slow runoff
Vegetation: Pangolagrass in pastureland
Surface stoniness: Class 0
Erosion: Slight
Parent material: Residuum from limestone-arenaceous material; parent material limestone is Quebradillas (Camuy) limestone.
Geographically associated soils: San Germán, San Sebastian, and Tanama
Weather station number: 0410
Diagnostic features: Argillic from a depth of 24 to 183 cm
Described and sampled by: D. Williams and C.L. Santiago during February 1989
Notes: Auger examination revealed tough clay at a depth of 290 cm and limestone at 315 cm.

Ap—0 to 13 cm; dark grayish brown (10YR 4/2) sandy loam; weak fine subangular blocky structure parting to weak fine granular; very friable, slightly sticky, slightly plastic; many fine roots throughout; few earthworms; extremely acid; clear smooth boundary. 89P2238

A—13 to 24 cm; dark yellowish brown (10YR 4/4) sandy loam; weak fine subangular blocky structure parting to weak fine granular; very friable, slightly sticky, slightly plastic; many fine roots throughout; common fine and medium rounded soft masses of iron-manganese; few earthworms; extremely acid; clear smooth boundary. 89P2239

Bt1—24 to 45 cm; strong brown (7.5YR 4/6) sandy clay; weak coarse prismatic structure parting to weak medium subangular blocky; very firm, sticky, plastic; few fine roots throughout and common fine roots between peds; few fine and medium tubular pores; common fine and medium rounded soft masses of iron-

manganese and common fine and medium platelike soft masses of iron-manganese; clear smooth boundary. 89P2240

Bt2—45 to 83 cm; strong brown (7.5YR 5/6) clay; weak medium and coarse prismatic structure parting to weak medium and coarse subangular blocky; firm, sticky, plastic; few fine roots throughout and common fine roots between peds; few fine and medium tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; common fine and medium rounded soft masses of iron-manganese and common fine and medium platelike soft masses of iron-manganese; clear smooth boundary. 89P2241

Bt3—83 to 106 cm; strong brown (7.5YR 5/8) clay; moderate medium and coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, sticky, plastic; few fine roots throughout; few fine and medium tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; common fine and medium rounded soft masses of iron-manganese and common fine and medium platelike soft masses of iron-manganese; clear smooth boundary. 89P2242

Bt4—106 to 150 cm; strong brown (7.5YR 5/8) clay; moderate medium and coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, sticky, plastic; few fine roots throughout; few fine and medium tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; few fine and medium platelike soft masses of iron-manganese, mainly along cracks and prism faces; few wormcasts; occasional slickensides; gradual boundary. 89P2243

Bt5—150 to 183 cm; strong brown (7.5YR 5/8) clay; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky, plastic; few fine roots throughout; few fine and medium tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; few fine and medium platelike soft masses of iron-manganese, mainly along cracks and prism faces; occasional slickensides. 89P2244

Corozal Municipio

Corozal: S58PR-047-001

Primary Characterization Data

Corozal Municipio, Puerto Rico

Sampled as: Corozal; clayey, mixed, isohyperthermic Aquic Tropudults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 582, Samples 40A 4260–4268

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4260S	0- 18	Ap		46.4	31.6	22.0			22.0	9.6	7.2	7.9	3.5	2.8	0.6	--C	--C	--	15	--
40A4261S	18- 30	B1		50.0	28.9	21.1			20.6	8.3	6.4	7.7	3.5	2.8	0.7	--C	--C	--	15	--
40A4262S	30- 53	B21t		66.0	25.4	8.6			20.6	4.8	3.4	3.0	1.1	0.9	0.2	--C	--C	--	5	--
40A4263S	53- 76	B22t		56.5	31.9	11.6			24.7	7.2	5.7	4.1	1.0	0.7	0.1	--C	--C	--	6	--
40A4264S	76- 97	B31		45.7	37.9	16.4			28.6	9.3	6.9	6.1	2.0	1.2	0.2	--C	--C	--	9	--
40A4265S	97-119	B32		40.5	38.7	20.8			30.5	8.2	5.5	7.5	4.2	3.3	0.3	--C	--C	--	15	--
40A4266S	119-142	C1		35.2	42.2	22.6			32.2	10.0	6.8	8.1	4.0	3.1	0.6	--C	--C	--	16	--
40A4267S	142-170	C2		30.7	42.5	26.8			31.0	11.5	8.4	8.8	4.0	4.6	1.0	--C	--C	--	18	--
40A4268S	292-323	C3		12.8	41.1	46.1			29.0	12.1	12.2	16.7	8.1	7.1	2.0	--C	--C	--	34	--

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	2.28	0.222			3.7			0.35	0.45					1.43					20.8	
18- 30	0.79	0.110			4.3			0.22	0.44					1.53					21.9	
30- 53	0.79	0.106			6.2			0.38	0.45					1.42					29.5	
53- 76	0.47	0.074			7.4			0.31	0.48					1.50					27.2	
76- 97	0.27				7.4			0.35	0.52					1.57					23.6	
97-119	0.20				5.1			0.34	0.51					1.53					20.7	
119-142	0.19				5.1			0.38	0.57					1.57					20.0	
142-170	0.16				5.3			0.45	0.62					1.39					19.1	
292-323	0.02				4.3			1.02	1.03										13.2	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- EXTR ITY	AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) KCL IN	CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - - - - -		- - ->	<- - - -		-PCT	- - - ->				1:2	1:1
0- 18	9.2	0.5	0.1	0.6	10.4	11.8	0.1	22.2	16.1	10.5	1	47	65				4.6		5.4
18- 30	2.0	0.1	TR	0.2	2.3	14.2	4.1	16.5	11.2	6.4	64	14	21				3.5		4.6
30- 53	1.7	0.2	TR	0.2	2.1	20.5	8.5	22.6	24.8	10.6	80	9	8				3.6		4.5
53- 76	2.2	0.5	TR	0.1	2.8	20.5	8.1	23.3	17.5	10.9	74	12	16				3.6		4.6
76- 97	1.3	0.2	0.1	0.1	1.7	18.9	8.9	20.6	16.0	10.6	84	8	11				3.6		4.6
97-119	0.8	0.3	0.1	0.1	1.3	16.3	9.4	17.6	13.6	10.7	88	7	10				3.6		4.5
119-142	0.7	0.7	0.1	0.1	1.6	15.9	9.8	17.5	13.2	11.4	86	9	12				3.6		4.5
142-170	0.6	0.4	0.1	0.1	1.2	17.6	10.1	18.8	13.7	11.3	89	6	9				3.6		4.5
292-323	0.3	0.1	TR	0.2	0.6	16.3	10.3	16.9	13.0	10.9	94	4	5				3.7		4.4

Narrative Pedon Description

Pedon: Corozal

NSSL pedon number: 40A0582

Pedon ID: S58PR-047-001

SSIR #12 pedon ID: S58PR-4-1

Field classification: Clayey, mixed, isohyperthermic Aquic Tropudults

Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Typic Hapludults

Location: Corozal, Puerto Rico; Cibuco Soil Conservation District; Corozal substation; 18 meters west of fence and about 322 meters west of main building; aerial photograph GS-LR-14-185

Latitude: 18°19’43" north

Longitude: 66°21’46" west

Elevation: 210 meters

Slope: 5 percent; convex with an aspect of 225 degrees in a rolling area with deeply cut ravines

Average annual precipitation: 2,032 mm

Vegetation: Cultivated cropland; used for pineapple for many years; severely eroded

Drainage and permeability: Well drained and moderately permeable

Parent material: Pedisediment derived from early Tertiary volcanic conglomerate that contains subangular to subrounded fragments from fine-gravel size to 1.5 meters across

Particle-size control section: 30 to 76 cm

Described and sampled by: L.T. Alexander, F. Llavat-Cristy, R.E. Gierbolini, J. Juarez, K.W. Flach, L.H. Rivera, and T.U. Yager on November 3, 1958

Notes: The soil was sampled at about one-quarter to one-half field capacity. Roots are fairly abundant to a depth of 76 cm and traverse to 170 cm. Soil temperature was 25 °C at a depth of 152 cm.

Ap—0 to 18 cm; brown (7.5YR 4/3) clay; weak fine subangular blocky structure; firm, extremely hard; patchy clay films on faces of peds; abrupt smooth boundary. 40A4260

B1—18 to 30 cm; brown (7.5YR 4/4) and yellowish red (5YR 4/6) clay; strong medium subangular blocky structure; firm; continuous clay films on faces of peds; clear smooth boundary. 40A4261

B21t—30 to 53 cm; red (2.5YR 4/6) clay; moderate medium prismatic structure parting to strong fine angular blocky; firm; continuous clay films on faces of peds; occasional streaks of strong brown (7.5YR 5/6) along root channels; clear wavy boundary. 40A4262

B22t—53 to 76 cm; red (2.5YR 4/6) and strong brown (7.5YR 5/6) clay; strong medium subangular blocky structure parting to strong fine angular blocky; firm; continuous clay films on faces of peds; clear wavy boundary. 40A4263

B31—76 to 97 cm; yellowish red (5YR 4/6) and red (2.5YR 4/6) clay; strong fine angular blocky structure; firm; continuous clay films on faces of peds; gradual irregular boundary. 40A4264

B32—97 to 119 cm; yellowish red (5YR 4/6) and red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; firm; patchy clay films; gradual wavy boundary. 40A4265

C1—119 to 142 cm; red (2.5YR 4/8) silty clay loam that tends to retain some appearance of the parent rock; 3 percent fine white (10YR 8/1) redoximorphic features; massive; firm; patchy clay films on faces of peds; clear wavy boundary. 40A4266

C2—142 to 170 cm; silty clay loam, red (2.5YR 4/8) rubbed; very highly weathered; retains the texture of the parent rock, giving it a common white mottled appearance; massive; friable, nonsticky; few very fine pores; 10 percent patchy clay films on faces of peds and in pores. 40A4267

C3—292 to 323 cm; sample of very highly weathered saprolite first encountered at a depth of 246 cm. 40A4268

Gurabo Municipio

Gurabo: S63PR-063-001

Primary Characterization Data

Gurabo Municipio, Puerto Rico

Sampled as: Gurabo; clayey over loamy, mixed, isohyperthermic Vertic Eutropepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 540, Samples 40A 3999–4006

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002	-2-- SILT .002 -.05	-3-- SAND .05 -2	-4-- FINE LT .0002	-5-- CO3 LT .002	-6-- FINE .02 -.02	-7-- COARSE .05 -.05	-8-- VF .05 -.10	-9-- F .10 -.25	-10- M .25 -.50	-11- C .5 -1	-12- VC 1 -2	-13- 2 -5	-14- 5 -20	-15- 20 -75	-16- .1- 75	-17- % OF WHOLE SOIL
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)					
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->					
40A3999S	0- 18	Ap	47.0	36.5	16.5			26.6	9.9	4.2	3.6	2.3	4.3	2.1	--C	--C	--	12	--
40A4000S	18- 30	A12	64.9	27.7	7.4			20.1	7.6	2.2	2.0	1.0	1.4	0.8	--C	--C	--	5	--
40A4001S	30- 53	C1	63.7	28.9	7.4			22.0	6.9	2.8	2.1	0.9	0.9	0.7	--C	--C	--	5	--
40A4002S	53- 74	C2	54.0	33.7	12.3			25.6	8.1	4.1	3.6	1.4	1.8	1.4	--C	--C	--	8	--
40A4003S	74- 99	2C3	26.8	31.8	41.4			21.8	10.0	7.8	10.4	5.4	8.8	9.0	--C	--C	--	34	--
40A4004S	99-122	3C4	20.0	21.6	58.4			14.3	7.3	7.0	15.6	11.9	14.8	9.1	1C	4C	--	54	5
40A4005S	122-157	4C5	32.9	33.8	33.3			23.1	10.7	8.7	8.9	4.0	6.3	5.4	1C	3C	--	28	4
40A4006S	157-178	5C6													--	--	--		--

DEPTH (CM)	-1-- ORGN C 6A1c PCT	-2-- TOTAL N 6B3a <2MM	-3-- EXTR P 6S3 PPM	-4-- TOTAL S 6R3b <- PERCENT	-5-- (- - DITH-CIT - -) EXTRACTABLE FE 6C2b	-6-- AL 6G7a OF	-7-- MN 6D2a <2MM -->	-8-- (RATIO/CLAY) CEC 8D1	-9-- 15 BAR 8D1	-10- (ATTERBERG) - LIMITS - LL 4F1 PCT	-11- PI 4F <0.4MM	-12- (- BULK DENSITY -) FIELD MOIST 4A3a <- -	-13- 1/3 BAR 4A1d G/CC -	-14- OVEN DRY 4A1h - ->	-15- COLE WHOLE SOIL 4D1 CM/CM	-16- (- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	-17- 1/10 BAR 4B1c -PCT OF	-18- 1/3 BAR 4B1c <2MM	-19- 15 BAR 4B2a - ->	-20- WRD WHOLE SOIL 4C1 CM/CM
0- 18	1.90	0.171			5.7			0.49	0.49			1.33	1.34	1.60	--	31.9		30.3	22.8	0.10
18- 30	0.95	0.088			4.1			0.45	0.41			1.20	1.19	1.75	--	39.9		38.1	26.6	0.14
30- 53	0.49	0.048			3.8			0.51	0.40			1.28	1.21	1.84	--	35.7		37.4	25.2	0.15
53- 74	0.29	0.033			3.5			0.60	0.42			1.44	1.35	1.80	--	26.7		31.2	22.7	0.11
74- 99	0.09				3.0			1.03	0.52			1.67	1.60	1.76	--	16.3		17.8	14.0	0.06
99-122	0.04				2.7			1.17	0.57				1.60						11.3	
122-157	0.04				4.0			0.77	0.48			1.70		1.79		16.6		21.5	15.7	
157-178																				

DEPTH (CM)	-1-- (- NH4OAC EXTRACTABLE BASES -) CA 6N2e	-2-- MG 6O2d	-3-- NA 6P2b	-4-- K 6Q2b	-5-- SUM BASES	-6-- ACID- EXTR ITY 6H5a	-7-- AL 6G9a	-8-- (- - - -CEC - - -) SUM CATS 5A3a	-9-- NH4- OAC 5A8b	-10- BASES + AL 5A3b	-11- AL SAT 5G1	-12- -BASE SAT- SUM 5C3	-13- NH4 OAC 5C1	-14- CO3 AS CACO3 <2MM 6E1g	-15- RES. OHMS /CM 8E1	-16- COND. MMHOS /CM 8I	-17- (- - - -PH - - -) KCL IN 8C1d	-18- CACL2 .01M 1:2 8C1f	-19- H2O 1:1 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->< - - - - -PCT - - - - ->																		
0- 18	8.5	9.8	0.5	0.3	19.1	17.1	0.3	36.2	23.2	19.4	2	53	82				4.3		5.1
18- 30	11.8	17.2	0.8	0.4	30.2	11.9	0.2	42.1	29.3	30.4	1	72	100				4.5		5.4
30- 53	12.5	20.1	1.2	0.5	34.3	8.7		43.0	32.3			80	100				5.0		6.1
53- 74	12.4	22.1	1.4	0.3	36.2	5.1		41.3	32.6			88	100	--			5.7		6.9
74- 99	10.6	18.3	1.3	0.2	30.4	4.0		34.4	27.6			88	100	--			5.5		7.3
99-122	9.5	15.2	1.0	0.2	25.9	3.8		29.7	23.3			87	100	--			5.2		6.9
122-157	10.7	16.8	1.0	0.3	28.8	4.1		32.9	25.3			88	100	--			5.3		6.8
157-178																			

Narrative Pedon Description

Pedon: Gurabo (inactive series)
NSSL pedon number: 40A540
Pedon ID: S63PR-063-001
SSIR #12 pedon ID: S63PR-16-1
Field classification: Clayey over loamy, mixed, isohyperthermic Vertic Eutropepts
Revised classification as of April 01, 2001: Clayey over loamy, mixed, active, isohyperthermic Aeric Epiaquerts
Location: Gurabo, Puerto Rico; Turabo Soil Conservation District; 5 km west of the town of Gurabo; 183 meters north of kilometer marker 5.6 on Highway 30, on Gurabo Experiment Station; aerial photograph GS-LR-15-72
Latitude: 18°15’09" north
Longitude: 66°59’25" west
Slope: 3 to 5 percent; on an alluvial fan
Microrelief: Gilgai evident
Drainage, runoff, and permeability: Somewhat poorly drained, medium runoff, and slow permeability
Vegetation: Unimproved native pasture for past 30 years or more
Erosion: Moderate
Parent material: Alluvial fan sediments derived from volcanic rocks
Particle-size control section: 25 to 100 cm
Described and sampled by: R.B. Grossman, W.E. McKinzie, J. Juarez, and L.H. Rivera on September 30, 1963
Notes: The Ap, C2, and 4C5 horizons were sampled for the Bureau of Public Roads. The upper three horizons were above field capacity; the fourth and fifth horizons were at field capacity; and the gravelly horizons were below field capacity when sampled. Reaction was determined by Soiltex. The field has been used for pasture for a long time. Five years before sampling (1958), the field was plowed and planted to pangolagrass. One year before sampling (1962), 14-4-10 fertilizer was applied at a rate of 400 pounds per acre.

Ap—0 to 18 cm; grayish brown (10YR 3/2) clay; common fine faint reddish brown (5YR 4/4) redoximorphic concentrations; weak fine granular structure; very hard, firm, slightly sticky, plastic; common fine black grains; few fine rock fragments; common fine roots; field moisture of 38.3 percent; slightly acid; clear smooth boundary. 40A3999

B12—18 to 30 cm; dark brown (10YR 3/3) clay; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations and few fine faint gray (10YR 5/1) and common fine distinct greenish gray (5GY 5/1) iron deletions; weak medium angular blocky structure with few pressure faces; firm, slightly sticky, plastic; common fine black grains; few fine rock fragments; common fine roots; field moisture of 44.9 percent; slightly acid; clear wavy boundary. 40A3999

C1—30 to 53 cm; grayish brown (10YR 5/2) clay; common medium distinct greenish gray (5GY 6/1) and common fine faint gray (10YR 5/1) iron

depletions; weak coarse angular blocky structure; many pressure faces and slickensides; firm, slightly sticky, plastic; few fine black grains; common fine roots; few fine rock fragments; field moisture of 37.1 percent; slightly acid; gradual wavy boundary. 40A3999

C2—53 to 74 cm; mixed dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) clay; weak medium and coarse angular blocky structure; common pressure faces and slickensides; firm, slightly sticky, plastic; few fine black grains; few fine rock fragments; few fine roots; field moisture of 31.0 percent; slightly acid; clear wavy boundary. 40A3999

2C3—74 to 99 cm; clay loam, mixed colors of the weathered rock fragments with a rubbed color of brown (10YR 5/6); massive; common pressure faces; friable, slightly sticky, slightly plastic; few fine black grains; many sand-sized volcanic grains; many weathered and partially weathered volcanic rock fragments; slightly acid; gradual wavy boundary. 40A3999

3C4—99 to 122 cm; sandy loam, mixed colors of the weathered rock fragments with a rubbed color or brown (10YR 5/3); friable, nonsticky, nonplastic; few fine black grains; slightly acid; gradual wavy boundary. 40A3999

4C5—122 to 157 cm; gravelly clay loam, mixed colors of the weathered rock fragments with a rubbed color of yellowish brown (10YR 5/4); weak coarse subangular blocky structure; pressure faces; friable, slightly sticky, slightly plastic; slightly acid; gradual wavy boundary. 40A3999

5C6—157 to 178 cm; coarse-textured and partially weathered volcanic rock fragments. 40A3999

Mabi: S63PR-063-002

Primary Characterization Data

Gurabo Municipio, Puerto Rico

Sampled as: Mabi; very-fine, montmorillonitic, isohyperthermic Aquic Chromuderts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 247, Samples 40A 1833–1840

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -			WT	
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A1833S	0- 18	Ap		47.7	37.8	14.5			26.0	11.8	5.4	3.5	1.8	2.5	1.3	TRC	1C	--	10	1
40A1834S	18- 38	A12		61.4	29.5	9.1			20.4	9.1	3.9	2.3	1.1	1.2	0.6	--C	--C	--	5	--
40A1835S	38- 61	C1		63.7	29.4	6.9			20.5	8.9	3.7	1.6	0.5	0.7	0.4	--C	--C	--	3	--
40A1836S	61- 97	C2		59.2	33.7	7.1	41.2		23.9	9.8	3.9	1.5	0.4	0.8	0.5	--C	--C	--	3	--
40A1837S	97-135	C3		58.0	34.6	7.4		--	24.5	10.1	4.5	1.7	0.4	0.4	0.4	--C	--C	--	3	--
40A1838S	135-170	C4		58.1	32.5	9.4		--	23.7	8.8	4.0	2.3	0.8	1.2	1.1	--C	--C	--	5	--
40A1839S	170-230	C5		59.2	37.9	2.9		--	32.4	5.5	0.9	0.5	0.3	0.5	0.7	TRC	2C	--	4	2
40A1840S	230-285	C6		54.8	39.9	5.3			34.8	5.1	1.8	1.9	0.7	0.7	0.2	--C	--C	--	3	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT	<0.4MM	<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.96	0.200			5.5			0.53	0.47			1.20	1.28	1.61	--	39.8		31.3	22.4	0.11
18- 38	1.17	0.121			4.1			0.44	0.43			1.15	1.17	1.81	--	44.8		39.7	26.1	0.16
38- 61	0.44	0.053			4.1			0.51	0.41			1.29	1.23	1.88	--	36.0		37.2	26.2	0.14
61- 97	0.13				3.3			0.54	0.40			1.35	1.28	1.91	--	33.2		35.4	23.6	0.15
97-135	0.10				2.9			0.51	0.39			1.46	1.34	1.96	--	28.6		32.7	22.6	0.14
135-170	0.06				2.6			0.55	0.42			1.49	1.33	1.96	--	27.1		33.5	24.2	0.12
170-230					3.4			0.55	0.43										25.6	
230-285					5.8			0.44	0.42										23.1	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- - ->	<- - - -	-PCT	- - ->						1:2	1:1
0- 18	5.8	11.0	0.4	0.4	17.6	16.9	0.5	34.5	25.5	18.1	3	51	69					4.0		4.8
18- 38	9.9	17.1	1.0	0.2	28.2	13.6	0.4	41.8	26.9	28.6	1	67	100					4.4		5.3
38- 61	10.8	22.1	1.9	0.4	35.2	7.6		42.8	32.2			82	100					5.0		5.9
61- 97	10.2	23.8	2.5	0.4	36.9	3.8		40.7	32.0			91	100	TR				5.8		6.8
97-135		22.9	3.3	0.5		3.2			29.4				100	1				6.5		7.5
135-170		24.7	3.8	0.5		1.8			31.9				100	2				6.6		7.6
170-230		24.8	3.8	0.4		1.9			32.5				100	1				6.6		7.8
230-285	6.7	17.8	2.6	0.3	27.4	2.6		30.0	24.1			91	100	TR				6.6		7.7

Narrative Pedon Description

Pedon: Mabi

NSSL pedon number: 40A247

Pedon ID: S63PR-063-002

SSIR #12 pedon ID: S63PR-16-2

Field classification: Very-fine, montmorillonitic, isohyperthermic Aquic Chromuderts

Revised classification as of April 01, 2001: Very-fine, mixed, active, isohyperthermic Aquic Hapluderts

Location: Gurabo, Puerto Rico; Turabo Soil Conservation District; 1.2 km west of town of Gurabo, 244 meters north and 183 meters west of Gurabo Experiment Station headquarters; aerial photograph GS-LR 15-72

Latitude: 18°15’27" north

Longitude: 65°39’34" west

Vegetation: Guava orchard with pasture undergrowth

Slope: 2 percent; on an alluvial fan

Drainage, runoff, and permeability: Somewhat poorly drained, slow runoff, and slow permeability

Parent material: Fine-textured alluvial fan sediments derived from volcanic rocks

Described and sampled by: R.B. Grossman, W.E. McKinzie, and L.H. Rivera on October 1, 1963

Notes: The Ap, C1, and 2C3 horizons were sampled for the Bureau of Roads. The soil was at field capacity when sampled, except the upper four horizons, which were above field capacity. The water table was at a depth of 3 meters during sampling. Reaction was determined by Soiltex. The soil was used for guava for the five years before sampling and before that supported native grasses. This site is in an old army camp. Since establishment of the Experiment Substation five years before sampling, no fertilizer or lime has been applied to this field. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; very dark grayish brown (10YR 3/2) clay; few fine faint yellowish brown redoximorphic features and red (2.5YR 4/6) coatings along root channels; weak fine granular structure; hard, very firm, slightly sticky, plastic; common fine roots; common fine black nodules; few fine volcanic fragments; field moisture of 42.1 percent; slightly acid; clear smooth boundary. 40A1833

B12—18 to 38 cm; dark yellowish brown (10YR 4/4) clay, brown (10YR 4/3) rubbed; few fine distinct gray (10YR 5/1) and common medium distinct yellowish brown (10YR 5/6) redoximorphic features; weak fine and medium angular blocky structure; many pressure faces; very firm, slightly sticky, plastic; common fine roots; few fine black nodules; few fine volcanic fragments; field moisture of 45.1 percent; slightly acid; clear wavy boundary. 40A1834

C1—38 to 61 cm; yellowish brown (10YR 5/6) clay, brown (10YR 4/3) rubbed; many medium distinct gray (10YR 5/1) redoximorphic features; weak fine and

medium angular blocky structure; many pressure faces and slickensides; very firm, slightly sticky, plastic; few fine roots; few fine black nodules; few fine volcanic fragments; coatings along root channels; field moisture of 40.3 percent; slightly acid; clear wavy boundary. 40A1835

C2—61 to 97 cm; yellowish brown (10YR 5/6) clay; many medium distinct gray (10YR 5/1) and few fine distinct greenish gray (5GY 6/1) redoximorphic features; weak medium and coarse angular blocky structure; common pressure faces and slickensides; very firm, slightly sticky, plastic; common fine black nodules; field moisture of 34.8 percent; few fine volcanic fragments; neutral; abrupt wavy boundary. 40A1836

C3—97 to 135 cm; yellowish brown (10YR 5/6) clay; common fine distinct gray (10YR 5/1) and few fine distinct greenish gray (5GY 6/1) redoximorphic features; weak medium angular blocky structure; common pressure faces and slickensides; very firm, slightly sticky, plastic; few fine black nodules; few fine volcanic fragments; few fine and medium carbonatic concretions; field moisture of 31.3 percent; alkaline; gradual smooth boundary. 40A1837

C4—135 to 170 cm; yellowish brown (10YR 5/6) clay; common fine distinct gray (10YR 5/1) and few fine distinct greenish gray (5GY 6/1) redoximorphic features; weak medium angular blocky structure; few pressure faces and slickensides; very firm, slightly sticky, plastic; few fine black nodules; few fine and medium volcanic fragments; few fine and medium carbonatic concretions; alkaline. 40A1838

C5—170 to 230 cm; auger sample of mixed yellowish brown (10YR 5/4) and greenish gray (5GY 6/1) clay; massive; very firm, slightly sticky, plastic; few fine black nodules; weak effervescence with dilute HCl; alkaline. 40A1839

C6—230 to 285 cm; auger sample of yellowish brown (10YR 5/6) clay; few medium distinct greenish gray (5GY 61/) iron deletions; massive; very firm, slightly sticky, plastic; weak effervescence with dilute HCl; alkaline. 40A1840

Hormigueros Municipio

Mucara: S61PR-067-001

Primary Characterization Data

Hormigueros Municipio, Puerto Rico

Sampled as: Mucara; clayey, montmorillonitic, isohyperthermic, shallow Vertic Eutropepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 541, Samples 40A 4007–4009

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4007S	0- 15	Ap		40.8	36.0	23.2			25.0	11.0	8.1	8.1	2.7	2.5	1.8	1C	8C	--	23	9
40A4008S	15- 30	B2		43.8	34.8	21.4			24.7	10.1	8.4	7.8	2.4	1.8	1.0	2C	13C	--	26	15
40A4009S	30- 51	C														--	--	--		--

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	2.67	0.233			3.4			1.05	0.56			1.22		1.65		38.2		39.1	23.0	
15- 30	1.44	0.135			3.6			1.02	0.54			1.18		1.63		37.8		41.4	23.6	
30- 51	0.10				1.9							1.58		1.72		20.0			10.9	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- EXTR ITY	AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) KCL IN	CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - -			->	<- - - -	-PCT	- - - ->					1:2	1:1
0- 15	27.0	14.4	0.2	0.3	41.9	12.3		54.2	42.9			77	98				4.6		5.8
15- 30	28.3	17.0	0.4	0.2	45.9	8.9		54.8	44.7			84	100				4.7		6.4
30- 51	22.3	14.3	0.4	0.1	37.1	3.5		40.6	34.5			91	100				4.4		6.6

Narrative Pedon Description

Pedon: Mucara

NSSL pedon number: 40A541

Pedon ID: S61PR-067-001

SSIR #12 pedon ID: S61PR-14-11

Field classification: Clayey, montmorillonitic, isohyperthermic, shallow Vertic Eutropepts

Revised classification as of April 01, 2001: Fine-loamy, mixed, superactive, isohyperthermic Typic Hapludolls

Location: Hormigueros, Puerto Rico; Suroeste Soil Conservation District; 30.5 meters north of new Highway 2, at a point 2.5 km east of bridge over the Rosario River; aerial photograph GS-LR-18-161

Latitude: 18°07’04" north

Longitude: 67°04’56" west

Slope: 30 percent with a west aspect; on a side slope in the uplands on the north side of the Guanajibo River Valley

Drainage, runoff, and permeability: Moderately well drained, medium internal drainage, medium runoff, and moderately slow permeability

Vegetation: Sourgrass, cerrillos grass, and other native pastures and weeds

Parent material: Residuum or very local colluvium from volcanic rocks

Described and sampled by: R.B. Grossman, W.E. McKinzie, and L.H. Rivera on December 20, 1961

Notes: The Ap and C horizons were sampled for the Bureau of Public Roads. The soil was at field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; very dark grayish brown (10YR 3/2) clay; few fine faint dark greenish gray (5BG 4/1) iron depletions; weak fine subangular blocky structure; firm, slightly sticky, plastic; few fine black concretions; many fine roots; clear smooth boundary. 40A3999

B2—18 to 30 cm; 60 percent brown (10YR 5/3) and 40 percent very dark grayish brown (10YR 3/2) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films along root channels and pores; abrupt wavy boundary. 40A3999

C—30 to 53 cm; semiconsolidated weathered volcanic rock; few stringers of A-C material running down into the saprolite. 40A3999

Toa: S63PR-067-001

Primary Characterization Data

Hormigueros Municipio, Puerto Rico

Sampled as: Toa; clayey, mixed, isohyperthermic Aquic Fluventic Hapludolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 546, Samples 40A 4026–4030

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) 2 -5	5 -20	WEIGHT - - - - 20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				
40A4026S	0- 20	Ap	27.3	39.7	33.0			27.9	11.8	9.5	15.8	5.9	1.6	0.2	--C	--C	--	23	--
40A4027S	20- 43	2A12	29.8	41.1	29.1			28.7	12.4	8.4	13.8	5.3	1.5	0.1	--C	--C	--	21	--
40A4028S	43- 74	2B21	38.2	52.4	9.4			35.0	17.4	7.9	1.2	0.1	0.1	0.1	--C	--C	--	1	--
40A4029S	74-109	2B22	41.8	49.5	8.7			33.8	15.7	7.8	0.9	TR	--	TR	--C	--C	--	1	--
40A4030S	109-163	3C	40.1	48.1	11.8			33.1	15.0	9.3	2.0	0.3	0.1	0.1	--C	--C	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	1.40	0.118			3.7			0.96	0.65			1.26	1.30	1.39	--	33.7		28.5	17.7	0.14
20- 43	1.63	0.122			3.5			0.91	0.61			1.31	1.37	1.48	--	34.5		28.9	18.1	0.15
43- 74	1.23	0.106			4.1			0.70	0.48			1.36	1.38	1.52	--	31.7		29.5	18.5	0.15
74-109	0.69	0.081			4.3			0.65	0.58			1.23	1.27	1.44	--	39.2		33.4	24.4	0.11
109-163	0.47	0.057			4.3			0.75	0.62				1.30						24.8	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 1:2 8C1f	H2O 1:1 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 20	11.7	16.0	0.1	0.2	28.0	7.8		35.8	26.3			78	100				5.3		6.5
20- 43	12.7	17.4	0.1	0.2	30.4	8.0		38.4	27.0			79	100	--			5.4		6.6
43- 74	11.0	20.8	0.1	0.2	32.1	7.4		39.5	26.6			81	100	--			5.6		6.8
74-109	7.9	24.1	0.2	0.3	32.5	6.3		38.8	27.2			84	100	--			5.7		6.9
109-163	7.2	26.0	0.2	0.3	33.7	5.8		39.5	30.0			85	100	--			5.8		7.0

Narrative Pedon Description

Pedon: Toa

NSSL pedon number: 40A546

Pedon ID: S63PR-067-001

SSIR #12 pedon ID: S63PR-14-1

Field classification: Clayey, mixed, isohyperthermic Aquic Fluventic Hapludolls

Revised classification as of April 01, 2001: Fine, mixed, superactive, isohyperthermic Fluventic Hapludolls

Location: Hormigueros, Puerto Rico; Suroeste Soil Conservation District; 9 km west-northwest of the town of San Germán; 700 meters on dirt road south of kilometer marker 2.5 on Highway 345 and 200 meters east of the dirt road

Latitude: 18°07’32" north

Longitude: 67°06’36" west

Slope: Nearly level (2 percent); on an alluvial fan on the flood plain along the Rosario River; on a natural levee near the course of the river

Drainage, runoff, and permeability: Moderately well drained, medium runoff, and moderate permeability

Vegetation: Cultivated; used for sugarcane

Parent material: Moderately fine-textured sediments derived from basic volcanic rocks

Depth to water table: 91 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, L.H. Rivera, G. Acevedo, and R.E. Gierbolini on September 25, 1963

Notes: The soil was above field capacity when sampled. Reaction was determined by Soiltex. The site of the pedon has been used for sugarcane for a long time. Scattered pottery fragments were found at a depth of 47 cm. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 20 cm; dark brown (10YR 3/3) clay loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common fine roots; few fine sand grains; few fine volcanic fragments; strongly acid; clear smooth boundary. 40A4026

2A12—20 to 43 cm; dark brown (10YR 3/3) silty clay loam; weak medium subangular blocky structure parting to weak fine granular; friable, slightly sticky, slightly plastic; few fine roots; few fine pores; common fine black nodules; neutral; clear smooth boundary. 40A4027

2B21—43 to 74 cm; dark yellowish brown (10YR 3/4) silty clay loam; few fine distinct dark brown (7.5YR 4/4) redoximorphic concentrations; weak medium and coarse subangular blocky structure parting to weak fine subangular blocky with thin patchy clay films; friable, slightly sticky, slightly plastic; few fine roots; common fine charcoal pieces; mildly alkaline; clear smooth boundary. 40A4028

2B22—74 to 109 cm; dark yellowish brown (10YR 4/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) redoximorphic concentrations and few fine

faint light gray (10YR 7/1) iron depletions; pottery and brick fragments at the top of the horizon; massive; friable, slightly sticky, slightly plastic; few fine roots; few fine pores; few fine charcoal pieces; mildly alkaline; clear smooth boundary. 40A4029

3C—109 to 163 cm; dark yellowish brown (10YR 4/4) clay loam; few fine faint yellowish brown (10YR 5/6) redoximorphic concentrations and few fine faint gray (10YR 7/1) iron depletions; massive; friable, slightly sticky, slightly plastic; few fine black nodules; mildly alkaline. 40A4030

Humacao Municipio

Cayagua: S61PR-005-003

Primary Characterization Data

Humacao Municipio, Puerto Rico

Sampled as: Cayagua; fine, mixed, isohyperthermic Aeric Tropaqualfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 562, Samples 40A 4119–4125

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
SAMPLE	DEPTH	HORIZON		CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
NO.	(CM)			LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
				.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4119S	0- 10	Ap		13.5	13.4	73.1			6.5	6.9	5.5	12.5	10.9	21.2	23.0	--C	--C	--	68	--
40A4120S	10- 25	B21t		45.7	13.6	40.7			7.0	6.6	5.7	12.0	8.0	11.4	3.6	--C	--C	--	35	--
40A4121S	25- 51	B22t		44.8	17.1	38.1			10.8	6.3	5.3	10.1	6.5	10.2	6.0	--C	--C	--	33	--
40A4122S	51- 69	B3		28.5	18.5	53.0			11.6	6.9	6.1	10.7	7.4	15.5	13.3	--C	--C	--	47	--
40A4123S	69- 91	C1		32.8	21.4	45.8			14.5	6.9	6.1	10.6	6.4	12.5	10.2	--C	--C	--	40	--
40A4124S	91-254	C2		22.4	20.2	57.4			11.8	8.4	8.4	13.3	7.8	14.5	13.4	--C	--C	--	49	--
40A4125S	5- 10	Ap2		13.0	12.6	74.4			6.7	5.9	5.7	12.5	10.3	21.3	24.6	--C	--C	--	69	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 10	1.81	0.160			1.6			0.48	0.63			1.21		1.41		35.0			8.5	
10- 25	0.45	0.064			1.2			0.26	0.35			1.45		1.73		27.3			16.2	
25- 51	0.21	0.038			1.4			0.28	0.36			1.57		1.80		21.4			15.9	
51- 69	0.09				1.6			0.32	0.41			1.70							11.6	
69- 91	0.05				1.7			0.31	0.41			1.81		1.84		10.9			13.5	
91-254	0.02				1.4			0.33	0.47										10.5	
5- 10	0.79				2.0			0.45	0.54										7.0	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.	COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - - -	-PCT	- -	- ->				1:2	1:1
0- 10	0.6	0.6	0.1	0.2	1.5	7.5	0.4	9.0	6.5	1.9	21	17	23				4.4		5.4
10- 25	2.0	3.2	0.6	0.1	5.9	8.6	3.3	14.5	11.9	9.2	36	41	50				3.6		4.9
25- 51	2.3	5.0	1.0	0.1	8.4	6.6	2.0	15.0	12.4	10.4	19	56	68				3.4		4.7
51- 69	1.6	4.1	0.9	0.1	6.7	3.6	0.3	10.3	9.0	7.0	4	65	74				3.5		5.0
69- 91	1.9	5.7	1.5	0.1	9.2	3.0	0.2	12.2	10.3	9.4	2	75	89				3.7		5.0
91-254	1.3	4.0	1.6	0.1	7.0	2.2		9.2	7.4			76	95				4.8		6.2
5- 10	TR	0.4	0.1	0.1	0.6	6.3	0.8	6.9	5.9	1.4	57	9	10				4.1		5.0

Narrative Pedon Description

Pedon: Cayagua
NSSL pedon number: 40A0562
Pedon ID: S61PR-005-003
SSIR #12 pedon ID: S61PR-12-3
Field classification: Fine, mixed, isohyperthermic Aeric Tropaqualfs
Revised classification as of March 01, 2001: Fine, mixed, semiactive, isohyperthermic Aeric Albaqualfs
Location: Humacao Municipio, Puerto Rico; Este Soil Conservation District; 137 meters west of kilometer marker 0.7 on Highway 450 (23 meters west of fence)
Latitude: Unknown
Longitude: Unknown
Slope: 7 percent with an aspect of 225 degrees; convex up
Drainage, runoff, and permeability: Somewhat poorly drained, medium runoff, and moderate permeability
Vegetation: Morning-glory, zorrograss, carpetgrass, and native legumes; used for pasture
Parent material: Residuum from plutonic rocks
Particle-size control section: 10 to 50 cm
Mineralogy: See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative.
Described and sampled by: R.B. Grossman, W.E. McKinzie, R. Boccheciamp, and J. Juarez on December 12, 1961

Ap—0 to 10 cm; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; 1 percent medium iron concretions; abrupt smooth boundary. 40A4119

B21t—10 to 25 cm; light brownish gray (10YR 6/2) clay; 21 percent coarse distinct strong brown (7.5YR 5/6) redoximorphic features; weak medium subangular blocky structure; very firm, slightly sticky, moderately plastic; common patchy clay films on faces of peds and in pores; clear wavy boundary. 40A4120

B22t—25 to 51 cm; light brownish gray (10YR 6/2) clay; 1 percent fine distinct red (2.5YR 5/6) and 21 percent coarse distinct strong brown (7.5YR 5/6) redoximorphic features; weak coarse subangular blocky structure; firm, slightly sticky, moderately plastic; few patchy clay films on faces of peds and in pores; clear wavy boundary. 40A4121

B3—51 to 69 cm; 40 percent light gray (10YR 7/1) clay and 60 percent yellowish red (5YR 5/6) sandy loam; massive; friable; very few roots; nonsticky, nonplastic; gradual wavy boundary. 40A4122

C1—69 to 91 cm; 40 percent light gray (10YR 7/1) clay and quartz seams and 60 percent yellowish red (5YR 4/6) sandy loam; massive; friable, nonsticky, slightly plastic; gradual wavy boundary. 40A4123

C2—91 to 254 cm; reddish yellow (7.5YR 6/6) and yellowish red (5YR 4/6) sandy loam; massive; very friable, nonsticky, nonplastic. Sampled at depths of 203 to 254 cm with an auger. 40A4124

Ap2—5 to 10 cm; subsample from lower 2.5 cm of Ap; sandier and richer in iron concretions than the upper half of the Ap horizon. 40A4125

Rio Arriba: S88PR-069-001

Primary Characterization Data

Humacao Municipio, Puerto Rico

Sampled as: Rio Arriba; fine, mixed, isohyperthermic Vertic Paleudalfs

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 365, Samples 88P 1848–1855

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			(- - -TOTAL	- - -)		(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -	- - - - -)			(-COARSE FRACS (MM)-)				(>2MM)
			CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - - WEIGHT - - - - -				WT
SAMPLE	DEPTH	HORIZON	LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)		.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
88P1848S	0- 28	Ap	39.1	37.8	23.1	17.9		23.2	14.6	7.3	4.6	2.8	4.2	4.2	6	2	--	23	8
88P1849S	28- 61	Bt1	58.9	31.7	9.4	25.1		20.6	11.1	3.5	1.9	1.1	1.3	1.6	3	1	--	10	4
88P1850S	61- 80	Bt2	60.4	34.5	5.1	22.3		25.4	9.1	2.2	0.9	0.6	0.8	0.6	2	--	--	5	2
88P1851S	80-107	Bt3	59.2	34.8	6.0	20.4		27.0	7.8	2.0	1.7	0.7	1.1	0.5	1	TR	--	5	1
88P1852S	107-146	Btv1	52.6	37.0	10.4	18.4		25.8	11.2	5.2	2.9	1.3	0.8	0.2	1	TR	--	6	1
88P1853S	146-173	Btv2	50.0	40.1	9.9	18.2		27.3	12.8	5.0	2.5	1.3	0.9	0.2	1	TR	--	6	1
88P1854S	173-210	Btv3	49.4	29.2	21.4	20.2		16.6	12.6	6.9	9.0	3.4	1.5	0.6	1	--	--	15	1
88P1855S	210-220	2Bg	50.9	24.1	25.0	25.3		13.5	10.6	8.5	10.3	3.7	1.5	1.0	2	TR	--	18	2

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT	- -)		(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT	- -)			WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 28	1.46	0.165	7		5.4	8.0	5.0	0.28	0.48	61	33		1.34	1.48	0.032			28.7	18.9	0.13
28- 61	0.29	0.070	--		6.9	8.0	1.0	0.15	0.40				1.34	1.46	0.028			31.1	23.7	0.10
61- 80	0.16	0.056	--		7.7	0.8	TR	0.24	0.40	61	29		1.44	1.54	0.022			27.9	24.3	0.05
80-107	0.09		--		8.0	0.7	TR	0.22	0.36				1.53	1.62	0.019			26.0	21.5	0.07
107-146	0.08		--		6.8	0.6	--	0.21	0.38				1.61	1.68	0.014			23.3	20.2	0.05
146-173	0.07		--		6.1	0.5	--	0.26	0.48	56	30		1.57	1.67	0.021			24.4	23.9	0.01
173-210	0.07		2		5.9	0.5	TR	0.24	0.41	57	32		1.52	1.77	0.052			26.5	20.3	0.09
210-220	0.07		--		4.3	0.3	--	0.25	0.39	62	37		1.47	1.64	0.037			28.0	20.0	0.12

	(- NH4OAC	EXTRACTABLE	BASES -)			ACID-	EXTR	(- - - -CEC	- - -)		AL	-BASE SAT-		CO3 AS	RES.	COND.	(- - - -PH	- - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS	KCL	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9b	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 28	0.9	0.2	TR	TR	1.1	17.0	2.5	18.1	10.8	3.6	69	6	10				3.7	3.9	4.3
28- 61	0.6	0.2	TR	TR	0.8	14.4	3.8	15.2	9.1	4.6	83	5	9				3.6	3.8	4.5
61- 80	2.4	0.6	0.1	TR	3.1	14.9	3.8	18.0	14.4	6.9	55	17	22				3.7	4.1	4.7
80-107	2.0	1.2	TR	TR	3.2	12.1	4.7	15.3	13.2	7.9	59	21	24				3.7	4.1	4.8
107-146	1.3	1.7	TR	0.1	3.1	11.4	4.6	14.5	11.2	7.7	60	21	28				3.7	4.1	4.8
146-173	1.2	1.8	TR	0.1	3.1	10.7	4.3	13.8	13.1	7.4	58	22	24				3.7	4.1	4.8
173-210	1.4	2.9	0.1	0.1	4.5	11.0	3.2	15.5	11.9	7.7	42	29	38				3.8	4.3	4.8
210-220	1.4	3.0	0.1	0.1	4.6	10.4	3.9	15.0	12.6	8.5	46	31	37				3.7	4.2	4.8

	< - CLAY MINERALOGY (<.002mm) - >												
	FRACT	< - - - - - - X-RAY - - - - - - >	< - - - THERMAL - - - >		< - - - - - - - - ELEMENTAL					- - - - - - - - >		< - -> EGME	INTER
SAMPLE	ION	<	> < - DTA - ->	< - TGA - ->	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	< > RETN	PRETA
		< - - - - - - 7A2i - - - - - - >	< - 7A6 - >	< - 7A4b - >	< - - - - - - - - - - 7C3						- - - - - - - - - - >	< > 7D2	TION
NUMBER	<- - >	< - - - - - peak size - - - - - >	< - - - Percent - - - >		< - - - - - - - - - - Percent						- - - - - - - - >	< - -><mg/g>	< - >
88P1848	TCLY	KK 4 GE 2 HE 2 MI 2				26.0	13.7			1.4			
88P1850	TCLY	KK 4 GE 2 MI 2 HE 1				25.0	13.9			1.4			
88P1853	TCLY	KK 4 MI 2 GE 2 HE 1				26.0	9.6			2.0			
88P1855	TCLY	KK 5 MI 2 GE 2				26.0	6.7			1.0			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

		ACID OPT DEN	OXALATE EXTRACTION FE	SI	AL	PHOSPHOUS RET	CIT- ACID	KCL MN	TOTAL C	(- -WATER 0.06 BAR	1- BAR	CONTENT- -) 2- BAR	15 BAR	(- - - - WATER DISPERSIBLE - - - -) MIN AGGRT PIPETTE - - >< - HYDROMETER - > SOIL STABL CLAY	SILT	SAND	CLAY	SILT	SAND	CONT	<5mm
SAMPLE NO.	HZ NO	8J	6C9a	6V2	6G12	6S4	6S5	6D3	6A2d	4B1c	4B1a	4B1a	4B2b	<- - - 3A1c - - -><- - - SML - - -> 8F1							4G1
			<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
88P1848	1	0.03	0.20	0.02	0.18	43						28.6									10
88P1849	2	0.09	0.80	0.03	0.31	44						24.3									
88P1850	3	0.02	0.18	0.02	0.13	38						29.8									
88P1851	4	0.02	0.17	0.03	0.12	29						26.1									
88P1852	5	0.02	0.20	0.03	0.12	33						24.9									
88P1853	6	0.02	0.18	0.04	0.11	33						25.8									
88P1854	7	0.02	0.23	0.06	0.15	29						25.7									
88P1855	8	0.02	0.12	0.04	0.15	26						26.4									

Narrative Pedon Description

Pedon: Rio Arriba

NSSL pedon number: 88P0365

Pedon ID: S88PR-069-001

Field classification: Fine, mixed, isohyperthermic Vertic Paleudalfs

Revised classification as of April 01, 2001: Fine, mixed, subactive, isohyperthermic Typic Paleudults

Location: Humacao Municipio, Puerto Rico; 69 meters west of row at kilometer marker 7.7 on Highway 924, about 0.8 km south of Pena Pobre junction 31 and 924 at kilometer marker 8.0

Latitude: 18°12’42" north

Longitude: 65°49’14" west

Elevation: 102 meters

Physiography: Terracettes on coastal plains

Slope: 3 percent with a plane northwest aspect

Major Land Resource Area: 272—Humid Coastal Plains

Depth to water table: 173 cm

Drainage, runoff, and permeability: Moderately well drained, moderate runoff, and slow permeability

Vegetation: Unspecified grasses in pastureland and native pasture

Erosion: Slight

Particle-size control section: 28 to 78 cm

Parent material: Alluvium from igneous-granite material

Diagnostic features: Ochric epipedon at 0 to 28 cm; argillic horizon at 28 to 220 cm

Described and sampled by: D. Williams and G. Acevedo during February 1988

Ap—0 to 28 cm; dark yellowish brown (10YR 4/4) clay loam; moderate fine granular structure; friable, sticky, plastic; many fine roots throughout; common fine rounded soft masses of iron-manganese; clear smooth boundary. 88P1848

Bt1—28 to 61 cm; strong brown (7.5YR 5/6) clay; common medium distinct redoximorphic features; moderate fine subangular blocky structure; firm, sticky, plastic; common fine roots throughout; common interstitial and tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; common fine rounded soft masses of iron-manganese; few charcoal fragments; clear smooth boundary. 88P1849

Bt2—61 to 80 cm; strong brown (7.5YR 5/6) clay; common medium distinct redoximorphic features; moderate fine subangular blocky structure parting to moderate medium subangular blocky; firm, sticky, plastic; common fine roots throughout; common fine and few medium interstitial and tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; few fine rounded iron concretions; clear smooth boundary. 88P1850

Bt3—80 to 107 cm; strong brown (7.5YR 5/6) clay; common coarse prominent and common medium distinct redoximorphic features in horizontal beds; few very pale brown (10YR 8/2) redoximorphic features along old root channels;

moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine voids between rock fragments and pores; many continuous distinct clay films on vertical and horizontal faces of peds; few fine rounded iron concretions and common fine rounded plinthite segregations; clear smooth boundary. 88P1851

Btv1—107 to 146 cm; strong brown (7.5YR 5/6) clay; common coarse prominent and common medium prominent redoximorphic features, white redoximorphic features tend to be horizontal; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine interstitial and tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; common fine rounded plinthite segregations; clear wavy boundary. 88P1852

Btv2—146 to 173 cm; strong brown (7.5YR 5/6) clay; common coarse prominent redoximorphic features; weak coarse subangular blocky structure; firm, sticky, plastic; few very fine roots throughout; few discontinuous faint clay films on faces of peds; common fine rounded plinthite segregations; extremely acid; clear smooth boundary. 88P1853

Btv3—173 to 210 cm; grayish (2.5Y 4/6) clay; few coarse prominent redoximorphic features; weak coarse subangular blocky structure; firm, sticky, plastic; few very fine roots throughout; few fine interstitial and tubular pores; few discontinuous faint clay films on faces of peds; common fine rounded plinthite segregations and common fine irregular soft masses of iron-manganese; few reddish clay balls; moderately acid; abrupt smooth boundary. 88P1854

2Bg—210 to 220 cm; light gray (10YR 7/1) clay; common coarse prominent redoximorphic features; moderate medium angular blocky structure; very firm, very sticky, very plastic; few fine interstitial and tubular pores; common discontinuous pressure faces throughout; moderately acid. 88P1855

Naranjito: S88PR-069-002

Primary Characterization Data

Humacao Municipio, Puerto Rico

Sampled as: Naranjito; fine, mixed, isohyperthermic Typic Haplohumults

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 366, Samples 88P 1856–1862

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS (MM) WEIGHT 2-5	5-20	20-75	>75MM 75-.1	WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1) ->												<- PCT OF <75MM(3B1)->				
88P1856S	0- 9	Ap	49.4	27.7	22.9	17.9		22.9	4.8	3.4	4.2	3.6	4.8	6.9	8	19	7V	47	37
88P1857S	9- 31	Bt1	60.0	30.2	9.8	20.9		26.9	3.3	1.9	2.3	1.7	1.8	2.1	3	8	4V	22	15
88P1858S	31- 52	Bt2	57.2	38.0	4.8	15.6		35.5	2.5	0.9	1.0	0.8	0.9	1.2	2	5	2	13	9
88P1859S	52- 75	Bt3	45.1	52.8	2.1	11.5		41.7	11.1	0.5	0.7	0.4	0.3	0.2	1	1	1	5	3
88P1860S	75-115	Bt4	45.6	53.4	1.0	9.2		50.3	3.1	0.3	0.4	0.2	0.1	--	TR	--	--	1	--
88P1861S	115-141	Bt5	37.1	60.6	2.3	7.3		56.3	4.3	0.9	0.8	0.5	0.1	--	--	--	--	1	--
88P1862S	141-188	Bw	31.8	63.9	4.3	5.8		60.3	3.6	2.3	1.5	0.5	--	--	TR	--	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT FE 6C2b OF	DITH-CIT AL 6G7a <2MM	DITH-CIT MN 6D2a -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <-	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a ->	WRD WHOLE SOIL 4C1 CM/CM
0- 9	2.44	0.185	1	6.3	0.5	TR	0.26	0.51				0.90	1.28	0.100				65.4	25.3	0.30
9- 31	1.33	0.119	--	5.5	0.4	TR	0.22	0.47	69	36		1.18	1.36	0.045				40.3	27.9	0.14
31- 52	0.53	0.061	TR	7.1	0.5	TR	0.38	0.47				1.25	1.42	0.042				37.0	26.6	0.12
52- 75	0.34	0.040	--	3.6	0.2	TR	0.87	0.54	63	28		1.30	1.44	0.034				35.6	24.4	0.14
75-115	0.21		--	4.9	0.3	TR	0.27	0.46				1.35	1.48	0.031				33.1	21.1	0.16
115-141	0.14		1	3.4	0.2	TR	0.26	0.39				1.45	1.50	0.011				28.5	14.6	0.20
141-188	0.12		TR	2.9	0.2	TR	0.28	0.65	47	15		1.39	1.44	0.007				31.5	20.8	0.15

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- MEQ / 100 G ->										<- PCT ->							1:2	1:1
0- 9	1.0	0.7	0.1	0.2	2.0	18.6	3.2	20.6	13.0	5.2	62	10	15				3.7	3.8	4.6
9- 31	0.8	0.1	0.1	0.1	1.1	16.7	4.7	17.8	12.9	5.8	81	6	9				3.6	3.7	4.5
31- 52	0.7	0.1	0.1	TR	0.9	13.2	3.9	14.1	21.9	4.8	81	6	4				3.6	3.8	4.5
52- 75	1.0	0.1	0.1	TR	1.2	12.0	4.9	13.2	39.1	6.1	80	9	3				3.6	3.9	4.2
75-115	0.5	0.1	0.2	TR	0.8	11.6	5.5	12.4	12.1	6.3	87	6	7				3.5	3.8	4.0
115-141	0.3	0.1	0.2	TR	0.6	10.5	5.8	11.1	9.6	6.4	91	5	6				3.5	3.8	4.1
141-188	0.2	0.1	0.2	TR	0.5	10.1	5.5	10.6	8.9	6.0	92	5	6				3.6	3.8	4.2

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size					THERMAL DTA 7A6 Percent					TGA 7A4b Percent					ELEMENTAL SiO2 7C3	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTER PRETA TION
88P1857	TCLY	KK 4	GE 2	MI 2	VR 2	HE 2											23.0	15.7				1.0			
88P1859	TCLY	KK 3	GE 2	HE 1	MI 1	VR 1											24.0	17.2				1.1			
88P1862	TCLY	KK 3	GE 2	MI 1													22.0	15.7				1.0			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite MI mica VR vermiculite HE hematite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m ->				<- P P M ->			<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - - >										<20mm>	<PCT>
88P1856	1	0.13	1.10	0.02	0.19	48						35.7									20
88P1857	2	0.10	0.92	0.02	0.22	36						37.8									
88P1858	3	0.06	0.70	0.02	0.17	33						36.4									
88P1859	4	0.06	0.82	0.02	0.15	23						36.5									
88P1860	5	0.05	0.69	0.02	0.13	29						34.5									
88P1861	6	0.04	0.62	0.02	0.10	26						31.6									
88P1862	7	0.03	0.50	0.02	0.10	18						31.3									

Narrative Pedon Description

Pedon: Naranjito
NSSL pedon number: 88P0366
Pedon ID: S88PR-069-002
Field classification: Fine, mixed, isohyperthermic Typic Haplohumults
Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Typic Haplohumults
Location: Humacao Municipio, Puerto Rico; 5 km northeast of Humacao, 80 m north of Highway 927
Latitude: 18°11’14" north
Longitude: 65°47’57" west
Elevation: 40 meters
Physiography: Hillside or mountainside in hills
Geomorphic position: Footslope of a nose slope; on lower third of component
Slope: 20 percent convex with a west aspect
Major Land Resource Area: 272—Humid Coastal Plains
Drainage, runoff, and permeability: Well drained, rapid runoff, and slow permeability
Vegetation: Guava in pastureland
Erosion: Severe
Particle-size control section: 9 to 59 cm
Parent material: Residuum from igneous-granite material
Diagnostic features: Ochric epipedon at 0 to 9 cm; argillic horizon at 9 to 141 cm
Described and sampled by: D. Williams and G. Acevedo during February 1988
Notes: Roots extend to a depth of 110 cm with a few below.

Ap—0 to 9 cm; reddish brown (5YR 4/3) clay loam; moderate fine subangular blocky structure parting to moderate fine granular; firm, sticky, plastic; many fine roots throughout; moderately acid; 3 percent gravel; 2 percent cobbles; abrupt smooth boundary. 88P1856

Bt1—9 to 31 cm; red (2.5YR 4/6) clay; few fine distinct redoximorphic features; moderate fine subangular blocky structure parting to moderate medium subangular blocky; firm, sticky, plastic; common fine roots throughout; many fine interstitial and tubular pores; common continuous distinct clay films on faces of peds; strongly acid; 2 percent gravel; clear wavy boundary. 88P1857

Bt2—31 to 52 cm; red (2.5YR 4/6) clay; few fine distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate coarse prismatic; firm, sticky, plastic; common fine roots throughout; common fine interstitial and tubular pores; common continuous distinct clay films on faces of peds; strongly acid; clear smooth boundary. 88P1858

Bt3—52 to 75 cm; red (2.5YR 4/6) clay; common medium distinct and few medium distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate very coarse prismatic; firm, sticky, plastic; common fine roots throughout; common fine interstitial and tubular pores;

common continuous distinct clay films on faces of peds; strongly acid; clear smooth boundary. 88P1859

Bt—75 to 115 cm; red (10R 4/8) clay; common medium distinct redoximorphic features; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky, plastic; common fine roots between peds; few fine interstitial and tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; strongly acid; clear smooth boundary. 88P1860

Bt5—115 to 141 cm; dark red (10R 3/6) clay; common medium distinct redoximorphic features; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky, plastic; few fine interstitial and tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; strongly acid; clear smooth boundary. 88P1861

Bw—141 to 188 cm; dark yellowish brown (10YR 3/6) clay loam; common medium distinct redoximorphic features; weak very coarse prismatic structure; firm, slightly sticky, slightly plastic; few prominent coatings on horizontal faces of peds; strongly acid. 88P1862

Isabela Municipio

Coto: S82PR-007-001

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Coto; clayey, kaolinitic, isohyperthermic Tropertic Eutrorthox

SSL—Project: 82P 136, (CP82PR253) SMSS-Benchmark soil

—Pedon: 82P 820, Samples 82P 4216–4222

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.05	SILT COARSE .05 -.10	SAND VF .10 -.25	SAND F .25 -.50	SAND M .5 -1	SAND C 1 -2	SAND VC 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
82P4216S	0- 16	Ap1	55.6	9.5	34.9	19.0		6.7	2.8	7.5	12.0	13.4	2.0	--	--	--	27	--
82P4217S	16- 27	Ap2	56.2	8.9	34.9	22.2		5.0	3.9	7.4	11.9	13.8	1.8	--	TR	--	--	27	--
82P4218S	27- 46	Bt1	62.0	6.3	31.7	25.0		2.9	3.4	6.6	10.9	12.4	1.8	--	TR	--	--	25	--
82P4219S	46- 61	Bt2	64.9	6.4	28.7	28.7		3.3	3.1	6.6	9.9	10.7	1.4	0.1	TR	--	--	22	--
82P4220S	61- 96	Bw1	64.6	7.9	27.5	25.7		5.8	2.1	6.4	9.4	9.9	1.5	0.3	TR	TR	--	21	--
82P4221S	96-125	Bw2	71.2	4.0	24.8	30.2		3.7	0.3	5.3	8.5	9.5	1.2	0.3	TR	--	--	19	--
82P4222S	125-162	Bw2	73.0	3.9	23.1	31.3		3.7	0.2	4.7	7.9	8.8	1.3	0.4	1	TR	--	19	1

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF	DITH-CIT EXTRACTABLE MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 16	1.83	0.183			9.0	1.3	0.3	0.23	0.32				1.65	1.79	0.028			21.9	17.7	0.07
16- 27	1.61	0.169			9.0	1.2	0.3	0.21	0.32										17.7	
27- 46	0.74	0.115			8.9	1.3	0.2	0.11	0.32				1.49	1.61	0.026			24.3	20.0	0.06
46- 61	0.61				9.6	1.4	0.3	0.11	0.33										21.3	
61- 96	0.42				9.6	1.4	0.3	0.10	0.34				1.34	1.47	0.031			26.8	21.8	0.07
96-125	0.26				10.4	1.5	0.1	0.08	0.29										20.3	
125-162	0.19				10.8	1.5	0.1	0.08	0.29				1.41	1.52	0.025			26.4	20.9	0.08

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->											<- - - - -PCT - - - ->						1:2	1:1
0- 16	8.0	1.1	0.1	0.2	9.4	8.5		17.9	13.0			53	72				5.1	5.7	5.9
16- 27	7.6	0.9	0.1	0.1	8.7	8.3		17.0	11.7			51	74				5.0	5.7	5.9
27- 46	3.7	0.4	0.1	0.1	4.3	7.6	0.2	11.9	7.1	4.5	4	36	61				4.9	5.4	5.5
46- 61	3.7	0.4	TR	0.1	4.2	6.9		11.1	7.1			38	59				5.1	5.6	5.7
61- 96	3.3	0.3	TR	0.1	3.7	6.2		9.9	6.2			37	60				5.5	5.9	5.9
96-125	4.1	0.4	0.1	0.1	4.7	5.3		10.0	5.8			47	81				5.7	6.1	6.2
125-162	4.2	0.5	TR	TR	4.7	5.0		9.7	6.1			48	77				5.9	6.5	6.8

SAMPLE NUMBER	FRACT ION <- - ><- - - - peak size	X-RAY 7A2i - - - - - -><- - - Percent	THERMAL DTA -><- TGA -> 7A6 - ><- 7A4b - ><- - - - - - - - - -	ELEMENTAL SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O 7C3 - - - - - - - - -><- - -><mg/g><- - >	EGME RETN 7D2	INTER PRETA TION
82P4216	TCLY	KK 3	GE 2	KK55	20.0	0.3
82P4218	TCLY	KK 3	GE 2	KK49	18.6	0.3
82P4220	TCLY	KK 3	GE 2	KK45	20.0	0.4
82P4222	TCLY	KK 3	GE 2	KK46	20.0	0.3

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
82P4216     FS                                                  101  QZ96  OP 4  FE 1  CBtr
82P4218     FS                                                  100  QZ96  OP 3  FE 1  ZRtr  MStr
82P4220     FS                                                  100  QZ95  OP 5  EPtr  FEtr
82P4222     FS                                                  100  QZ98  OP 2  FEtr  ZRtr  FKtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            FS    Fine Sand, 0.1-0.25mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         QZ  quartz           OP  opaques          FE  iron oxides      CB  carb-aggrega
    ZR  zircon           MS  muscovite        EP  epidote          FK  potas feldsp
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Coto
NSSL pedon number: 82P0820
Pedon ID: S82PR-007-001
Field classification: Clayey, kaolinitic, isohyperthermic Tropeptic Eutrorthox
Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Eutrudox
Location: Isabela Municipio, Puerto Rico; 100 meters south of Highway 2 kilometer marker
Latitude: Unknown
Longitude: Unknown
Physiography: Level or undulating uplands
Slope: 2 percent with an east aspect
Moisture regime: Udic
Drainage and permeability: Well drained and moderate permeability
Described and sampled by: R. Guthrie during August 1982
Notes: Matrix colors are for moist ped interiors.

Ap—0 to 16 cm; grayish brown (10YR 5/2) clay, dark yellowish brown (10YR 4/6) dry; moderate fine and medium subangular blocky structure; very hard, very firm, slightly sticky, plastic; common fine roots; very strongly acid; clear smooth boundary. 82P4216

Ap2—16 to 27 cm; brown (7.5YR 5/2) clay, brown to dark brown (7.5YR 4/2) dry; moderate fine and medium subangular blocky structure; very hard, very firm, slightly sticky, plastic; common fine roots; very strongly acid; clear smooth boundary. 82P4217

Bt1—27 to 46 cm; dark reddish brown (5YR 3/4) clay, reddish brown (5YR 4/4) dry; moderate medium subangular blocky structure; hard, friable, slightly sticky, plastic; few fine roots; patchy clay films; many fine dark concretions; extremely acid; clear smooth boundary. 82P4218

Bt2—46 to 61 cm; reddish brown (5YR 4/4) clay, reddish brown (5YR 4/4) dry; weak fine subangular blocky structure; hard, friable, slightly sticky, plastic; few fine roots; patchy clay films; many fine dark concretions; very strongly acid; clear smooth boundary. 82P4219

Bw1—61 to 96 cm; strong brown (7.5YR 5/6) clay, strong brown (7.5YR 5/6) dry; weak fine subangular blocky structure; hard, friable, slightly sticky, plastic; few fine roots; patchy faint clay films; many fine dark concretions; very strongly acid; clear smooth boundary. 82P4220

Bw2—96 to 162 cm; strong brown (7.5YR 5/6) clay, strong brown (7.5YR 5/6) dry; weak fine subangular blocky structure; friable, slightly sticky, plastic; few dark concretions; very strongly acid; clear smooth boundary. 82P4221

Coto: S94PR-005-001

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Coto; clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 94P 149, (RP94PR257) PR-ARS

—Pedon: 94P 843, Samples 94P 6597–6602

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05 -.05	SAND -2	FINE .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE -.02	COARSE -.05	(- - - - - -SAND- - - - - -) VF -.10	F -.25	M -.50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
94P6597S	0- 23	Ap	45.2	10.9	43.9			6.6	4.3	6.9	16.8	16.7	3.4	0.1	--	--	--	37	--
94P6598S	23- 38	AB	49.2	8.5	42.3			4.4	4.1	7.1	15.9	16.2	3.0	0.1	--	--	--	35	--
94P6599S	38- 56	Bo1	64.8	4.7	30.5			2.4	2.3	4.6	12.0	11.5	2.2	0.2	--	--	--	26	--
94P6600S	56- 86	Bo2	68.0	4.6	27.4			3.0	1.6	3.7	10.7	10.8	2.0	0.2	--	--	--	24	--
94P6601S	86-119	Bo3	80.1	3.4	16.5			2.9	0.5	2.5	6.1	6.4	1.3	0.2	--	--	--	14	--
94P6602S	119-180	Bo4	82.5	5.9	11.6			4.1	1.8	3.3	3.7	3.8	0.7	0.1	--	--	--	8	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT <0.4MM	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A5 <- - G/CC - - ->	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	1.77							0.23	0.33										15.0	
23- 38	1.06							0.20	0.33										16.0	
38- 56	0.77							0.15	0.31										20.1	
56- 86	0.39							0.13	0.31										21.4	
86-119	0.40							0.13	0.31										24.7	
119-180	0.29							0.13	0.31										25.8	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																	
0- 23	10.7	0.9	--	0.1	11.7	8.7		20.4	10.3			57	100					
23- 38	5.4	0.4	--	TR	5.8	11.0		16.8	9.7			35	60					
38- 56	5.4	0.3	--	0.1	5.8	10.0		15.8	9.5			37	61					
56- 86	6.6	0.2	TR	0.1	6.9	7.6		14.5	9.0			48	77					
86-119	7.9	0.5	TR	0.1	8.5	7.8		16.3	10.6			52	80					
119-180	8.4	0.7	TR	0.1	9.2	8.1		17.3	10.8			53	85					

Narrative Pedon Description

Pedon: Coto
NSSL pedon number: 94P0843
Pedon ID: S94PR-005-001
Pedon type: Modal pedon for map unit
Pedon purpose: Research site
Field classification: Clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox
Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Eutrudox
Location: Isabela Municipio, Puerto Rico; ARS Research Station, Isabela, Puerto Rico
Major Land Resource Area: 272—Humid Coastal Plains
Latitude: 18°28’25"
Longitude: 67°02’30"
UTM zone: 19
Geomorphic position: On footslope of a side slope in coastal plain and on footslope of a side slope of sink
Slope: 7 percent with an aspect of 200 degrees, length of 200 meters, and an upslope length of 200 meters; convex up and concave across
Vegetation: Grass and herbaceous cover in an area of hayland
Particle-size control section: 25 to 100 cm
Diagnostic features: Oxic horizon at a depth of 25 to 100 cm
Described and sampled by: R.L. Vick and J.R. Davis on June 16, 1994

Ap—0 to 23 cm; clay, dark yellowish brown (10YR 4/4) broken face; weak medium and coarse subangular blocky structure; friable; many very fine and fine and common medium roots throughout; 1 percent subrounded arenaceous limestone fragments 2 to 75 mm in diameter; slightly acid; abrupt smooth boundary. 94P6597

AB—23 to 38 cm; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; friable; common very fine and fine roots between peds; few very fine and fine pores; 3 percent fine irregular masses of dark accumulation; few fine channels filled with dark yellowish brown (10YR 4/4) material from the Ap horizon; moderately acid; clear smooth boundary. 94P6598

Bo1—38 to 56 cm; yellowish brown (10YR 5/6) clay; moderate fine subangular blocky structure; friable; few very fine and fine roots between peds; few fine pores; 10 percent discontinuous faint yellowish brown (10YR 5/4) coatings on faces of peds; few fine uncoated sand grains; slightly acid; gradual smooth boundary. 94P6599

Bo2—56 to 86 cm; yellowish brown (10YR 5/8) clay; moderate fine subangular blocky structure; friable; few very fine roots between peds; 10 percent discontinuous faint dark yellowish brown (10YR 4/4) coatings on faces of peds; 1 percent fine cylindrical dark yellowish brown (10YR 4/4) wormcasts throughout; neutral; gradual wavy boundary. 94P6600

Bo3—86 to 119 cm; yellowish brown (10YR 5/8) clay; moderate fine and medium subangular blocky structure; friable; few very fine roots between peds; 1 percent patchy faint dark yellowish brown (10YR 4/6) coatings on horizontal faces of peds and 1 percent pressure faces; neutral; gradual wavy boundary. 94P6601

Bo4—119 to 180 cm; yellowish brown (10YR 5/8) clay; 1 percent medium distinct yellowish red (5YR 5/8) redoximorphic features; moderate fine and medium subangular blocky structure; friable; few very fine roots between peds; 1 percent discontinuous faint dark yellowish brown (10YR 4/6) coatings on faces of peds and 1 percent pressure faces; neutral. 94P6602

Cotito: S88PR-071-001

Primary Characterization Data

Isabela Municipio, Puerto Rico

Sampled as: Cotito; clayey, mixed, isohyperthermic Aquic Hapludox

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 371, Samples 88P 1896–1901

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	>2MM WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)				
88P1896S	0- 1	A1	60.9	9.8	29.3	32.7		5.1	4.7	6.1	12.6	9.6	1.0	--	--	--	--	23	--
88P1897S	1- 6	A1	66.3	7.7	26.0	40.6		4.0	3.7	5.9	10.4	8.4	1.3	--	--	--	--	20	--
88P1898S	6- 18	A2	68.5	6.8	24.7	42.6		3.6	3.2	5.8	9.9	7.9	1.1	--	--	--	--	19	--
88P1899S	18- 31	Bo1	78.0	8.9	13.1	49.4		2.2	6.7	0.3	6.9	5.1	0.8	--	--	--	--	13	--
88P1900S	31- 54	Bo2	86.3	3.4	10.3	50.1		0.7	2.7	2.2	4.6	3.0	0.5	--	--	--	--	8	--
88P1901S	54- 74	2R ROCK													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT <0.4MM	LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
			<- PERCENT		OF <2MM -->							<- G/CC	- ->		CM/CM	<- -PCT OF <2MM			- ->	CM/CM
0- 1	3.32	0.333			8.0	1.1	0.1	0.33	0.32										19.3	
1- 6	2.84	0.315	49		8.6	1.2	0.1	0.28	0.33				1.25	1.43	0.046			27.9	22.1	0.07
6- 18	1.85	0.229	14		9.6	1.3	0.1	0.20	0.32				1.30	1.44	0.035			26.3	21.7	0.06
18- 31	1.02	0.203	3		10.7	1.5	0.2	0.14	0.31	54	27		1.39	1.53	0.033			28.6	24.5	0.06
31- 54	0.76		2		11.1	1.5	0.1	0.13	0.31				1.39	1.56	0.039			31.5	26.6	0.07
54- 74																			5.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- -MEQ / 100 G										<-	-PCT	- ->					1:2	1:1
0- 1	11.6	3.5	0.4	0.9	16.4	13.6	TR	30.0	20.3			55	81					5.2	5.5
1- 6	8.0	1.7	0.1	0.3	10.1	16.1	TR	26.2	18.8			39	54				4.4	4.7	5.2
6- 18	2.8	0.5	TR	0.1	3.4	18.7	2.5	22.1	13.6	5.9	42	15	25				3.7	3.9	4.4
18- 31	2.0	0.2	0.1	TR	2.3	17.7	3.0	20.0	11.0	5.3	57	12	21				3.7	4.0	4.4
31- 54	5.8	0.3	0.1	TR	6.2	12.6	0.5	18.8	10.8	6.7	7	33	57				4.2	4.4	5.0
54- 74																			

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY 7A6	THERMAL DTA 7A4b	THERMAL TGA	ELEMENTAL SiO2 7C3	ELEMENTAL AL2O3 7C3	ELEMENTAL Fe2O3 7C3	ELEMENTAL MgO 7C3	ELEMENTAL CaO 7C3	ELEMENTAL K2O 7C3	ELEMENTAL Na2O 7C3	EGME RETN 7D2	INTER PRETA TION
		peak size		Percent		Percent							mg/g	
88P1899	TCLY	KK 3	GE 3	HE 2			24.0	20.0			0.3			
88P1900	TCLY	KK 3	GE 3	HE 2			25.0	20.0			0.3			
88P1901	TCLY	KK 3	GE 2	CA 1			16.0	14.3			0.3			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite HE hematite CA calcite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OXALATE EXTRACTION OPT DEN 8J	FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	WATER 0.06 BAR 4B1c	WATER 1- BAR 4B1a	WATER 2- BAR 4B1a	WATER 15 BAR 4B2b	WATER DISPERSIBLE PIPETTE CLAY 3A1c	PIPETTE SILT	PIPETTE SAND	HYDROMETER CLAY SML	HYDROMETER SILT	HYDROMETER SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
		<- PCT	OF	< 2	mm ->	<- PPM	->	<-				PERCENT								>20mm	<PCT>
88P1896	1																				
88P1897	2	0.10	0.29	0.03	0.24	30						26.6									90
88P1898	3	0.08	0.29	0.02	0.26	33						25.7									77
88P1899	4	0.04	0.18	0.03	0.24	45						28.3									
88P1900	5	0.04	0.16	0.04	0.20	40						30.0									
88P1901	6																				

Narrative Pedon Description

Pedon: Cotito

NSSL pedon number: 88P0371

Pedon ID: S88PR-071-001

Field classification: Clayey, mixed, isohyperthermic Aquic Hapludox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Lithic Kandiudox

Location: Isabela Municipio, Puerto Rico; USDA Tropical Agriculture Experiment Station; 1.8 km west of Mora and 700 meters north of Highway 2

Latitude: 18°28’16" north

Longitude: 67°02’58" west

Elevation: 123 meters

Geomorphic position: On middle third of component

Slope: 4 percent with a north aspect

Average annual precipitation: 1,500 mm; udic moisture regime

Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability

Vegetation: Unspecified grasses in pastureland and native pasture

Erosion: Slight

Parent material: Residuum from limestone material

Described and sampled by: D. Williams and F. Beinroth during February 1988

A1—0 to 6 cm; brown to dark brown (7.5YR 4/4) clay, brown to dark brown (7.5YR 4/4) dry; moderate fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, sticky, slightly plastic; common fine roots throughout; surface cover of dark brown (7.5YR 4/4) granules (possibly wormcasts or insect casts); common fine tubular pores; gradual smooth boundary. 88P1896

A2—6 to 18 cm; reddish brown (5YR 4/4) clay, yellowish red (5YR 5/6) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots throughout; common fine tubular pores; clear smooth boundary. 88P1898

Bo1—18 to 31 cm; yellowish red (5YR 4/6) clay, yellowish red (5YR 5/6) dry; moderate fine subangular blocky structure parting to moderate very fine subangular blocky; slightly hard, friable, sticky, plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; few manganese coatings in lower part; gradual wavy boundary. 88P1899

Bo2—31 to 54 cm; yellowish red (5YR 4/6) clay, yellowish red (5YR 5/6) dry; moderate medium subangular blocky structure parting to moderate fine subangular blocky parting to weak fine subangular blocky; hard, friable, sticky, plastic; few fine roots throughout; few fine tubular pores; few discontinuous distinct coatings on vertical and horizontal faces of peds; common medium platelike soft masses of iron-manganese; some peds completely coated with manganese parting to weak fine angular blocky. 88P1900

R—54 to 74 cm; bedrock. 88P1901

Las Piedras Municipio

Cayagua: S88PR-085-001

Primary Characterization Data

Las Piedras Municipio, Puerto Rico
Sampled as: Cayagua; fine, mixed, isohyperthermic Albaquic Hapludalfs
SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988
—Pedon: 88P 368, Samples 88P 1871–1876
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	>2MM WEIGHT .1-75	WT % OF WHOLE SOIL
	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19- -20-
				<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
88P1871S	0- 9	A		15.4	16.6	68.0	10.5		9.3	7.3	7.5	14.6	18.2	19.4	8.3	1	TR	--	61	1
88P1872S	9- 21	E		15.1	14.7	70.2	9.8		9.3	5.4	7.5	14.2	14.7	18.2	15.6	1	TR	--	63	1
88P1873S	21- 43	Bt1		41.4	14.5	44.1	32.5		7.3	7.2	5.9	10.8	11.1	10.9	5.4	1	TR	--	39	1
88P1874S	43- 60	Bt2		30.2	13.8	56.0	24.1		6.4	7.4	10.6	16.7	11.7	11.3	5.7	--	--	--	45	--
88P1875S	60- 69	BC		9.8	10.9	79.3	6.2		6.4	4.5	11.2	20.8	17.4	17.1	12.8	3	--	--	69	3
88P1876S	69-101	Cr SAP		5.4	10.5	84.1	3.8		3.7	6.8	9.4	20.7	18.5	19.8	15.7	3	--	--	75	3

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	EXTRACTABLE CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	COLE OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM	WRD WHOLE SOIL 4C1 - -> CM/CM
0- 9	3.02	0.276	147		1.2	0.2	0.1	1.11	0.74				1.13	1.26	0.037			28.0	11.4	0.19
9- 21	1.13	0.091	21		1.7	0.3	0.2	0.57	0.55				1.51	1.58	0.015			14.3	8.3	0.09
21- 43	0.25	0.040	--		1.5	0.2	TR	0.38	0.39	66	47		1.47	1.91	0.091			28.2	16.1	0.18
43- 60	0.13	0.020	--		1.7	0.1	TR	0.50	0.43				1.54	1.90	0.073			24.7	12.9	0.18
60- 69	0.06		--		1.1	0.1	TR	0.76	0.53				1.72	1.85	0.024			14.2	5.2	0.15
69-101	0.02		3		0.7	TR	TR	0.96	0.67				2.08	2.16	0.012			5.9	3.6	0.05

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->< - - - - -PCT - - - ->																	1:2	1:1
0- 9	5.5	1.8	0.1	0.6	8.0	12.0	0.3	20.0	17.1	8.3	4	40	47				4.1	4.4	4.6
9- 21	2.3	0.8	--	0.3	3.4	8.2	1.0	11.6	8.6	4.4	23	29	40				4.0	4.3	4.6
21- 43	8.1	4.3	0.3	0.2	12.9	6.5	0.6	19.4	15.9	13.5	4	66	81				4.0	4.6	5.1
43- 60	7.1	4.6	0.3	0.2	12.2	3.5		15.7	15.0			78	81				4.7	5.4	5.9
60- 69	4.2	2.5	0.2	0.1	7.0	1.8		8.8	7.4			80	95				4.6	5.5	6.0
69-101	3.3	1.7	0.1	TR	5.1	0.7		5.8	5.2			88	98				4.4	5.6	6.2

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY				THERMAL DTA 7A6	THERMAL TGA 7A4b	ELEMENTAL SiO2 Percent	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN 7C3	INTER PRETA 7D2	TIO2
	<- - - - - - - - - - - - - - -

Narrative Pedon Description

Pedon: Cayagua
NSSL pedon number: 88P0368
Pedon ID: S88PR-085-001
Field classification: Fine, mixed, isohyperthermic Albaquic Hapludalfs
Revised classification as of March 01, 2001: Clayey over loamy-skeletal, mixed, active, isohyperthermic Albaquic Hapludalfs
Location: Las Piedras Municipio, Puerto Rico; 4.5 km southeast of Juncos, 200 meters northeast of Highway 30
Latitude: 18°11’52" north
Longitude: 65°53’40" west
Elevation: 133 meters
Physiography: Hillside or mountainside in hills; on middle third of component
Slope: 8 percent with a plane surface and a west aspect
Average annual precipitation: 2,030 mm; udic moisture regime
Major Land Resource Area: 272—Humid Coastal Plains
Drainage, runoff, and permeability: Somewhat poorly drained, moderate runoff, and slow permeability
Vegetation: Unspecified grasses in grazed rangeland
Erosion: Slight
Particle-size control section: 21 to 60 cm
Parent material: Residuum from sandstone material
Diagnostic features: Ochric epipedon at 0 to 21 cm; argillic horizon at 21 to 60 cm; paralithic contact at 69 cm
Described and sampled by: D. Williams and G. Acevedo during February 1988

A—0 to 9 cm; dark brown (7.5YR 3/2) sandy loam; moderate fine subangular blocky structure parting to moderate fine granular; friable, slightly sticky, slightly plastic; many fine roots throughout; clear smooth boundary. 88P1871

E—9 to 21 cm; dark yellowish brown (10YR 3/4) sandy loam; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, slightly plastic; many fine roots throughout; common fine rounded iron-manganese concretions; abrupt wavy boundary. 88P1872

Bt—21 to 43 cm; yellowish brown (10YR 5/6) clay; many medium distinct and common fine distinct redoximorphic features; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; very firm, sticky, very plastic; few fine roots throughout; few fine tubular pores; few discontinuous distinct clay films on vertical and horizontal faces of peds; few fine rounded iron-manganese concretions; gradual boundary. 88P1873

Bt2—43 to 60 cm; yellowish brown (10YR 5/6) clay; many medium distinct and common fine distinct redoximorphic features; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; very firm, sticky, very plastic; few fine roots throughout; few fine tubular pores; few discontinuous distinct clay films on vertical and horizontal faces of peds; clear smooth boundary. 88P1874

BC—60 to 69 cm; brownish yellow (10YR 6/8) sandy clay loam; many medium distinct redoximorphic features; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; few patchy faint clay films on vertical and horizontal faces of peds; few fine rounded iron-manganese concretions; clear smooth boundary. 88P1875

Cr—69 to 101 cm; light brownish gray (2.5Y 6/2) very gravelly sand; common coarse distinct redoximorphic features; massive; fractured planes coated with clean sand grains and manganese; more than 35 percent rock fragments. 88P1876

Luquillo Municipio

Humatas: S88PR-089-001

Primary Characterization Data

Luquillo Municipio, Puerto Rico

Sampled as: Humatas; clayey, mixed, isohyperthermic Aquic Hapludox

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 370, Samples 88P 1887–1895

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SILT VF .05 -.10	-9-- SAND F .10 -.25	-10-- SAND M .25 -.50	-11-- SAND C .5 -1	-12-- SAND VC 1 -2	-13-- WEIGHT 2 -5	-14-- WEIGHT 5 -20	-15-- WEIGHT 20 -75	-16-- WT .1- 75	-17-- % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P1887S	0- 1	A1	46.4	50.3	3.3	21.2		39.2	11.1	0.3	1.5	0.6	0.3	0.6	--	--	--	3	--
88P1888S	1- 7	A2	45.5	49.1	5.4	20.6		39.4	9.7	2.4	1.5	0.8	0.5	0.2	1	2	--	6	3
88P1889S	7- 17	Bw1	45.3	47.7	7.0	18.7		38.0	9.7	2.7	1.6	1.8	--	0.9	1	2	2V	9	5
88P1890S	17- 30	Bw2	48.8	45.3	5.9	19.2		35.8	9.5	2.3	1.5	0.9	0.7	0.5	--	TR	2V	6	2
88P1891S	30- 53	Bo1	46.8	43.1	10.1	16.1		32.0	11.1	2.5	2.3	1.6	1.9	1.8	1	TR	2V	10	3
88P1892S	53- 73	Bo2	39.8	42.9	17.3	12.1		34.1	8.8	4.6	3.4	2.5	3.5	3.3	3	2	2V	19	7
88P1893S	73- 97	Bo3	29.3	48.5	22.2	8.2		36.8	11.7	5.5	5.0	3.9	4.1	3.7	2	3	6V	26	11
88P1894S	97-154	BC	21.6	52.7	25.7	6.1		40.7	12.0	4.8	4.7	4.2	5.7	6.3	4	6	9V	36	23
88P1895S	154-190	C	25.3	55.5	19.2	4.9		40.8	14.7	5.8	5.2	3.5	3.2	1.5	--	TR	--	13	--

DEPTH (CM)	-1-- ORGN C 6A1c PCT	-2-- TOTAL N 6B3a <2MM	-3-- EXTR P 6S3 PPM	-4-- TOTAL S 6R3a	-5-- EXTRACTABLE FE 6C2b	-6-- EXTRACTABLE AL 6G7a	-7-- EXTRACTABLE MN 6D2a	-8-- (RATIO/CLAY) CEC 8D1	-9-- 15 BAR 8D1	-10-- (ATTERBERG) LL 4F1	-11-- PI 4F	-12-- (BULK DENSITY) FIELD MOIST 4A3a	-13-- 1/3 BAR 4A1d	-14-- OVEN DRY 4A1h	-15-- COLE WHOLE SOIL 4D1	-16-- WATER CONTENT FIELD MOIST 4B4	-17-- 1/10 BAR 4B1c	-18-- 1/3 BAR 4B1c	-19-- 15 BAR 4B2a	-20-- WRD WHOLE SOIL 4C1
				<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 1	7.50	0.457	--		3.0	0.4	--	0.55	0.50										23.1	
1- 7	4.66	0.316	--		3.2	0.5	--	0.36	0.49				0.93	1.12	0.063			40.7	22.1	0.17
7- 17	2.59	0.186	--		3.6	0.4	--	0.25	0.53				1.22	1.40	0.046			35.7	24.0	0.14
17- 30	1.20	0.092	TR		4.0	0.5	--	0.19	0.46				1.32	1.48	0.038			32.7	22.3	0.14
30- 53	0.57	0.055	1		4.2	0.4	--	0.18	0.35	55	23		1.36	1.48	0.028			31.2	16.6	0.20
53- 73	0.38		--		4.0	0.4	--	0.24	0.52				1.40	1.49	0.020			30.3	20.7	0.13
73- 97	0.27		--		3.6	0.3	--	0.26	0.59				1.33	1.40	0.016			30.5	17.2	0.17
97-154	0.18		--		3.2	0.3	--	0.26	0.70				1.35	1.39	0.008			28.7	15.2	0.16
154-190	0.14		--		3.6	0.3	TR	0.26	0.65	48	15		1.26	1.31	0.013			37.0	16.4	0.26

DEPTH (CM)	-1-- (NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	-2-- MG 5B5a 6O2d	-3-- NA 5B5a 6P2b	-4-- K 5B5a 6Q2b	-5-- SUM BASES	-6-- ACID- EXTR ITY 6H5a	-7-- AL 6G9b	-8-- (CEC) SUM CATS 5A3a	-9-- NH4- OAC 5A8b	-10-- BASES + AL 5A3b	-11-- AL SAT 5G1	-12-- BASE SAT- SUM 5C3	-13-- NH4 OAC 5C1	-14-- CO3 AS CACO3 <2MM 6E1g	-15-- RES. OHMS /CM 8E1	-16-- COND. MMHOS /CM 8I	-17-- (PH) KCL IN 8C1g	-18-- CACL2 .01M 8C1f	-19-- H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 1	3.2	2.6	0.4	0.3	6.5	29.3	2.7	35.8	25.6	9.2	29	18	25				3.4	3.7	4.3
1- 7	0.6	1.1	0.2	0.1	2.0	22.1	3.9	24.1	16.5	5.9	66	8	12				3.6	3.7	3.9
7- 17	0.2	0.7	0.2	0.1	1.2	16.3	3.4	17.5	11.2	4.6	74	7	11				3.6	3.8	4.2
17- 30	0.1	0.4	0.1	TR	0.6	12.5	2.9	13.1	9.4	3.5	83	5	6				3.6	3.9	4.5
30- 53	TR	0.3	0.1	--	0.4	10.3	2.8	10.7	8.5	3.2	87	4	5				3.7	4.0	4.7
53- 73	0.1	0.2	0.1	--	0.4	9.7	2.9	10.1	9.6	3.3	88	4	4				3.8	4.0	4.7
73- 97	TR	0.2	0.2	--	0.4	8.3	2.8	8.7	7.7	3.2	87	5	5				3.8	4.1	4.7
97-154	TR	0.2	0.2	--	0.4	6.8	2.8	7.2	5.6	3.2	87	6	7				3.8	4.1	4.8
154-190	TR	0.3	0.2	TR	0.5	8.2	3.9	8.7	6.6	4.4	89	6	8				3.8	4.0	4.9

SAMPLE NUMBER	-1-- FRACT ION 7A2i peak size	-2-- X-RAY 7A2i peak size	-3-- X-RAY 7A2i peak size	-4-- X-RAY 7A2i peak size	-5-- THERMAL DTA 7A6 Percent	-6-- THERMAL TGA 7A4b Percent	-7-- ELEMENTAL SiO2 7C3 Percent	-8-- ELEMENTAL AL2O3 7C3 Percent	-9-- ELEMENTAL Fe2O3 7C3 Percent	-10-- ELEMENTAL MgO 7C3 Percent	-11-- ELEMENTAL CaO 7C3 Percent	-12-- ELEMENTAL K2O 7C3 Percent	-13-- ELEMENTAL Na2O 7C3 Percent	-14-- EGME RETN <mg/g>	-15-- INTER PRETA TION 7D2
88P1888	TCLY	KK 5	GE 2	VR 2				21.0	10.3			0.1			
88P1891	TCLY	KK 5	GE 2	VR 1	HE 1			24.0	10.7			0.3			
88P1895	TCLY	KK 3	HE 2	GE 2				24.0	9.4			0.2			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite HE hematite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL <- - PIPETTE - - ><- HYDROMETER - > CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m ->				<- P P M ->		<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - - ->												<20mm><PCT>
88P1887	1								8.05												
88P1888	2	0.18	0.92	0.03	0.28	36			4.39												87
88P1889	3	0.12	0.86	0.03	0.22	36			2.59												
88P1890	4	0.06	0.76	0.03	0.20	30			1.23												
88P1891	5	0.04	0.52	0.03	0.19	26			0.66												
88P1892	6	0.03	0.30	0.03	0.16	29			0.47												
88P1893	7	0.03	0.16	0.03	0.17	26			0.33												
88P1894	8	0.03	0.12	0.02	0.14	23			0.25												
88P1895	9	0.02	0.05	0.02	0.12	23			0.17												

Narrative Pedon Description

Pedon: Humatas

NSSL pedon number: 88P0370

Pedon ID: S88PR-089-001

Field classification: Clayey, mixed, isohyperthermic Aquic Hapludox

Revised classification as of April 01, 2001: Fine, kaolinitic, isohyperthermic Typic Hapludox

Location: Luquillo Municipio, Puerto Rico; Caribbean National Forest

Latitude: Unknown

Longitude: Unknown

Physiography: Hillside or mountainside in hills

Geomorphic position: On lower third of component

Slope: 30 percent with a convex southwest aspect

Major Land Resource Area: 270—Humid Mountains and Valleys

Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability

Vegetation: Unspecified tree species in ungrazed forestland

Erosion: Slight

Particle-size control section: 25 to 100 cm

Parent material: Local colluvium from igneous-granite material

Diagnostic features: Ochric epipedon at 0 to 7 cm; cambic horizon at 7 to 30 cm; oxic horizon at 30 to 97 cm

Described and sampled by: D. Williams and R. Rolling during February 1988

A1—0 to 1 cm; brown to dark brown (7.5YR 4/4) clay loam; strong fine granular structure; friable, sticky, plastic; many very fine roots throughout; very strongly acid; abrupt smooth boundary. 88P1887

A2—1 to 7 cm; brown to dark brown (7.5YR 4/4) clay loam; moderate fine subangular blocky structure parting to moderate fine granular; friable, sticky, plastic; many fine and many medium roots throughout; very strongly acid; clear smooth boundary. 88P1888

Bw1—7 to 17 cm; yellowish brown (10YR 5/6) clay; few coarse distinct redoximorphic features; moderate fine subangular blocky structure; friable, sticky, plastic; common fine and common medium roots throughout; few fine discontinuous tubular pores; common continuous distinct coatings on vertical and horizontal faces of peds; 1 percent igneous gravel; very strongly acid; gradual smooth boundary. 88P1889

Bw2—17 to 30 cm; strong brown (7.5YR 5/6) clay; common coarse distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, sticky, plastic; common fine and common medium roots throughout; few fine discontinuous tubular pores; common continuous distinct coatings on vertical and horizontal faces of peds; 1 percent igneous gravel; very strongly acid; gradual smooth boundary. 88P1890

Bo1—30 to 53 cm; yellowish red (5YR 5/8) clay; few coarse distinct and few fine distinct redoximorphic features; weak medium subangular blocky structure; firm, sticky, plastic; few fine and few medium roots throughout; few fine discontinuous tubular pores; few discontinuous faint coatings; 1 percent igneous gravel; very strongly acid; gradual smooth boundary. 88P1891

Bo2—53 to 73 cm; red (2.5YR 4/8) clay; few coarse prominent and few fine prominent redoximorphic features; weak medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine discontinuous tubular pores; few discontinuous faint coatings; 1 percent igneous gravel; very strongly acid; clear smooth boundary. 88P1892

Bo3—73 to 97 cm; red (2.5YR 4/8) clay; many coarse distinct and few medium prominent redoximorphic features; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots throughout; common fine discontinuous tubular pores; few fine platelike nonmagnetic shot; 3 percent igneous gravel; clear smooth boundary. 88P1893

BC—97 to 154 cm; red (2.5YR 4/8) clay loam; many coarse prominent redoximorphic features; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots throughout; few fine platelike nonmagnetic shot; 5 percent igneous gravel; clear smooth boundary. 88P1894

C—154 to 190 cm; red (2.5YR 4/8) weathered saprolite that crushes to loam; many coarse prominent and few fine distinct redoximorphic features; friable, slightly sticky, slightly plastic; few fine roots throughout; few fine platelike nonmagnetic shot. 88P1895

Manati Municipio

Bayamón: S73PR-091-001

Primary Characterization Data

Manati Municipio, Puerto Rico

Sampled as: Bayamón; very-fine, kaolinitic, isohyperthermic Typic Hapludox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1257, Samples 40A 9563–9569

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SILT- -) VF .05 -.10	F .10 -.25	(- - - - - -SAND- - - - - -) M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-) 2 -5	5 -20	- - - - WEIGHT - - - - 20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->			
40A9563S	0- 14	Ap1	68.7	6.9	24.4			6.3	0.6	2.9	14.2	5.4	1.6	0.3	--	--	--	21	--
40A9564S	14- 28	Ap2	68.8	5.5	25.7			5.0	0.5	3.0	15.2	5.7	1.6	0.2	--	--	--	23	--
40A9565S	28- 49	B21	70.1	3.8	26.1			3.2	0.6	2.5	14.9	6.4	1.9	0.4	--	--	--	24	--
40A9566S	49- 83	B22	66.2	3.3	30.5			2.8	0.5	2.2	16.5	8.5	2.3	1.0	--	--	--	28	--
40A9567S	83-117	B23	63.5	4.7	31.8			4.0	0.7	2.9	18.4	7.6	2.2	0.7	--	--	--	29	--
40A9568S	117-152	B24	67.7	7.9	24.4			6.5	1.4	4.3	14.7	3.7	1.3	0.4	--	--	--	20	--
40A9569S	152-165	B25	72.2	17.0	10.8			13.9	3.1	1.2	5.1	1.7	1.8	1.0	--	--	--	10	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 14	1.74				7.1	1.0		0.15	0.32	45	18								22.1	
14- 28	1.52				7.1	0.9		0.12	0.34				1.56	1.72					23.2	
28- 49	0.24				6.4	0.9		0.07	0.36				1.36	1.48	--			30.8	24.9	0.08
49- 83	0.23				6.2	0.9		0.08	0.36	54	27		1.43	1.56	--			28.6	23.5	0.07
83-117	0.17				6.1	0.9		0.08	0.35				1.40	1.48	--			22.3	22.0	TR
117-152	0.16				7.0	0.9		0.09	0.35	50	10		1.49	1.57					23.5	
152-165	0.10				8.0	1.0		0.08	0.34				1.38	1.44	--			26.5	24.5	0.03

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	(- - - -PH - - -) SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - -			-MEQ / 100	G - - - - - - - - - ->					PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 14	--	--	0.1	1.1	1.2	15.0	1.8	16.2	10.4	1		7	12						3.8	4.0
14- 28	0.6	TR	TR	0.5	1.1	17.2	3.8	18.3	8.5	TR		6	13						3.5	3.6
28- 49	0.1	TR	--	0.2	0.3	12.7	3.6	13.0	5.2	TR		2	6						3.6	3.7
49- 83	0.2	TR	TR	0.2	0.4	12.4	3.4	12.8	5.0	TR	1	3	8					4.3	3.6	3.7
83-117	0.2	TR	--	0.2	0.4	11.9	3.0	12.3	5.2	TR		3	8						3.6	3.7
117-152	3.0	0.5	0.2	0.5	4.2	8.8	0.8	13.0	6.3	3		32	67						4.3	4.6
152-165	2.7	0.5	TR	0.5	3.7	4.1	0.5	7.8	5.7	TR		47	65						4.3	4.6

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - ->											<- -PCT- ->			
0- 14															
14- 28															
28- 49															
49- 83	0.4	0.1	0.4	0.2	--	--		--	1.2		1.9	69.6	TR	0.5	
83-117															
117-152															
152-165															

Narrative Pedon Description

Pedon: Bayamón
NSSL pedon number: 40A1257
Pedon ID: S73PR-091-001
Field classification: Very-fine, kaolinitic, isohyperthermic Typic Hapludox
Revised classification as of April 01, 1998: Bayamón; very-fine, kaolinitic, isohyperthermic Typic Hapludox
Location: Manati Municipio, Puerto Rico; 50 meters north of kilometer marker 2.75 on Highway 670
Latitude: Unknown
Longitude: Unknown
Elevation: 75 meters
Geomorphic position: Valley between limestone haystack hills
Slope: 3 percent
Drainage, runoff, and permeability: Well drained, moderate runoff, and moderately slow permeability
Vegetation: Cultivated field of pineapples
Parent material: Fine-textured oxidic sediments
Described and sampled by: Luis H. Rivera during November 1973

Ap1—0 to 13 cm; dark reddish brown (5YR 3/3) clay; weak fine subangular blocky structure parting to moderate fine granular; friable, slightly sticky, slightly plastic; many fine roots; many fine quartz grains; very strongly acid; clear smooth boundary. 40A9563

Ap2—13 to 28 cm; red (2.5YR 4/6) and dark reddish brown (5YR 3/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; many fine quartz grains; very strongly acid; abrupt smooth boundary. 40A9564

B21—28 to 48 cm; red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; common fine tubular pores; black stains in root channels and/or pores; few fine dark concretions; many fine quartz grains; shiny ped faces; very strongly acid; gradual wavy boundary. 40A9565

B22—48 to 84 cm; red (2.5YR 4/6) clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; common fine tubular pores; black stains in root channels and/or pores; few fine dark concretions; common fine quartz grains; very strongly acid; gradual wavy boundary. 40A9566

B23—84 to 117 cm; dark red (2.5YR 3/6) clay; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; common fine tubular pores; few fine dark concretions; many fine quartz grains; black coatings along ped faces; very strongly acid; gradual wavy boundary. 40A9567

B24—117 to 152 cm; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine tubular pores; common fine quartz grains; very strongly acid; clear wavy boundary. 40A9568

B25—152 to 165 cm; dark red (2.5YR 3/6) clay; few fine distinct redoximorphic features; weak medium subangular blocky structure parting to moderate fine subangular blocky; firm, slightly sticky, slightly plastic; common fine tubular pores; few fine rounded dark concretions; common fine quartz grains; very strongly acid. 40A9569

Maricao Municipio

Anones: S61PR-093-001

Primary Characterization Data

Maricao Municipio, Puerto Rico

Sampled as: Anones; clayey, oxidic, isohyperthermic Typic Dystropepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 208, Samples 40A 1542–1545

—General methods: 1B1A, 2A1, 2B

-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)				(>2MM)
			CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON	LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)		.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A1542S	0- 15	Ap	40.2	40.1	19.7			27.0	13.1	7.9	4.8	1.7	2.5	2.8	--C	--C	--	12	--
40A1543S	15- 33	B	38.0	40.1	21.9			26.6	13.5	9.6	5.2	1.5	2.4	3.2	--C	--C	--	12	--
40A1544S	33- 69	C1	14.3	41.9	43.8			24.6	17.3	18.9	18.6	3.6	2.3	0.4	--C	--C	--	25	--
40A1545S	69-100	C2	7.6	39.6	52.8			21.0	18.6	18.6	22.3	5.8	4.8	1.3	--C	--C	--	34	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	2.28	0.194			10.2			0.47	0.56			1.20		1.39		32.4		32.3	22.7	
15- 33	1.35	0.119			9.7			0.44	0.60			1.11		1.30		35.0		30.0	22.9	
33- 69	0.26	0.028			7.2			1.18	1.29										18.5	
69-100	0.05				7.9			2.24	2.28										17.3	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - - - - - - - - ->			<- - - - -PCT		- - - ->						1:2	1:1
0- 15	1.6	0.7	TR	0.3	2.6	23.8	8.6	26.4	18.7	11.2	77	10	14					3.5		4.2
15- 33	3.0	0.7	TR	0.1	3.8	19.0	6.9	22.8	16.6	10.7	64	17	23					3.7		4.6
33- 69	1.9	1.4	TR	0.2	3.5	19.8	10.9	23.3	16.9	14.4	76	15	21					3.7		4.5
69-100	TR	0.8	0.1	0.2	1.1	20.4	12.6	21.5	17.0	13.7	92	5	6					3.7		4.6

Narrative Pedon Description

Pedon: Anones

NSSL pedon number: 40A208

Pedon ID: S61PR-093-001

SSIR #12 pedon ID: S61PR-8-5

Field classification: Clayey, oxidic, isohyperthermic Typic Dystropepts

Revised classification as of April 01, 2001: Fine, parasesquic, isohyperthermic Humic Dystrudepts

Location: Maricao, Puerto Rico; Oeste Soil Conservation District; 3 km from kilometer marker 19.4 on Highway 105, on dirt road, 15 meters west of road; aerial photograph GS-LR-3-208

Latitude: 18°12’45" north

Longitude: 67°3’42" west

Vegetation: Merker (elephant) grass

Slope: Steep (50 percent); on an east-facing side slope leading to a stream and about 15 meters from an interfluve summit

Drainage, runoff, and permeability: Well drained, rapid runoff, medium internal drainage, and moderate permeability

Parent material: Residuum or very local colluvium from volcanic rocks, supposedly high in manganese

Described and sampled by: R.B. Grossman, W.E. McKenzie, O.R. Carter, and L.H. Rivera on December 19, 1961

Notes: The Ap, B, and C2 horizons were sampled for the Bureau of Public Roads. The soil was near field capacity when sampled. Family texture was based on clay percentage as 2.5 times the 15-bar water content. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; clay loam, reddish gray (10R 5/1) dry and dusky red (2.5YR 3/2) moist; weak fine granular structure; firm, nonsticky, plastic; many fine roots; clear smooth boundary. 40A1542

B—15 to 33 cm; silty clay loam, reddish gray (10R 5/1) dry and dusky red (2.5YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine subangular blocky; thin patchy clay films on ped surfaces and root channels; firm, nonsticky, slightly plastic; many fine roots; very fine pores; small pieces fail semiplastically; gradual wavy boundary. 40A1543

C1—33 to 69 cm; weak red (10YR 4/2) loam; 50 percent saprolite; massive; very friable, nonsticky, nonplastic; common fine roots; gradual wavy boundary. 40A1544

C2—60 to 100 cm; bluish gray saprolite (original rock structure visible); rock easily broken with fingers. 40A1545

Daguey: S61PR-093-002

Primary Characterization Data

Maricao Municipio, Puerto Rico

Sampled as: Daguey; clayey, mixed, isohyperthermic Orthoxic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 580, Samples 40A 4243–4249

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4243S	1- 0	O2														--	--	--		--
40A4244S	0- 15	Ap		64.7	33.2	2.1			30.7	2.5	1.2	0.6	0.2	0.1	--	--C	--C	--	1	--
40A4245S	15- 36	B21t		70.1	28.0	1.9			25.7	2.3	0.9	0.6	0.2	0.1	0.1	--C	--C	--	1	--
40A4246S	36- 66	B22t		75.7	22.6	1.7			20.6	2.0	0.7	0.6	0.2	0.1	0.1	--C	--C	--	1	--
40A4247S	66-102	B23t		60.0	35.5	4.5			30.9	4.6	2.2	1.6	0.4	0.2	0.1	--C	--C	--	2	--
40A4248S	102-132	B3		43.5	47.7	8.8			40.1	7.6	4.2	3.1	0.8	0.5	0.2	--C	--C	--	5	--
40A4249S	132-160	C		37.5	53.5	9.0			46.2	7.3	4.6	3.1	0.7	0.5	0.1	--C	--C	--	4	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
1- 0																				
0- 15	2.94	0.275			7.4			0.31	0.46			0.99		1.23		47.2		43.2	30.0	
15- 36	1.27	0.122			8.0			0.20	0.45			1.20		1.40		39.4		39.8	31.6	
36- 66	0.90	0.110			8.4			0.17	0.44				1.20		--	45.1		42.2	33.3	0.11
66-102	0.53	0.066			8.6			0.22	0.53			1.22		1.34		39.0		41.7	31.8	
102-132	0.30				7.4			0.29	0.60				1.20		--	42.4		40.6	26.0	0.18
132-160	0.25				6.7			0.29	0.59			1.20		1.29		38.0		40.9	22.2	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - -				-> <- - - -			-PCT	- - - ->				1:2	1:1
1- 0																				
0- 15	1.0	0.6	TR	0.2	1.8	27.6	7.2	29.4	20.1	9.0	80	6	9					3.5		4.1
15- 36	0.2	0.9	TR	0.1	1.2	21.2	6.1	22.4	14.3	7.3	84	5	8					3.6		4.4
36- 66	0.1	0.8	0.1	0.1	1.1	19.2	5.0	20.3	12.7	6.1	82	5	9					3.8		4.7
66-102	TR	0.6	0.1	0.1	0.8	18.8	6.6	19.6	13.3	7.4	89	4	6					3.8		4.8
102-132	0.1	0.7	TR	0.1	0.9	16.9	7.4	17.8	12.6	8.3	89	5	7					3.8		4.8
132-160	--	0.6	0.1	0.1	0.8	15.7	7.3	16.5	10.8	8.1	90	5	7					3.7		4.7

Narrative Pedon Description

Pedon: Daguey

NSSL pedon number: 40A0580

Pedon ID: S61PR-093-002

SSIR #12 pedon ID: S61PR-8-6

Field classification: Clayey, mixed, isohyperthermic Orthoxic Tropohumults

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Inceptic Hapludox

Location: Maricao, Puerto Rico; Oeste Soil Conservation District; 2.45 km on dirt road from kilometer marker 19.4 on Highway 105, Maricao to Lares, 15 meters east of road; aerial photograph GS-LR-3-208

Latitude: 18°10’55" north

Longitude: 66°52’18" west

Geomorphic position: On side slope of a drainageway

Vegetation: Coffee grown under shade

Slope: 35 percent with an aspect of 90 degrees (east)

Drainage, runoff, and permeability: Well drained, medium internal drainage, medium runoff, and moderate permeability

Parent material: Residuum or very local colluvium from volcanic rocks

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, L.H. Rivera, W. Francia, J.E. Trigo, and D.A. Compton on December 19, 1961

Notes: The Ap, B22t, and C1 horizons were sampled for the Bureau of Roads. The soil was at field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

O2—1 to 0 cm; partially decomposed leaf mulch. 40A4243

Ap—0 to 15 cm; dark red (2.5YR 3/6) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; 21 percent wormcasts; clear smooth boundary. 40A4244

B21t—15 to 36 cm; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; small pieces fail semiplastically; common fine roots; many fine pores; patchy clay films on faces of peds and in pores; clear smooth boundary. 40A4245

B22t—36 to 66 cm; red (2.5YR 4/6) clay; weak coarse subangular blocky structure; firm, slightly sticky, moderately plastic; small pieces fail semiplastically; common fine roots; common fine pores; patchy clay films on faces of peds and in pores; clear smooth boundary. 40A4246

B23t—66 to 102 cm; red (10R 4/8) clay; weak medium and coarse angular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail semiplastically; few fine roots; many fine pores; 10 percent clay films; gradual smooth boundary. 40A4247

B3—102 to 132 cm; red (2.5YR 5/8) clay; massive; friable, nonsticky, slightly plastic; fails abruptly; few fine roots; many fine pores; 1 percent clay films; gradual wavy boundary. 40A4248

C1—132 to 160 cm; silty clay loam, red (2.5YR 5/6) rubbed; massive; friable, nonsticky, slightly plastic; fails abruptly; many fine pores. 40A4249

Mayagüez Municipio

Nipe: S81PR-007-007

Primary Characterization Data

Mayagüez Municipio, Puerto Rico
Sampled as: Nipe; clayey, oxidic, isohyperthermic Typic Acrorthox
Revised to: Very-fine, mixed, isohyperthermic Anionic Acrudox
SSL—Project: 81P 75, (CP81PR160) Lajas Valley
—Pedon: 81P 321, Samples 81P 1653–1659
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - - -SAND- - - - - - -)						(-COARSE FRACS (MM)-)			(>2MM)
			CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	- - WEIGHT - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
81P1653S	0- 20	A1	56.3	34.0	9.7	14.2		27.1	6.9	2.4	1.8	1.2	1.7	2.6	1	1	--	9	2
81P1654S	20- 43	B21	24.9	16.8	58.3	10.8		8.7	8.1	22.3	30.5	2.8	1.2	1.5	TR	--	--	36	TR
81P1655S	43- 69	B22	23.0	19.4	57.6	7.0		11.1	8.3	17.0	37.2	0.9	1.3	1.2	--	--	--	41	--
81P1656S	69- 97	B23	30.9	27.4	41.7	7.4		16.5	10.9	16.4	19.4	2.6	1.9	1.4	TR	TR	--	25	TR
81P1657S	97-122	B24	45.6	43.9	10.5	10.3		32.4	11.5	4.9	2.6	1.0	1.1	0.9	--	--	--	6	--
81P1658S	122-155	B25	48.2	45.2	6.6	8.2		37.1	8.1	2.8	1.6	0.8	0.7	0.7	1	TR	--	5	1
81P1659S	155-170	B26	47.3	44.7	8.0	8.2		35.8	8.9	4.7	2.3	0.5	0.2	0.3	--	--	--	3	--
84P1620S	97-122	B24	46.3	35.8	17.9	9.9	0.6	26.5	9.3	7.0	6.8	2.2	1.2	0.7	--	--	--	11	--
84P1621S	122-155	B25	37.3	39.1	23.6	8.5		26.0	13.1	8.8	11.7	1.5	0.8	0.8	1	TR	--	16	1

Column numbers as printed: -1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20-

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 20	2.54	0.161			11.0	1.3	TR	0.19	0.43	54	20		1.19	1.34	0.040		32.7	31.9	24.3	0.09
20- 43	0.72	0.054			10.9	1.2	TR	0.11	1.06				1.27	1.35	0.021		36.2	34.8	26.3	0.11
43- 69	0.26				11.5	1.1	TR	0.09	1.08	56	19		1.46	1.52	0.014		32.0	31.1	24.8	0.09
69- 97	0.25				9.0	0.8	TR	0.08	0.85				1.40	1.44	0.009		35.0	33.1	26.2	0.10
97-122	0.28				9.8	0.9	TR	0.07	0.59				1.42	1.48	0.014		34.6	33.5	27.0	0.09
122-155	0.26				9.3	0.7	TR	0.07	0.58	57	15		1.37	1.43	0.014		37.3	36.5	28.0	0.12
155-170	0.25				8.3	0.6	TR	0.12	0.60				1.32	1.45	0.032		38.8	36.9	28.6	0.11
97-122	0.19				23.5	2.5	0.1	0.10	0.59				1.42	1.48	0.014		34.6	33.5	27.3	0.09
122-155	0.20				22.4	2.3	TR	0.10	0.76	57	15		1.37	1.43	0.014		37.3	36.5	28.5	0.11

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 20	2.0	0.6	0.1	0.1	2.8	15.4	0.2	18.2	10.7	3.0	7	15	26				4.7	5.3	5.5
20- 43	0.6	0.2	TR	TR	0.8	11.0		11.8	2.8			7	29				6.1	6.2	6.0
43- 69	0.4	0.3	--	0.1	0.8	9.2		10.0	2.1			8	38				6.5	6.5	5.8
69- 97	0.1	0.2	0.1	TR	0.4	9.4		9.8	2.6			4	15				6.3	6.1	5.6
97-122	0.1	0.3	--	TR	0.4	10.4		10.8	3.2			4	12				6.2	6.3	5.6
122-155	0.1	0.4	--	TR	0.5	8.9		9.4	3.5			5	14				5.9	6.1	5.6
155-170	0.3	0.6	0.1	TR	1.0	10.0		11.0	5.8			9	17				5.4	5.8	5.6
97-122	TR	0.3	TR	--	0.3	11.1	--	11.4	4.4			3	7				6.0	5.9	5.6
122-155	0.1	0.4	TR	--	0.5	11.2	--	11.7	3.9			4	13				5.8	5.3	5.4

SAMPLE NUMBER	FRACTION	< - - - - - - X-RAY 7A2i - - - - - -> (peak size)				< - - - THERMAL - - -> - DTA - 7A6 (Percent)	- TGA - 7A4b	< - - ELEMENTAL 7C3 - - > SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
	CLAY MINERALOGY (<.002mm)															
81P1653	TCLY	KK 2	GE 2	VR 1	HE 1	KK24				34.3			0.1			
81P1654	TCLY	GE 3	KK 2	GI 2	HE 1	KK17	GI 5			44.3			0.1			
81P1655	TCLY	GE 3	KK 2	HE 2	GI 2	KK17	GI 3									
81P1656	TCLY	GE 3	KK 2	GI 1	HE 1	KK17	GI 2									
81P1657	TCLY	GE 3	KK 3	GE 1	HE 1	KK22	GI 2									
81P1658	TCLY	KK 3	GE 2			KK23	GI 1									
81P1659	TCLY	KK 3	GE 2	GI 1		KK35	GI 2									
84P1620	TCLY	KK 2	GE 2			KK22	GI 2			41.5						
84P1621	TCLY	KK 3	GE 2	GI 1		KK23	GI 1			38.6						

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
81P1658     VFS                                                   100  QZ 1  FE99
84P1621     VFS                                                    98  RA96  QZ 2  FP 1  BTtr  FKtr  HNtr GMtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         VR  vermiculite      HE  hematite         GI  gibbsite         QZ  quartz
    FE  iron oxides
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Nipe
NSSL pedon number: 81P0321
Pedon ID: S81PR-007-007
Field classification: Clayey, oxidic, isohyperthermic Typic Acrorthox
Revised classification as of March 01, 2001: Very-fine, allic, isohyperthermic Anionic Acrudox
Location: Mayagüez, Puerto Rico
Latitude: Unknown
Longitude: Unknown
Geomorphic position: Hillside in uplands
Slope: 5 percent with an aspect of 0 degrees (north)
Drainage: Well drained
Parent material: Weathered, fine-textured, iron-rich materials
Vegetation: Unspecified ornamentals, shrubs, trees, and grasses in an urban and built-up area
Described and sampled by: G. Acevedo and L.H. Rivera on August 1, 1981
Notes: Matrix colors are for moist ped exteriors.

A1—0 to 20 cm; dusky red (10R 3/3) clay; moderate fine granular structure; friable, soft, slightly sticky, moderately plastic; many fine roots; strongly acid; clear smooth boundary. 81P1653

B21—20 to 43 cm; dark red (2.5YR 3/6) clay; weak coarse subangular blocky structure; firm, hard, slightly sticky, moderately plastic; few fine roots; strongly acid; diffuse smooth boundary. 81P1654

B22—43 to 69 cm; dark red (2.5YR 3/6) clay; weak coarse subangular blocky structure parting to moderate subangular blocky; firm, hard, slightly sticky, moderately plastic; few fine roots; moderately acid; diffuse smooth boundary. 81P1655

B23—69 to 97 cm; dark red (10R 3/6) clay; weak coarse subangular blocky structure parting to moderate fine subangular blocky; firm, hard, slightly sticky, moderately plastic; strongly acid; diffuse smooth boundary. 81P1656

B24—97 to 122 cm; dark red (10R 3/6) clay; weak coarse subangular blocky structure parting to moderate fine subangular blocky; firm, hard, slightly sticky, moderately plastic; strongly acid; diffuse smooth boundary. 81P1657

B25—122 to 155 cm; dark red (10R 3/6) clay; weak coarse subangular blocky structure parting to moderate fine subangular blocky; firm, hard, slightly sticky, moderately plastic; strongly acid; diffuse smooth boundary. 81P1658

B26—155 to 170 cm; dark red (10R 3/6) clay; weak coarse subangular blocky structure parting to moderate fine subangular blocky; firm, hard, slightly sticky, moderately plastic; strongly acid. 81P1659

Nipe: S57PR-097-001

Primary Characterization Data
Mayagüez Municipio, Puerto Rico
Sampled as: Nipe; clayey, oxidic, isohyperthermic Typic Acrorthox
SSL—Project: 40A 1, (NL40) SSIR Samples
—Pedon: 40A 228, Samples 40A 1700–1706
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS (MM) WEIGHT 2 -5	-17- COARSE FRACS WEIGHT 5 -20	-18- COARSE FRACS WEIGHT 20 -75	-19- COARSE FRACS .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
-1--	-2--	-3--	<- - - PCT OF <2MM ( )											- ->	<- PCT OF <75MM(3B1)			->	SOIL
40A1700S	0- 28	A1	54.5	36.3	9.2			29.6	6.7	2.5	2.3	0.9	2.0	1.5	--C	--C	--	7	--
40A1701S	28- 46	B1	57.7	34.9	7.4			27.8	7.1	1.3	1.1	0.6	1.5	2.9	--C	--C	--	6	--
40A1702S	46- 71	B21	59.6	30.6	9.8			17.2	13.4	4.8	1.4	0.4	0.9	2.3	--C	--C	--	5	--
40A1703S	71- 97	B22	55.7	21.0	23.3			11.6	9.4	11.9	6.0	1.1	1.8	2.5	--C	--C	--	11	--
40A1704S	97-120	B23	59.7	23.3	17.0			14.1	9.2	8.1	4.3	1.1	1.8	1.7	--C	--C	--	9	--
40A1705S	120-155	B24	53.6	27.2	19.2			17.0	10.2	7.0	3.5	1.4	3.3	4.0	1C	7C	--	19	8
40A1706S	155-180	C1	37.6	45.3	17.1			35.2	10.1	1.9	1.4	1.0	4.0	8.8	--C	--C	--	15	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	DITH-CIT AL 6G7a <2MM	DITH-CIT MN 6D2a -->	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1 PCT	(ATTERBERG) PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF <2MM	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 28	6.04	0.390			13.0			0.47	0.49			1.08		1.30		43.2		35.4	26.5	
28- 46	2.04	0.131			12.9			0.21	0.40			1.18		1.32		36.8		26.7	22.8	
46- 71	1.33				16.5			0.14	0.42			1.08		1.23		41.5		34.4	24.8	
71- 97	0.86				19.2			0.12	0.47			1.30		1.38		38.6		35.7	25.9	
97-120	0.72	0.048			23.1			0.09	0.44			1.36		1.42		37.1		31.6	26.4	
120-155	0.56				25.7			0.07	0.46			1.33		1.38		38.0		29.8	24.5	
155-180	0.19				27.3			0.04	0.48			1.72		1.72		24.4		22.7	18.0	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - -				-MEQ / 100 G					- ->	<- - -	-PCT		- ->					
0- 28	1.3	1.4	0.1	0.1	2.9	31.9	1.4	34.8	25.4	4.3	33	8	11				4.3		5.1
28- 46	0.1	--	--	--	0.1	21.4	0.9	21.5	12.1	1.0	90	TR	1				4.4		5.0
46- 71	--	--	--	--	--	15.7	--	15.7	8.2			TR	TR				4.7		5.0
71- 97	--	--	--	--	--	12.8		12.8	6.4			TR	TR				5.7		5.2
97-120	--	0.1	--	--	0.1	12.0	TR	12.1	5.3			1	2				6.1		5.5
120-155	--	--	--	--	--	12.8	TR	12.8	3.8			TR	TR				6.4		5.7
155-180	--	--	--	--	--	9.4	TR	9.4	1.4			TR	1				6.7		5.8

FINE EARTH MINERALOGY (<2.0mm)

DEPTH (cm)	FRACTION	X-RAY (Peak Size)	THERMAL DTA / TGA (Percent)	ELEMENTAL SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O (Percent)	SURF AREA (M2/G)	INTERPRETATION
0- 28	FETH	QZ 4 GE 2	GI25 KK 5			
28- 46	FETH	QZ 4 GE 2	GI25 KK10			
46- 71	FETH	QZ 3 GE 3	GI30 KK20			
71- 97	FETH	GE 3 QZ 2	GI30 KK20			
97- 120	FETH	GE 3 QZ 2	GI30 KK12			
120- 155	FETH	GE 3	GI40 KK10			
155- 180	FETH	GE 4	GI60 KK 3			

FRACTION INTERPRETATION:
FETH Fine Earth, <2mm
MINERAL INTERPRETATION:
QZ quartz GE goethite GI gibbsite KK kaolinite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Nipe
NSSL pedon number: 40A0228
Pedon ID: S57PR-097-001
SSIR #12 pedon ID: S57PR-8-1
Field classification: Clayey, oxidic, isohyperthermic Typic Acrorthox
Revised classification as of March 01, 2001: Fine, sesquic, isohyperthermic Anionic Acrudox
Pedon purpose: Full pedon description
Location: Mayagüez, Puerto Rico; Oeste Soil Conservation District, Las Mesas Ridge; 0.8 km west of kilometer marker 5.5 on Highway 349; on crest of hill under mango trees; aerial photograph GS-LR-11-32
Latitude: 18°11’11" north
Longitude: 67°06’35" west
Soil survey area: PR684—Mayagüez Area, Puerto Rico Western Part
Climate: Hot and humid
Average annual precipitation: 2,159 mm
Slope: 2 to 3 percent with a plane surface
Drainage: Well drained
Parent material: Serpentine
Vegetation: Native grasses and trees
Erosion: Slight to moderate
Particle-size control section: 25 to 100 cm
Described and sampled by: L.T. Alexander, C.J. Koch, J. Juarez, Jr., and J.E. Trigo on September 11, 1957
Notes: This site was resampled in 1961 for bulk density and moisture determinations. The Nipe soil is an Oxisol that occupies mesa-like hilltops in western Puerto Rico. It is a deeply weathered soil and has all the characteristics of an old soil. The soil is limited in extent, but is important because of the genetic processes it represents. The B2 horizons tend to harden when exposed. The soil name and concept comes from Cuba, where it was first analyzed in 1929 by Bennett and Allison. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy. Soil temperature was 25 °C at a depth of 123 cm.

A1—0 to 28 cm; dark reddish brown (2.5YR 2/4) clay; strong fine granular structure; friable; peds are shiny but do not have clay skins; very strongly acid; abrupt smooth boundary. 40A1700

B1—28 to 46 cm; dark reddish brown (2.5YR 3/4) clay; weak fine angular blocky structure; very friable, nonsticky, nonplastic; no clay skins; extremely acid; clear smooth boundary. 40A1701

B21—46 to 71 cm; dark red (7.5R 3/8) clay; weak fine angular blocky structure; very friable, nonsticky, nonplastic; no clay skins; extremely acid; abrupt boundary. 40A1702

B22—71 to 97 cm; dark red (7.5R 3/6) and dusky red (7.5R 3/4) clay; massive; firm, nonsticky, nonplastic; no clay skins; few small iron-coated pebbles (probably serpentine); extremely acid; abrupt boundary. 40A1703

B23—97 to 120 cm; dusky red (7.5R 3/4) and dark red (7.5R 3/6) clay; massive; friable, nonsticky, nonplastic; no clay skins; few iron-coated fragments; extremely acid; clear boundary. 40A1704

B24—120 to 155 cm; dark red (7.5R 3/6) and red (7.5R 5/6) clay; massive; friable, nonsticky, nonplastic; no clay skins; very strongly acid; abrupt boundary. 40A1705

C1—155 to 180 cm; dusky red (7.5R 3/4) clay; massive; very firm, nonsticky, nonplastic; no clay skins; moderately acid. 40A1706

Humatas: S61PR-097-001

Primary Characterization Data

Mayagüez Municipio, Puerto Rico

Sampled as: Humatas; clayey, mixed, isohyperthermic Typic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 571, Samples 40A 4177–4182

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4177S	0- 13	Ap		62.9	30.0	7.1			25.1	4.9	3.5	2.6	0.6	0.4	--	--C	--C	--	4	--
40A4178S	13- 36	B21t		64.8	28.5	6.7			24.0	4.5	3.3	2.5	0.5	0.4	--	--C	--C	--	3	--
40A4179S	36- 56	B22t		71.3	23.2	5.5			19.5	3.7	3.0	2.0	0.4	0.1	--	--C	--C	--	2	--
40A4180S	56- 84	B31		54.5	33.0	12.5			26.3	6.7	6.1	5.1	1.0	0.3	--	--C	--C	--	6	--
40A4181S	84-114	B32		45.8	37.9	16.3			29.8	8.1	7.4	6.6	1.6	0.6	0.1	--C	--C	--	9	--
40A4182S	114-152	C		32.1	40.5	27.4			32.6	7.9	8.8	11.7	4.6	2.1	0.2	--C	--C	--	19	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 13	1.99	0.225			6.5			0.29	0.45			1.13		1.36		40.0		41.0	28.2	
13- 36	1.26	0.142			7.2			0.26	0.44			1.15		1.34		36.8		39.2	28.7	
36- 56	0.81	0.097			6.7			0.22	0.45			1.15		1.32		39.2		41.2	31.8	
56- 84	0.41	0.065			6.5			0.27	0.52			1.15		1.26		36.6		39.6	28.3	
84-114	0.23				7.2			0.33	0.59				1.10		--	39.0		37.9	27.2	0.12
114-152	0.14				6.9			0.44	0.73			1.08		1.14		41.2		41.6	23.4	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->								1:2	1:1
0- 13	2.8	2.4	0.1	0.2	5.5	20.4	5.1	25.9	18.0	10.6	48	21	31					3.6		4.4
13- 36	1.7	2.1	0.1	0.1	4.0	19.6	6.2	23.6	17.1	10.2	61	17	23					3.6		4.6
36- 56	0.8	2.2	0.1	0.1	3.2	18.8	6.8	22.0	16.0	10.0	68	15	20					3.6		4.9
56- 84	0.1	2.1	0.2	0.1	2.5	17.6	7.2	20.1	14.6	9.7	74	12	17					3.7		4.9
84-114	0.1	2.1	0.2	0.1	2.5	18.1	8.5	20.6	14.9	11.0	77	12	17					3.7		4.8
114-152	0.1	1.8	0.2	0.1	2.2	16.7	7.8	18.9	14.1	10.0	78	12	16					3.7		4.9

Narrative Pedon Description

Pedon: Humatas

NSSL pedon number: 40A0571

Pedon ID: S61PR-097-001

SSIR #12 pedon ID: S61-8-4

Field classification: Clayey, mixed, isohyperthermic Typic Tropohumults

Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Oxic Dystrudepts

Location: Mayagüez, Puerto Rico;Oeste Soil Conservation District; 300 meters beyond kilometer marker 5.4 on Highway 349, on dirt road, 200 meters east of Rosario School; aerial photograph GS-LR-11-46

Latitude: 18°09’59" north

Longitude: 67°04’42" west

Soil survey area: PR684—Mayagüez Area, Puerto Rico Western Part

Geomorphic position: On side slope of an interfluve

Slope: 55 percent with an aspect of 225 degrees (southwest); on a side slope leading directly to a drainageway near the interfluve summit

Drainage, runoff, and permeability: Well drained, medium internal drainage, medium runoff, and moderate permeability

Vegetation: Coffee under shade; undergrowth of native pasture, ferns, and weeds

Parent material: Residuum or very local colluvium from volcanic rocks

Particle-size control section: 12 to 55 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, O.R. Carter, L.H. Rivera, W. Francia, and J.E. Trigo on December 18, 1961

Notes: The soil was slightly below field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 13 cm; yellowish red (5YR 4/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; small pieces fail semiplastically; many fine and medium roots; many fine pores; 21 percent fine wormcasts; clear smooth boundary. 40A4177

B21t—13 to 36 cm; yellowish red (5YR 4/6) clay; weak fine subangular blocky structure; firm, slightly sticky, slightly plastic; small pieces fail semiplastically; many fine roots; many fine pores; patchy clay films; gradual wavy boundary. 40A4178

B22t—36 to 56 cm; yellowish red (5YR 4/6) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail semiplastically; common fine roots; many fine pores; pressure faces and patchy clay films; gradual smooth boundary. 40A4179

B31—56 to 84 cm; red (2.5YR 4/8) clay; weak fine subangular blocky structure; friable, nonsticky, slightly plastic; small pieces fail abruptly; few fine roots; many fine pores; 10 percent patchy clay films; gradual wavy boundary. 40A4180

B32—84 to 114 cm; red (2.5YR 4/6) clay; few vertical clay lenses; small amount of saprolite; weak fine subangular blocky structure; friable, nonsticky, slightly plastic; small pieces fail abruptly; few fine roots; many fine pores; gradual wavy boundary. 40A4181

C—114 to 152 cm; red (10R 4/6), brownish yellow (10YR 6/6), very pale brown (10YR 8/4), and very dark grayish brown (10YR 3/2) clay loam; massive; friable, nonsticky, nonplastic; small pieces fail abruptly; few fine roots; many fine pores. 40A4182

Consumo: S87PR-007-007

Primary Characterization Data

Mayagüez Municipio, Puerto Rico

Sampled as: Consumo; clayey, oxidic, isohyperthermic Typic Kanhapludults

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 298, Samples 87P 1499–1505

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	SOIL
87P1499S	0- 4	Ap	66.5	29.6	3.9	27.2		26.3	3.3	2.2	0.7	0.6	0.4	--	--	--	TR	2	--
87P1500S	4- 20	Bt1	62.4	32.8	4.8	20.6		29.4	3.4	2.3	1.6	0.7	0.2	--	--	--	--V	2	--
87P1501S	20- 40	Bt2	57.4	35.6	7.0	17.8		31.8	3.8	3.1	2.5	1.0	0.3	0.1	--	--	--V	4	--
87P1502S	40- 61	Bw1	49.6	37.2	13.2	11.9		32.2	5.0	5.2	4.1	2.5	1.1	0.3	--	--	--V	8	--
87P1503S	61-106	Bw2	47.6	43.0	9.4	11.6		37.4	5.6	7.6	0.2	1.1	0.5	--	1	TR	16V	18	17
87P1504S	106-136	Bw3	45.7	42.2	12.1	11.2		36.4	5.8	5.9	3.6	1.4	0.9	0.3	1	8	12V	26	21
87P1505S	136-150	Cr	28.1	52.7	19.2	9.5		44.1	8.6	8.2	6.2	3.0	1.6	0.2	--	TR	--	11	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 4	4.11	0.289			5.3	0.7	0.2	0.35	0.42										27.8	
4- 20	1.34	0.143			5.6	0.6	0.2	0.29	0.43				1.14	1.39	0.068			40.2	27.0	0.15
20- 40	0.79	0.096			5.5	0.6	0.1	0.28	0.47	67	33		1.25	1.45	0.051			37.0	27.1	0.12
40- 61	0.34	0.074			5.6	0.6	0.1	0.31	0.50				1.11	1.21	0.029			37.4	24.7	0.14
61-106	0.19				5.0	0.5	0.1	0.29	0.49	60	26		1.04	1.15	0.031			39.5	23.2	0.16
106-136	0.14				4.9	0.5	0.1	0.30	0.49										22.3	
136-150	0.05				3.6	0.4	0.3	0.38	0.58										16.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G									- - ->	<- - - - -PCT		- - - ->					1:2	1:1
0- 4	3.2	1.6	TR	0.7	5.5	24.0	7.1	29.5	23.3	12.6	56	19	24				3.7	4.0	4.6
4- 20	0.9	0.6	--	0.2	1.7	22.1	10.6	23.8	18.1	12.3	86	7	9				3.6	3.9	4.6
20- 40	0.5	0.4	--	0.2	1.1	19.5	10.5	20.6	16.0	11.6	91	5	7				3.7	3.9	4.6
40- 61	0.3	0.4	--	0.2	0.9	17.9	10.2	18.8	15.2	11.1	92	5	6				3.7	4.0	4.8
61-106	0.2	0.4	--	0.2	0.8	16.5	9.3	17.3	13.6	10.1	92	5	6				3.7	4.0	4.8
106-136	0.2	0.4	--	0.2	0.8	17.0	9.2	17.8	13.6	10.0	92	4	6				3.6	3.9	4.7
136-150	0.1	0.4	--	0.2	0.7	12.9	7.7	13.6	10.8	8.4	92	5	6				3.7	4.0	4.7

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
87P1501	TCLY	KK 3 MI 3 GE 2 HE 1 QZ 1	KK32 GItr	KK29 GI 2			10.0			3.1			
87P1503	TCLY	KK 3 MI 3 GE 2 HE 1	KK22 GItr				9.3			3.6			
87P1505	TCLY	KK 3 MI 3 GE 2	KK20 GItr				7.4			3.8			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	THERMAL TGA 7A4b (Percent)	OPTICAL TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)	INTERPRETATION
87P1501	VFS	QZ 4 KK 2 MI 2 HE 2			93	KK50 FE36 QZ 7 TA 3 BT 3	

FRACTION INTERPRETATION:
- TCLY Total Clay, <0.002mm
- VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:
- QZ quartz
- KK kaolinite
- MI mica
- HE hematite
- GE goethite
- GI gibbsite
- FE iron oxides
- TA talc
- BT biotite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Consumo

NSSL pedon number: 87P0298

Pedon ID: S87PR-007-007

Field classification: Clayey, oxidic, isohyperthermic Typic Kanhapludults

Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Typic Haplohumults

Location: Mayagüez Municipio, Puerto Rico; Oeste Soil and Water Conservation District; 61 meters south of Highway 106 at kilometer marker 12.6 and 2.4 km west on 106 from junction with Highway 356

Latitude: 18°12’33" north

Longitude: 67°02’00" west

Elevation: 360 meters

Physiography: Hillside or mountainside in hills

Slope: 25 percent with a convex north aspect

Major Land Resource Area: 270—Humid Mountains and Valleys

Average air temperature: Annual—24 °C; summer—25 °C; winter—22 °C

Average soil temperature: Annual—27 °C; summer—28 °C; winter—25 °C

Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability

Vegetation: Paspalum and *andropogan* genera in pastureland

Erosion: Severe

Particle-size control section: 4 to 54 cm

Parent material: Residuum from igneous-granite material

Diagnostic features: Ochric epipedon at 0 to 4 cm; argillic horizon at 4 to 40 cm; paralithic contact at 136 to 150 cm

Described and sampled by: D. Williams, G. Acevedo, W. Lynn, and L.H. Rivera during April 1987

Notes: Matrix colors are for moist ped interiors.

Ap—0 to 4 cm; dark reddish brown (5YR 3/4) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots throughout; few patchy faint coatings in root channels and/or pores; few charcoal fragments; very strongly acid; clear smooth boundary. 87P1499

Bt1—4 to 20 cm; yellowish red (5YR 5/6) clay; few fine redoximorphic features; moderate medium subangular blocky structure; friable, slightly sticky, plastic; common fine and few medium roots throughout; few fine tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; 1 percent gravel; few old root channels; few filled insect holes; few clay balls; very strongly acid; gradual smooth boundary. 87P1500

Bt2—20 to 40 cm; yellowish red (5YR 5/6) clay; few fine distinct redoximorphic features; moderate medium subangular blocky structure; slightly sticky, plastic; common fine roots throughout; few fine tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds and few

continuous distinct clay films in root channels and/or pores; few filled insect holes; few clay balls; very strongly acid; clear smooth boundary. 87P1501

Bw1—40 to 61 cm; yellowish red (5YR 5/6) silty clay loam; few fine distinct redoximorphic features; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; few patchy distinct clay films in root channels and/or pores; 10 percent soft volcanic gravel; few old root channels; very strongly acid; clear smooth boundary. 87P1502

Bw2—61 to 106 cm; yellowish red (5YR 5/6) silty clay loam; few fine distinct redoximorphic features; massive; very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; coatings; 10 percent soft volcanic gravel; very strongly acid; clear smooth boundary. 87P1503

Bw3—106 to 136 cm; yellowish red (5YR 5/6) silty clay loam; few fine distinct redoximorphic features; massive; very friable, slightly sticky, slightly plastic; few fine roots throughout; few fine tubular pores; 10 percent soft volcanic gravel; few old root channels; very strongly acid; abrupt smooth boundary. 87P1504

Cr—136 to 150 cm; soft mudstone with a few quartz fragments. 87P1505

Daguey: S88PR-097-001

Primary Characterization Data

Mayagüez Municipio, Puerto Rico

Sampled as: Daguey; clayey, mixed, isohyperthermic Typic Palehumults

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 375, Samples 88P 1922–1929

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4-- CLAY LT .002 (TOTAL)	-5-- SILT .002 -.05 (TOTAL)	-6-- SAND .05 -2 (TOTAL)	-7-- FINE LT .0002 (CLAY)	-8-- CO3 LT .002 (CLAY)	-9-- FINE .002 -.02 (SILT)	-10- COARSE .02 -.05 (SILT)	-11- VF .05 -.10 (SAND)	-12- F .10 -.25 (SAND)	-13- M .25 -.50 (SAND)	-14- C .5 -1 (SAND)	-15- VC 1 -2 (SAND)	-16- 2 -5 (COARSE FRACS (MM) WEIGHT)	-17- 5 -20	-18- 20 -75	-19- .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - -	PCT OF <2MM	(3A1)	- - - - - - - - - - - - -						->	<- PCT OF <75MM(3B1)->				SOIL
88P1922S	0- 5	A1	55.9	38.7	5.4	16.1		32.4	6.3	2.1	1.8	0.7	0.5	0.3	TR	TR	--	3	TR
88P1923S	5- 19	A2	61.7	34.1	4.2	20.4		30.3	3.8	1.8	1.5	0.5	0.3	0.1	TR	--	--	2	--
88P1924S	19- 39	AB	77.1	22.4	0.5	30.2		19.0	3.4	--	0.4	0.1	--	--	TR	--	--	TR	--
88P1925S	39- 68	Bt1	74.4	24.1	1.5	25.3		20.8	3.3	0.7	0.6	0.2	--	--	--	--	--	1	--
88P1926S	68-108	Bt2	62.7	33.7	3.6	18.7		29.4	4.3	1.9	1.2	0.4	0.1	--	--	--	--	2	--
88P1927S	108-150	Bt3	57.1	37.5	5.4	16.4		32.3	5.2	2.9	1.7	0.6	0.2	--	--	--	--	2	--
88P1928S	150-192	Bt4	51.6	41.1	7.3	14.5		35.2	6.0	3.5	2.6	0.8	0.3	0.1	--	--	--	4	--
88P1929S	192-230	BC	47.3	42.6	10.1	13.6		36.4	6.2	4.8	3.8	1.2	0.3	--	--	--	--	5	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 5	3.73		6		3.7	0.3	0.1	0.43	0.43	64	29		1.22	1.42	0.052			33.5	24.0	0.12
5- 19	1.90		2		4.0	0.3	TR	0.27	0.40				1.29	1.50	0.052			32.9	24.4	0.11
19- 39	1.18		1		5.5	0.5	TR	0.19	0.38				1.26	1.46	0.050			33.8	29.6	0.05
39- 68	0.73		1		7.2	0.6	TR	0.20	0.43	78	38		1.22	1.41	0.049			39.8	31.8	0.10
68-108	0.31		TR		7.0	0.5	TR	0.23	0.47				1.29	1.44	0.037			37.5	29.3	0.11
108-150	0.18		1		6.7	0.4	TR	0.28	0.50				1.25	1.36	0.029			39.8	28.4	0.14
150-192	0.17		1		6.2	0.4	TR	0.32	0.52	71	35		1.19	1.33	0.038			42.8	26.9	0.19
192-230	0.19		1		6.2	0.4	TR	0.38	0.55				1.17	1.27	0.028			43.6	25.9	0.21

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(PH) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -	-MEQ / 100 G	- - - - - - - - - - -			->	<- - - - -	-PCT - - - ->						1:2	1:1
0- 5	13.3	5.3	0.1	1.3	20.0	12.5	0.1	32.5	23.8	20.1	TR	62	84				3.7	5.1	5.5
5- 19	6.1	3.4	0.1	0.6	10.2	14.1	0.9	24.3	16.7	11.1	8	42	61				3.9	4.2	4.7
19- 39	1.7	3.1	0.1	0.1	5.0	16.7	4.4	21.7	14.7	9.4	47	23	34				3.8	3.9	4.4
39- 68	0.6	2.2	0.2	0.1	3.1	18.5	7.1	21.6	15.1	10.2	70	14	21				3.5	3.9	4.3
68-108	0.2	1.8	0.4	0.1	2.5	17.1	7.6	19.6	14.7	10.1	75	13	17				3.5	4.0	4.5
108-150	0.1	2.2	0.3	0.2	2.8	16.6	7.8	19.4	15.7	10.6	74	14	18				3.6	4.0	4.7
150-192	0.1	2.8	0.2	0.2	3.3	17.5	8.3	20.8	16.6	11.6	72	16	20				3.6	4.0	4.6
192-230	0.1	3.3	0.2	0.3	3.9	20.0	7.9	23.9	17.9	11.8	67	16	22				3.6	4.0	4.6

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)				THERMAL DTA 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 <mg/g>	INTERPRETATION
88P1925	TCLY	KK 3	HE 2	GE 1	GI 1				24.0	13.2			0.7			
88P1926	TCLY	KK 3	HE 2	GE 1	GI 1				24.0	14.3			0.6			
88P1928	TCLY	KK 3	HE 2	GE 1					23.0	14.3			0.7			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite HE hematite GE goethite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL <- - PIPETTE - - ><- HYDROMETER - -> CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m ->				<- P P M ->		<- - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - ->												<20mm><PCT>
88P1922	1	0.12	0.92	0.04	0.15	26			4.13			32.1									67
88P1923	2	0.09	0.83	0.02	0.19				2.16			31.3									24
88P1924	3	0.05	0.47	0.01	0.18	36			1.24			35.6									10
88P1925	4	0.04	0.40	TR	0.23	38			0.82			38.1									
88P1926	5	0.03	0.27	0.02	0.22	43			0.39			36.0									
88P1927	6	0.03	0.27	0.02	0.21	44			0.28			36.5									
88P1928	7	0.03	0.21	0.01	0.18	54			0.26			37.0									
88P1929	8	0.03	0.29	0.02	0.19	38			0.29			37.5									

Narrative Pedon Description

Pedon: Daguey

NSSL pedon number: 88P0375

Pedon ID: S88PR-097-001

Field classification: Clayey, mixed, isohyperthermic Typic Palehumults

Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Typic Haplohumults

Location: Mayagüez Municipio, Puerto Rico; University of Puerto Rico Research Farm

Latitude: 18°13’20" north

Longitude: 67°09’02" west

Elevation: 35 meters

Geomorphic position: On lower third of component

Slope: 17 percent convex with a southwest aspect

Average annual precipitation: 1,900 mm; udic moisture regime

Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability

Vegetation: Coffee plantation in horticultural land

Erosion: Slight

Particle-size control section: 39 to 89 cm

Diagnostic features: Ochric epipedon at 0 to 19 cm; argillic horizon at 19 to 192 cm

Described and sampled by: D. William, G. Acevedo, and F. Beinroth during February 1988

A1—0 to 5 cm; dark reddish brown (5YR 3/3) clay, light reddish brown (5YR 6/3) dry; moderate fine subangular blocky structure parting to moderate fine granular; hard, friable, sticky, plastic; common fine roots throughout; clear smooth boundary. 88P1922

A2—5 to 19 cm; reddish brown (5YR 4/4) clay, reddish brown (5YR 5/4) dry; moderate fine subangular blocky structure; hard, friable, sticky, plastic; common fine and few medium roots throughout; few fine tubular pores; clear smooth boundary. 88P1923

Bw—19 to 39 cm; dark red (2.5YR 3/6) clay, red (2.5YR 4/6) dry; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable, sticky, plastic; common medium and common fine roots throughout; few fine tubular pores; gradual smooth boundary. 88P1924

Bt1—39 to 68 cm; dark red (2.5YR 3/6) clay, dark red (2.5YR 3/6) dry; strong medium subangular blocky structure parting to strong fine subangular blocky; hard, firm, sticky, plastic; common fine and few medium roots throughout; common fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; few old root channels; gradual wavy boundary. 88P1925

Bt2—68 to 108 cm; red (2.5YR 4/8) clay, red (2.5YR 4/8) dry; moderate medium subangular blocky structure parting to moderate medium prismatic; hard, firm,

sticky, plastic; common fine and few medium roots throughout; common fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; few old root channels; few insect casts; few clay balls 2 to 3 cm in size; gradual wavy boundary. 88P1926

Bt3—108 to 150 cm; red (2.5YR 4/8) clay, red (2.5YR 4/6) dry; moderate medium subangular blocky structure parting to moderate fine subangular blocky parting to moderate medium prismatic; hard, firm, sticky, plastic; few fine roots throughout; common fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; few old root channels filled with darker material; few clay balls 2 to 3 cm in size; gradual wavy boundary. 88P1927

Bt4—150 to 192 cm; red (2.5YR 4/8) clay, red (2.5YR 5/8) dry; moderate coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable, sticky, plastic; few fine roots throughout; few fine tubular pores; common continuous distinct clay films on faces of peds; few fine rounded soft masses of iron-manganese; few old root channels filled with darker material; 5 percent very pale brown (10YR 7/4) small highly weathered fragments of saprolite. 88P1928

BC—192 to 220 cm; red (2.5YR 4/8) clay loam, red (2.5YR 4/8) dry; weak medium subangular blocky structure; slightly hard, friable, sticky, plastic; few fine roots throughout; few fine tubular pores; common continuous distinct clay films on faces of peds; 40 percent very pale brown (10YR 7/4) medium and large highly weathered fragments of saprolite. 88P1929

Humatas: S94PR-097-001

Primary Characterization Data

Mayagüez Municipio, Puerto Rico

Sampled as: Humatas; clayey, mixed, isohyperthermic Typic Haplohumults

SSL—Project: 94P 149, (RP94PR257) PR-ARS

—Pedon: 94P 844, Samples 94P 6603–6609

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
94P6603S	0- 13	Ap1	52.1	36.3	11.6		2.3	31.2	5.1	3.3	3.0	2.8	1.6	0.9	1	5	--	14	6
94P6604S	20- 33	A	62.3	31.8	5.9			28.6	3.2	1.8	1.7	1.4	0.6	0.4	1	1	--	6	2
94P6605S	33- 46	Bt1	74.8	23.4	1.8			22.5	0.9	0.8	0.5	0.3	0.2	TR	--	--	--	1	--
94P6606S	46- 71	Bt2	77.0	22.0	1.0			20.0	2.0	0.5	0.2	0.1	0.1	0.1	--	--	--	TR	--
94P6607S	71-104	BC1	73.6	24.8	1.6			22.9	1.9	1.2	0.3	0.1	TR	TR	--	--	--	TR	--
94P6608S	104-132	BC2	64.1	32.5	3.4			29.4	3.1	1.8	0.6	0.5	0.3	0.2	TR	--	--	2	TR
94P6609S	132-165	C	50.4	41.2	8.4			35.7	5.5	3.6	2.4	0.9	0.7	0.8	--	--	--	5	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A5 <- -	1/3 BAR 4A1d G/CC - - ->	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	3.28							0.50	0.46										24.0	
20- 33	1.60							0.29	0.46										28.6	
33- 46	1.30							0.25	0.48										35.7	
46- 71	0.87							0.25	0.49										37.6	
71-104	0.57							0.34	0.50										36.5	
104-132	0.41							0.38	0.50										32.3	
132-165	0.18							0.58	0.49										24.8	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 13	19.5	4.3	--	0.2	24.0			24.0	26.1			100	92					
20- 33	15.4	1.9	TR	0.1	17.4	6.1		23.5	18.3			74	95					
33- 46	9.5	1.3	0.1	0.2	11.1	13.1		24.2	18.7			46	59					
46- 71	2.1	0.4	TR	0.1	2.6	21.0		23.6	19.6			11	13					
71-104	0.8	0.3	--	0.2	1.3	23.3		24.6	25.0			5	5					
104-132	0.3	0.2	--	0.2	0.7	22.1		22.8	24.5			3	3					
132-165	0.1	0.2	--	0.2	0.5	17.6		18.1	29.0			3	2					

Narrative Pedon Description

Pedon: Humatas
NSSL pedon number: 94P0844
Pedon ID: S94PR-097-001
Pedon type: Map unit inclusion
Pedon purpose: Research site
Field classification: Clayey, mixed, isohyperthermic Typic Haplohumults
Revised classification as of April 01, 2001: Very-fine, parasesquic, isohyperthermic Typic Palehumults
Location: ARS Research Facility, University of Puerto Rico, Mayagüez
Latitude: 18°12’40" north
Longitude: 67°08’00" west
UTM zone: 19
Major Land Resource Area: 270—Humid Mountains and Valleys
Soil survey area: PR684—Mayagüez Area, Puerto Rico Western Part
USGS 7.5-minute quadrangle: Mayagüez, Puerto Rico
Geomorphic position: On summit of an interfluve of a ridge in mountains
Slope: 3 percent with an aspect of 10 degrees; convex upslope and linear across slope; slope length of 100 meters with 20 meters being upslope from pedon
Drainage: Well drained
Vegetation: Grass and herbaceous cover
Bedrock kind: Fine igneous crystal
Bedrock hardness: Slightly cemented
Surface fragments: 0 percent
Particle-size control section: 33 to 71 cm
Diagnostic features: Argillic horizon at a depth of 33 to 71 cm
Described and sampled by: R.L. Vick and J.R. Davis on June 16, 1994

Ap1—0 to 13 cm; clay, brown (10YR 4/3) crushed; well naturalized and presumed to be overburden from previous human activity; 3 percent medium faint dark yellowish brown (10YR 4/4) redoximorphic features; moderate medium and coarse granular structure; friable; many fine roots; neutral; clear smooth boundary. 94P6603

Ap2—13 to 20 cm; very gravelly clay, yellowish brown (10YR 5/4) crushed; 3 percent medium distinct brown (7.5YR 4/3) redoximorphic features; moderate fine subangular blocky structure; friable; common very fine and fine roots; 50 percent rounded intermediate igneous rock fragments 2 to 75 mm in diameter; slightly alkaline; clear smooth boundary; presumed to be overburden from previous human activity; high pH along with the kind and content of rock fragments is indicative of degraded cement mixture, possibly from a foundation. Not sampled.

A—20 to 33 cm; clay, light olive brown (2.5Y 5/3) crushed; 3 percent medium prominent strong brown (7.5YR 4/6) redoximorphic features; moderate very fine and fine subangular blocky structure; friable; few fine roots; common fine

pores; 3 percent cylindrical wormcasts; slightly alkaline; clear wavy boundary. 94P6604

Bt1—33 to 46 cm; red (2.5YR 4/6) clay; 3 percent fine prominent light olive brown (2.5Y 5/3) and 3 percent medium prominent brown (10YR 5/3) redoximorphic features; moderate fine and medium subangular blocky structure; firm; few fine roots; common fine and medium vesicular pores; 10 percent discontinuous faint clay films on faces of peds; strongly acid; clear wavy boundary. 94P6605

Bt2—46 to 71 cm; red (2.5YR 4/6) clay; 3 percent medium prominent yellowish brown (10YR 5/6) redoximorphic features; moderate medium subangular blocky structure; firm; few fine roots; many fine and medium pores; 30 percent discontinuous faint clay films on faces of peds; very strongly acid; clear wavy boundary. 94P6606

BC1—71 to 104 cm; light reddish brown (2.5YR 6/4) clay; 3 percent medium prominent yellowish brown (10YR 5/6) and 3 percent fine prominent very pale brown (10YR 8/2) redoximorphic features; weak coarse subangular blocky structure; firm; few very fine roots; 10 percent patchy prominent yellow (10YR 7/6) clay films on faces of peds; very strongly acid; clear wavy boundary. 94P6607

BC2—104 to 132 cm; yellow (10YR 7/6) clay; 3 percent medium prominent light reddish brown (2.5YR 6/4) and 3 percent medium distinct very pale brown (10YR 8/2) redoximorphic features; weak medium subangular blocky structure; firm; very strongly acid; clear wavy boundary. 94P6608

C—132 to 165 cm; variegated white, yellow, brown, and red highly weathered saprolite; rock structure; crushes to silty clay; firm; very strongly acid. 94P6609

Moca Municipio

Voladora: S87PR-007-006

Primary Characterization Data

Moca Municipio, Puerto Rico
Sampled as: Voladora; clayey, mixed, isohyperthermic Humic Hapludults
SSL—Project: 87P 65, (CP87PR108)
—Pedon: 87P 297, Samples 87P 1492–1498
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.02	SILT COARSE .05 -.05	SAND VF .10 -.10	SAND F .25 -.25	SAND M .5 -.50	SAND C 1 -1	SAND VC 2 -2	COARSE FRACS (MM) 5 -5	WEIGHT 20 -20	WEIGHT .1- -75	WEIGHT % OF 75	>2MM WT OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
87P1492S	0- 17	Ap	53.5	30.0	16.5	22.7		22.4	7.6	4.9	4.2	2.8	2.1	2.5	3	3	2	19	8
87P1493S	17- 45	Bt1	68.7	23.9	7.4	32.3		18.6	5.3	2.9	1.7	1.0	0.9	0.9	1	2	--	7	3
87P1494S	45- 78	Bt2	49.1	36.2	14.7	17.3		29.0	7.2	7.2	5.0	1.6	0.6	0.3	TR	1	TR	8	1
87P1495S	78-110	Bt3	37.9	40.8	21.3	11.0		32.0	8.8	13.6	3.1	2.6	1.2	0.8	1	2	5V	15	13
87P1496S	110-160	Bt4	33.9	46.4	19.7	8.3		36.3	10.1	9.6	6.3	1.8	0.9	1.1	3	3	5V	20	15
87P1497S	160-202	Bw	28.8	46.2	25.0	7.3		36.5	9.7	9.5	7.7	3.6	2.3	1.9	4	5	3V	26	16
87P1498S	202-225	C	25.6	42.9	31.5	6.0		33.0	9.9	11.0	8.6	4.2	3.9	3.8	6	1	--	26	7

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	DITH-CIT EXTRACTABLE AL 6G7a <2MM	DITH-CIT EXTRACTABLE MN 6D2a -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <-	BULK DENSITY 1/3 BAR 4A1d G/CC	BULK DENSITY OVEN DRY 4A1h -	COLE WHOLE SOIL 4D1 -> CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM -	WRD WHOLE SOIL 4C1 -> CM/CM
0- 17	2.28	0.260			4.1	0.1	TR	0.56	0.47				1.09	1.37	0.076			42.4	25.0	0.18
17- 45	1.30	0.155			5.5	0.4	--	0.37	0.47	80	36		0.97	1.36	0.118			55.5	32.2	0.22
45- 78	0.67	0.087			4.8	0.3	--	0.63	0.63				1.03	1.36	0.096			50.3	30.7	0.20
78-110	0.38	0.052			4.1	0.5	--	0.90	0.73				0.98	1.32	0.097			53.4	27.8	0.24
110-160	0.22				3.3	0.4	--	0.99	0.78	65	23		1.05	1.24	0.053			50.1	26.4	0.23
160-202	0.09				3.7	0.4	--	1.17	0.81				0.99	1.15	0.048			53.3	23.2	0.28
202-225	0.06				1.8	0.2	--	1.10	0.73				1.03	1.17	0.042			54.4	18.7	0.36

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																	1:2	1:1
0- 17	14.3	1.0	TR	0.9	16.2	23.3	7.1	39.5	30.0	23.3	30	41	54				3.5	4.1	4.0
17- 45	2.3	0.4	--	0.2	2.9	28.9	16.2	31.8	25.6	19.1	85	9	11				3.5	3.9	4.3
45- 78	1.8	0.5	TR	0.2	2.5	34.8	25.0	37.3	30.7	27.5	91	7	8				3.5	3.8	4.3
78-110	2.4	1.5	TR	0.2	4.1	33.6	25.1	37.7	34.0	29.2	86	11	12				3.4	3.8	4.2
110-160	4.1	5.7	0.1	0.3	10.2	29.9	19.5	40.1	33.7	29.7	66	25	30				3.4	3.9	4.4
160-202	5.5	9.8	0.1	0.3	15.7	24.8	13.8	40.5	33.8	29.5	47	39	46				3.4	3.9	4.5
202-225	5.8	9.4	0.1	0.3	15.6	17.7	9.2	33.3	28.2	24.8	37	47	55				3.3	4.0	4.6

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY				THERMAL DSC	THERMAL TGA	ELEMENTAL SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN mg/g	INTER PRETA TION
						Percent					Percent					
87P1493	TCLY	KK 3	VR 2	GE 1	HE 1	KK52	GItr			12.7			0.5			
87P1494	TCLY	KK 3	VM 2			KK48	GItr	KK43	GI 2	14.0			0.5			
87P1496	TCLY	VM 3	KK 3			KK44	GItr			9.4			0.6			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACT ION 7A2i Peak Size	X-RAY				THERMAL DTA	THERMAL TGA	TOT RE	OPTICAL GRAIN COUNT								INTER PRETA TION
						Percent					Percent						
87P1493	VFS	QZ 5	FD 2					93	QZ65	KK14	FE10	CL 4	RA 3	TA 2			
87P1493	VFS								FK 1	MG 1	POtr						

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
QZ quartz FD feldspar KK kaolinite VR vermiculite GE goethite HE hematite
FE iron oxides CL chlorite RA resist-aggre TA talc FK potas feldsp MG magnetite
PO plant opal GI gibbsite VM vermici-mica
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Voladora

NSSL pedon number: 87P0297

Pedon ID: S87PR-007-006

Field classification: Clayey, mixed, isohyperthermic Humic Hapludults

Revised classification as of April 01, 2001: Fine, mixed, active, isohyperthermic Typic Haplohumults

Location: Moca Municipio, Puerto Rico; Culebrinas Soil and Water Conservation District; 1.1 km south on Highway 420 from junction with Highway 111 and 122 meters west of road

Latitude: 18°22’12" north

Longitude: 67°04’19" west

Elevation: 97 meters

Slope: 15 percent with a convex north aspect

Major Land Resource Area: 270—Humid Mountains and Valleys

Average air temperature: Annual—24 °C; summer—25 °C; winter—22 °C

Average soil temperature: Annual—27 °C; summer—28 °C; winter—25 °C

Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability

Vegetation: Sugarcane in cropland

Erosion: Moderate

Particle-size control section: 17 to 67 cm

Parent material: Alluvium from conglomerate-noncalcareous material

Diagnostic features: Ochric epipedon at 0 to 17 cm; argillic horizon at 17 to 160 cm

Described and sampled by: D. Williams, L.H. Rivera, G. Acevedo, and W. Lynn during April 1987

Notes: Matrix colors are for moist interior peds.

Ap—0 to 17 cm; dark brown (7.5YR 3/4) silty clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots throughout; few very fine interstitial and tubular pores; few earthworms; 10 percent mixing of B material; 5 percent subrounded volcanic rock fragments; extremely acid; abrupt smooth boundary. 87P1492

Bt1—17 to 45 cm; red (2.5YR 4/6) clay; weak coarse prismatic structure parting to weak medium subangular blocky parting to weak fine subangular blocky; firm, slightly sticky, plastic; common fine roots throughout; few very fine interstitial and tubular pores; common continuous distinct clay films on faces of peds; few old roots; root channels filled with dark material; 3 percent subrounded volcanic rock fragments; very strongly acid; clear wavy boundary. 87P1493

Bt2—45 to 78 cm; red (2.5YR 4/6) clay; few fine distinct redoximorphic features; weak very coarse prismatic structure parting to weak medium subangular blocky parting to weak fine subangular blocky; friable, slightly sticky, plastic; few fine roots throughout; few fine interstitial and tubular pores; common continuous distinct clay films on faces of peds; few old roots; 1 percent

subrounded volcanic rock fragments; extremely acid; clear wavy boundary. 87P1494

Bt3—78 to 110 cm; yellowish red (5YR 5/6) silty clay loam; common fine distinct redoximorphic features; weak coarse prismatic structure parting to weak medium subangular blocky; friable, slightly sticky, slightly plastic; few fine roots throughout; common fine interstitial and tubular pores; common continuous distinct iron stains on faces of peds; 5 percent gravel; 2 percent cobbles; subrounded volcanic rock fragments; few old roots; 10 percent of horizon has rock structure; extremely acid; clear wavy boundary. 87P1495

Bt4—110 to 160 cm; 40 percent red (2.5YR 4/6), 40 percent brownish yellow (10YR 6/6), and 20 percent light gray (10YR 7/2) silty clay loam; weak coarse prismatic structure; friable, slightly sticky, slightly plastic; few fine roots throughout; common fine interstitial and tubular pores; common continuous distinct clay films on faces of peds; 2 percent gravel; 1 percent cobbles; subrounded volcanic rock fragments; few old roots; very strongly acid; clear wavy boundary. 87P1496

Bw—160 to 202 cm; 50 percent yellow (10YR 7/8), 40 percent yellowish red (5YR 4/6), and 10 percent light gray (10YR 7/1) gravelly loam; few fine distinct redoximorphic features; weak coarse prismatic structure; very friable, slightly sticky, slightly plastic; common fine interstitial and tubular pores; few discontinuous distinct iron stains on faces of peds; 15 percent gravel; 2 percent cobbles; few old root channels; very strongly acid; clear wavy boundary. 87P1497

C—202 to 225 cm; 60 percent light gray (10YR 7/2) and 40 percent reddish yellow (7.5YR 6/8) silt loam; massive; very friable, slightly sticky, slightly plastic; common fine interstitial and tubular pores; few discontinuous distinct clay films on faces of peds; 6 percent gravel; 1 percent cobbles; very strongly acid. 87P1498

Coto: S63PR-099-001

Primary Characterization Data

Moca Municipio, Puerto Rico

Sampled as: Coto; clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 596, Samples 40A 4368–4376

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND -2	FINE .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .02	COARSE -.05	VF -.10	(- - - - - -SAND- - - - - -) F -.25	M -.50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 5 -5	20 -20	75 -75	.1- 75	WT PCT WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM					(	) - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				
40A4368S	0- 13	Ap	70.7	7.0	22.3			4.1	2.9	6.8	7.9	5.1	2.5	TR	--C	--C	--	15	--
40A4369S	13- 25	A12	71.1	7.1	21.8			3.9	3.2	6.4	7.7	5.2	2.5	TR	--C	--C	--	15	--
40A4370S	25- 43	B21	75.9	5.3	18.8			2.7	2.6	5.5	6.5	4.4	2.3	0.1	--C	--C	--	13	--
40A4371S	43- 63	B22	79.6	5.9	14.5	36.5		4.2	1.7	4.4	5.1	3.1	1.7	0.2	--C	--C	--	10	--
40A4372S	63- 91	B23	81.9	6.7	11.4			5.3	1.4	3.9	4.0	2.2	1.2	0.1	--C	--C	--	7	--
40A4373S	91-127	B24	76.2	10.5	13.3			7.6	2.9	5.5	4.7	2.1	0.9	0.1	--C	--C	--	8	--
40A4374S	127-163	B25	67.4	16.2	16.4			10.2	6.0	7.6	5.3	2.2	1.2	0.1	--C	--C	--	9	--
40A4375S	213-305	B26	70.1	15.1	14.8			10.5	4.6	6.5	4.2	2.6	1.4	0.1	--C	--C	--	8	--
40A4376S	305-366	B27	70.5	15.7	13.8			10.6	5.1	7.1	3.9	1.8	1.0	TR	--C	--C	--	7	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b <- PERCENT	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	2.44	0.252			9.6			0.19	0.32			1.25	1.30	1.39	--	28.5		25.0	22.5	0.03
13- 25	1.69	0.197			9.8			0.15	0.32			1.30	1.34	1.44	--	28.2		28.0	22.8	0.07
25- 43	0.99	0.143			10.1			0.09	0.31			1.30	1.32	1.41	--	28.6		31.5	23.7	0.10
43- 63	0.62	0.127			10.6			0.07	0.33			1.28	1.30	1.38	--	29.3		30.6	26.4	0.05
63- 91	0.46	0.113			11.5			0.07	0.33			1.24	1.25	1.32	--	31.5		33.3	26.8	0.08
91-127	0.25				11.2			0.07	0.33				1.45	1.48	--	26.1		27.3	25.0	0.03
127-163	0.19				11.2			0.08	0.35										23.5	
213-305	0.15				12.9			0.07	0.33										23.0	
305-366	0.11				13.3			0.07	0.33										23.1	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - -MEQ / 100 G							- - - - - - - - - - ->			<- - - - -PCT - - - ->								
0- 13	3.6	0.9	0.1	0.4	5.0	20.4	0.6	25.4	13.3	5.6	11	20	38				4.1		4.8
13- 25	2.1	0.5	0.1	0.1	2.8	20.0	1.4	22.8	10.6	4.2	33	12	26				3.9		4.5
25- 43	1.2	0.4	0.1	0.1	1.8	16.4	1.6	18.2	7.1	3.4	47	10	25				3.9		4.5
43- 63	3.7	0.6	0.1	0.1	4.5	15.6	0.9	20.1	5.8	5.4	17	22	78				4.1		4.6
63- 91	3.6	0.7	0.1	0.1	4.5	9.7		14.2	5.8			32	78				5.5		5.9
91-127	4.1	0.6	0.1	0.1	4.9	8.5		13.4	5.7			37	86				5.9		6.3
127-163	3.7	0.9	0.1	TR	4.7	8.9		13.6	5.5			35	85				5.8		6.0
213-305	1.8	2.0	0.1	TR	3.9	11.4		15.3	4.9			25	80				5.4		5.5
305-366	1.4	1.2	0.1	TR	2.7	11.2	0.1	13.9	4.8	2.8	4	19	56				4.9		4.6

Narrative Pedon Description

Pedon: Coto

NSSL pedon number: 40A0596

Pedon ID: S63PR-099-001

SSIR #12 pedon ID: S63PR-6-1

Field classification: Clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Hapludox

Location: Moca, Puerto Rico; 16 km west of Quebradillas, 61 meters south of kilometer marker 115.0 on Highway 2

Latitude: 18°27’40" north

Longitude: 67°03’39" west

Geomorphic position: Alluvial fan in limestone hills

Slope: 3 percent with an aspect of 0 degrees (north)

Drainage: Well drained

Vegetation: Grass and herbaceous cover

Particle-size control section: 25 to 100 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, R.E. Gierbolini, and J. Torres-Mas on September 26, 1963

Notes: The B25 horizon was the same as the B24 horizon and was arbitrarily split for sampling. The B26 and B27 horizons were sampled with an auger. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 13 cm; brown (7.5YR 5/4) silty clay; weak fine granular structure; friable, slightly hard, slightly sticky, slightly plastic; strongly acid; clear smooth boundary. 40A4368

A12—13 to 25 cm; brown (7.5YR 4/4) silty clay; weak medium subangular blocky structure; firm, hard, slightly sticky, slightly plastic; common fine roots; 3 percent fine black (10YR 2/1) dark nodules; common fine quartz grains; field moisture of 31.4 percent; moderately acid, clear smooth boundary. 40A4369

B21—25 to 43 cm; reddish brown (5YR 5/4) and yellowish red (5YR 5/8) clay; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; discontinuous clay films; 1 percent fine black (10YR 2/1) dark nodules; few fine quartz grains; field moisture of 30.8 percent; strongly acid; gradual smooth boundary. 40A4370

B22—43 to 63 cm; yellowish red (5YR 4/6) and yellowish red (5YR 5/8) clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine pores; patchy clay films in root channels and/or pores; 1 percent fine black (10YR 2/1) dark nodules; field moisture of 34.6 percent; strongly acid; gradual smooth boundary. 40A4371

B23—63 to 91 cm; yellowish red (5YR 5/8) clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films on ped surfaces and root channels; small pieces fail abruptly upon slight pressure; common fine pores; common fine quartz grains; few fine black nodules; black

coatings along root channels; field moisture of 34.0 percent; clear smooth boundary. 40A4372

B24—91 to 127 cm; yellowish red (5YR 4/8) clay loam; few fine red (2.5YR 4/8) and few fine yellowish brown (10YR 5/4) redoximorphic features; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; shiny ped faces; small pieces fail abruptly upon slight pressure; few fine roots; few fine quartz grains; common fine pores; slightly acid; gradual smooth boundary. 40A4373

B25—127 to 163 cm; yellowish red (5YR 4/8) clay loam (same as B24 horizon, which was split for sampling); few fine red (2.5YR 4/8) and few fine yellowish brown (10YR 5/4) redoximorphic features; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; shiny ped faces; small pieces fail abruptly upon slight pressure; few fine roots; few fine quartz grains; common fine pores; slightly acid; gradual smooth boundary. 40A4374

B26—213 to 305 cm; strong brown (7.5YR 5/8) clay loam. 40A4375

B27—305 to 366 cm; strong brown (7.5YR 5/8) clay loam. 40A4376

Morovis Municipio

Moca: S89PR-101-001

Primary Characterization Data

Morovis Municipio, Puerto Rico

Sampled as: Moca; clayey, mixed, isohyperthermic Typic Paleudults

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 405, Samples 89P 2269–2275

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4- TOTAL CLAY LT .002	-5- TOTAL SILT .002 -.05	-6- TOTAL SAND .05 -2	-7- CLAY FINE LT .0002	-8- CLAY CO3 LT .002	-9- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS WEIGHT 2 -5	-17- COARSE FRACS WEIGHT 5 -20	-18- COARSE FRACS WEIGHT 20 -75	-19- .1- 75	-20- (>2MM) WT PCT WHOLE SOIL
			<- - - - - - - - - - - -	PCT OF <2MM	(3A1)	- - - - - -	- - - -	- - - -	- ->		<- PCT OF	<75MM(3B1)	->		
89P2269S	0- 18	Ap	50.1	28.8	21.1	31.8		19.6	9.2	11.8	6.6	1.6	0.8	0.3	TR	--	--	9	--
89P2270S	18- 39	Bt1	74.3	16.2	9.5	51.0		11.5	4.7	5.8	3.2	0.3	0.2	--	--	--	--	4	--
89P2271S	39- 82	Bt2	69.0	21.0	10.0	44.6		12.2	8.8	5.5	4.3	0.2	--	--	--	--	--	4	--
89P2272S	82-110	Bt3	70.6	19.4	10.0	47.7		12.5	6.9	6.7	3.0	0.2	--	0.1	--	--	--	3	--
89P2273S	110-145	Bt4	61.3	22.7	16.0	38.0		15.0	7.7	9.1	4.6	1.2	0.8	0.3	TR	--	--	7	--
89P2274S	145-175	Bt5	61.4	21.0	17.6	40.1		13.0	8.0	10.2	6.2	0.7	0.3	0.2	--	--	--	7	--
89P2275S	175-235	Bt6	48.5	26.1	25.4	16.3		16.3	9.8	15.2	9.9	0.3	--	--	--	--	--	10	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT AL 6G7a	DITH-CIT MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
				<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC	- -	->		<- - -PCT OF	<2MM	- ->		
0- 18	2.78	0.263			5.5	0.7	0.2	0.43	0.48				1.05	1.40	0.101			44.4	23.9	0.22
18- 39	1.39	0.173			7.0	0.9	TR	0.33	0.44				1.01	1.45	0.128			54.5	32.9	0.22
39- 82	0.74	0.108			6.4	0.7	--	0.38	0.44				1.07	1.63	0.151			50.4	30.2	0.22
82-110	0.54	0.123			6.3	0.6	--	0.35	0.44				1.09	1.64	0.146			49.3	30.8	0.20
110-145	0.33				7.6	0.6	TR	0.37	0.43				1.22	1.60	0.095			39.9	26.2	0.17
145-175	0.22				7.1	0.5	TR	0.44	0.42				1.15	1.66	0.130			45.9	25.6	0.23
175-235	0.08				4.0	0.4	--	0.65	0.48				1.19	1.51	0.083			46.2	23.4	0.27

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - -	- - - -	- - -	- -MEQ /	100 G - -	- - -	- - - -	- - -	- - ->	<- - - -	-PCT -	- - ->						1:2	1:1
0- 18	7.9	1.4	0.3	0.3	9.9	20.9	2.1	30.8	21.6	12.0	17	32	46				3.9	4.2	4.7
18- 39	8.4	0.9	0.3	0.3	9.9	24.5	7.8	34.4	24.4	17.7	44	29	41				4.1	4.1	4.6
39- 82	6.7	0.9	0.2	0.4	8.2	27.0	13.3	35.2	26.2	21.5	62	23	31				3.8	4.0	4.5
82-110	5.0	2.3	0.3	0.3	7.9	27.1	12.4	35.0	24.4	20.3	61	23	32				3.5	3.9	4.4
110-145	3.8	3.3	0.3	0.3	7.7	17.1	10.4	24.8	22.7	18.1	57	31	34				3.5	4.0	4.7
145-175	5.2	4.9	0.3	0.4	10.8	22.4	12.5	33.2	27.2	23.3	54	33	40				3.5	4.0	4.9
175-235	10.0	7.2	0.3	0.4	17.9	19.4	11.4	37.3	31.6	29.3	39	48	57				3.5	4.0	4.9

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
89P2270	TCLY	KK 5 MT 3 GE 2 VC 2 HE 1				27.0	10.9			0.4			
89P2270	TCLY	MI 1											
89P2271	TCLY	KK 5 MT 3 VC 3 GE 1				27.0	8.4			0.4			
89P2274	TCLY	KK 5 MT 3 VC 3 GE 1				26.0	7.0			0.4			
89P2275	TCLY	MT 3 KK 3 VC 2 GE 1 MI 1				22.0	6.6			0.4			

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          < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE      ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                < - - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER    < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - - -><  - >
89P2271    VFS                                                    96  QZ69  OP26  OT 3  GE 1  FD 1  BTtr POtr SRtr
89P2274    VFS                                                    97  QZ58  OP35  GE 4  OT 2  FDtr  Potr SRtr CDtr
89P2275    VFS                                                    88  QZ74  OP12  OT 9  FD 3  GE 2  MStr
89P2275    VFS                                                        POtr  ZRtr  CLtr  BTtr
MINERAL INTERPRETATION:
    KK  kaolinite        MT  montmorillon     GE  goethite         VC  verm-chlorit     HE  hematite         MI  mica
    QZ  quartz           OP  opaques          OT  other            FD  feldspar         BT  biotite          PO  plant opal
    ZR  zircon           CD  chalcedony       MS  muscovite        CL  chlorite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9a  6V2   6G12  6S4   6S5   6D3   6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
89P2269  1  0.08  1.12  0.06  0.32              16.2                    33.5                                                   85
89P2270  2  0.05  0.62  0.06  0.38               2.2                    43.4
89P2271  3  0.04  0.49  0.06  0.42               1.0                    40.7
89P2272  4  0.04  0.35  0.06  0.38               0.4                    40.6
89P2273  5  0.04  0.33  0.07  0.33               1.6                    34.1
89P2274  6  0.03  0.28  0.07  0.30               1.7                    33.6
89P2275  7  0.12  0.16  0.05  0.24               2.6                    32.4
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Narrative Pedon Description

Pedon: Moca

NSSL pedon number: 89P0405

Pedon ID: S89PR-101-001

Field classification: Clayey, mixed, isohyperthermic Typic Paleudults

Revised classification as of April 01, 2001: Very-fine, mixed, semiactive, isohyperthermic Vertic Paleudults

Location: Morovis Municipio, Puerto Rico; Arecibo Soil Survey sheet 31; 4.2 km on Highway 633 from junction with Highway 149 and 0.5 km north on Highway 155

USGS 7.5-minute quadrangle: Ciales

Latitude: 18°21’34" north

Longitude: 66°26’09" west

Elevation: 130 meters

Physiography: Coastal plains

Slope: 5 percent with a convex southeast aspect

Major Land Resource Area: 272—Humid Coastal Plains

Drainage, runoff, and permeability: Somewhat poorly drained, slow runoff, and slow permeability

Vegetation: Unspecified grasses in pastureland and native pasture

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 38 to 89 cm

Parent material: Local colluvium from limestone-arenaceous material over local colluvium from limestone-arenaceous material

Weather station number: 3431

Diagnostic features: Ochric epipedon at 0 to 18 cm; argillic horizon at 18 to 236 cm

Geographically associated soils: Naranjo, Perchas, and Soller

Described and sampled by: D. Williams and C.L. Santiago during February 1989

Ap—0 to 18 cm; dark brown (7.5YR 3/2) clay loam; moderate fine subangular blocky structure parting to moderate fine granular; friable, sticky, plastic; common fine roots throughout; few fine rounded iron-manganese concretions; few earthworms; common wormcasts; 5 percent mixing of material from the Bt horizon; abrupt wavy boundary. 89P2269

Bt1—18 to 38 cm; yellowish red (5YR 4/6) clay; many medium distinct redoximorphic features; moderate fine and medium subangular blocky structure; firm, very sticky, very plastic; common fine roots throughout; few fine tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; few fine rounded iron-manganese concretions; few small pockets of strong brown (7.5YR 4/6) material; few old roots; clear wavy boundary. 89P2270

Bt2—38 to 81 cm; 40 percent yellowish brown (10YR 5/4) and 60 percent red (2.5YR 4/6) clay; common medium distinct redoximorphic features; moderate

fine and medium subangular blocky structure parting to moderate medium and coarse prismatic; firm, very sticky, very plastic; common fine roots throughout; common fine tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; few fine rounded soft masses of iron-manganese; few old roots; gradual boundary. 89P2271

Bt3—81 to 109 cm; 40 percent grayish brown (10YR 5/2) and 60 percent red (2.5YR 4/8) clay; few medium distinct redoximorphic features; moderate medium and coarse subangular blocky structure parting to moderate medium and coarse prismatic; firm, very sticky, very plastic; few fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few small slickenside faces on 40 degree angle; few fine rounded soft masses of iron-manganese and few fine platelike soft masses of iron-manganese; few old roots; gradual boundary. 89P2272

Bt4—109 to 145 cm; 40 percent red (2.5YR 5/8) and 60 percent light gray to gray (10YR 6/1) clay; few medium distinct redoximorphic features; moderate fine and medium angular blocky structure; firm, very sticky, very plastic; few fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few fine rounded soft masses of iron-manganese; slickensides increase with depth; few old roots; gradual boundary. 89P2273

Bt5—145 to 175 cm; light brownish gray (10YR 6/2) clay; few fine distinct and many medium distinct redoximorphic features; moderate fine and medium angular blocky structure; firm, very sticky, very plastic; few fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few fine rounded soft masses of iron-manganese; few old roots; slickensides increase with depth to the lower boundary; strongly acid; abrupt wavy boundary. 89P2274

2Bt6—175 to 234 cm; light gray (10YR 7/2) clay; many medium distinct redoximorphic features; moderate fine and medium angular blocky structure; firm, very sticky, very plastic; few fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few fine platelike soft masses of iron-manganese; slickensides decrease with depth; few old roots; strongly acid. 89P2275

Perchas: S89PR-101-002

Primary Characterization Data

Morovis Municipio, Puerto Rico

Sampled as: Perchas; clayey, mixed, isohyperthermic Typic Ochraquults

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 406, Samples 89P 2276–2284

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-		- - - -)		(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -			WT	
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(3A1)	- - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
89P2276S	0- 10	Ap1		50.2	24.1	25.7	24.6		17.6	6.5	4.0	8.3	8.1	4.3	1.0	TR	--	--	22	TR
89P2277S	10- 20	Ap2		52.8	22.6	24.6	23.6		16.4	6.2	4.1	7.9	7.1	3.9	1.6	1	TR	--	21	1
89P2278S	20- 31	Bt1		59.8	25.8	14.4	16.0		18.6	7.2	1.7	5.6	5.2	1.9	--	--	--	--	13	--
89P2279S	31- 51	Bt2		48.0	29.1	22.9	11.3		22.7	6.4	4.7	7.0	7.4	3.0	0.8	--	TR	--	18	--
89P2280S	51- 77	Bt3ss		32.5	34.5	33.0	8.1		25.7	8.8	7.1	7.7	9.5	6.3	2.4	1	TR	--	27	1
89P2281S	77-126	Btcss		19.5	36.4	44.1	3.4		26.3	10.1	9.2	8.5	9.0	10.2	7.2	7	8	--	45	15
89P2282S	126-205	BCss		18.1	40.9	41.0	2.6		28.4	12.5	12.2	11.6	8.5	6.3	2.4	7	13	1	44	21
89P2283S	205-230	2C		24.2	29.9	45.9	2.6		22.1	7.8	5.9	9.3	12.8	12.0	5.9	--	16	3	51	19
89P2284S	77-126	BtC														--	--	--		--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 10	4.06	0.401			2.4	0.4	0.1	0.94	0.54				0.99	1.41	0.125			48.8	27.3	0.21
10- 20	1.65	0.202			2.1	0.5	0.1	0.96	0.53				1.12	1.38	0.072			43.2	28.2	0.17
20- 31	0.61	0.070			0.8	0.5	TR	1.11	0.53				1.09	1.61	0.139			46.4	31.7	0.16
31- 51	0.37	0.039			TR	0.3	--	1.23	0.54				1.10	1.68	0.152			45.8	25.9	0.22
51- 77	0.21				TR	0.2	TR	1.54	0.66				1.27	1.63	0.086			36.2	21.3	0.19
77-126	0.02				TR	0.1	TR	2.35	0.90				1.50	1.65	0.029			25.5	17.6	0.11
126-205	0.03				TR	--	--	3.50	1.13				1.42	1.68	0.050			30.4	20.5	0.12
205-230	0.02				--	--	--	2.07	0.72				1.50	1.73	0.042			25.7	17.4	0.11
77-126					1.9	0.1	0.1												7.3	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.	COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS	KCL	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9b	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - -				-MEQ /	100 G	- - -	- - - - - - - - -			- ->	<- - - - -PCT		- - - ->				1:2	1:1
0- 10	18.9	9.5	0.4	3.2	32.0	24.8	6.7	56.8	47.2	38.7	17	56	68				3.6	4.2	5.0
10- 20	16.8	9.1	0.4	0.7	27.0	29.5	17.3	56.5	50.9	44.3	39	48	53				3.5	4.1	5.0
20- 31	15.6	13.6	0.5	0.5	30.2	41.8	36.5	72.0	66.3	66.7	55	42	46				3.8	4.0	5.0
31- 51	12.9	17.2	0.7	0.4	31.2	32.8	25.6	64.0	58.8	56.8	45	49	53				3.5	4.1	4.8
51- 77	12.0	21.6	0.8	0.3	34.7	19.5	11.9	54.2	49.9	46.6	26	64	70				3.6	4.2	5.2
77-126	14.2	23.6	1.1	0.4	39.3	10.9	2.5	50.2	45.8	41.8	6	78	86				3.7	4.4	5.2
126-205	22.0	36.3	2.3	0.5	61.1	4.5		65.6	63.3			93	97				4.3	5.2	6.3
205-230	19.2	29.5	1.7	0.4	50.8	2.0		52.8	50.2			96	100				4.6	5.6	6.1
77-126																	4.3	5.9	6.2

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - - -><  - -><mg/g><  - >
89P2278      TCLY  MT 4  VC 2  KK 2  MI 1                                      21.0  10.9              0.4
89P2279      TCLY  MT 5  VC 1  KK 1  MI 1  QZ 1                                21.0  10.7              0.4
89P2280      TCLY  MT 5  VC 2  KK 2  MI 1                                      20.0   9.6              0.4
89P2281      TCLY  MT 4  GE 2  VC 2  KK 1  MI 1                                19.0  17.2              0.6
89P2283      TCLY  MT 5  KK 1  GE 1  MI 1                                      15.0  13.0              0.4
89P2284      TCLY  MT 3  VR 3  KK 2  VC 2  MI 1                                 8.3  12.2              0.9
89P2284      TCLY  FD 1  GE 1
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm
MINERAL INTERPRETATION:
    MT  montmorillon     VC  verm-chlorit     KK  kaolinite        MI  mica            QZ  quartz           GE  goethite
    VR  vermiculite      FD  feldspar
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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             ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
              DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9a  6V2   6G12  6S4   6S5   6D3   6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
 NO.    NO        <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
89P2276  1  0.08  0.90  0.05  0.39             23.7                  37.5                                                        79
89P2277  2  0.04  0.70  0.06  0.49             16.0                  35.2                                                        72
89P2278  3  0.03  0.19  0.05  0.64             11.7                  39.6
89P2279  4  0.03  0.10  0.05  0.49             12.6                  36.3
89P2280  5  0.04  0.15  0.04  0.31             12.5                  31.5
89P2281  6  0.04  0.34  0.04  0.17             14.7                  24.3
89P2282  7  0.02  0.15  0.05  0.12                                   27.1
89P2283  8  0.05  0.03  0.04  0.10                                   22.2
89P2284  9
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Narrative Pedon Description

Pedon: Perchas

NSSL pedon number: 89P0406

Pedon ID: S89PR-101-002

Field classification: Clayey, mixed, isohyperthermic Typic Ochraquults

Revised classification as of April 01, 2001: Fine, smectitic, isohyperthermic Chromic Dystraquerts

Location: Morovis Municipio, Puerto Rico; Arecibo Soil Survey sheet 31; 11.6 km south on Highway 149 from junction with Highway 2 and about 4.8 km east on Highway 145

USGS 7.5-minute quadrangle: Ciales

Latitude: 18°19’32" north

Longitude: 66°26’37" west

Elevation: 225 meters

Physiography: Hillside or mountainside

Geomorphic position: On rounded finger-ridge

Slope: 3 percent with a southeast aspect

Major Land Resource Area: 272—Humid Coastal Plains

Drainage, runoff, and permeability: Poorly drained, moderate runoff, and slow permeability

Vegetation: Cerrillos grass and Guayabo in pastureland and native pasture

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 30 to 81 cm

Parent material: Local colluvium from igneous-intermediate material over residuum from volcaniclastics

Geographically associated soils: Almirante, Bayamón, and Pellejas

Weather station number: 3431

Diagnostic features: Ochric epipedon at 0 to 20 cm; argillic horizon at 20 to 127 cm

Described and sampled by: D. Williams and C.L. Santiago during February 1989

Ap1—0 to 10 cm; brown to dark brown (10YR 4/3) clay loam; many fine distinct redoximorphic features; moderate fine and medium subangular blocky structure parting to moderate fine granular; firm, sticky, plastic; many fine roots throughout; 1 percent igneous gravel; clear smooth boundary. 89P2276

Ap2—10 to 20 cm; brown to dark brown (10YR 4/3) clay; common medium and many fine distinct redoximorphic features; moderate fine and medium subangular blocky structure parting to moderate fine granular; firm, sticky, plastic; many fine roots throughout; common fine and medium rounded iron-manganese concretions; 5 percent mixing of material from the Bt horizon in the lower part of the Ap2 horizon; redoximorphic features along root channels; 1 percent igneous gravel; clear smooth boundary. 89P2277

Bt1—20 to 30 cm; light gray (10YR 7/2) clay; few fine distinct redoximorphic features; strong fine and medium blocky structure; firm, very sticky, very

plastic; common fine roots throughout; common fine tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; common fine and medium rounded iron-manganese concretions and few medium platelike iron-manganese concretions; redoximorphic features in matrix and along root channels; 1 percent igneous gravel; gradual boundary. 89P2278

Bt2—30 to 51 cm; white (2.5Y 8/2) clay; common fine distinct redoximorphic features; strong medium and coarse angular blocky structure; firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; common fine and medium rounded iron-manganese concretions and few medium platelike iron-manganese concretions; few striated small slickensides on 40 degree angle; few old roots; few quartz grains; 1 percent igneous gravel; clear smooth boundary. 89P2279

Bt3ss—51 to 76 cm; white (2.5Y 8/2) clay; common fine distinct redoximorphic features; moderate medium and coarse angular blocky structure; firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; few continuous distinct clay films on vertical and horizontal faces of peds; many medium platelike iron-manganese concretions and common fine irregular iron-manganese concretions; few striated small slickensides on 40 degree angle; common quartz grains; dark stains along old root channels; many manganese concretions; few old roots; common large sand grains; 1 percent igneous cobbles; 5 percent igneous gravel; gradual boundary. 89P2280

Btcss—76 to 127 cm; 35 percent yellowish brown (10YR 5/6) and 65 percent white (5Y 8/2) sandy clay loam; common medium distinct and common coarse distinct redoximorphic features; strong medium and coarse angular blocky structure; very firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; few continuous distinct intersecting slickensides on vertical and horizontal faces of peds; common medium irregular iron-manganese concretions; common very small bodies of red plinthite; 30 percent large manganese concretions; many large sand grains; 1 percent igneous cobbles; 5 percent igneous gravel. 89P2281

BCss—127 to 206 cm; 40 percent yellowish red (5YR 5/6) and 60 percent pale yellow (5Y 8/4) clay loam; common medium prominent and common coarse prominent redoximorphic features; strong medium and coarse angular blocky structure; very firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; few continuous distinct intersecting slickensides on vertical and horizontal faces of peds; few medium irregular iron-manganese concretions; many large intersecting slickensides that are polished and grooved; 15 percent manganese concretions; 2 percent igneous cobbles; 10 percent igneous gravel; clear smooth boundary. 89P2282

2C—206 to 229 cm; 40 percent weak red (10R 4/4) and 60 percent light greenish gray (5GY 7/1) sandy clay loam; common medium distinct redoximorphic features; structure not determined (auger sample); firm, sticky, plastic; few fine irregular iron-manganese concretions; slightly acid. 89P2283

Naranjito Municipio

Cialitos: S58PR-105-002

Primary Characterization Data

Naranjito Municipio, Puerto Rico

Sampled as: Cialitos; clayey, oxidic, isohyperthermic Orthoxic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 576, Samples 40A 4214–4222

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02 -.05	SILT COARSE .05 -.10	SAND VF .10 -.25	SAND F .25 -.50	SAND M .5 -1	SAND C 1 -2	SAND VC 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - - ->											<- PCT OF <75MM(3B1)->				
40A4214S	0- 25	Ap	71.4	26.1	2.5		23.2	2.9	1.1	0.6	0.3	0.3	0.2	--C	--C	--	1	--
40A4215S	25- 36	B11	73.6	23.8	2.6		21.2	2.6	1.0	0.6	0.2	0.4	0.4	--C	--C	--	2	--
40A4216S	36- 58	B12	71.2	26.7	2.1		24.2	2.5	0.9	0.6	0.1	0.2	0.3	--C	--C	--	1	--
40A4217S	58- 79	B21t	60.3	37.1	2.6		33.3	3.8	1.7	0.8	0.1	--	--	--C	--C	--	1	--
40A4218S	79-109	B22t	51.4	43.0	5.6		37.8	5.2	3.1	1.9	0.3	0.2	0.1	--C	--C	--	2	--
40A4219S	109-150	B23t	42.8	47.5	9.7		40.1	7.4	5.2	3.6	0.7	0.2	--	--C	--C	--	4	--
40A4220S	150-183	B3	36.1	48.3	15.6		40.1	8.2	6.7	5.9	1.9	1.0	0.1	--C	--C	--	9	--
40A4221S	183-218	C1	27.3	45.5	27.2		36.4	9.1	8.0	9.3	4.4	4.3	1.2	--C	--C	--	19	--
40A4222S	218-229	C2	24.7	48.8	26.5		40.0	8.8	7.9	8.8	4.2	4.4	1.2	--C	--C	--	19	--

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR TOTAL P 6S3	EXTR TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	COLE OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC	- ->	CM/CM		<- - -PCT OF <2MM			- ->	CM/CM
0- 25	3.45	0.313			8.8			0.27	0.44					1.05					31.7	
25- 36	1.56	0.150			9.0			0.19	0.44					1.26					32.6	
36- 58	0.88	0.085			10.9			0.19	0.46					1.26					32.8	
58- 79	0.60	0.056			11.3			0.21	0.50					1.44					30.1	
79-109	0.48	0.046			11.5			0.23	0.55					1.42					28.2	
109-150	0.38				10.9			0.28	0.64					1.30					27.2	
150-183	0.32				10.4			0.34	0.68					1.26					24.6	
183-218	0.26				9.6			0.40	0.81					1.16					22.0	
218-229	0.22				10.4			0.45	0.79					1.12					19.5	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 25	0.9	1.0	0.1	0.2	2.2	28.7	5.1	30.9	19.2	7.3	70	7	11				3.5		4.5
25- 36	0.7	0.8	0.1	0.1	1.7	21.7	3.8	23.4	13.8	5.5	69	7	12				3.6		4.8
36- 58	0.7	0.6	0.1	TR	1.4	19.2	3.6	20.6	13.2	5.0	72	7	11				3.7		4.9
58- 79	0.5	0.8	0.1	TR	1.4	19.7	5.0	21.1	12.5	6.4	78	7	11				3.7		4.8
79-109	0.3	0.7	0.1	TR	1.1	17.1	5.3	18.2	11.8	6.4	83	6	9				3.6		4.8
109-150	0.3	0.4	0.1	TR	0.8	18.0	5.7	18.8	12.1	6.5	88	4	7				3.7		4.7
150-183	0.1	--	0.1	TR	0.2	17.1	6.0	17.3	12.1	6.2	97	1	2				3.7		4.7
183-218	0.1	1.2	0.1	0.1	1.5	15.1	5.7	16.6	10.9	7.2	79	9	14				3.7		4.8
218-229	0.1	0.8	0.1	0.1	1.1	15.9	6.2	17.0	11.1	7.3	85	6	10				3.7		4.7

Narrative Pedon Description

Pedon: Cialitos (inactive series)
NSSL pedon number: 40A576
Pedon ID: S58PR-105-002
SSIR #12 pedon ID: S58PR-4-8
Field classification: Clayey, oxidic, isohyperthermic Orthoxic Tropohumults
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Hapludox
Location: Cibuco Soil Conservation District, Puerto Rico; 12 meters west of Highway 813 and 24 meters south of road junction to house; aerial photograph GS-LR-15-53
Latitude: 18°16’33" north
Longitude: 66°14’24" west
Elevation: 650 meters
Average annual precipitation: 2,286 mm
Vegetation: Unimproved pasture
Slope: 25 percent with a west aspect
Drainage and permeability: Well drained and moderate permeability
Parent material: Residuum or local colluvium derived from volcanic rocks of andesitic or basaltic composition
Described and sampled by: L.T. Alexander, F. Llavat-Cristy, R.E. Gierbolini, J. Juarez, K.W. Flach, L.H. Rivera, and T.U. Yager on November 7, 1958
Notes: The soil was sampled at one-half to three-fourths field capacity. Samples were collected under a tent because of rain. The site was moderately eroded. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 25 cm; brown to dark brown (7.5YR 4/4) clay; weak medium subangular blocky structure parting to moderate fine granular; firm, slightly sticky, slightly plastic; abrupt wavy boundary. 40A4214

B11—25 to 36 cm; reddish brown (5YR 5/4) clay; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy clay films; clear smooth boundary. 40A4215

B12—36 to 58 cm; yellowish red (5YR 4/6) clay; weak coarse prismatic structure parting to moderate medium and fine subangular and angular blocky; firm, slightly sticky, slightly plastic; few medium distinct yellowish brown (10YR 5/5) redoximorphic features; thin to thick patchy clay films; clear smooth boundary. 40A4216

B21t—58 to 79 cm; red (2.5YR 4/6) clay; strong medium and fine angular blocky structure; firm, slightly sticky, slightly plastic; thick continuous clay films around peds; gradual smooth boundary. 40A4217

B22t—79 to 109 cm; similar to B21t horizon except for a strong tendency for the structure to become slightly subangular and clay films that are thick and patchy. 40A4218

B23t—109 to 150 cm; red (2.5YR 4/6) clay; moderate fine subangular blocky structure; firm, slightly sticky, slightly plastic; thin to thick patchy clay films; gradual smooth boundary. 40A4219

B3—150 to 183 cm; red (2.5YR 4/6) and yellowish red (5YR 4/6) clay containing a few small angular fragments of parent rock; weak medium and fine subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy clay films; clear smooth boundary. 40A4220

C1—183 to 218 cm; yellowish red (5YR 4/6) and red (2.5YR 4/8) silty clay loam; very fine strong brown (7.5YR 5/6) and reddish yellow (7.5YR 6/6) redoximorphic features; massive; some evidence of parent rock texture; friable, slightly sticky, slightly plastic; very few patchy clay films; gradual smooth boundary. 40A4221

C2—218 to 229 cm; similar to C1 horizon except for having well defined rock texture and no clay films; few pores less than 1 mm across; horizon grades to hard rock at 218 cm. 40A4222

Cialitos: S58PR-105-004

Primary Characterization Data

Naranjito Municipio, Puerto Rico

Sampled as: Cialitos; clayey, oxidic, isohyperthermic Orthoxic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 575, Samples 40A 4205–4213

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - -					<- PCT OF <75MM(3B1)->				SOIL
40A4205S	0- 15	Ap		72.4	19.1	8.5			16.0	3.1	3.0	3.8	0.8	0.6	0.3	--C	--C	--	5	--
40A4206S	15- 36	B1		76.1	20.5	3.4			18.5	2.0	1.5	1.4	0.2	0.2	0.1	--C	--C	--	2	--
40A4207S	36- 66	B21t		67.8	27.6	4.6			25.0	2.6	2.4	2.0	0.2	--	--	--C	--C	--	2	--
40A4208S	66- 94	B22t		59.0	35.6	5.4			32.6	3.0	2.4	2.6	0.3	0.1	--	--C	--C	--	3	--
40A4209S	94-122	B23t		59.7	34.1	6.2			30.5	3.6	2.8	3.0	0.3	0.1	--	--C	--C	--	3	--
40A4210S	122-152	B3		57.6	34.7	7.7			29.8	4.9	3.7	3.5	0.4	0.1	--	--C	--C	--	4	--
40A4211S	152-180	C1		38.1	39.6	22.3			30.8	8.8	7.5	7.7	2.7	2.8	1.6	--C	--C	--	15	--
40A4212S	180-198	C2		34.9	41.8	23.3			32.6	9.2	9.4	9.7	2.5	1.3	0.4	--C	--C	--	14	--
40A4213S	297-325	C3		32.4	44.3	23.3			34.1	10.2	10.2	10.5	2.0	0.5	0.1	--C	--C	--	13	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15	2.72	0.227			11.6			0.23	0.42					1.19					30.5	
15- 36	1.42	0.139			12.7			0.17	0.42					1.30					32.1	
36- 66	0.66	0.059			12.2			0.19	0.44					1.42					30.1	
66- 94	0.24				9.0			0.20	0.45					1.51					26.5	
94-122	0.22				9.8			0.20	0.45					1.51					26.9	
122-152	0.26				9.0			0.20	0.47					1.43					27.0	
152-180	0.16				8.8			0.27	0.49					1.42					18.7	
180-198	0.21				9.8			0.32	0.56					1.30					19.7	
297-325	0.06				7.9			0.37	0.66										21.4	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - -				<- - - -	-PCT	- - -	->					1:2	1:1
0- 15	2.1	0.6	0.1	0.2	3.0	21.3	2.3	24.3	16.7	5.3	43	12	18					3.8		4.6
15- 36	3.2	1.5	0.1	0.1	4.9	16.8	0.7	21.7	13.0	5.6	13	23	38					4.2		5.0
36- 66	1.0	0.8	TR	0.1	1.9	16.7	3.6	18.6	12.8	5.5	65	10	15					3.8		5.1
66- 94	0.5	0.6	TR	0.1	1.2	14.3	5.6	15.5	11.9	6.8	82	8	10					3.7		4.9
94-122	0.5	0.9	TR	0.1	1.5	15.1	5.4	16.6	11.7	6.9	78	9	13					3.7		4.9
122-152	0.6	0.9	TR	0.1	1.6	14.3	4.9	15.9	11.4	6.5	75	10	14					3.7		4.9
152-180	0.5	0.8	TR	0.1	1.4	11.8	5.0	13.2	10.4	6.4	78	11	13					3.7		4.8
180-198	0.5	0.6	TR	0.1	1.2	12.6	5.6	13.8	11.1	6.8	82	9	11					3.7		4.8
297-325	0.2	0.8	TR	0.1	1.1	14.3	6.2	15.4	12.0	7.3	85	7	9					3.7		4.8

Narrative Pedon Description

Pedon: Cialitos (inactive series)
NSSL pedon number: 40A575
Pedon ID: S58PR-105-004
SSIR #12 pedon ID: S58PR-4-3
Field classification: Clayey, oxidic, isohyperthermic Orthoxic Tropohumults
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Typic Hapludox
Location: Naranjito Municipio, Puerto Rico; Cibuco Soil Conservation District; 200 meters north of Dr. Jose Padin 2nd rural school unit; aerial photograph GS-LR-3-26
Latitude: 18°17’39" north
Longitude: 66°21’12" west
Elevation: 480 meters
Average annual precipitation: 2,032 mm
Vegetation: Unimproved pasture
Slope: 18 percent with a southeast convex aspect; in mountainous topography
Drainage and permeability: Well drained and moderate permeability
Parent material: Residuum or very local colluvium from volcanic rocks of andesitic or basaltic composition
Described and sampled by: L.T. Alexander, F. Llavat-Cristy, R.E. Gierbolini, J. Juarez, K.W. Flach, L.H. Rivera, and T.U. Yager on November 4, 1958
Notes: The soil was sampled at one-forth to one-half field capacity. The site was moderately to severely eroded. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 15 cm; dark reddish brown (5YR 3/4) clay; strong fine and very fine granular structure; firm, slightly sticky, slightly plastic; abrupt smooth boundary. 40A3972

B1—15 to 36 cm; dark red (2.5YR 3/6) clay; weak medium subangular blocky structure parting to moderate very fine angular blocky; firm, slightly sticky, slightly plastic; few thin patchy clay films; few small (less than 0.5 mm) pores; stringers of material from the Ap horizon intermixed into the B1 horizon; few yellowish brown (10YR 5/4) coatings or redoximorphic features; gradual smooth boundary. 40A3973

B21t—36 to 66 cm; dark red (2.5YR 3/6) clay; common fine reddish brown (5YR 4/4) redoximorphic features; moderate very fine angular blocky structure; firm, slightly sticky, slightly plastic; few thin and thick patchy clay films; few small (less than 0.5 mm) pores; clear smooth boundary. 40A3974

B22t—66 to 94 cm; red (10R 4/6) clay; weak medium subangular blocky structure parting to strong very fine angular blocky; firm, slightly sticky, slightly plastic; few thin patchy clay films; gradual smooth boundary. 40A3975

B23t—94 to 122 cm; red (10YR 4/6) clay; similar to B22t horizon; slickensides that are about 69 cm in length and parallel to the surface; clear smooth boundary. 40A3976

B3—122 to 152 cm; dark red (2.5YR 3/6) silty clay loam; weak medium subangular blocky structure parting to moderate very fine angular blocky; firm, slightly sticky, slightly plastic; few thin patchy clay films; clear wavy boundary. 40A3976

C1—152 to 180 cm; dominantly weak red (10R 4/4) silty clay loam; massive; friable, nonsticky, nonplastic; occasional tongues of material from the B3 horizon; highly weathered; texture of the parent rock (volcanic flow), which gives the C1 horizon many colors ranging from strong brown (7.5YR 5/6) to light gray and dark gray; gradual wavy boundary. 40A3976

C2—180 to 198 cm; dominantly yellowish red (5YR 4/6) silty clay loam; massive; firm, nonsticky, nonplastic; few small (less than 0.5 mm) pores; texture of parent rock, which gives the C2 horizon colors ranging from red (10R 4/6) to strong brown (7.5YR 5/6). 40A3976

C3—198 to 325 cm; auger sample of saprolite similar to the C2 horizon. 40A3976

Patillas Municipio

Pandura: S61PR-109-001

Primary Characterization Data

Patillas Municipio, Puerto Rico

Sampled as: Pandura; loamy, mixed, isohyperthermic, shallow Typic Dystropepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 534, Samples 40A 3972–3976

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS WEIGHT 2-5	WEIGHT 5-20	WEIGHT 20-75	WEIGHT .1-75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM												<- PCT OF <75MM(3B1) ->				
40A3972S	0- 8	Ap	20.8	28.3	50.9			15.4	12.9	15.3	19.7	8.5	6.6	0.8	--C	--C	--	36	--
40A3973S	8- 18	B2	21.6	28.1	50.3			15.7	12.4	14.7	19.0	8.4	7.1	1.1	--C	--C	--	36	--
40A3974S	18- 38	C1	14.4	31.6	54.0			21.6	10.0	14.2	20.9	8.7	8.8	1.4	--C	--C	--	40	--
40A3975S	38- 58	C2	10.4	31.0	58.6			20.1	10.9	14.9	22.4	9.2	10.4	1.7	--C	--C	--	44	--
40A3976S	58- 89	C3	4.4	29.2	66.4			17.8	11.4	17.9	25.7	9.8	11.2	1.8	--C	--C	--	48	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 8	2.36	0.222			2.2			0.59	0.56										11.7	
8- 18	1.68	0.163			2.3			0.54	0.57										12.4	
18- 38	0.21	0.025			1.7			0.69	0.63										9.1	
38- 58	0.14				1.8			0.83	0.68										7.1	
58- 89	0.04				1.0			1.34	0.89										3.9	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- MEQ / 100 G									->	<- PCT		->					1:2	1:1
0- 8	3.5	1.1	0.1	0.2	4.9	13.4	0.8	18.3	12.2	5.7	14	27	40				4.0		5.1
8- 18	3.8	1.2	0.1	0.1	5.2	11.8	0.7	17.0	11.7	5.9	12	31	44				4.0		5.2
18- 38	8.2	1.9	0.2	TR	10.3	4.8		15.1	10.0			68	100				4.2		5.8
38- 58	7.6	1.5	0.2	TR	9.3	3.8		13.1	8.6			71	100				4.2		6.1
58- 89	5.0	1.2	0.2	0.1	6.5	2.4		8.9	5.9			73	100				4.2		6.2

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        < - - - - - - - - - - - - - - - - - - - - - - - - - CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - ->
        FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - - -><  - -> EGME INTER
SAMPLE   ION  <                              >< - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <     > RETN PRETA
              < - - - - -       - - - - - - -><  -      - ><  -       - ><  - - - - - - - - - -      - - - - - - - - - -><    >      TION
NUMBER  <- - >< - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - - -><  - -><mg/g>< - >
40A3974  TCLY  KK 3  MT 2                  KK60
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        < - - - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - ->
        FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - - -  OPTICAL - - - - - - - - - ><                 >INTER
SAMPLE   ION  <                       >< - DTA - -><  - TGA - ->TOT RE< - - - - - - GRAIN COUNT - - - - - - -><                 >PRETA
              < - - - -      - - - - ><  -     - ><  -      - ><  - - - - - - - - -          - - - - - - - - - -><                 > TION
NUMBER  < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - - Percent - - - - - - - - -><  - - - - - - - - -><  - >
40A3972  VFS                                                 FD40  HN30
40A3973  VFS                                                 FD40  HN30
40A3974  VFS                                                 FD40  HN30
40A3975  VFS                                                 FD40  HN30
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        < - - - - - - - - - - - - - - - - - - - - - - - - - FINE EARTH MINERALOGY (<2.0mm) - - - - - - - - - - - - - - - - - - - - - - - - ->
        FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - - -><  - -> SURF INTER
 DEPTH   ION  <                              >< - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <     > AREA PRETA
              < - - - - -       - - - - - - -><  -      - ><  -       - ><  - - - - - - - - - -      - - - - - - - - - -><    >      TION
  (cm)  <- - >< - - - - Peak Size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - - -><  - -><M2/G>< - >
  7-  15 FETH                               KK20
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FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm; VFS Very Fine Sand, 0.05-0.10mm; FETH Fine Earth, <2mm

MINERAL INTERPRETATION:
FD feldspar; HN hornblende; KK kaolinite; MT montmorillon

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Pandura

NSSL pedon number: 40A534

Pedon ID: S61PR-109-001

SSIR #12 pedon ID: S61PR-13-3

Field classification: Loamy, mixed, isohyperthermic, shallow Typic Dystropepts

Revised classification as of April 01, 2001: Coarse-loamy, mixed, active, isohyperthermic Dystric Eutrudepts

Location: Sudeste Soil Conservation District, Puerto Rico; 46 meters northeast of kilometer marker 23.93 on Highway 181

Latitude: 18°02’34" north

Longitude: 65°59’56" west

Vegetation: Cerillo grass, Tortuga grass, and ferns; used as permanent pasture

Slope: 40 percent with a southwest aspect; in steeply dissected uplands

Drainage, runoff, and permeability: Well drained, medium to rapid runoff, and moderately rapid permeability

Parent material: Residuum or very local side slope colluvium from plutonic rocks

Described and sampled by: R.B. Grossman, W.E. McKenzie, R. Boccheciamp, and J. Juarez on December 13, 1961

Notes: Many quartz grains were mixed throughout the profile. The B2 and C1 horizons had saprolite mixed throughout as a result of worm activity. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 8 cm; dark brown (10YR 3/3) sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many roots; many wormcasts; very strongly acid; clear smooth boundary. 40A3972

B2—8 to 18 cm; dark grayish brown (10YR 4/2) sandy clay loam; weak medium subangular structure; friable, slightly sticky, slightly plastic; thin patchy clay films on peds; many roots; many wormcasts; many dark-colored, highly weatherable minerals; very strongly acid; gradual smooth boundary. 40A3973

C1—18 to 38 cm; light olive brown (2.5Y 5/4) sandy clay loam; massive; friable, nonsticky, nonplastic; thin patchy clay films on peds; few roots; very strongly acid; gradual wavy boundary. 40A3974

C2—38 to 58 cm; light olive brown (2.5Y 5/4) sandy loam; massive; friable, nonsticky, nonplastic; thin patchy clay films on peds; few roots; very strongly acid; gradual wavy boundary. 40A3975

C3—58 to 89 cm; highly weathered, intrusive volcanic rock. 40A3976

Río Grande Municipio

Limones: S85PR-119-001

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Limones; clayey, kaolinitic, isohyperthermic Oxic Humitropepts

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 250, Samples 86P 1444–1450

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE CLAY LT .0002	CO3 CLAY LT .002	FINE SILT .002 -.02	COARSE SILT .02 -.05	VF SAND .05 -.10	F SAND .10 -.25	M SAND .25 -.50	C SAND .5 -1	VC SAND 1 -2	WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	WT % OF WHOLE SOIL (>2MM)
	-1-	-2-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			PCT OF <2MM (3A1)												PCT OF <75MM(3B1)				
86P1444S	0- 3	A	71.8	24.1	4.1	34.3		20.5	3.6	1.4	1.5	0.9	0.3	--	--	--	--	3	--
86P1445S	3- 10	Bw	73.0	23.3	3.7	30.1		20.0	3.3	1.2	1.3	0.8	0.2	0.2	--	--	--	2	--
86P1446S	10- 28	Bt1	71.5	22.1	6.4	27.4		18.5	3.6	1.4	1.5	1.1	1.2	1.2	1	3	10	18	14
86P1447S	28- 53	Bt2	72.6	22.8	4.6	27.5		19.2	3.6	1.4	1.2	0.7	0.7	0.6	TR	4	--	7	4
86P1448S	53- 84	Bt3	71.4	24.4	4.2	23.5		19.5	4.9	1.7	1.4	0.6	0.4	0.1	TR	--	--	2	--
86P1449S	84-112	Bt4	62.0	31.2	6.8	18.3		23.7	7.5	2.8	2.2	0.9	0.6	0.3	--	--	--	4	--
86P1450S	112-152	C	52.5	36.2	11.3	14.2		28.0	8.2	3.2	3.2	2.0	1.8	1.1	--	2	--	10	2

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 3	7.71							0.41	0.46										32.7	
3- 10	5.01							0.32	0.46										33.8	
10- 28	2.87							0.22	0.44										31.2	
28- 53	1.69							0.14	0.45										32.4	
53- 84	0.76							0.11	0.47										33.7	
84-112	0.35							0.15	0.50										31.1	
112-152	0.25							0.17	0.53										27.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 3	3.0	2.6	0.4	0.3	6.3	31.7	3.7	38.0	29.7	10.0	37	17	21				3.9	4.3
3- 10	1.4	1.5	0.3	0.2	3.4	27.0	4.6	30.4	23.0	8.0	57	11	15				4.0	4.4
10- 28	0.7	1.2	0.2	0.1	2.2	20.0	2.9	22.2	15.8	5.1	57	10	14				4.2	4.8
28- 53	0.4	1.1	0.2	TR	1.7	15.3	1.9	17.0	10.5	3.6	53	10	16				4.3	5.1
53- 84	0.3	0.7	0.2	TR	1.2	14.0	0.6	15.2	8.2	1.8	33	8	15				4.5	5.2
84-112	0.2	0.6	0.2	TR	1.0	13.9	1.6	14.9	9.0	2.6	62	7	11				4.4	5.2
112-152	0.3	0.5	0.2	TR	1.0	13.4	2.7	14.4	9.0	3.7	73	7	11				4.4	5.2

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
86P1447	TCLY	KK 3 GE 2 VR 1	KK57	GI 3			14.3			0.1			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Limones
NSSL pedon number: 86P0250
Pedon ID: S85PR-119-001
Field classification: Clayey, kaolinitic, isohyperthermic Oxic Humitropepts
Soil taxonomy classification: Fine, kaolinitic, isohyperthermic Typic Kandiudox
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Humic Hapludox
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 18 meters north of kilometer marker 7.0 on Road 966
Latitude: Unknown
Longitude: Unknown
Slope: 30 percent with a concave northeast aspect
Average annual precipitation: 2,030 mm; udic moisture regime
Drainage: Moderately well drained
Parent material: Fine-textured residuum of very highly weathered plutonic rocks
Described and sampled by: Unknown authors during July 1985

A—0 to 3 cm; dark brown (7.5YR 3/4) clay loam; strong very fine and fine subangular blocky structure; many very fine and fine roots; many very fine interstitial pores; strongly acid; abrupt smooth boundary. 86P1444

Bw—3 to 10 cm; dark brown (7.5YR 3/4) clay loam; moderate very fine and fine subangular blocky structure; many very fine and fine and many medium and coarse roots; common fine and medium interstitial pores; strongly acid; 10 percent gravel; abrupt smooth boundary. 86P1445

Bt1—10 to 28 cm; yellowish brown (10YR 5/6) clay; strong fine and medium subangular blocky structure; few fine and medium and common coarse roots; many fine and medium tubular pores; 5 percent gravel; strongly acid; clear smooth boundary. 86P1446

Bt2—28 to 53 cm; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; common fine and few coarse roots; few coarse tubular pores; few faint clay films on faces of peds and in pores; 5 percent gravel; strongly acid; gradual smooth boundary. 86P1447

Bt3—53 to 84 cm; strong brown (7.5YR 5/6) clay; moderate fine and medium subangular blocky structure; few fine roots; few fine tubular pores; 5 percent gravel; moderately acid; clear wavy boundary. 86P1448

Bt4—84 to 112 cm; red (2.5YR 4/8) clay; 50 percent yellowish brown (10YR 5/6) mottling; weak very fine angular blocky structure; few fine roots; few fine tubular pores; few faint clay films on faces of peds; moderately acid; clear wavy boundary. 86P1449

C—112 to 152 cm; red (2.5YR 4/8) clay; massive; few fine tubular pores; 25 percent brownish yellow (10YR 6/8) redoximorphic features; moderately acid. 86P1450

Zarzal: S85PR-119-005

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Zarzal; fine, mixed, isohyperthermic Typic Eutropepts

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 254, Samples 86P 1465–1469

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND -2 .05	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE -.05 .02	SAND VF -.10 .05	SAND F -.25 .10	SAND M -.50 .25	SAND C -1 .5	SAND VC -2 1	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						(3A1) - - - - - - - - - - - - - -						<- PCT OF <75MM(3B1)->				
86P1465S	0- 3	A	53.4	30.4	16.2	21.2		24.9	5.5	4.1	5.4	2.7	1.5	2.5	2	12	3	27	17
86P1466S	3- 13	Bt1	55.2	31.3	13.5	23.5		24.3	7.0	4.6	5.9	2.2	0.5	0.3	1	2	--	12	3
86P1467S	13- 28	Bt2	55.2	30.3	14.5	25.0		23.2	7.1	4.6	6.0	2.6	0.9	0.4	TR	1	1	12	2
86P1468S	46- 76	Bt4	43.6	34.3	22.1	20.4		25.6	8.7	6.2	6.7	4.0	2.8	2.4	TR	1	--	17	25
86P1469S	76-152	BC	30.2	40.3	29.5	12.3		30.3	10.0	8.0	8.4	5.5	4.7	2.9	1	1	--	23	26

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	DITH-CIT EXTRACTABLE AL 6G7a <2MM	DITH-CIT EXTRACTABLE MN 6D2a -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <-	BULK DENSITY 1/3 BAR 4A1d - G/CC	BULK DENSITY OVEN DRY 4A1h -	COLE WHOLE SOIL 4D1 -> CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -	WATER CONTENT 1/3 BAR 4B1c PCT	WATER CONTENT 15 BAR 4B2a OF	WRD WHOLE SOIL 4C1 CM/CM
0- 3	6.14							0.57	0.64										34.3	
3- 13	2.64							0.38	0.52										28.9	
13- 28	1.55							0.34	0.53										29.0	
46- 76	0.72							0.39	0.66										28.6	
76-152	0.45							0.63	0.82										24.9	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - -				-MEQ / 100 G	- - - - - - - - - -				->	<- - - -		-PCT	- - - ->					
0- 3	9.6	6.7	0.4	0.5	17.2	19.0	0.1	36.2	30.5	17.3	1	48	56					5.1	5.6
3- 13	4.9	5.0	0.5	0.1	10.5	15.6	0.1	26.1	20.8	10.6	1	40	50					4.9	5.6
13- 28	4.3	4.9	0.5	--	9.7	14.4	--	24.1	18.5			40	52					5.1	5.8
46- 76	3.2	5.7	0.8	--	9.7	12.9	0.2	22.6	17.0	9.9	2	43	57					4.9	5.8
76-152	3.6	7.2	0.8	--	11.6	13.1	0.4	24.7	19.0	12.0	3	47	61					4.9	5.8

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY	X-RAY	X-RAY	THERMAL DSC 7A6	THERMAL TGA 7A4b	ELEMENTAL SiO2	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO 7C3	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN 7D2	INTER PRETA TION
	<- -	peak size				Percent					Percent				<mg/g>	
86P1467	TCLY	KK 3	GE 1	VR 1		KK58	GI 1			12.6			0.1			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Zarzal
NSSL pedon number: 86P0254
Pedon ID: S85PR-119-005
Field classification: Fine, mixed, isohyperthermic Typic Eutropepts
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Oxic Dystrudepts
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 183 meters west of kilometer marker 7.0 on Road 966
Latitude: Unknown
Longitude: Unknown
Elevation: 340 meters
Slope: 48 percent with a convex west aspect
Average air temperature: Annual—23.3 °C
Average annual precipitation: 2,030 mm; udic moisture regime
Described and sampled by: Unknown authors during July 1985

A—0 to 3 cm; brown to dark brown (10YR 4/3) clay loam; strong fine subangular blocky structure; many fine and medium and many coarse roots; many fine and medium interstitial pores; very strongly acid; abrupt smooth boundary. 86P1465

Bt1—3 to 13 cm; dark yellowish brown (10YR 4/4) clay; moderate fine subangular blocky structure; common fine and medium roots; common fine tubular pores; few clay films on faces of peds and in pores; strongly acid; clear smooth boundary. 86P1466

Bt2—13 to 28 cm; dark yellowish brown (10YR 4/4) clay; few fine redoximorphic features; moderate medium subangular blocky structure; few very fine and fine and few medium roots; common medium tubular pores; common distinct clay films on faces of peds and in pores; strongly acid; gradual smooth boundary. 86P1467

Bt3—28 to 46 cm; dark yellowish brown (10YR 4/6) clay; moderate fine and medium subangular blocky structure; few very fine and fine roots; few fine and medium tubular pores; common distinct clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

Bt4—46 to 76 cm; dark yellowish brown (10YR 4/6) clay; 20 percent saprolite; reddish yellow (7.5YR 6/8) and very pale brown (10YR 8/2) redoximorphic features; moderate fine subangular blocky structure; few very fine and fine roots; common very fine tubular pores; common clay films on faces of peds and in pores; 15 percent stones; strongly acid; gradual smooth boundary. 86P1468

BC—76 to 152 cm; dark yellowish brown (10YR 4/6) clay; 20 percent saprolite; reddish yellow (7.5YR 6/8), black (10YR 2/1), and very pale brown (10YR 8/2) redoximorphic features; weak fine subangular blocky structure; few very fine roots; few medium tubular pores; few clay films in root channels and/or pores; 15 percent stones; strongly acid. 86P1469

Junquitos: S85PR-119-006

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Junquitos; fine, mixed, isohyperthermic Typic Tropudalfs

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 255, Samples 86P 1470–1474

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->				
86P1470S	0- 8	A	34.8	48.1	17.1	15.1		36.2	11.9	5.1	5.8	2.8	1.5	1.9	TR	--	--	12	24
86P1471S	8- 23	Bt	37.0	43.4	19.6	15.4		32.4	11.0	5.4	6.3	3.0	2.0	2.9	3	5	--	21	8
86P1472S	23- 38	Btg1	50.2	40.3	9.5	23.6		30.3	10.0	3.5	2.4	1.5	1.2	0.9	1	--	--	7	1
86P1473S	38- 61	Btg2	40.6	41.5	17.9	22.0		29.4	12.1	8.9	4.0	2.0	1.9	1.1	--	--	--	9	--
86P1474S	61-127	Cg	23.7	32.5	43.8	10.6		20.0	12.5	12.3	12.5	7.3	7.0	4.7	TR	--	--	31	TR

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->				<- - -PCT OF <2MM - ->				
0- 8	4.87								0.76										26.3	
8- 23	1.44								0.60										22.3	
23- 38	0.67							0.78	0.57										28.6	
38- 61	0.35							1.12	0.79										31.9	
61-127	0.20							2.12	0.83										19.7	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - -MEQ / 100 G - - - ->										<- - - -PCT - - - ->							
0- 8																	6.0	6.4
8- 23																	5.4	6.1
23- 38	16.3	18.0	0.5	0.1	34.9	8.9		43.8	39.2			80	89				5.5	6.1
38- 61	19.4	23.5	0.5	0.1	43.5	7.8		51.3	45.6			85	95				5.4	6.0
61-127	20.5	29.1	0.8	0.1	50.5	7.1		57.6	50.2			88	100				5.4	6.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	TGA 7A4b	SiO2 7C3 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
86P1473	TCLY	MT 3 KK 3 VR 2	KK10				12.7			0.1			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
MT montmorillon KK kaolinite VR vermiculite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Junquitos
NSSL pedon number: 86P0255
Pedon ID: S85PR-119-006
Field classification: Fine, mixed, isohyperthermic Typic Tropudalfs
Revised classification as of April 01, 2001: Very-fine, mixed, active, isohyperthermic Aquic Hapludalfs
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 9.1 meters east of kilometer marker 2.2 on Road 903
Latitude: Unknown
Longitude: Unknown
Elevation: 110 meters
Slope: 48 percent with a convex west aspect
Average annual precipitation: 1,910 mm; udic moisture regime
Average air temperature: Annual—24.4 °C
Described and sampled by: Unknown authors during July 1985

A—0 to 8 cm; dark brown (10YR 3/3) cobbly clay loam; moderate fine subangular blocky structure; many fine roots; many fine interstitial pores; very dark grayish brown (10YR 3/2) root channels; 15 percent cobbles; strongly acid; abrupt smooth boundary. 86P1470

Bt—8 to 23 cm; brown (10YR 5/3) clay; moderate fine and medium subangular blocky structure; common fine and medium and common coarse roots; common fine and medium tubular pores; 10 percent gravel; strongly acid; clear smooth boundary. 86P1471

Btg1—23 to 38 cm; yellowish brown (10YR 5/4) clay; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; few fine and few medium and coarse roots; common fine tubular pores; few clay films on faces of peds; strong brown (7.5YR 5/6) and white (10YR 8/1) redoximorphic features; lateral cracking every 8 cm, cracks are 2.5 mm thick; strongly acid; clear smooth boundary. 86P1472

Btg2—38 to 61 cm; yellowish brown (10YR 5/6) gravelly clay; moderate fine and medium subangular blocky structure; few fine and few medium and coarse roots; few fine tubular pores; few clay films on faces of peds; reddish yellow (7.5YR 6/8), light yellowish brown (2.5Y 6/4), and pale olive (5Y 6/3) redoximorphic features; 20 percent gravel; strongly acid; clear wavy boundary. 86P1473

Cg—61 to 127 cm; pale olive (5Y 6/3) extremely cobbly silty clay; yellowish brown (10YR 5/6) redoximorphic features; weak fine and medium angular blocky structure; few fine and medium roots; 70 percent cobbles; 10 percent gravel; strongly acid; gradual wavy boundary. 86P1474

R—127 to 152 cm; bedrock. Not sampled.

Zarzal: S86PR-119-012

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Zarzal; clayey, mixed, isohyperthermic Typic Tropohumults

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 305, Samples 86P 1808–1818

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS (MM) WEIGHT 2 -5	-17- WEIGHT 5 -20	-18- WEIGHT 20 -75	-19- WEIGHT .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1) ->												<- PCT OF <75MM(3B1)->				
86P1808S	0- 2	A	50.1	29.7	20.2			23.6	6.1	4.0	4.2	3.5	4.9	3.6	TR	TR	--	16	TR
86P1809S	2- 17	Bt1	64.3	24.3	11.4	21.0		18.5	5.8	4.0	4.5	1.6	0.7	0.6	TR	TR	--	7	TR
86P1810S	17- 38	Bt2	65.2	24.2	10.6	23.4		18.2	6.0	3.8	4.1	1.5	0.6	0.6	1	TR	--	8	1
86P1811S	38- 65	Bt3	64.8	22.6	12.6	23.4		17.6	5.0	4.1	4.8	2.0	1.1	0.6	TR	--	--	8	TR
86P1812S	65- 89	Bt4	58.9	24.1	17.0	20.0		18.2	5.9	5.3	5.9	3.2	1.8	0.8	TR	3	1	15	4
86P1813S	89-118	Bw1	44.0	29.7	26.3	14.1		22.2	7.5	6.3	7.7	5.4	4.0	2.9	TR	3	--	22	3
86P1814S	118-143	Bw2	36.9	36.3	26.8	10.9		28.0	8.3	7.0	7.2	5.2	3.8	3.6	TR	1	--	21	1
86P1815S	143-175	Bw3	32.6	49.0	18.4	8.7		39.8	9.2	6.0	4.9	3.4	2.5	1.6	TR	TR	--	12	--
86P1816S	175-190	Bw4	31.2	41.8	27.0			30.9	10.9	11.1	10.9	3.8	1.0	0.2	--	--	--	16	--
86P1817S	190-209	Bw5	26.9	43.9	29.2			33.0	10.9	11.7	10.4	4.1	1.8	1.2	TR	1	--	18	1
86P1818S	209-230	Cr	29.5	38.7	31.8			30.7	8.0	6.6	6.2	4.3	5.6	9.1	TR	19	7	45	26

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 2	16.2	0.866			5.1	0.8	0.2	1.27	0.90										44.9	
2- 17	2.46	0.283			7.8	1.0	0.2	0.29	0.49				1.00	1.40	0.119			51.9	31.2	0.21
17- 38	1.94	0.210			7.9	1.0	0.1	0.23	0.49	62	23		1.10	1.45	0.096			44.8	31.9	0.14
38- 65	1.03	0.123			8.0	1.1	0.1	0.20	0.49				1.02	1.35	0.098			56.2	31.8	0.25
65- 89	0.66				8.1	1.1	0.1	0.22	0.53	70	23		1.06	1.29	0.066			48.6	31.1	0.18
89-118	0.30				7.1	0.9	0.1	0.30	0.65				1.14	1.27	0.036			42.3	28.8	0.15
118-143	0.29				5.5	0.7	0.1	0.37	0.68				1.17	1.30	0.036			40.6	25.0	0.18
143-175	0.26				4.1	0.5	TR	0.29	0.64	57	18		1.05	1.13	0.025			48.3	20.7	0.29
175-190	0.23				5.9	0.7	0.1	0.49	0.86										26.9	
190-209	0.17				5.3	0.6	0.1	0.61	0.95										25.5	
209-230	0.14				4.5	0.5	0.1	0.49	0.74										21.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								
0- 2	52.7	11.2	TR	1.1	65.0	22.3		87.3	63.8			74	100	TR			5.9	6.2	6.3
2- 17	3.4	2.5	--	0.4	6.3	18.1	1.0	24.4	18.8	7.3	14	26	34				4.1	4.4	4.9
17- 38	2.2	2.1	0.1	0.1	4.5	17.2	1.6	21.7	15.3	6.1	26	21	29				4.0	4.4	5.0
38- 65	1.1	1.5	TR	TR	2.6	16.2	2.1	18.8	12.8	4.7	45	14	20				4.0	4.6	5.1
65- 89	0.8	1.6	0.1	TR	2.5	16.1	2.5	18.6	13.0	5.0	50	13	19				4.0	4.6	5.1
89-118	0.6	1.8	0.1	TR	2.5	16.4	4.0	18.9	13.4	6.5	62	13	19				3.9	4.3	5.2
118-143	0.8	1.9	0.1	TR	2.8	16.0	5.0	18.8	13.6	7.8	64	15	21				3.9	4.3	5.2
143-175	0.4	1.2	0.2	TR	1.8	12.4	3.6	14.2	9.6	5.4	67	13	19				3.9	4.2	5.2
175-190	0.8	2.5	0.2	TR	3.5	17.3	6.6	20.8	15.4	10.1	65	17	23				3.8	4.2	5.0
190-209	0.6	2.4	0.2	TR	3.2	18.0	7.7	21.2	16.5	10.9	71	15	19				3.8	4.2	5.1
209-230	0.4	1.9	0.2	0.1	2.6	15.0	6.2	17.6	14.4	8.8	70	15	18				3.8	4.2	5.0

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)			THERMAL DSC 7A6 (Percent)		THERMAL TGA 7A4b (Percent)		ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
86P1810	TCLY	KK 4	GE 2	VR 1	KK59	GI 2					13.2			0.1			
86P1812	TCLY	KK 3	GE 2		KK36	GI 1	KK40	GI 5			13.6			0.1			
86P1815	TCLY	KK 3	GE 1	QZ 1	KK17	GI 1					10.7						

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                       >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
86P1812     VFS                                                   41  AR48  RA28  BT10  QZ 9  PO 2  OP 2
86P1812     VFS                                                       CA 1  FK 1  HNtr  PRtr
86P1817     VFS                                                    6  AR94  RA 5  OP 1  FKtr  HNtr
86P1818     VFS                                                    7  AR91  RA 6  BT 2  OP 1  QZtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    KK  kaolinite        GE  goethite         VR  vermiculite      GI  gibbsite         AR  wthr aggrega     RA  resist-aggre
    BT  biotite          QZ  quartz           PO  plant opal       OP  opaques          CA  calcite          FK  potas feldsp
    HN  hornblende       PR  pyroxene
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Zarzal

NSSL pedon number: 86P0305

Pedon ID: S86PR-119-012

Field classification: Clayey, mixed, isohyperthermic Typic Tropohumults

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Inceptic Hapludox

Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 1.1 km south of El Verde, 183 meters north of Highway 966 at kilometer marker 7.0; UTM Zone 20: 2,028,820 m northing and 201,760 m easting

Latitude: 18°19’44" north

Longitude: 65°49’19" west

Elevation: 240 meters

Physiography: Hillside or mountainside in mountain valleys or canyons

Geomorphic position: Backslope of a side slope; on middle third of component

Slope: 48 percent with a convex west aspect

Average annual precipitation: 2,000 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Average soil temperature: Annual—27 °C

Drainage, runoff, and permeability: Moderately well drained, rapid runoff, and moderately slow permeability

Vegetation: Unidentified species in ungrazed forestland

Surface stoniness: Class 1

Erosion: Slight

Particle-size control section: 2 to 52 cm

Parent material: Residuum from sandstone material

Diagnostic features: Umbric horizon at 0 to 2 cm; argillic horizon at 2 to 89 cm

Described and sampled by: D. Williams, G. Acevedo, W. Lynn, and L. Huffaker during February 1986

A—0 to 2 cm; dark reddish brown (5YR 2/2) mucky loam covered with a 2-cm thick leaf-and-root mat; moderate fine granular structure; friable, nonsticky; many fine and many medium roots throughout; common fine discontinuous tubular pores; few coarse roots; strongly acid; abrupt smooth boundary. 86P1808

Bt1—2 to 17 cm; yellowish brown (10YR 5/6) clay; moderate fine subangular blocky structure; firm, very sticky, very plastic; few fine and few medium roots throughout; very fine discontinuous tubular pores; common patchy distinct organic coatings on faces of peds; few fine rounded iron-manganese concretions; few large root and worm channels filled with dark material; strongly acid; clear smooth boundary. 86P1809

Bt2—17 to 38 cm; yellowish brown (10YR 5/8) clay; moderate fine subangular blocky structure; firm, very sticky, very plastic; few fine and few medium roots throughout; very fine discontinuous tubular pores; common patchy distinct clay films on faces of peds; common fine rounded iron-manganese

concretions; many large root and worm channels filled with dark material; very strongly acid; clear smooth boundary. 86P1810

Bt3—38 to 65 cm; yellowish brown (10YR 5/8) clay; moderate medium subangular blocky structure; firm, very sticky, very plastic; few fine and few medium roots throughout; very fine discontinuous tubular pores; common patchy distinct clay films on faces of peds; common fine rounded iron-manganese concretions; common large root channels filled with dark material; very strongly acid; gradual boundary. 86P1811

Bt4—65 to 89 cm; yellowish brown (10YR 5/8) clay; few medium distinct redoximorphic features; moderate medium subangular blocky structure; firm, very sticky, very plastic; few fine roots throughout; few fine discontinuous tubular pores; common patchy distinct clay films on faces of peds; few fine rounded iron-manganese concretions; few large root channels filled with dark material; strongly acid; gradual boundary. 86P1812

Bw1—89 to 118 cm; strong brown (7.5YR 5/8) clay; common fine distinct redoximorphic features; weak coarse subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine discontinuous tubular pores; common patchy faint coatings on faces of peds; few fine rounded iron-manganese concretions; strongly acid; 10 percent igneous gravel; gradual boundary. 86P1813

Bw2—118 to 143 cm; strong brown (7.5YR 5/8) paragravelly clay; weak coarse subangular blocky structure parting to weak medium subangular blocky; firm, sticky, plastic; few fine discontinuous tubular pores; few fine rounded iron-manganese concretions; 15 percent rock structure (highly weathered rock fragments); very strongly acid; clear wavy boundary. 86P1814

Bw3—143 to 175 cm; strong brown (7.5YR 5/8) very paragravelly clay; common medium distinct redoximorphic features; weak very coarse subangular blocky structure; friable, sticky, plastic; few fine discontinuous tubular pores; few fine rounded iron-manganese concretions; 40 percent rock structure (highly weathered rock fragments); very strongly acid; clear wavy boundary. 86P1815

Bw4—175 to 190 cm; strong brown (7.5YR 5/8) clay loam; weak very coarse subangular blocky structure; friable, sticky, plastic; very strongly acid; gradual boundary. 86P1816

Bw5—190 to 209 cm; strong brown (7.5YR 5/8) clay loam; few fine distinct redoximorphic features; friable, sticky, plastic; very strongly acid; clear boundary. 86P1817

Cr—209 to 230 cm; strong brown (7.5YR 5/8) very gravelly clay loam; friable, sticky, plastic; very strongly acid; 40 percent igneous gravel. 86P1818

San Germán Municipio

Santa Marta: S87PR-007-009

Primary Characterization Data

San Germán Municipio, Puerto Rico

Sampled as: Santa Marta; fine, mixed, isohyperthermic Rhodic Hapludox

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 300, Samples 87P 1515–1523

—General methods: 1B1A, 2A1, 2B

SAMPLE NO. -1--	DEPTH (CM) -2--	HORIZON -3--	TOTAL CLAY LT .002 -4--	TOTAL SILT .002 -.05 -5--	TOTAL SAND .05 -2 -6--	CLAY FINE LT .0002 -7--	CLAY CO3 LT .002 -8--	SILT FINE .002 -.02 -9--	SILT COARSE .02 -.05 -10-	SAND VF .05 -.10 -11-	SAND F .10 -.25 -12-	SAND M .25 -.50 -13-	SAND C .5 -1 -14-	SAND VC 1 -2 -15-	COARSE FRACS WEIGHT 2 -5 -16-	COARSE FRACS WEIGHT 5 -20 -17-	COARSE FRACS WEIGHT 20 -75 -18-	COARSE FRACS WEIGHT .1- 75 -19-	(>2MM) WT %OF WHOLE SOIL -20-
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
87P1515S	0- 17	Ap	49.9	30.8	19.3	15.8		23.6	7.2	5.4	5.4	3.5	2.6	2.4	5	4	1	23	10
87P1516S	17- 29	Bt1	52.1	32.5	15.4	15.5		24.5	8.0	4.9	4.3	2.5	2.3	1.4	--	3	5	18	8
87P1517S	29- 58	Bt2	48.6	32.8	18.6	14.7		25.3	7.5	5.7	5.4	3.2	2.4	1.9	1	4	5V	22	12
87P1518S	58- 86	Bt3	37.7	28.1	34.2	11.2		19.7	8.4	6.3	7.2	6.0	6.9	7.8	5	5	4V	38	16
87P1519S	86-114	Bt4	42.1	34.0	23.9	11.5		23.8	10.2	8.8	7.3	4.4	2.6	0.8	--	TR	46V	54	46
87P1520G	114-215	Cr															V		P
87P1521S	110-115	Bw	43.5	34.7	21.8	10.8		21.9	12.8	9.2	6.7	3.2	2.2	0.5	--	--	--	13	--
87P1522S	150-190	C1	40.8	33.0	26.2	12.9		23.6	9.4	8.6	6.9	4.2	4.0	2.5	3	TR	--	20	3
87P1523S	215-245	C/Cr	14.3	47.1	38.6	3.7		32.2	14.9	16.7	8.6	8.1	4.5	0.7	--	--	--	22	--

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	(ATTERBERG) LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 17	1.34	0.119			9.3	0.8	0.1	0.16	0.41				1.30	1.41	0.026			28.1	20.4	0.10
17- 29	0.86	0.087			9.8	0.8	0.1	0.11	0.42				1.37	1.54	0.038			31.0	22.0	0.12
29- 58	0.22	0.061			9.2	0.7	0.1	0.11	0.44	53	24		1.42	1.55	0.028			30.3	21.2	0.12
58- 86	0.24	0.034			7.5	0.5	0.2	0.11	0.49				1.39	1.50	0.023			32.0	18.4	0.17
86-114	0.15				9.6	0.6	0.3	0.14	0.47				1.33	1.42	0.015			35.1	19.8	0.14
114-215					2.7	0.1	0.2						1.75	1.75	--			20.3	8.7	0.20
110-115	0.05				9.5	0.5	0.2	0.18	0.48	56	26		1.41	1.54	0.030			36.0	21.0	0.21
150-190	0.05				6.1	0.3	0.3	0.33	0.44				1.40	1.49	0.021			33.2	17.9	0.21
215-245	0.14				2.2	0.1	TR	1.17	0.75	37	11		1.41	1.52	0.025			30.1	10.7	0.27

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - -				-MEQ / 100 G					- ->	<- - - - -PCT		- - - ->					1:2	1:1
0- 17	0.9	1.9	--	0.2	3.0	10.3	0.4	13.3	7.9	3.4	12	23	38				4.2	4.5	5.0
17- 29	1.2	2.6	--	0.1	3.9	7.7		11.6	5.9			34	66				5.2	5.3	5.7
29- 58	1.0	2.7	--	TR	3.7	6.5		10.2	5.3			36	70				5.5	5.7	6.0
58- 86	0.7	3.0	0.1	--	3.8	5.1		8.9	4.3			43	88				5.6	5.9	6.2
86-114	0.5	4.5	TR	--	5.0	4.7		9.7	5.7			52	88				5.8	6.0	6.3
114-215	0.4	6.9	0.1	--	7.4	2.3		9.7	7.1			76	100				5.4	6.1	6.6
110-115	0.3	6.5	TR	--	6.8	4.1		10.9	7.7			62	88				5.5	5.9	6.2
150-190	0.5	12.3	0.1	--	12.9	5.2		18.1	13.4			71	96				5.0	5.7	6.1
215-245	0.5	14.0	0.1	0.3	14.9	4.1		19.0	16.7			78	89				4.4	5.7	6.2

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)						THERMAL DSC 7A6 (Percent)		THERMAL TGA 7A4b (Percent)		SiO2 7C3	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
87P1516	TCLY	TA 4	KK 3	GE 2				KK26	GI 3					25.7			0.4			
87P1517	TCLY	TA 4	KK 3	GE 2				KK21	GI 3	KK21	GI 4			22.9			0.4			
87P1520	TCLY	CL 5	TA 3	MT 2	GE 1			KKtr	GItr					12.0						
87P1521	TCLY	CL 5	TA 3	GE 2				KK 7	GItr					14.3						
87P1522	TCLY	CL 5	TA 3	GE 1				KKtr	GItr					15.7						
87P1523	TCLY	KK 3	TA 3	MI 2	VR 1	GE 1		KK 9	GItr					14.3			1.7			
87P1523	TCLY	CL 1																		

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< - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
87P1517     VFS   QZ 3  TA 3  MG 2  KK 1                           64  TA35  FE23  MG16  QZ10  RA10  KK 4
87P1517     VFS   HE 1                                                HE 1  BT 1  POtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    TA  talc            KK  kaolinite       GE  goethite        GI  gibbsite        QZ  quartz          MG  magnetite
    HE  hematite        FE  iron oxides     RA  resist-aggre    BT  biotite         PO  plant opal      CL  chlorite
    MT  montmorillon    MI  mica            VR  vermiculite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Santa Marta
NSSL pedon number: 87P0300
Pedon ID: S87PR-007-009
Field classification: Fine, mixed, isohyperthermic Rhodic Hapludox
Revised classification as of April 01, 2001: Fine, mixed, isohyperthermic Rhodic Eutrudox
Location: San Germán Municipio, Puerto Rico; Suroeste Soil and Water Conservation District; 2 km west-northwest of San Germán
Latitude: 18°05’34" north
Longitude: 67°03’43" west
Elevation: 47 meters
Physiography: Hillside or mountainside in hills
Geomorphic position: Footslope of a side slope; on lower third of component
Slope: 30 percent with a convex southwest aspect
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Average air temperature: Annual—26 °C; summer—27 °C; winter—24 °C
Average soil temperature: Annual—29 °C; summer—30 °C; winter—27 °C
Drainage and permeability: Well drained and moderate permeability
Vegetation: Unspecified grasses in pastureland
Particle-size control section: 17 to 67 cm
Parent material: Residuum from serpentine material
Diagnostic features: Ochric epipedon at 0 to 17 cm; argillic horizon at 17 to 114 cm; paralithic contact at 114 cm
Described and sampled by: L.H. Rivera and D. Williams during April 1987
Notes: Matrix colors are for moist ped interiors.

Ap—0 to 17 cm; dark reddish brown (5YR 3/4) clay; weak fine granular structure; friable, sticky, plastic; many fine roots throughout; abrupt smooth boundary. 87P1515

Bt1—17 to 29 cm; dark reddish brown (2.5YR 3/4) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; common fine roots throughout; few fine interstitial and tubular pores; common discontinuous distinct clay films on faces of peds; clear smooth boundary. 87P1516

Bt2—29 to 58 cm; dark reddish brown (5YR 3/3) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; common fine roots throughout; few fine interstitial and tubular pores; common discontinuous distinct clay films on faces of peds; 3 percent gravel; 1 percent cobbles; clear wavy boundary. 87P1517

Bt3—58 to 86 cm; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; few fine roots throughout; few fine interstitial and tubular pores; common discontinuous distinct clay films on faces of peds; 2 percent gravel; 1 percent cobbles; clear wavy boundary. 87P1518

Bt4—86 to 114 cm; dark reddish brown (5YR 3/3) clay; common fine distinct redoximorphic features; weak medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few fine interstitial and tubular pores; common discontinuous distinct clay films on faces of peds; 30 percent gravel; abrupt wavy boundary. 87P1519

Cr—114 to 215 cm; 97 percent rock and 3 percent fines. 87P1520

Satellite samples:

Bw—110 to 115 cm; dusky red (2.5YR 3/2) clay; common fine distinct redoximorphic features; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots throughout; few fine interstitial and tubular pores; clear wavy boundary. Satellite sample. 87P1521

C1—150 to 190 cm; dark brown (10YR 3/3) clay; common medium distinct redoximorphic features; massive; friable, sticky, plastic; few fine roots throughout; 15 percent unaltered. Satellite sample. 87P1522

C/Cr—215 to 245 cm; olive gray (5Y 5/2) saprolite that crushes to loam; massive containing rock structure; friable, slightly sticky, slightly plastic; common continuous distinct clay films on vertical and horizontal faces of peds and common continuous distinct manganese or iron-manganese coatings on vertical and horizontal faces of peds. Satellite sample. 87P1523

Santa Marta: S87PR-007-010

Primary Characterization Data

San Germán Municipio, Puerto Rico
Sampled as: Santa Marta; fine, oxidic, isohyperthermic Typic Hapludalfs
SSL—Project: 87P 65, (CP87PR108)
—Pedon: 87P 301, Samples 87P 1524–1530
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND .05-2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE LT .002	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS (MM) 2-5	COARSE FRACS (MM) 5-20	COARSE FRACS (MM) 20-75	COARSE FRACS (MM) .1-75	>2MM WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->				
87P1524S	0- 13	A	33.4	30.5	36.1	11.2		23.3	7.2	8.4	6.1	7.3	7.8	6.5	8	8	2	41	18
87P1525S	13- 29	Bt1	38.5	31.6	29.9	12.7		25.7	5.9	5.7	6.5	5.6	5.9	6.2	7	8	1	36	16
87P1526S	29- 51	Bt2	44.0	36.2	19.8	13.5		21.9	14.3	4.8	4.7	4.0	3.2	3.1	3	10	8	33	21
87P1527S	51- 63	Bt3	44.7	40.8	14.5	12.5		32.7	8.1	5.8	3.5	2.3	1.8	1.1	2	3	1	14	6
87P1528G	63-130	Cr															V		P
87P1529G	130-160	Bw SAT	11.1	56.9	32.0	2.0		40.0	16.9	14.5	9.3	5.3	1.8	1.1					P
87P1530G	0- 0	R	3.4	13.7	82.9			7.5	6.2	9.6	14.6	15.1	19.8	23.8					P

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a OF	EXTRACTABLE MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	LIMITS - LL 4F1 PCT	LIMITS - PI 4F <0.4MM	BULK DENSITY - FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT - - - FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	1.58	0.123			5.5	0.4	0.1	0.25	0.51				1.31	1.34	0.007			24.4	17.1	0.09
13- 29	1.19	0.105			5.9	0.5	0.1	0.21	0.49				1.33	1.40	0.016			25.5	18.8	0.08
29- 51	0.88	0.085			6.4	0.5	0.1	0.18	0.48	54	24		1.29	1.40	0.025			30.9	21.1	0.11
51- 63	0.55	0.060			8.2	0.5	0.1	0.22	0.51				1.24	1.36	0.030			32.6	23.0	0.12
63-130					4.2	0.3	0.2						1.69	1.74	0.010			22.4	13.1	0.16
130-160	0.02				4.8	0.3	TR	0.51	0.82				1.26	1.31	0.013			32.7	9.1	0.30
0- 0	0.01				0.8	TR	TR	1.12	1.56										5.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES - CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G										<- - - - -PCT							1:2	1:1
0- 13	1.2	1.3	TR	0.2	2.7	10.5	1.2	13.2	8.3	3.9	31	20	33				3.8	4.2	4.8
13- 29	0.8	0.9	TR	--	1.7	9.8	1.8	11.5	7.9	3.5	51	15	22				3.8	4.1	4.7
29- 51	1.8	2.5	TR	--	4.3	7.7	0.5	12.0	8.0	4.8	10	36	54				4.2	4.6	5.1
51- 63	1.8	4.7	0.1	TR	6.6	6.7	0.2	13.3	9.9	6.8	3	50	67				4.6	5.0	5.4
63-130	1.2	7.5	TR	--	8.7	5.7		14.4	13.5			60	64				4.5	5.6	6.0
130-160	0.4	4.2	TR	0.1	4.7	2.4		7.1	5.7			66	82				5.0	5.5	6.0
0- 0	0.7	5.5	TR	TR	6.2	0.8		7.0	3.8			89	100	--			8.0	8.4	8.8

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size				DSC 7A6 Percent		TGA 7A3b	SiO2 7A4b	AL2O3 7C3	Fe2O3 7B1a	MgO	CaO	K2O	Na2O	EGME RETN mg/g	INTER PRETA TION
87P1526	TCLY	KK 4	TA 3	GE 2		KK37	GI 1	KK34	GI 3		15.7			0.8			
87P1529	TCLY	KK 3	MI 2	GE 1	TA 1	KK19	GI 1				15.7			1.2			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i Peak Size				DTA 7A3b Percent		TGA 7A4b	TOT RE		OPTICAL GRAIN COUNT 7B1a						INTER PRETA TION
87P1526	VFS	QZ 4	TA 3	KK 2	HE 1				71	QZ37	TA25	RA17	FE12	MG 4	BT 2		
87P1526	VFS									FK 1	HE 1	KKtr	RUtr				
87P1529	VFS	QZ 4	KK 2	MI 1					62	QZ39	CL17	TA15	FE11	RA11	BT 3		
87P1529	VFS									KK 1	FK 1	MGtr	FPtr				

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
QZ quartz TA talc KK kaolinite HE hematite GE goethite GI gibbsite
RA resist-aggre FE iron oxides MG magnetite BT biotite FK potas feldsp RU rutile
MI mica CL chlorite FP plag-feldspa
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Santa Marta
NSSL pedon number: 87P0301
Pedon ID: S87PR-007-010
Field classification: Fine, oxidic, isohyperthermic Typic Hapludalfs
Revised classification as of April 01, 2001: Fine, parasesquic, isohyperthermic Typic Hapludalfs
Location: San Germán Municipio, Puerto Rico; Suroeste Soil and Water Conservation District; 2 km west-northwest of San Germán
Latitude: 18°05’35" north
Longitude: 67°03’43" west
Elevation: 47 meters
Physiography: Hillside or mountainside in hills
Geomorphic position: Footslope of a side slope; on lower third of component
Slope: 25 percent with a convex west aspect
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Average air temperature: Annual—26 °C; summer—27 °C; winter—24 °C
Average soil temperature: Annual—29 °C; summer—30 °C; winter—27 °C
Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability
Vegetation: Unspecified grasses in pastureland
Erosion: Moderate
Particle-size control section: 13 to 63 cm
Parent material: Residuum from serpentine material
Diagnostic features: Ochric epipedon at 0 to 13 cm; argillic horizon at 13 to 63 cm; paralithic contact at 63 to 130 cm
Described and sampled by: L.H. Rivera and D. Williams during April 1987
Notes: Matrix colors are for moist ped interiors.

Ap—0 to 13 cm; dark reddish brown (5YR 3/4) clay; moderate fine granular structure; firm, sticky, plastic; many fine roots throughout; very strongly acid; 2 percent serpentine gravel; abrupt smooth boundary. 87P1524

Bt1—13 to 29 cm; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; common fine roots throughout; common fine interstitial and tubular pores; few discontinuous faint clay films on vertical and horizontal faces of peds; very strongly acid; 5 percent gravel; clear smooth boundary. 87P1525

Bt2—29 to 51 cm; reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; common fine interstitial and tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; strongly acid; 5 percent gravel; 1 percent cobbles; clear wavy boundary. 87P1526

Bt3—51 to 63 cm; red (10R 4/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, sticky, plastic; few fine roots throughout; common fine interstitial and tubular pores; common

discontinuous distinct clay films on vertical and horizontal faces of peds; few fine platelike soft masses of iron-manganese; strongly acid; abrupt wavy boundary. 87P1527

Cr—63 to 130 cm; highly fractured hard serpentine bedrock; 97 percent rock and 3 percent fines. 87P1528

Bw—130 to 160 cm; 80 percent red (10R 4/8) and 20 percent strong brown (7.5YR 5/8) clay loam; weak very coarse prismatic structure; very friable, slightly sticky, slightly plastic; few fine roots throughout; many fine interstitial and tubular pores; few discontinuous distinct clay films in root channels and/or pores; strongly acid. Satellite sample from right side of pit where rock dipped below 1.5 meters. 87P1529

Caguabo: S01PR-125-001

Primary Characterization Data

San Germán Municipio, Puerto Rico

Sampled as: Caguabo; fine-loamy, mixed, isohyperthermic Typic Argiudolls

SSL—Project: 1P 166, (CP01PR157) San Germán Area Soil Survey

—Pedon: 1P1040, Samples 1P 5286–5286

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
1P5286S	0- 10	Ap/A2	30.3	26.9	42.8			20.4	6.5	4.3	6.9	9.5	17.4	4.7	20	21	3	66	44

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4b <2MM	EXTR P 6S3e PPM	TOTAL S 6R3d <- PERCENT	(- - DITH-CIT - -)(RATIO/CLAY)(ATTERBERG)(- BULK DENSITY -) COLE (- - -WATER CONTENT - -) WRD EXTRACTABLE FE 6C2h	AL 6G7g OF	MN 6D2g <2MM -->	CEC 8D1	15 BAR 8D1	- LIMITS - LL 4F1 PCT <0.4MM	PI 4F	FIELD MOIST 4A5 <- - G/CC - - ->	1/3 BAR 4A1d	OVEN DRY 4A1h CM/CM	WHOLE SOIL 4D1	FIELD MOIST 4B4 <- - -PCT OF <2MM - ->	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WHOLE SOIL 4C1 CM/CM
0- 10		0.183		0.02	3.4	0.3	0.1	1.15	0.62									18.7	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2i <- - - - - - - - - - - -MEQ /	MG 5B5a 6O2h 20.2	NA 5B5a 6P2f 0.2	K 5B5a 6Q2f 0.3	SUM BASES 29.0	ACID- ITY 6H5a 100 G - - - - - - - - - - - - - - - ->	EXTR AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1 <- - - - -PCT - - - ->	-BASE SUM 5C3 73	SAT- NH4 OAC 5C1 83	CO3 AS CACO3 <2MM 6E1h	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I 0.06	(- - - -PH - - -) NAF 8C1d 9.4	CACL2 .01M 8C1f 5.3	H2O 8C1f 1:2 1:1 6.0
0- 10	8.3	20.2	0.2	0.3	29.0	10.9		39.9	34.8			73	83			0.06	9.4	5.3	6.0

DEPTH (CM)	(- -NA PYROPHOSPHATE EXTRACTABLE- -) C 6A5a <- PCT OF <2MM ->	FE 6C8c 0.1	AL 6G1z 0.1	FE+AL (- -DIVIDED BY- -) DI-CI PCT FE+AL CLAY 0.1	FE+AL 0.1	AL+C PCT CLAY --	(- -) INDEX OF ACCUM
0- 10							

SAMPLE NO.	HZ NO	ACID OXALATE EXTRACTION OPT DEN 8J1c <- P C T	FE 6C9b 0.09	SI 6V2b 0.03	AL 6G12b o f < 2 m m -> 0.20	PHOSPHOUS RET 6S4d 23	CITR- ACID 6S5 <- P P M	MN 6D3b ->	TOTAL C 6A2f 2.00	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CLAY 3A1c	SILT - - -><- - - SAND	CLAY SML	SILT - - ->	SAND 8F1	AGGRT STABL CONT <5mm 4G1
			<- P P M - - - - - - - - - - - - - - - - -

Narrative Pedon Description

Pedon: Caguabo
NSSL pedon number: 01P1040
Pedon ID: S01PR-125-001R
Field classification: Fine-loamy, mixed, isohyperthermic Typic Argiudolls
Revised classification as of April 01, 2001: Loamy, mixed, active, isohyperthermic, shallow Typic Eutrudepts
Location: San Germán Municipio; Puerto Rico
Major Land Resource Area: 270—Humid Mountains and Valleys
Latitude: 18°05’00.33" north
Longitude: 67°02’00.10" west
Geomorphic setting: Backslope of volcanic hill
Parent material: Volcanic rock
Slope: 52 percent with an aspect of 20 degrees; linear upslope and convex across
Drainage: Well drained
Described and sampled by: J.L. Lugo and S. Rios on October 26, 2000

A1—0 to 10 cm; very dark grayish brown (10YR 3/2) loam; moderate fine and medium granular structure; very friable, nonsticky, nonplastic; common fine roots; common very fine vesicular pores; 25 percent rock fragments 2 to 75 mm in diameter; neutral; gradual smooth boundary. 1P5286S

A2—10 to 25 cm; very dark grayish brown (10YR 3/2) loam; moderate fine and medium subangular blocky structure; very friable, slightly sticky, slightly plastic; common fine roots; common very fine and fine vesicular and interstitial pores; 30 percent rock fragments 2 to 75 mm in diameter; neutral; abrupt wavy boundary. Not sampled.

Bt—25 to 17 cm; brown (7.5YR 4/3) clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine interstitial pores; 40 percent rock fragments 2 to 75 mm in diameter; slightly alkaline; abrupt wavy boundary. Not sampled.

R1—17 to 71 cm; highly fractured semiconsolidated volcanic bedrock. Not sampled.

R2—71 cm; consolidated volcanic bedrock. Not sampled.

Rosario: S01PR-125-007

Primary Characterization Data

San Germán Municipio, Puerto Rico

Sampled as: Rosario; fine-loamy, ferruginous, isohyperthermic Lithic Eutrudepts

SSL—Project: 1P 166, (CP01PR157) San Germán Area Soil Survey

—Pedon: 1P1042, Samples 1P 5289–5293

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND LT .2	FINE .0002	CO3 .002	(- -CLAY- -) FINE .002	COARSE .02	(- -SILT- -) VF .05	F .10	(- - - - - -SAND- - - - - -) M .25	C .5	VC 1	(-COARSE FRACS (MM)-) 2	5	20	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
1P5289S	8- 25	Ap	26.1	42.5	31.4			22.7	19.8	9.4	5.7	6.7	8.2	1.4	TR	--	--	22	TR
1P5290S	25- 36	Bw1	31.8	40.4	27.8			25.1	15.3	6.6	5.1	6.4	8.3	1.4	TR	--	--	21	TR
1P5291S	36- 61	Bw2	18.4	44.3	37.3			22.8	21.5	12.5	11.6	7.2	4.9	1.1	--	--	--	25	--
1P5292S	61- 76	BC	21.5	47.0	31.5			25.7	21.3	11.2	9.3	6.2	3.9	0.9	--	--	--	20	--
1P5293S	76- 86	C	23.7	42.8	33.5			24.6	18.2	11.3	10.1	6.2	4.6	1.3	1	--	--	23	1

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4b <2MM	EXTR P 6S3e PPM	TOTAL S 6R3d <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2h	AL 6G7g OF	MN 6D2g <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A5 <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
8- 25		0.150		0.09	13.7	1.8	0.2	0.38	1.12										29.2	
25- 36		0.157		0.11	16.2	2.2	0.2	0.33	0.77										24.4	
36- 61		0.052		0.15	17.1	2.3	0.4	0.18	1.32										24.3	
61- 76		0.011		0.18	19.5	2.3	0.7	0.09	1.06										22.7	
76- 86		0.028		0.18	15.9	1.9	0.5	0.19	0.97										23.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2i	MG 5B5a 6O2h	NA 5B5a 6P2f	K 5B5a 6Q2f	SUM BASES -MEQ /	ACID- ITY 6H5a 100 G	EXTR AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3 -PCT	NH4 OAC 5C1	CACO3 <2MM 6E1h	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) NAF 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -					- - - - - - - - - -					<- - - -							1:2	1:1
8- 25	0.5	0.2	0.1	0.1	0.9	18.1	--	19.0	9.8			5	9			0.07	9.7	5.0	5.3
25- 36	0.5	0.3	0.2	0.1	1.1	21.2	--	22.3	10.5			5	10			0.07	9.7	5.0	5.2
36- 61	0.4	0.2	0.2	0.1	0.9	14.6		15.5	3.4			6	26			0.03	9.7	5.9	5.9
61- 76	0.3	0.1	0.2	0.1	0.7	14.5		15.2	2.0			5	35			0.02	9.6	5.9	5.9
76- 86	0.4	0.6	0.1	TR	1.1	15.9		17.0	4.6			6	24			0.03	9.6	5.9	6.0

DEPTH (CM)	(- -NA PYROPHOSPHATE EXTRACTABLE- -) C 6A5a <- PCT	FE 6C8c OF <2MM ->	AL 6G1z	FE+AL (- -DIVIDED DI-CI FE+AL	FE+AL PCT CLAY	AL+C BY- -) PCT CLAY	(- -) INDEX OF ACCUM
8- 25		1.4	0.4	0.1	0.1		
25- 36		1.3	0.4	0.1	0.1		
36- 61		0.3	0.1				
61- 76		TR	TR				
76- 86		TR	TR				

SAMPLE NO.	HZ NO	ACID OPT DEN 8J1c <- P C T	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b o f < 2 m m ->	PHOSPHOUS RET 6S4d	CIT- ACID 6S5 <- P P M	KCL MN 6D3b ->	TOTAL C 6A2f	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - ><- HYDROMETER - -> CLAY 3A1c	SILT	SAND	CLAY	SILT	SAND	MIN SOIL CONT SML	AGGRT STABL <5mm 8F1	4G1
								<- - - - - - - - - - - - P E R C E N T														
1P5289	1	0.09	0.29	TR	0.30	82		1.2	2.50													
1P5290	2	0.04	0.31	TR	0.33	82		1.6	2.92													
1P5291	3	0.02	0.31	0.02	0.22	94			0.88													
1P5292	4	0.04	0.44	0.04	0.22	93			0.39													
1P5293	5	0.05	0.33	0.04	0.19	93			0.56													

Narrative Pedon Description

Pedon: Rosario
NSSL pedon number: 01P1042
Pedon ID: S01PR-125-007
Field classification: Fine-loamy, ferruginous, isohyperthermic Lithic Eutrudepts
Revised classification as of April 01, 2001: Clayey, ferruginous, isohyperthermic, shallow Typic Hapludox
Location: San Germán Municipio, Puerto Rico
Major Land Resource Area: 270—Humid Mountains and Valleys
Latitude: 18°09’27" north
Longitude: 67°00’14" west
Elevation: 650 meters
Geomorphic setting: Summit of serpentine hill
Drainage: Well drained
Described and sampled by: J.L. Lugo and S. Rios on May 10, 2001

Oe/Oi—0 to 8 cm; leaves, needles, twigs, sticks, and bark. Not sampled.
Ap—8 to 25 cm; dark yellowish brown (10YR 3/4) loam; weak medium and coarse subangular blocky structure; very strongly acid. 1P5289
Bw1—25 to 36 cm; dark reddish brown (2.5YR 3/4) clay loam; weak fine and medium subangular blocky structure; very strongly acid. 1P5290
Bw2—36 to 61 cm; dark reddish brown (2.5YR 3/3) loam; weak fine and medium subangular blocky structure; very strongly acid. 1P52891
BC—61 to 76 cm; reddish brown (5YR 4/4) loam; weak fine and medium subangular blocky structure; 2 percent paragravel; very strongly acid. 1P52892
C—76 to 86 cm; reddish brown (5YR 4/4) and 10 percent yellowish brown (10YR 5/6) loam; massive; 2 percent paragravel; very strongly acid. 1P52893
Cr—86 to 91 cm; weathered serpentinite bedrock. Not sampled.
R—91 cm; unweathered serpentinite bedrock. Not sampled.

Maresua: S88PR-125-001

Primary Characterization Data

San Germán Municipio, Puerto Rico

Sampled as: Maresua; clayey-skeletal, mixed, isohyperthermic, shallow Typic Hapludolls

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 376, Samples 88P 1930–1934

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS WEIGHT 2 -5	5 -20	20 -75	.1- 75	>2MM WT % OF WHOLE SOIL
			-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			PCT OF <2MM (3A1)												PCT OF <75MM(3B1)				
88P1930S	0- 21	A	47.8	24.7	27.5	32.7		17.0	7.7	4.8	5.6	4.9	6.1	6.1	8	15	16V	53	39
88P1931S	21- 32	Bw1	46.6	19.5	33.9	36.5		12.4	7.1	5.4	6.1	5.2	7.9	9.3	12	25	37V	81	74
88P1932S	32- 44	Bw2	38.2	18.5	43.3	31.0		10.7	7.8	5.7	9.1	8.6	10.8	9.1	6	21	58V	91	85
88P1933S	44- 75	Cr	26.5	17.2	56.3	21.4		10.1	7.1	8.5	11.5	10.6	13.8	11.9	5	37	24	82	66
88P1934G	0- 0	R																	P

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 21	3.76	0.365	1		6.4	0.3	0.2	0.87	0.59				1.02	1.31	0.068			38.4	28.3	0.08
21- 32	1.68	0.187	1		5.2	0.3	0.1	0.80	0.67	79	47		0.95	1.19	0.036			48.0	31.3	0.08
32- 44	1.09				4.3	0.2	0.1	0.73	0.77				0.72	0.82	0.017			81.8	29.3	0.15
44- 75	0.42				3.1	0.1	0.1	0.75	0.94				1.52	1.60	0.008			23.6	24.9	
0- 0					1.0	TR	TR							2.36					5.7	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - -MEQ / 100 G - - - - ->											<- - -PCT - - ->							
0- 21	6.2	31.9	0.1	0.4	38.6	10.4		49.0	41.5			79	93				3.6	6.1	6.6
21- 32	3.3	32.4	0.1	0.2	36.0	7.2		43.2	37.1			83	97				5.5	6.3	7.0
32- 44	2.0	25.8	0.1	0.1	28.0	4.9		32.9	28.0			85	100				5.6	6.5	7.3
44- 75	1.1	19.4	0.1	0.1	20.7	3.1		23.8	19.9			87	100				5.8	6.6	7.3
0- 0	1.4	5.1	TR	--	6.5			6.5	5.0			100	100	TR				7.9	8.3

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i peak size				THERMAL DTA 7A6 Percent	TGA 7A4b	ELEMENTAL 7C3 Percent SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTERPRETATION
88P1931	TCLY	MT 3	KK 3	GE 1	HE 1				5.2	20.0			0.1			
88P1934	TCLY	KK 2								4.1						

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
MT montmorillon KK kaolinite GE goethite HE hematite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OXALATE EXTRACTION OPT DEN 8J	FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	WATER CONTENT 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	WATER DISPERSIBLE PIPETTE CLAY 3A1c	SILT	HYDROMETER SAND SML	CLAY	SILT	SAND	MIN SOIL CONT 8F1 <20mm	AGGRT STABL <5mm 4G1 PCT
			<- P C T of < 2 m m ->			<- P P M ->				<- P E R C E N T of < 2 m m ->											
88P1930	1											35.8									83
88P1931	2											38.4									
88P1932	3																				
88P1933	4																				
88P1934	5																				

Narrative Pedon Description

Pedon: Maresua[2]
NSSL pedon number: 88P0376
Pedon ID: S88PR-125-001
Field classification: Clayey-skeletal, mixed, isohyperthermic, shallow Typic Hapludolls
Revised classification as of March 01, 2001: Clayey-skeletal, magnesic, isohyperthermic, shallow Typic Hapludolls
Location: San Germán Municipio, Puerto Rico; 25 meters northeast of Highway 2; 1.5 km east of San Germán
Latitude: 18°05’03" north
Longitude: 67°01’07" west
Elevation: 80 meters
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus
Geomorphic position: On lower third of component
Slope: 40 percent with a plane southwest aspect
Major Land Resource Area: 272—Humid Coastal Plains
Drainage, runoff, and permeability: Well drained, rapid runoff, and moderate permeability
Vegetation: Unidentified grasses in pastureland
Surface stoniness: Class 5
Erosion: Slight
Particle-size control section: 25 to 42 cm
Parent material: Residuum
Diagnostic features: Mollic epipedon at 0 to 42 cm; paralithic contact at 44 cm
Described and sampled by: D. Williams and G. Acevedo during February 1988

A—0 to 21 cm; very dark brown (10YR 2/2) silty clay loam; moderate fine subangular blocky structure parting to moderate fine granular; friable, slightly sticky, slightly plastic; many fine roots throughout; 6 percent gravel; neutral; clear smooth boundary. 88P1930

Bw1—21 to 33 cm; dark reddish brown (5YR 3/2) gravelly clay; moderate fine subangular blocky structure parting to weak fine granular; firm, sticky, plastic; common fine roots throughout; few fine tubular pores; 35 percent gravel; 10 percent cobbles; neutral; clear smooth boundary. 88P1931

Bw2—33 to 42 cm; dark reddish brown (5YR 3/2) extremely gravelly clay; weak fine subangular blocky structure; firm, sticky, plastic; common fine roots throughout; 60 percent gravel; 10 percent cobbles; neutral; abrupt smooth boundary. 88P1932

Cr—42 to 75 cm; highly fractured serpentine (2 to 5 cm between fractures); 5 percent fine-earth material; few roots along fracture planes. 88P1933

[2] The name of the Maresua soil was recently changed to La Taina.

San Juan Municipio

Vega Baja: S61PR-127-001

Primary Characterization Data

San Juan Municipio, Puerto Rico

Sampled as: Vega Baja; fine, mixed, isohyperthermic Aeric Tropaqualfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 179, Samples 40A 1325–1331

—General methods: 1B1A, 2A1, 2B

-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)				(>2MM)
			CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON	LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)		.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - - - - - - - -				PCT OF <2MM			(	) - - - - - - - - - - - -				<- PCT OF <75MM(3B1)->				SOIL
40A1325S	0- 18	Ap	40.5	43.8	15.7			32.1	11.7	4.7	3.8	2.1	3.5	1.6	--C	--C	--	11	--
40A1326S	18- 30	A1	42.0	43.2	14.8			32.5	10.7	4.5	3.3	1.9	3.3	1.8	--C	--C	--	10	--
40A1327S	30- 43	B21t	48.4	40.6	11.0			29.0	11.6	3.4	2.4	1.6	2.6	1.0	--C	--C	--	8	--
40A1328S	43- 81	B22t	53.2	39.7	7.1			29.7	10.0	4.0	1.6	0.5	0.6	0.4	--C	--C	--	3	--
40A1329S	81-125	B3	38.0	42.9	19.1			29.4	13.5	9.3	6.5	1.8	1.1	0.4	--C	--C	--	10	--
40A1330S	125-140	C1	49.2	44.9	5.9			34.8	10.1	3.7	1.3	0.5	0.4	--	--C	--C	--	2	--
40A1331S	140-150	C2	41.0	52.4	6.6			39.7	12.7	4.8	1.4	0.3	0.1	--	--C	--C	--	2	--

	ORGN TOTAL		EXTR TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.48	0.156			5.9			0.51	0.54			1.20		1.48		40.7		32.1	21.7	
18- 30	1.19	0.135			6.5			0.47	0.51			1.26		1.46		34.7		31.2	21.5	
30- 43	0.54	0.061			4.9			0.38	0.47			1.29		1.45		33.6		30.6	22.9	
43- 81	0.32	0.039			5.2			0.41	0.47			1.28		1.58		35.2		34.9	25.0	
81-125	0.10				5.7			0.57	0.58			1.36		1.52		30.8		30.2	22.2	
125-140	0.09				4.8			0.51	0.47										23.2	
140-150	0.06				5.2			0.58	0.56										22.9	

	(- NH4OAC EXTRACTABLE BASES -)					ACID- EXTR		(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - - -	-PCT	- - - ->						1:2	1:1
0- 18	9.4	3.0	0.3	0.1	12.8	16.2	0.5	29.0	20.7	13.3	4	44	62					4.0		4.6
18- 30	9.0	3.6	0.4	0.1	13.1	15.9	0.4	29.0	19.9	13.5	3	45	66					4.1		5.1
30- 43	5.1	4.4	0.6	0.2	10.3	16.3	3.5	26.6	18.5	13.8	25	39	56					3.5		4.8
43- 81	4.1	7.8	1.1	0.3	13.3	15.5	5.1	28.8	21.7	18.4	28	46	61					3.4		4.8
81-125	4.5	11.9	1.7	0.3	18.4	9.9	1.3	28.3	21.8	19.7	7	65	84					3.7		5.1
125-140	6.4	15.4	2.2	0.4	24.4	6.3		30.7	25.0			79	98					4.1		5.6
140-150	6.5	14.6	2.1	0.3	23.5	6.9		30.4	23.8			77	99					4.3		5.8

Narrative Pedon Description

Pedon: Vega Baja
NSSL pedon number: 40A179
Pedon ID: S61PR-127-001
SSIR #12 pedon ID: S61PR-9-1
Field classification: Fine, mixed, isohyperthermic Aeric Tropaqualfs
Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Aquic Hapludalfs
Location: San Juan Soil Conservation District, Puerto Rico; 61 meters northwest on road to Foods Laboratory and 61 meters northeast of the entrance to the Experiment Station (section north of highway)
Latitude: 18°23’42" north
Longitude: 66°03’11" west
Vegetation: Merker grass; used as pasture
Slope: Nearly level (1 percent); on a coastal plain
Drainage and permeability: Somewhat poorly drained, slow surface drainage, and slow permeability
Parent material: Old coastal alluvium
Described and sampled by: W.E. McKinzie, I.L. Martin, J. Jaurez, R.B. Grossman, and W.E. McKinzie on October 11, 1961
Notes: See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; dark brown (10YR 4/3) silty clay loam, weak fine granular structure; firm, slightly sticky, slightly plastic; few fine iron-manganese concretions; many roots; strongly acid; gradual wavy boundary. 40A1325

A1—18 to 30 cm; yellowish brown (10YR 5/8) and dark grayish brown (10YR 4/2) silty clay loam; weak fine granular structure; firm, slightly sticky, plastic; few fine manganese concretions; many roots; strongly acid; abrupt wavy boundary. 40A1326

B21t—30 to 43 cm; dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/8) clay; common fine distinct yellowish brown redoximorphic concentrations; weak coarse subangular blocky structure; firm, slightly sticky, slightly plastic; few fine manganese concretions; black coatings on peds and in root channels; strongly acid; abrupt wavy boundary. 40A1327

B22t—43 to 81 cm; strong brown (7.5YR 5/8) and gray (5Y 6/1) clay; weak medium subangular block structure; firm, slightly sticky, plastic; seams between peds and root channels filled with gray clayey material; few fine iron-manganese concretions; strongly acid; gradual wavy boundary. 40A1328

B3—81 to 125 cm; brownish yellow (10YR 6/8) and light gray (N 7/0) clay with pockets of yellowish brown clay loam; weak coarse subangular blocky structure; slightly sticky, slightly plastic; few peds and fracture planes coated with manganese; root channels and worm burrows filled with clayey material; strongly acid; abrupt wavy boundary. 40A1329

C1—125 to 140 cm; clay, light gray (N 7/0) mottled with strong brown (7.5YR 5/8); massive; sticky, plastic; few roots; strongly acid; abrupt wavy boundary. 40A1330

C2—140 to 150 cm; light gray (N 7/0) and strong brown (7.5YR 5/8) clay; massive; sticky, plastic. 40A1331

Vega Alta: S61PR-127-002

Primary Characterization Data

San Juan Municipio, Puerto Rico

Sampled as: Vega Alta; clayey, mixed, isohyperthermic Plinthic Tropudults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 589, Samples 40A 4305–4310

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4305S	0- 20	Ap		38.3	39.3	22.4			30.5	8.8	4.4	5.0	3.0	5.2	4.8	2C	10C	--	28	12
40A4306S	20- 36	B1		54.2	34.0	11.8			26.4	7.6	3.2	3.3	1.6	2.0	1.7	1C	6C	--	15	7
40A4307S	36- 63	B21t		62.8	27.0	10.2			20.4	6.6	3.4	3.2	1.1	1.3	1.2	--C	--C	--	7	--
40A4308S	63- 91	B22t		53.9	28.7	17.4			20.7	8.0	5.6	6.6	2.4	1.7	1.1	TRC	2C	--	14	2
40A4309S	91-132	B23t		45.9	28.0	26.1			20.9	7.1	7.8	11.7	3.9	2.1	0.6	--C	--C	--	18	--
40A4310S	132-213	B24t		52.8	37.0	10.2			32.9	4.1	3.0	3.1	1.3	1.4	1.4	1C	3C	--	11	4

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 20	2.09	0.212			4.7			0.40	0.48			1.22		1.35		35.9		30.4	18.4	
20- 36	0.49	0.083			5.8			0.19	0.46			1.30		1.44		32.5		31.0	25.1	
36- 63	0.41	0.062			7.4			0.20	0.44			1.34		1.44		33.2		36.0	27.8	
63- 91	0.23				7.8			0.24	0.46			1.35		1.46		33.5		33.8	24.7	
91-132	0.14				7.4			0.26	0.47										21.6	
132-213	0.10				7.4			0.30	0.44										23.1	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->								1:2	1:1
0- 20	7.4	1.2	0.2	TR	8.8	12.8	0.2	21.6	15.2	9.0	2	41	58					4.8		5.4
20- 36	6.6	0.8	0.2	0.1	7.7	8.2		15.9	10.4			48	74					5.5		5.5
36- 63	4.0	1.1	0.2	0.1	5.4	14.4	3.1	19.8	12.5	8.5	36	27	43					3.6		5.2
63- 91	1.9	1.2	0.2	0.1	3.4	16.4	5.7	19.8	12.8	9.1	63	17	27					3.5		4.9
91-132	0.9	1.4	0.1	0.1	2.5	15.6	7.1	18.1	11.9	9.6	74	14	21					3.5		4.7
132-213	0.3	2.1	0.1	0.2	2.7	18.9	10.6	21.6	16.0	13.3	80	12	17					3.5		4.8

Narrative Pedon Description

Pedon: Vega Alta
NSSL pedon number: 40A589
Pedon ID: S61PR-127-002
SSIR #12 pedon ID: S61PR-9-2
Field classification: Clayey, mixed, isohyperthermic Plinthic Tropudults
Revised classification as of April 01, 2001: Fine, kaolinitic, isohyperthermic Typic Kandiudox
Location: San Juan Soil Conservation District, Puerto Rico; Rio Piedras Experiment Station; 46 meters north of radio station (15 meters south of trail)
Latitude: 18°23'48" north
Longitude: 66°03'49" west
Vegetation: Merker grass; the area has supported grass for several years.
Slope: Nearly level (1 percent); on a coastal terrace
Drainage, runoff, and permeability: Well drained, medium runoff, and moderate permeability
Parent material: Old coastal alluvium
Described and sampled by: I.L. Martin, J. Juarez, R.B. Grossman, and W.E. McKinzie on October 11, 1961
Notes: See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 20 cm; dark yellowish brown (10YR 3/4) silty clay loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; many fine manganese concretions; common roots; strongly acid; abrupt wavy boundary. 40A4305

B1—20 to 36 cm; reddish yellow (7.5YR 6/8) and yellowish red (5YR 4/6) silty clay; weak medium and coarse subangular blocky structure parting to moderate fine granular; few thin patchy clay films on peds and in root channels; firm, slightly sticky, slightly plastic; many fine manganese concretions; few roots; strongly acid; clear wavy boundary. 40A4306

B21t—36 to 63 cm; red (2.5YR 4/8) and strong brown (7.5YR 5/8) clay; moderate medium and coarse subangular blocky structure parting to weak coarse blocky; clay films on about 50 percent of ped surfaces; firm, slightly sticky, slightly plastic; few fine manganese concretions; few roots; strongly acid; gradual wavy boundary. 40A4307

B22t—63 to 91 cm; red (2.5YR 4/8) clay loam mottled with brownish yellow (10YR 6/8) and red (2.5YR 4/6) clay; weak medium and coarse subangular blocky structure; firm, nonsticky, nonplastic; brownish yellow (10YR 6/6) clay films in root channels and worm channels; few fine quartz grains; strongly acid; gradual wavy boundary. 40A4308

B23t—91 to 132 cm; red (10R 4/8) clay loam with strong brown (7.5YR 5/8) and light gray (5Y 7/1) clay; massive; friable, nonsticky, nonplastic; few thin manganese coatings; illuvial clay in pockets and in seams between cleavage planes; few roots; strongly acid; gradual wavy boundary. 40A4308

B24t—132 to 213 cm; clay, red (10R 4/8) mottled with brownish yellow (10YR 6/8) and light gray (5Y 7/1); massive; friable, nonsticky, nonplastic; clay appears to be developing in place in lenses parallel to the surface; few tongues of manganese coatings; no roots. 40A4310

Toa Alta Municipio

Colinas: S58PR-135-002

Primary Characterization Data

Toa Alta Municipio, Puerto Rico

Sampled as: Colinas; fine-loamy, carbonatic, isohyperthermic Eutropeptic Rendolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 544, Samples 40A 4018–4020

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4018S	0- 25	Ap		44.7	18.2	37.1			13.1	5.1	4.9	10.3	7.1	10.0	4.8	TRC	--C	--	32	--
40A4019S	25- 43	B		19.9	40.8	39.3		2.0	31.5	9.3	9.9	11.2	5.4	8.0	4.8	--C	--C	--	29	--
40A4020S	43- 84	C		18.1	40.8	41.1		6.0	31.4	9.4	8.2	13.9	7.4	8.6	3.0	--C	--C	--	33	--

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 25	3.90	0.407			2.9			0.82	0.47					1.34					21.0	
25- 43	0.42	0.047			0.9			0.63	0.46					1.40					9.2	
43- 84	0.25	0.027			0.8			0.49	0.40					1.13					7.3	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- EXTR ITY	AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ / 100 G	- - - - - - - - - -				- - ->	<- - - - -PCT			- - - ->				1:2	1:1
0- 25			0.1	0.2					36.8			100	1	15					7.5
25- 43			0.1	0.2					12.6			100	2	72					7.9
43- 84			0.1	0.3					8.8			100	5	78					8.0

Narrative Pedon Description

Pedon: Colinas
NSSL pedon number: 40A544
Pedon ID: S58PR-135-002
SSIR #12 pedon ID: S58PR-4-5
Field classification: Fine-loamy, carbonatic, isohyperthermic Eutropeptic Rendolls
Revised classification as of April 01, 2001: Coarse-loamy, carbonatic, isohyperthermic Typic Haprendolls
Location: Cibuco Soil Conservation District, Puerto Rico; 15 meters north of a road at kilometer marker 0.1 on Road 823; aerial photograph GS-LR-1-47
Latitude: Unknown
Longitude: Unknown
Elevation: 130 meters
Average annual precipitation: 2,032 mm
Slope: 35 percent with a south aspect; on a footslope below a limestone hill
Drainage and permeability: Well drained and moderate permeability
Parent material: Residuum or local colluvium from the basal Lares (?) formation
Vegetation: Unimproved native pasture
Described and sampled by: L.T. Alexander, F. Llavat-Cristy, R.E. Gierbolini, J. Juarez, Jr., K.W. Flach, L.H. Rivera, and T.U. Yager on November 6, 1958
Notes: The soil was sampled at one-half to three-fourths field capacity.

Ap—0 to 25 cm; very dark brown (10YR 2/2) clay; weak coarse subangular block structure parting to moderate fine and medium granular; firm, slightly sticky, plastic; few light yellowish brown (10YR 6/4) inclusions of material from the B horizon; few coarse lime fragments and angular pebbles; strong effervescence with dilute HCl; clear smooth boundary. 40A4018

B—25 to 43 cm; dark yellowish brown (10YR 4/4) gravelly clay; very weak medium subangular block structure parting to moderate fine granular; firm, slightly plastic; 25 percent fine and coarse lime fragments with a tendency toward partial case hardening; tongues amounting to about 10 percent of the Ap horizon extend into the B horizon; few scattered shells; violent effervescence with dilute HCl; gradual smooth boundary. 40A4019

C—43 to 84 cm; very pale brown (10YR 7/4) and light yellowish brown (10YR 6/4) clay loam; massive; friable, nonsticky, nonplastic; few fine to coarse soft white lime fragments. 40A4020

Toa Baja Municipio

Sabana Seca: S58PR-137-001

Primary Characterization Data

Toa Baja Municipio, Puerto Rico

Sampled as: Sabana Seca; clayey, mixed, isohyperthermic Oxic Plinthaquults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 238, Samples 40A 1769–1775

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4- TOTAL CLAY LT .002	-5- TOTAL SILT .002 -.05	-6- TOTAL SAND .05 -2	-7- CLAY FINE LT .0002	-8- CLAY CO3 LT .002	-9- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS (MM) WEIGHT 2 -5	-17- WEIGHT 5 -20	-18- WEIGHT 20 -75	-19- WEIGHT .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM	(	) - - - - - - - - -					- - - - - ->	<- PCT OF <75MM(3B1)->				SOIL
40A1769S	0- 25	Ap	55.7	28.0	16.3			19.3	8.7	4.0	5.8	2.6	3.1	0.8	--C	--C	--	12	--
40A1770S	25- 33	B1t	76.4	15.5	8.1			10.5	5.0	2.1	2.9	1.3	1.4	0.4	--C	--C	--	6	--
40A1771S	33- 58	B21tg	76.2	15.9	7.9			11.0	4.9	2.1	2.7	1.1	1.5	0.5	--C	--C	--	6	--
40A1772S	58- 91	B22tg	69.7	19.7	10.6			13.8	5.9	3.3	3.7	1.5	1.7	0.4	--C	--C	--	7	--
40A1773S	91-120	B23tg	65.1	21.8	13.1			15.7	6.1	3.4	4.2	1.9	2.4	1.2	--C	--C	--	10	--
40A1774S	120-140	B24tg	62.7	22.9	14.4			17.5	5.4	3.5	4.9	2.1	2.7	1.2	--C	--C	--	11	--
40A1775S	140-180	B25tg	65.1	24.9	10.0			19.7	5.2	2.8	3.6	1.5	1.7	0.4	--C	--C	--	7	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- -	->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 25	3.25	0.250			2.9			0.26	0.46					1.19					25.6	
25- 33	1.18	0.115			3.7			0.17	0.42					1.29					32.2	
33- 58	0.74	0.070			4.5			0.16	0.42					1.28					31.8	
58- 91	0.31	0.045			4.1			0.16	0.40					1.49					28.2	
91-120	0.21				4.1			0.19	0.39					1.46					25.5	
120-140	0.20				4.7			0.19	0.39					1.60					24.2	
140-180	0.11				2.3			0.21	0.36										23.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G	- - - - - - -				- - ->	<- - - - -PCT	- - - ->						1:2	1:1
0- 25	1.1	0.6	0.1	0.2	2.0	23.6	5.2	25.6	14.2	7.2	72	8	14				3.5		4.2
25- 33	2.6	0.4	0.1	0.1	3.2	18.7	5.7	21.9	12.7	8.9	64	15	25				3.2		4.2
33- 58	1.7	0.4	0.1	0.1	2.3	17.1	6.2	19.4	12.2	8.5	73	12	19				3.3		4.4
58- 91	0.7	0.8	0.1	0.1	1.7	17.9	7.6	19.6	11.4	9.3	82	9	15				3.4		4.3
91-120	0.3	0.8	0.2	0.1	1.4	17.0	8.3	18.4	12.4	9.7	86	8	11				3.3		4.3
120-140	0.3	0.8	0.2	0.1	1.4	16.2	8.5	17.6	11.6	9.9	86	8	12				3.3		4.2
140-180	0.4	1.1	0.4	0.1	2.0	15.8	8.6	17.8	13.6	10.6	81	11	15				3.3		4.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY (peak size)	THERMAL DTA (Percent)	THERMAL TGA (Percent)	ELEMENTAL SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN (mg/g)	INTERPRETATION
40A1771	TCLY		KK45	GI10									

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Sabana Seca

NSSL pedon number: 40A238

Pedon ID: S58PR-137-001

SSIR #12 pedon ID: S58PR-9-1

Field classification: Clayey, mixed, isohyperthermic Oxic Plinthaquults

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Plinthic Haplaquox

Location: Toa Baja, Barrio of Sabana Seca, San Juan Soil Conservation District, Puerto Rico; 400 meters east of kilometer marker 8.5 on Highway 866 or about 1.5 km east by northeast of Sabana Seca schools; about 2.3 km from the Atlantic Ocean; aerial photograph GS-LR-4-12

Latitude: 18°26’00" north

Longitude: 60°10’26" west

Elevation: Less than 1 meter

Slope: Less than 1 percent; smooth to slightly undulating; in a field 15 to 20 cuerdas in size

Drainage and permeability: Poorly drained and slow permeability

Parent material: Coastal plain clays

Vegetation: Sugarcane; recently plowed under

Described and sampled by: L.T. Alexander, K.W. Flach, L.H. Rivera, and T.U. Yager on November 8, 1958

Notes: The soil was sampled at one-half to three-fourths field capacity. The B1t horizon had the best developed structure and most pronounced clay films. Roots extended into the B22tg horizon, but few were observed in lower horizons. Perdigons were found in B22tg horizon and all lower horizons, reaching maximum hardness and abundance in the B24tg horizon. They were generally soft and appeared dry even though below the water table. Some offered moderate resistance to crushing. Free water collected in the lower few inches of the pit within 2 hours. The variety of colors made description of the soil difficult. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 25 cm; very dark grayish brown (10YR 3/2) clay; weak fine subangular structure parting to weak fine granular; firm, slightly sticky, plastic; abrupt smooth boundary. 40A1769

Bt1—25 to 33 cm; dark grayish brown (2.5Y 4/2) clay; many medium and coarse prominent yellowish brown (10YR 5/6) redoximorphic concentrations; 1:1 ratio of matrix to redoximorphic features; moderate fine subangular and angular blocky structure; firm, slightly sticky, very plastic; thin patchy clay films on peds decreasing in number with increasing depth; dark gray (10YR 4/1) linings in old root channels; cracks decrease in number with depth throughout the lower part of the horizon; inclusions of material from the Ap horizon do not exceed 5 to 10 percent; clear wavy boundary. 40A1770

B21tg—33 to 58 cm; light gray (5Y 6/1) clay; many coarse prominent yellowish brown (10YR 5/6) and few fine prominent red (10R 4/6) redoximorphic concentrations; 1:1 ratio of matrix to redoximorphic features; very weak blocky structure; firm, slightly sticky, very plastic; thin patchy clay films on peds decreasing in number with increasing depth; dark gray (10YR 4/1) linings in old root channels; cracks decrease in number with depth throughout the lower part of the horizon; inclusions of material from the Ap horizon do not exceed 5 to 10 percent; clear wavy boundary. 40A1771

B22tg—58 to 91 cm; light gray (5Y 6/1 to 7/1) clay; many fine to coarse prominent strong brown (7.5YR 5/6) and common medium and coarse prominent dark red (10R 3/6) redoximorphic concentrations and perdigons and a few specks of red (7.5YR 4/6); very weak very coarse prismatic structure parting to moderate medium subangular and angular blocky; very firm, slightly sticky, very plastic; redoximorphic features and perdigons are nonsticky and nonplastic; clay films similar to those in the B21tg horizon; gradual smooth boundary. 40A1772

B23tg—91 to 120 cm; white (5Y 8/1 to 8/2) clay; many fine to coarse prominent dusky red (10R 3/4) and strong brown (7.5YR 5/6) redoximorphic concentrations and perdigons; weak coarse prismatic structure parting to weak medium angular and subangular; consistence similar to that of the B22tg horizon; thin patchy clay films in vertical and horizontal cleavage planes; clear smooth boundary. 40A1773

B24tg—120 to 140 cm; white (5Y 8/1) clay; many coarse prominent dusky red (10R 3/4) and dark red (7.5R 3/6) and few fine red (10R 4/8) and strong brown (7.5YR 5/8) redoximorphic concentrations and perdigons; ratio of matrix to all mottling of about 2:1; weak coarse prismatic structure; consistence similar to that of the B22tg horizon; very few patchy clay films in vertical planes. 40A1774

B25tg—140 to 180 cm; white (5Y 8/1) clay; many coarse prominent dusky red (10R 3/ 4) and dark red (7.5YR 3/6) redoximorphic concentrations and few fine red (10R 4/8) and strong brown (7.5YR 5/8) redoximorphic concentrations and perdigons; ratio of matrix to all mottling of about 2:1; weak coarse prismatic structure; consistence similar to that of the B22tg horizon; very few patchy clay films in vertical planes. 40A1775

Utuado Municipio

Adjuntas: S73PR-141-001

Primary Characterization Data

Utuado Municipio, Puerto Rico

Sampled as: Adjuntas

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1266, Samples 40A 9635–9640

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1- 75	WT % OF WHOLE SOIL
			<- PCT OF <2MM						( )					->	<- PCT OF <75MM(3B1)->				
40A9635S	0- 13	Ap	52.2	29.8	18.0	19.2		22.3	7.5	2.7	2.9	1.9	4.1	6.4	--	--	--	15	--
40A9636S	13- 25	B1	55.1	31.1	13.8			23.9	7.2	3.2	2.6	1.4	2.3	4.3	--	--	--	11	--
40A9637S	25- 43	B2	47.6	38.1	14.3	13.7		31.4	6.7	4.1	3.0	1.2	2.4	3.6	--	--	--	10	--
40A9638S	43- 61	B3	41.0	41.2	17.8			31.9	9.3	5.9	5.3	2.1	2.5	2.0	--	--	--	12	--
40A9639S	61-122	C	36.1	43.3	20.6			35.2	8.1	4.5	4.5	2.6	4.5	4.5	--	--	--	16	--
40A9640S	122	R													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	COLE OVEN DRY 4A1h	WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT	OF	<2MM -->						<- - G/CC	- ->	CM/CM		<- - -PCT OF <2MM			- ->	CM/CM
0- 13	3.69				7.3	1.1		0.37	0.50				1.09	1.22	--			35.6	26.3	0.10
13- 25	2.03				6.1	1.0		0.27	0.50				1.14	1.29	--			37.7	27.7	0.11
25- 43	0.80				5.7	0.8		0.25	0.59	60	11		1.14	1.30	--			38.0	28.3	0.11
43- 61	0.76				4.0	0.7		0.29	0.72				1.09	1.26	--			41.0	29.7	0.12
61-122	0.26				3.1	0.5		0.33	0.81				1.05	1.13	--			46.8	29.3	0.18
122																				

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	PH SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - -			-MEQ / 100	G	- - - - - - - - -			->	PCT		<- -PCT-	>	<- -PCT ->		<- -PCT ->			1:2	1:1
0- 13	0.8	0.4	0.1	0.5	1.8	24.4	4.4	26.2	19.4	1		7	9						3.9	4.6
13- 25	0.5	0.3	0.1	0.2	1.1	19.4	4.6	20.5	15.0	1		5	7						3.9	4.6
25- 43	0.7	0.7	0.1	0.2	1.7	14.2	4.8	15.9	11.8	1	1	11	14					4.7	4.1	4.7
43- 61	0.6	0.7	0.1	0.2	1.6	14.3	5.6	15.9	11.9	1		10	13						3.9	4.7
61-122	0.2	0.6	TR	0.3	1.1	12.4	6.6	13.5	11.8	TR		8	9						4.0	4.6
122																				

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - -				-MEQ / LITER	- - - - - - - - - - - -			->	<- -PCT-			->		
0- 13															
13- 25															
25- 43	0.6	0.6	0.6	0.1	--	--		--	TR		0.4	63.6	TR	0.3	
43- 61															
61-122															
122															

Narrative Pedon Description

Pedon: Adjuntas
NSSL pedon number: 40A1266
Pedon ID: S73PR-141-001
Series classification: Very-fine, kaolinitic, isohyperthermic Inceptic Hapludox
Revised classification as of April 01, 2001: Clayey, kaolinitic, isohyperthermic Inceptic Hapludox
Location: Utuado Municipio, Puerto Rico; Caonills Soil Conservation District; Arecibo Soil Survey Area; 320 meters east of school at the end of Highway 602
Latitude: Unknown
Longitude: Unknown
Elevation: 550 meters
Slope: 45 percent
Drainage: Well drained
Geomorphic setting: Volcanic uplands
Vegetation: Grass and herbaceous cover
Particle-size control section: 25 to 100 cm
Described and sampled by: L.H. Rivera on November 27, 1973

Ap—0 to 13 cm; dark brown (10YR 3/3) clay; few fine quartz grains; moderate fine and medium granular structure; firm, slightly sticky, moderately plastic; many fine roots; many pores; 1 percent fragments of volcanic breccia 20 to 75 mm in diameter; very strongly acid; clear smooth boundary. 40A9635

B1—13 to 25 cm; strong brown (7.5YR 5/6) and brown (7.5YR 4/4) clay; few fine quartz grains; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; many fine pores; 10 percent patchy clay films; 1 percent fragments of volcanic breccia 20 to 75 mm in diameter; very strongly acid; clear smooth boundary. 40A9636

B2—25 to 43 cm; strong brown (7.5YR 5/6) clay; few fine quartz grains; weak fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; many fine pores; 30 percent patchy clay films; 1 percent fragments of volcanic breccia 20 to 75 mm in diameter; very strongly acid; clear wavy boundary. 40A9637

B3—43 to 61 cm; yellow (10YR 7/6), very pale brown (10YR 8/2), and brownish yellow (10YR 6/8) clay; many fine quartz grains; 3 percent fine prominent red (2.5YR 4/6) redoximorphic features; weak medium subangular blocky structure; friable, slightly sticky, moderately plastic; few fine roots; many fine pores; very strongly acid; clear wavy boundary. 40A9638

C—61 to 122 cm; strongly and partially weathered volcanic rocks. 40A9639

R—122 cm; semiconsolidated volcanic rock. 40A9640

Consejo: S89PR-141-001

Primary Characterization Data

Utuado Municipio, Puerto Rico

Sampled as: Consejo; fine, kaolinitic, isohyperthermic Xanthic Hapludox

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 403, Samples 89P 2251–2260

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
89P2251M	0- 1	A1	35.8	43.4	20.8	10.0		29.0	14.4	6.1	4.5	3.9	3.0	3.3	1	--	--	16	1
89P2252S	1- 15	A2	40.4	48.0	11.6	11.4		31.6	16.4	3.8	3.7	1.4	2.0	0.7	1	TR	--	9	1
89P2253S	15- 32	A3	43.0	47.6	9.4	11.1		32.8	14.8	2.9	2.4	2.4	1.4	0.3	2	TR	--	8	2
89P2254S	32- 71	Bt1	39.8	50.1	10.1	9.9		39.0	11.1	3.1	2.7	2.4	1.6	0.3	--	--	--	7	--
89P2255S	71- 90	Bt2	31.3	55.2	13.5	9.0		45.1	10.1	5.0	4.1	2.5	1.3	0.6	--	--	--	8	--
89P2256S	90-110	Bt3	28.4	57.0	14.6	8.1		46.2	10.8	5.6	5.4	1.8	1.4	0.4	--	--	--	9	--
89P2257S	110-184	BC	18.7	58.4	22.9	4.5		47.7	10.7	5.8	7.3	5.8	3.2	0.8	--	--	--	17	--
89P2258S	184-224	BC	17.9	58.8	23.3	3.3		50.0	8.8	7.9	7.3	5.1	2.3	0.7	TR	--	--	15	--
89P2259S	100-120	Bt3	30.1	59.9	10.0	9.8		51.7	8.2	4.8	3.0	1.6	0.5	0.1	--	--	--	5	--
89P2260S	125-130	R													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F PCT <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF	1/10 BAR 4B1c	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 1	11.9	0.743			3.6	0.4	--	1.09	0.74				1.10						26.6	
1- 15	3.66	0.295			4.2	0.4	--	0.46	0.48				0.94	1.22	0.091			57.0	19.4	0.35
15- 32	2.37	0.184			4.3	0.4	--	0.31	0.43				1.08	1.27	0.055			44.8	18.7	0.28
32- 71	0.74	0.059			4.8	0.5	--	0.20	0.47				1.15	1.33	0.050			39.6	18.7	0.24
71- 90	0.27				4.0	0.4	--	0.21	0.52				1.33	1.44	0.027			31.3	16.4	0.20
90-110	0.23				3.9	0.4	--	0.21	0.56				1.29	1.38	0.023			32.2	15.9	0.21
110-184	0.21				3.4	0.4	--	0.28	0.83				1.26	1.30	0.010			33.8	15.6	0.23
184-224	0.20				3.7	0.4	--	0.29	0.82				1.14	1.19	0.014			41.7	14.7	0.31
100-120	0.25				3.5	0.4	--	0.18	0.61				1.31	1.41	0.025			32.2	18.3	0.18
125-130	0.16				1.5	0.3	--												5.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<-				-MEQ / 100 G					->	<-	-PCT	->					1:2	1:1
0- 1	15.8	1.3	0.1	1.3	18.5	35.4	1.1	53.9	38.9	19.6	6	34	48				4.2	4.3	4.7
1- 15	2.4	0.2	0.1	0.2	2.9	26.4	5.2	29.3	18.6	8.1	64	10	16				3.5	3.6	3.8
15- 32	1.4	TR	0.1	0.1	1.6	20.2	5.3	21.8	13.5	6.9	77	7	12				3.6	3.7	4.1
32- 71	1.1	TR	0.1	0.1	1.3	11.8	3.4	13.1	7.8	4.7	72	10	17				3.9	4.0	4.3
71- 90	0.9	TR	TR	0.2	1.1	10.6	3.4	11.7	6.5	4.5	76	9	17				3.9	4.0	4.3
90-110	0.8	TR	0.1	0.2	1.1	8.3	3.2	9.4	6.1	4.3	74	12	18				3.9	4.0	4.4
110-184	0.9	TR	0.1	0.2	1.2	8.9	2.7	10.1	5.2	3.9	69	12	23				4.1	4.1	4.5
184-224	0.8	TR	0.1	0.3	1.2	9.6	2.2	10.8	5.1	3.4	65	11	24				4.0	4.1	4.5
100-120	0.7	TR	0.1	0.2	1.0	9.1	3.0	10.1	5.4	4.0	75	10	19				3.9	4.0	4.2
125-130																		5.1	5.6

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)				THERMAL DTA 7A6 (Percent)	TGA 7A4b	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
89P2254	TCLY	KK 5	MI 2	QZ 1	HE 1				29.0	7.9			0.7			
89P2256	TCLY	KK 4	MI 1	GE 1	HE 1				29.0	7.0			0.5			
89P2258	TCLY	KK 3	GE 1	HE 1	MI 1				26.0	9.7			0.1			
89P2259	TCLY	KK 4	GE 2	HE 1	MI 1				28.0	10.0			0.3			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite MI mica QZ quartz HE hematite GE goethite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

		ACID OPT DEN	OXALATE FE	EXTRACTION SI	AL	PHOSPHOUS RET	CIT- ACID	KCL MN	TOTAL C	(- -WATER 0.06 BAR	1- BAR	CONTENT- -) 2- BAR	15 BAR	(- - - - WATER DISPERSIBLE - - - -) CLAY	SILT	SAND	CLAY	SILT	SAND	MIN SOIL CONT	AGGRT STABL <5mm
SAMPLE NO.	HZ NO	8J	6C9a	6V2	6G12	6S4	6S5	6D3	6A2d	4B1c	4B1a	4B1a	4B2b	PIPETTE 3A1c			HYDROMETER SML			8F1	4G1
			<- P C T	o f	< 2	m m ->	<- P P M	->	< - - - - - - - - - - - - P E R C E N T						o f	< 2	m m - - - - - - - -			>20mm	<PCT>
89P2251	1	0.28	0.71	0.01	0.20			2.5				41.5								76	82
89P2252	2	0.22	0.68	0.02	0.21			0.4				33.1									35
89P2253	3	0.15	0.76	0.02	0.22			0.1				31.6									4
89P2254	4	0.06	0.41	TR	0.17			--				29.2									
89P2255	5	0.03	0.08	TR	0.13			--				26.5									
89P2256	6	0.03	0.05	TR	0.12			--				26.1									
89P2257	7	0.03	0.04	TR	0.13			--				26.2									
89P2258	8	0.03	0.06	0.01	0.15			--				26.9									
89P2259	9	0.03	0.06	0.01	0.14			--				26.7									
89P2260	10																				

Narrative Pedon Description

Pedon: Consejo
NSSL pedon number: 89P0403
Pedon ID: S89PR-141-001
Field classification: Fine, kaolinitic, isohyperthermic Xanthic Hapludox
Revised classification as of April 01, 2001: Fine, kaolinitic, isohyperthermic Xanthic Hapludox
Location: Utuado Municipio, Puerto Rico; Arecibo Soil Survey sheet 46; 2.1 km north on Highway 140 from junction with Highway 143 and 1.9 km west-northwest
Latitude: 18°10’45" north
Longitude: 66°39’25" west
Elevation: 610 meters
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus
Geomorphic position: Backslope of a side slope; on upper third of component
Slope: 45 percent with a plane north aspect
Major Land Resource Area: 270—Humid Mountains and Valleys
Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability
Vegetation: Coffee and bananas in cropland
Surface stoniness: Class 0
Erosion: Slight
Particle-size control section: 33 to 81 cm
Parent material: Colluvium from igneous-acid material
Weather station number: 9608
USGS 7.5-minute quadrangle: Adjuntas
Geographically associated soils: Adjuntas, Humatas, and Lirios
Described and sampled by: D. Williams and C.L. Santiago during February 1989

A1—0 to 1 cm; dark brown (10YR 3/3) clay loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; abrupt smooth boundary. 89P2251

A2—1 to 15 cm; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable, sticky, plastic; few coarse and common very fine and fine roots throughout; few fine tubular pores; few charcoal fragments; clear smooth boundary. 89P2252

A3—15 to 32 cm; dark yellowish brown (10YR 4/6) clay loam; moderate fine and medium subangular blocky structure; friable, sticky, plastic; few coarse and common very fine and fine roots throughout; common fine tubular pores; very few discontinuous faint coatings on vertical and horizontal faces of peds; few charcoal fragments; gradual boundary. 89P2253

Bt1—32 to 71 cm; reddish yellow (7.5YR 7/8) clay; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable, sticky, plastic; few coarse and common very fine and fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and

horizontal faces of peds; upper 3 to 5 cm is slightly darker (10YR 5/8); slightly darker stains along root channels; clear smooth boundary. 89P2254

Bt2—71 to 90 cm; reddish yellow (7.5YR 7/8) clay; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable, sticky, plastic; few very fine and fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; slightly darker stains along root channels; clear boundary. 89P2255

Bt3—90 to 110 cm; reddish yellow (7.5YR 6/8) clay; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine and fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; few large insect nests filled with darker material; slightly darker stains along root channels; clear smooth boundary. 89P2256

BC1—110 to 184 cm; 5 percent pale red (10R 6/4), 30 percent light red (2.5YR 6/8), and 65 percent reddish yellow (7.5YR 7/8) loam; common medium distinct redoximorphic features; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots throughout; common fine tubular pores; very few patchy faint coatings on faces of peds and in pores; few large insect nests filled with darker material; slightly darker stains along root channels; gradual boundary. 89P2257

BC2—184 to 224 cm; 35 percent weak red (10R 5/4) and 65 percent brownish yellow (10YR 6/8) loam; few medium distinct and common medium distinct redoximorphic features; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots throughout; common fine and medium tubular pores; few large insect nests filled with darker material; slightly darker stains along root channels. 89P2258

Bt3—100 to 120 cm; yellowish red (5YR 5/8) clay loam; weak medium and coarse prismatic structure; friable; common fine roots; few medium and large insect holes filled with yellowish material; satellite sample of soft, red saprolite. Subsample. 89P2259

Ingenio: S89PR-141-002

Primary Characterization Data

Utuado Municipio, Puerto Rico
Sampled as: Ingenio; fine, mixed, isohyperthermic Humic Hapludults
SSL—Project: 89P 83, (CP89PR115) Caribbean Area
—Pedon: 89P 404, Samples 89P 2261–2268
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND .05-2	TOTAL FINE CLAY LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS (MM) 2-5	COARSE FRACS (MM) 5-20	COARSE FRACS (MM) .1-75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->			
89P2261S	0- 17	Ap	24.5	11.5	64.0	12.7		10.5	1.0	7.6	23.1	26.4	6.4	0.5	1	--	--	57	1
89P2262S	17- 27	Bt1	28.0	18.1	53.9	9.5		11.9	6.2	6.9	20.2	20.4	5.1	1.3	TR	TR	--	47	TR
89P2263S	27- 35	Bt2	43.3	21.7	35.0	12.7		15.9	5.8	3.3	12.6	15.0	3.6	0.5	TR	--	--	32	--
89P2264S	35- 56	Bt3	53.5	21.1	25.4	15.9		18.4	2.7	3.3	9.0	10.6	2.3	0.2	--	--	--	22	--
89P2265S	56- 92	Bt4	52.7	25.9	21.4	14.7		23.3	2.7	3.6	8.1	8.5	1.2	--	--	--	--	18	--
89P2266S	92-116	Bt5	48.2	30.0	21.8	13.8		26.7	3.3	3.3	9.0	8.5	1.0	--	--	--	--	18	--
89P2267S	116-178	BC	37.3	36.2	26.5	9.3		32.1	4.1	3.1	7.7	12.4	2.9	0.4	TR	--	--	23	TR
89P2268S	260-300	C SAP	25.1	40.7	34.2	5.7		36.0	4.7	4.8	8.4	13.2	7.3	0.5	TR	--	--	29	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	ORGN TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	EXTR TOTAL S 6R3a	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	EXTRACTABLE CEC 8D1	15 BAR 8D1	LIMITS LL 4F1	LIMITS PI 4F	FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	WHOLE SOIL 4D1	FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- G/CC		- ->	CM/CM	<- -PCT OF <2MM - ->				CM/CM
0- 17	2.35	0.156			2.4	0.4	0.1	0.33	0.47				1.18	1.32	0.038			28.9	11.5	0.20
17- 27	0.97	0.076			3.1	0.4	TR	0.23	0.49				1.21	1.43	0.057			25.3	13.6	0.14
27- 35	0.60	0.054			4.7	0.6	TR	0.19	0.50				1.42	1.51	0.021			27.0	21.5	0.08
35- 56	0.54	0.049			6.8	0.8	TR	0.20	0.49				1.33	1.49	0.039			34.8	26.4	0.11
56- 92	0.41				8.3	0.9	TR	0.36	0.52				1.36	1.54	0.042			34.5	27.5	0.10
92-116	0.28				7.7	0.7	TR	0.31	0.52				1.40	1.53	0.030			32.6	25.2	0.10
116-178	0.21				7.0	0.7	TR	0.32	0.56				1.43	1.55	0.027			31.3	20.9	0.15
260-300	0.12				6.0	0.6	TR	0.30	0.55										13.7	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- -MEQ / 100 G										<- -PCT							1:2	1:1
0- 17	1.7	0.7	0.1	0.4	2.9	10.4	0.8	13.3	8.1	3.7	22	22	36				4.0	4.3	4.9
17- 27	0.8	0.1	0.1	0.1	1.1	9.5	2.3	10.6	6.5	3.4	68	10	17				3.8	4.1	4.7
27- 35	0.7	0.1	0.1	0.1	1.0	11.6	3.3	12.6	8.1	4.3	77	8	12				3.7	4.1	4.6
35- 56	0.7	0.2	0.1	0.1	1.1	12.6	3.1	13.7	10.7	4.2	74	8	10				3.9	4.1	4.8
56- 92	0.1	TR	TR	--	0.1	11.5	3.3	11.6	19.2	3.4	97	1	1				4.1	4.1	4.8
92-116	0.6	0.1	0.1	0.1	0.9	12.1	4.6	13.0	14.8	5.5	84	7	6				4.5	4.1	4.7
116-178	0.6	0.1	0.1	0.1	0.9	12.4	5.4	13.3	11.8	6.3	86	7	8				3.6	4.0	4.7
260-300	1.1	5.0	0.6	0.1	6.8	10.2	5.3	17.0	7.6	12.1	44	40	89				3.7	4.0	4.7

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY 7A6	X-RAY 7A4b	THERMAL DTA	THERMAL TGA	ELEMENTAL SiO2	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN 7D2	INTER PRETA TION
		CLAY MINERALOGY (<.002mm)													
		peak size			Percent									mg/g	
89P2262	TCLY	KK 5	VR 2	GE 2	VC 1	HE 1			24.0	12.7		0.7			
89P2262	TCLY	MI 1													
89P2264	TCLY	KK 5	GE 3	VR 2	HE 2	LE 1			26.0	15.7		0.8			
89P2264	TCLY	VC 1	MI 1												
89P2265	TCLY	KK 4	GE 3	HE 2	VR 2	VC 1			25.0	15.7		1.0			
89P2265	TCLY	LE 1	MI 1												
89P2267	TCLY	KK 4	GE 3	HE 2	VR 2	MI 1			24.0	15.7		1.1			
89P2267	TCLY	LE 1													
89P2268	TCLY	KK 5	GE 3	HE 2	VR 2	MI 1			24.0	14.3		1.3			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite VR vermiculite GE goethite VC verm-chlorit HE hematite MI mica
LE lepidocrocit
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER 0.06 BAR 4B1c	1-BAR 4B1a	CONTENT- -) 2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CONT <5mm 8F1	AGGRT STABL 4G1
			<- P C T o f < 2 m m ->			<- P P M ->			<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -						><20mm><PCT>
89P2261	1	0.06	0.34	0.02	0.16			3.5				17.3			72
89P2262	2	0.05	0.35	0.02	0.17			1.0				19.2			
89P2263	3	0.05	0.42	0.02	0.19			0.3				29.2			
89P2264	4	0.05	0.52	TR	0.21			0.2				34.8			
89P2265	5	0.04	0.49	TR	0.21			0.3				37.3			
89P2266	6	0.04	0.34	TR	0.17			0.1				35.4			
89P2267	7	0.07	0.22	TR	0.16			0.2				32.1			
89P2268	8	0.14	0.07	0.03	0.13			0.2				25.6			

SAMPLE NO.	HZ NO	<- - PIPETTE - - > CLAY 3A1c	SILT 3A1c	SAND 3A1c	< - HYDROMETER - > CLAY SML	SILT SML	SAND SML
		<- - -	- - -	-><- - -	- - -	->	

Narrative Pedon Description

Pedon: Ingenio
NSSL pedon number: 89P0404
Pedon ID: S89PR-141-002
Field classification: Fine, mixed, isohyperthermic Humic Hapludults
Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Typic Hapludults
Location: Utuado Municipio, Puerto Rico; Arecibo Soil Survey sheet 33; 2.7 km south on Highway 602 from junction with Highway 111 and 0.6 km east on municipal road
USGS 7.5-minute quadrangle: Bayaney
Latitude: 18°16’25" north
Longitude: 66°47’49" west
Elevation: 530 meters
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus
Geomorphic position: On upper third of component
Slope: 12 percent with a convex west aspect
Major Land Resource Area: 270—Humid Mountains and Valleys
Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability
Surface stoniness: Class 0
Erosion: Moderate
Particle-size control section: 18 to 66 cm
Parent material: Residuum from igneous-acid material
Weather station number: 9608
Diagnostic features: Ochric epipedon at 0 to 18 cm; argillic horizon at 18 to 117 cm
Geographically associated soils: Lirios and Voladora
Described and sampled by: D. Williams and G. Acevedo during February 1989

Ap—0 to 18 cm; dark brown (7.5YR 3/4) sandy clay loam; moderate fine and medium granular structure; friable, sticky, plastic; many fine roots throughout; few splotches of material from the B horizon in the lower part of the Ap horizon; strongly acid; clear smooth boundary. 89P2261

Bt1—18 to 28 cm; brown to dark brown (7.5YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable, sticky, plastic; common fine roots throughout; few continuous distinct coatings on vertical and horizontal faces of peds; many fine quartz grains; few large insect cavities; 5 to 10 percent mixing of material from the A horizon; strongly acid; gradual boundary. 89P2262

Bt2—28 to 36 cm; yellowish red (5YR 5/8) clay; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; friable, sticky, plastic; common fine roots throughout; many fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; many fine

quartz grains; roots concentrated along faces of prisms; few large insect cavities; strongly acid; clear smooth boundary. 89P2263

Bt3—36 to 56 cm; red (2.5YR 5/8) clay; few medium distinct redoximorphic features; moderate medium and coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable, sticky, plastic; few fine roots throughout; many fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; many fine quartz grains; roots concentrated along faces of prisms; few large insect cavities; strongly acid; clear smooth boundary. 89P2264

Bt4—56 to 91 cm; red (2.5YR 5/8) clay; common medium distinct redoximorphic features; moderate medium and coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable, sticky, plastic; few fine roots throughout; many fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; many fine quartz grains; roots concentrated along faces of prisms; few large (3 to 5 cm) insect cavities containing reddish soil material in the bottom of the cavity; clear smooth boundary. 89P2265

Bt5—91 to 117 cm; red (2.5YR 4/6) clay; common medium distinct redoximorphic features; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable, sticky, plastic; few fine roots throughout; common fine tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; many fine quartz grains; roots concentrated along faces of prisms; few large (3 to 5 cm) insect cavities containing reddish soil material in the bottom of the cavity; gradual boundary. 89P2266

BC—117 to 178 cm; 40 percent strong brown (7.5YR 5/6) and 60 percent red (2.5YR 4/6) clay loam; common fine distinct redoximorphic features; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; friable, slightly sticky, plastic; few fine roots throughout; common fine tubular pores; few discontinuous distinct coatings on vertical faces of peds; many fine quartz grains; roots concentrated along faces of prisms; few large (3 to 5 cm) insect cavities containing reddish soil material in the bottom of the cavity; gradual boundary. 89P2267

C—178 to 300 cm; red (10R 4/6) loamy textured saprolite; sampled at 260 to 300 cm. 89P2268

Vega Alta Municipio

Bayamón: S63PR-143-001

Primary Characterization Data

Vega Alta Municipio, Puerto Rico
Sampled as: Bayamón
SSL—Project: 40A 1, (NL40) SSIR Samples
—Pedon: 40A 230, Samples 40A 1712–1717
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM					(	) - - - - - - - - - - - -					->	<- PCT OF <75MM(3B1)->				
40A1712S	0- 20	Ap	73.1	7.7	19.2		6.1	1.6	1.8	9.8	6.2	1.4	--	--	C	-- C	--	17	--
40A1713S	20- 46	B21	81.2	6.5	12.3		5.4	1.1	1.4	6.3	3.5	1.0	0.1	--	C	-- C	--	11	--
40A1714S	46- 69	B22	85.5	5.2	9.3	42.3	3.5	1.7	0.9	4.7	2.7	0.7	0.3	--	C	-- C	--	8	--
40A1715S	69- 99	B23	89.5	4.7	5.8		4.6	0.1	0.5	3.1	1.8	0.3	0.1	--	C	-- C	--	5	--
40A1716S	99-130	B3	90.6	6.3	3.1		6.3	--	0.4	1.6	0.9	0.2	--	--	C	-- C	--	3	--
40A1717S	130	R													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d <- - G/CC	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c <- - -PCT	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	2.73	0.227			7.2			0.21	0.37			1.22	1.20	1.42		35.1			26.7	
20- 46	0.94	0.145			8.3			0.12	0.37			1.25	1.30	1.41		34.7			30.1	
46- 69	0.55	0.110			7.8			0.10	0.38			1.23	1.26	1.37	--	36.1		34.2	32.5	0.02
69- 99	0.35				8.3			0.11	0.34			1.25	1.26	1.40	--	35.0		33.9	30.1	0.05
99-130	0.25				8.8			0.16	0.33			1.29	1.28	1.46	--	34.9		34.9	29.8	0.07
130																				

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G							- - - - - - - - - - ->				<- - - - -PCT		- - - ->				1:2	1:1
0- 20	8.1	2.1	0.1	0.6	10.9	15.6		26.5	15.1			41	72				4.9		5.6
20- 46	4.2	1.6	0.1	0.6	6.5	13.2	0.3	19.7	9.5	6.8	4	33	68				4.7		5.4
46- 69	5.0	1.5	0.2	0.4	7.1	12.0	--	19.1	8.6			37	83				5.4		5.9
69- 99	5.9	1.9	0.2	0.1	8.1	11.0		19.1	9.8			42	83				5.2		5.6
99-130	10.2	1.9	0.3	0.1	12.5	8.8		21.3	14.1			59	89				5.7		5.7
130														98					

SAMPLE NUMBER	FRACT ION	X-RAY peak size	THERMAL Percent	DTA	TGA	ELEMENTAL Percent SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN mg/g	INTER PRETA TION
	<- -	- - - - - ->	- - - ->	< -	< -	- - - - - - - - -	- - - - - - - -	- - - - - - - -	- - - - - - - -	- - - - - - - -	- - - - - - - -	->	< - ->	>
40A1712	TCLY	MI 1 CL 1				KK45	GI 5							

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
MI mica CL chlorite KK kaolinite GI gibbsite GE goethite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Bayamón

NSSL pedon number: 40A0230

Pedon ID: S63PR-143-001

SSIR #12 pedon ID: S63PR-7-1

Field classification: Clayey, mixed, isohyperthermic Tropeptic Eutrorthox

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Kandiudalfic Eutrudox

Pedon purpose: Full pedon description

Location: Norte Soil Conservation District, Puerto Rico; 2 kilometers northeast of Vega Alta, Puerto Rico; 1.7 kilometers north on Highway 694 (from kilometer 28.5 on Highway 2), left 0.8 kilometer, by dairy barn 0.2 kilometer; aerial photograph GS-LR-5-22

Latitude: 18°25’48" north

Longitude: 66°18’15" west

Average annual precipitation: 2,032 mm

Slope: 3 percent; on a terrace or alluvial fan directly north of limestone hills

Drainage, runoff, and permeability: Well drained, medium internal drainage, medium runoff, and moderate permeability

Vegetation: Pangolagrass; used for pasture

Parent material: Transported sediments derived from weathered limestone and quarzitic sand deposits

Described and sampled by: R.B. Grossman, W.E. McKinzie, J. Juarez, and L.H. Rivera on September 30, 1963

Notes: The Ap, B22, and B3 horizons were sampled for the Bureau of Public Roads. Soil was at about field capacity when sampled. Reaction was determined by Soiltex. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 20 cm; dark reddish brown (5YR 3/4) clay; weak fine subangular blocky structure; firm, slightly hard, slightly sticky, slightly plastic; common fine roots; field moisture of 33.4 percent; very strongly acid; clear smooth boundary. 40A1712

B21—20 to 46 cm; dark red (2.5YR 3/6) and red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure parting to moderate medium granular; friable, slightly sticky, slightly plastic; common fine roots; common fine pores; patchy clay films; 30 percent pressure faces; small pieces fail abruptly upon slight pressure between fingers; field moisture of 60.7 percent; very strongly acid; gradual smooth boundary. 40A1713

B22—46 to 69 cm; red (2.5YR 4/6) and dark red (2.5YR 3/6) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; patchy clay films; 30 percent pressure faces; small pieces fail abruptly upon slight pressure between fingers; field moisture of 39.9 percent; very strongly acid; gradual smooth boundary. 40A1714

B23—69 to 99 cm; red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure parting to moderate medium granular; friable, slightly sticky, slightly plastic; patchy clay films; 30 percent pressure faces; small pieces fail abruptly upon slight pressure between fingers; field moisture of 38.6 percent; very strongly acid; gradual smooth boundary. 40A1715

B3—99 to 130 cm; red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; small pieces fail semiplastically upon slight pressure between fingers; field moisture of 39.8 percent; very strongly acid; abrupt wavy boundary. 40A1716

R—130 cm; white hard limestone probably of the Aymamón Formation. 40A1717

Sabana Seca: S89PR-143-001

Primary Characterization Data

Vega Alta Municipio, Puerto Rico

Sampled as: Sabana Seca; clayey, mixed, isohyperthermic Aeric Paleaquults

SSL—Project: 89P 83, (CP89PR115) Caribbean Area

—Pedon: 89P 407, Samples 89P 2285–2292

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - PCT OF <2MM (3A1)											- - ->	<- PCT OF <75MM(3B1)			->	
89P2285S	0- 15	Ap1	38.0	31.2	30.8	25.7		20.0	11.2	8.0	9.4	8.0	3.7	1.7	--	TR	--	23	TR
89P2286S	15- 30	Ap2	41.3	31.4	27.3	28.0		21.5	9.9	7.7	8.8	7.6	2.7	0.5	TR	TR	--	20	TR
89P2287S	30- 41	Bt1	53.9	29.0	17.1	25.7		17.1	11.9	3.5	6.7	5.0	1.5	0.4	TR	TR	--	14	TR
89P2288S	41- 71	Bt2	64.3	20.7	15.0	28.2		13.0	7.7	4.8	6.6	2.3	0.9	0.4	TR	--	--	10	TR
89P2289S	71-109	Bt3	57.3	29.8	12.9	35.1		19.7	10.1	7.7	3.5	1.0	0.5	0.2	TR	--	--	5	TR
89P2290S	109-150	2Bw1	54.0	41.2	4.8	27.4		17.0	24.2	1.5	1.6	1.1	0.5	0.1	TR	--	--	3	TR
89P2291S	150-182	2Bw2	51.3	24.6	24.1	35.9		13.4	11.2	4.4	10.7	6.8	1.8	0.4	TR	--	--	20	--
89P2292S	182-230	3Bw	50.3	17.7	32.0	36.5		8.9	8.8	7.5	12.5	8.1	2.9	1.0	1	TR	--	25	1

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 15	3.74	0.267			3.7	0.3	--	0.51	0.57										21.8	
15- 30	2.87	0.220			3.5	0.3	--	0.48	0.55										22.8	
30- 41	2.13	0.159			4.3	0.5	--	0.40	0.52										28.2	
41- 71	0.90	0.080			5.2	0.9	--	0.35	0.45										29.1	
71-109	0.45				5.6	0.6	--	0.43	0.49										28.3	
109-150	0.20				8.6	0.4	TR	0.55	0.56										30.0	
150-182	0.07				2.1	0.2	--	0.25	0.39										19.9	
182-230	0.06				6.0	0.4	TR	0.16	0.38										19.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - MEQ / 100 G									- - ->	<- - -PCT		- - ->					1:2	1:1
0- 15	7.9	2.7	0.3	0.4	11.3	17.4	0.5	28.7	19.4	11.8	4	39	58				3.9	4.3	4.6
15- 30	7.4	2.3	0.2	0.2	10.1	17.3	1.5	27.4	19.8	11.6	13	37	51				3.8	4.1	4.7
30- 41	5.2	2.6	0.2	0.2	8.2	21.3	5.6	29.5	21.8	13.8	41	28	38				3.6	3.9	4.6
41- 71	3.6	5.8	0.4	0.3	10.1	21.2	8.6	31.3	22.8	18.7	46	32	44				3.5	4.0	4.6
71-109	1.8	12.8	1.0	0.4	16.0	15.9	5.8	31.9	24.9	21.8	27	50	64				3.6	4.1	5.1
109-150	2.0	19.6	1.6	0.5	23.7	12.2	1.9	35.9	29.9	25.6	7	66	79				3.6	4.3	4.9
150-182	1.3	8.9	0.9	0.2	11.3	4.2	0.7	15.5	12.7	12.0	6	73	89				3.7	4.3	4.9
182-230	1.1	5.4	0.6	0.1	7.2	4.8	0.1	12.0	7.9	7.3	1	60	91				4.1	4.4	5.0

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)					THERMAL DTA 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
89P2288	TCLY	KK 5	MT 3	GE 3	VC 2	HE 1				27.0	13.4			0.6			
89P2288	TCLY	MI 1															
89P2289	TCLY	KK 5	MT 3	GE 3	VC 2	HE 1				24.0	11.2			0.7			
89P2289	TCLY	MI 1															
89P2291	TCLY	KK 5	MT 2	VC 2	GE 1	MI 1				30.0	6.3			0.4			

TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:

KK kaolinite MT montmorillon GE goethite VC verm-chlorit HE hematite MI mica

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9a	EXTRACTION SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER 0.06 BAR 4B1c	1-BAR 4B1a	CONTENT- -) 2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - ><- HYDROMETER - -> CLAY 3A1c	SILT	SAND	CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
89P2285	1	0.15	1.26	0.03	0.11			1.7				28.9									55
89P2286	2	0.18	1.44	0.04	0.18			1.1				28.8									63
89P2287	3	0.13	1.28	0.03	0.23			0.3				35.0									
89P2288	4	0.05	0.26	0.01	0.24			--				39.0									
89P2289	5	0.04	0.23	0.03	0.18			--				36.0									
89P2290	6	0.02	0.34	0.04	0.12			0.6				37.8									
89P2291	7	0.03	0.06	0.02	0.04			TR				24.9									
89P2292	8	0.03	0.05	0.03	0.03			--				22.0									

Narrative Pedon Description

Pedon: Sabana Seca
NSSL pedon number: 89P0407
Pedon ID: S89PR-143-001
Field classification: Clayey, mixed, isohyperthermic Aeric Paleaquults
Revised classification as of April 01, 2001: Very-fine, mixed, semiactive, isohyperthermic Typic Argiaquolls
Weather station number: 3409
Location: Vega Alta Municipio, Puerto Rico; Arecibo Soil Survey sheet 8; 2.4 km west on 689 from junction with Highway 2 to junction with Highway 690
Latitude: 18°27’21" north
Longitude: 66°20’43" west
Elevation: 5 meters
Physiography: Coastal plains
Slope: 5 percent with a plane southeast aspect
Major Land Resource Area: 272—Humid Coastal Plains
Geomorphic position: Fluvial delta of Rio Cibuco; Aymamón limestone outcrops in vicinity
Drainage, runoff, and permeability: Poorly drained, ponded, and slow permeability
Surface stoniness: Class 0
Erosion: Slight
Parent material: Marine sediments
Vegetation: Cortadera grass and sensitive briha in pastureland
Geographically associated soils: Coloso, Corozo, and Jobos
Described and sampled by: D. Williams and C.L. Santiago during February 1989

Ap1—0 to 15 cm; very dark brown (10YR 2/2) clay loam; weak fine and medium subangular blocky structure; firm, sticky, plastic; common fine roots throughout; common fine tubular pores; clear smooth boundary. 89P2285

Ap2—15 to 30 cm; very dark grayish brown (10YR 3/2) clay; common fine distinct redoximorphic features; moderate fine and medium subangular blocky structure; firm, sticky, plastic; common fine roots throughout; common fine tubular pores; clear wavy boundary. 89P2286

Bt1—30 to 41 cm; strong brown (7.5YR 5/8) clay; common fine distinct redoximorphic features; weak fine and medium subangular blocky structure; firm, sticky, plastic; few fine roots throughout; common tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; strongly acid; gradual boundary. 89P2287

Bt2—41 to 71 cm; yellowish brown (10YR 5/6) clay; common fine distinct redoximorphic features; weak medium and coarse prismatic structure parting to moderate fine and medium blocky; firm, sticky, plastic; few fine roots throughout; common tubular pores; few continuous distinct coatings on vertical and horizontal faces of peds; strongly acid; gradual boundary. 89P2288

Bt3—71 to 109 cm; brownish yellow (10YR 6/8) clay; few coarse distinct and common medium distinct redoximorphic features; weak medium and coarse prismatic structure parting to weak medium and coarse subangular blocky; firm, sticky, plastic; few fine roots throughout; common tubular pores; very few patchy faint coatings in root channels and/or pores and very few patchy faint coatings on rock fragments; strongly acid; clear wavy boundary. 89P2289

Bw1—109 to 150 cm; white (10YR 8/1) clay; few fine and medium distinct redoximorphic features; weak coarse subangular blocky structure; firm, sticky, plastic; few fine roots throughout; very few patchy distinct coatings on rock fragments; strongly acid; gradual boundary. 89P2290

Bw2—150 to 183 cm; white (10YR 8/1) clay; common medium distinct redoximorphic features; weak coarse subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots throughout; very few patchy distinct coatings on rock fragments; moderately acid; clear wavy boundary. 89P2291

Bw—183 to 229 cm; strong brown (7.5YR 5/8) clay; slightly sticky, slightly plastic; very few patchy distinct coatings on rock fragments; moderately acid. 89P2292

Vega Baja Municipio

Arecibo: S73PR-145-001

Primary Characterization Data

Vega Baja Municipio, Puerto Rico

Sampled as: Arecibo; sandy, siliceous, isohyperthermic Entic Grossarenic Haplorthods

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1258, Samples 40A 9570–9581

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-	-	- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A9570S	0- 15	A11		1.6	2.0	96.4			1.2	0.8	5.7	60.0	21.1	9.4	0.2	--	--	--	91	--
40A9571S	15- 30	A12		1.6	1.7	96.7			1.2	0.5	5.0	53.7	24.1	13.4	0.5	--	--	--	92	--
40A9572S	30- 50	A21		1.2	1.6	97.2			0.8	0.8	5.2	57.2	23.1	11.4	0.3	--	--	--	92	--
40A9573S	50- 72	A22		1.2	3.4	95.4			1.2	2.2	6.1	55.4	21.7	11.8	0.4	--	--	--	89	--
40A9574S	72-101	A23		0.8	3.3	95.9			1.6	1.7	6.3	60.0	19.5	9.5	0.6	--	--	--	90	--
40A9575S	101-149	A24		1.2	1.2	97.6			0.4	0.8	6.2	55.0	17.8	17.3	1.3	--	--	--	91	--
40A9576S	149-173	B11		1.6	1.6	96.8			1.2	0.4	4.5	41.7	21.2	28.1	1.3	--	--	--	92	--
40A9577S	173-188	B12h		4.1	3.0	92.9			0.4	2.6	8.3	53.1	22.7	8.6	0.2	--	--	--	85	--
40A9578S	188-208	B13h		6.1	1.8	92.1			--	1.8	5.7	47.7	27.2	11.4	0.1	--	--	--	86	--
40A9579S	208-226	B21t		17.3	4.7	78.0			3.2	1.5	5.3	46.1	17.7	8.5	0.4	--	--	--	73	--
40A9580S	226-234	B22t		13.2	2.9	83.9			0.2	2.7	4.1	49.8	20.4	9.4	0.2	--	--	--	80	--
40A9581S	234-289	C		13.9	1.4	84.7			0.8	0.6	3.9	43.7	22.7	14.1	0.3	--	--	--	81	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 15					TR	TR		0.25	2.31										3.7	
15- 30	0.36							0.81	1.50										2.4	
30- 50	0.14				0.9	TR		0.33	1.25										1.5	
50- 72	0.11				0.1	TR		0.17	1.42										1.7	
72-101	0.04																		1.5	
101-149	0.01				TR	0.5		0.08	1.00										1.2	
149-173	0.04				TR	0.5		0.13	0.63										1.0	
173-188	0.52				TR	0.1		0.80	0.71					1.66			9.2		2.9	
188-208	0.47				TR	0.1		0.51	0.49					1.83			9.6		3.0	
208-226	0.21				0.4	0.1		0.27	0.39					1.85			9.8		6.7	
226-234	0.10				0.2	TR		0.26	0.39										5.2	
234-289					TR	TR		0.17	0.40										5.5	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- - ->	<- - - -	-PCT	- - - ->						1:2	1:1
0- 15	1.0	0.3	TR	0.1	1.4	2.1	0.2	3.5	0.4	1.6	13	40	100					3.5	3.9	4.0
15- 30	0.3	0.1	TR	TR	0.4	1.6	0.2	2.0	1.3	0.6	33	20	31					3.1	3.5	3.8
30- 50	0.2	TR	TR	--	0.2	0.5	0.1	0.7	0.4	0.3	33	29	50					3.3	3.7	3.9
50- 72	0.1	TR	--	--	0.1	0.2	0.1	0.3	0.2	0.2	50	33	50					3.5	3.8	4.0
72-101	TR	TR	--	TR	TR	0.5	0.1	0.5	0.2			4	10					3.6	3.9	4.1
101-149	0.1	--	--	TR	0.1	0.1	0.1	0.2	0.1	0.2	50	50	100					3.8	4.1	4.3
149-173	0.2	--	--	--	0.2	1.1	0.2	1.3	0.2	0.4	50	15	100					3.5	3.8	4.0
173-188	0.4	0.2	TR	0.1	0.7	7.5	1.0	8.2	3.3	1.7	59	9	21					3.7	4.1	4.5
188-208	0.4	0.1	TR	0.1	0.6	6.1	1.1	6.7	3.1	1.7	65	9	19					3.6	4.0	4.4
208-226	1.2	1.0	0.1	0.5	2.8	4.1	1.4	6.9	4.7	4.2	33	41	60					3.5	4.0	4.4
226-234	0.6	0.8	0.1	0.4	1.9	2.7	1.1	4.6	3.4	3.0	37	41	56					3.4	3.9	4.4
234-289	0.2	0.6	0.1	0.2	1.1	1.9	0.8	3.0	2.3	1.9	42	37	48					3.7	3.4	2.7

DEPTH (CM)	(- -NA PYROPHOSPHATE EXTRACTABLE- -) C	FE	AL	FE+AL	FE+AL	AL+C	(- -) INDEX OF ACCUM
	<- PCT OF <2MM ->			(- -DIVIDED BY- -) DI-CI FE+AL	PCT CLAY	PCT CLAY	
0- 15	0.5	TR	TR				
15- 30							
30- 50		TR	TR				
50- 72							
72-101							
101-149	0.3	TR	TR			0.3	
149-173	0.3	TR	TR			0.2	
173-188	0.6	TR	0.3	3.0	0.1	0.2	92
188-208	0.8	TR	0.1	1.0	TR	0.1	
208-226	0.2	TR	0.1	0.2	--	TR	
226-234		TR	TR				
234-289		TR	TR				

Narrative Pedon Description

Pedon: Arecibo

NSSL pedon number: 40A1258

Pedon ID: S73PR-145-001

Field classification: Sandy, siliceous, isohyperthermic Entic Grossarenic Haplorthods

Revised classification as of April 01, 2001: Sandy, siliceous, isohyperthermic Entic Grossarenic Alorthods[3]

Pedon purpose: Full pedon description

Location: Vega Baja Municipio, Puerto Rico; Norte Soil Conservation District; Arecibo Soil Survey Area; 600 meters west of kilometer marker 15.2 on Highway 686

Latitude: Unknown

Longitude: Unknown

Slope: 3 percent

Average air temperature: Annual—25.6 °C

Average annual precipitation: 1,524 mm

Drainage: Excessively drained

Vegetation: Pangolagrass

Geographically associated soils: Carrizales, Guerrero, and Jobos

Particle-size control section: 25 to 100 cm

Diagnostic features: Ochric epipedon at 0 to 30 cm; albic horizon at 30 to 150 cm; spodic horizon at 150 to 208 cm

Described and sampled by: L.H. Rivera on November 6, 1973

A11—0 to 15 cm; gray (10YR 5/1) fine sand; single grain; loose, nonsticky, nonplastic; many fine roots; 50 percent spherical black (10YR 2/1) dark concretions; very strongly acid; clear smooth boundary. 40A9570

A12—15 to 30 cm; gray (10YR 5/1 and 6/1) fine sand; single grain; loose, nonsticky, nonplastic; common fine roots; 15 percent spherical black (10YR 2/1) dark concretions; very strongly acid; clear wavy boundary. 40A9571

A21—30 to 50 cm; gray (10YR 6/1) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; very strongly acid; clear wavy boundary. 40A9572

A22—50 to 72 cm; white (10YR 8/1) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; very strongly acid; diffuse wavy boundary. 40A9573

A23—72 to 101 cm; white (10YR 8/1) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; very strongly acid; gradual wavy boundary. 40A9574

A24—101 to 149 cm; white (10YR 8/1) fine sand, brown (10YR 4/3) where decayed roots are found; single grain; loose, nonsticky, nonplastic; very strongly acid; clear wavy boundary. 40A9575

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[3] Only two pedons sampled in Puerto Rico classify as Spodosols. See the following pedon (ID S73PR-145-003) for the second Spodosol. It is thought that these soils are quite minor in extent and that their genesis was quit unlike that of Spodosols from temperate regions of the world.

B11—149 to 173 cm; brown (10YR 5/3) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid; abrupt wavy boundary. 40A9576

B12h—173 to 188 cm; very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2), and black (10YR 2/1) loamy sand; the uppermost part of the horizon, about 1 centimeter thick, is the black material, followed by the very dark grayish brown and the very dark brown; single grain; loose, nonsticky, nonplastic; very strongly acid; clear wavy boundary. 40A9577

B13h—188 to 208 cm; yellowish brown (10YR 5/4) and yellowish brown (10YR 5/8) loamy sand; single grain; loose, nonsticky, nonplastic; very strongly acid; clear wavy boundary. 40A9578

B21t—208 to 226 cm; reddish yellow (7.5YR 6/8), brown (10YR 5/3), white (10YR 8/1), and very pale brown (10YR 8/4) sandy loam; tongues of material about 3 cm in diameter from the Bh horizon in the upper boundary, diminishing to zero at 5 to 10 cm apart; massive; firm, slightly sticky, slightly plastic; 20 to 30 percent yellowish bodies, possibly remnants of a degrading argillic horizon; very strongly acid; gradual wavy boundary. 40A9579

B22t—226 to 234 cm; brown (10YR 5/3), reddish yellow (7.5YR 6/8), white (10YR 8/1), and very pale brown (10YR 8/4) sandy loam; massive; firm, slightly sticky, slightly plastic; very strongly acid; clear wavy boundary. 40A9580

C—234 to 289 cm; light gray (5Y 7/2) and white (5Y 8/1) sand; single grain; loose, nonsticky, nonplastic; very strongly acid; smell of sulfide. 40A9581

Corozo: S73PR-145-003

Primary Characterization Data

Vega Baja Municipio, Puerto Rico
Sampled as: Corozo
SSL—Project: 40A 1, (NL40) SSIR Samples
—Pedon: 40A1260, Samples 40A 9591–9600
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- TOTAL FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- COARSE FRACS (MM) WEIGHT 5 -20	-15- COARSE FRACS (MM) WEIGHT 20 -75	-16- COARSE FRACS (MM) WEIGHT .1- 75	-17- >2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM ( ) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
40A9591S	0- 10	A11	0.8	3.2	96.0			2.0	1.2	3.2	66.8	23.9	2.1	--	--	--	--	93	--
40A9592S	10- 31	A12	0.8	3.4	95.8			0.8	2.6	3.2	67.1	23.4	2.1	--	--	--	--	93	--
40A9593S	31- 46	A2	--	4.0	96.0				4.0	3.7	68.5	21.4	2.3	0.1	--	--	--	92	--
40A9594S	46- 47	B11h	5.2	12.0	82.8			8.5	3.5	3.7	59.3	17.9	1.8	0.1	--	--	--	79	--
40A9595S	47- 50	B12h	10.1	11.0	78.9			7.7	3.3	3.0	55.7	18.6	1.5	0.1	--	--	--	76	--
40A9596S	50- 61	B13h	26.0	7.8	66.2			5.3	2.5	2.9	48.4	13.9	0.9	0.1	--	--	--	63	--
40A9597S	61- 84	B2t	55.2	2.3	42.5			1.2	1.1	2.9	34.6	4.8	0.2	--	--	--	--	40	--
40A9598S	84-102	B31m	19.9	10.0	70.1			5.0	5.0	7.5	42.0	17.7	2.7	0.2	--	--	--	63	--
40A9599S	102-152	B32	32.3	4.4	63.3			2.8	1.6	2.2	45.6	14.9	0.6	--	--	--	--	61	--
40A9600S	84-102	B31m													--	--	--		--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b OF	AL 6G7a <2MM -->	MN 6D2a	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <-	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	1/10 BAR 4B1c -PCT	1/3 BAR 4B1c OF	15 BAR 4B2a <2MM -	WRD WHOLE SOIL 4C1 -> CM/CM
0- 10	1.20				TR	TR														
10- 31	0.68				TR	TR								1.47			4.6		2.0	
31- 46	0.14				TR	TR														
46- 47	0.69				TR	0.1		0.87												
47- 50	0.72				TR	0.1		0.51	0.49					1.80			11.3		4.9	
50- 61	1.31				TR	0.1		0.35	0.46					1.44			21.8		12.0	
61- 84	0.53				TR	0.6		0.15	0.32					1.73			19.4		17.6	
84-102	0.94				TR	0.1		0.37	0.53					1.85			12.9		10.5	
102-152	0.23				TR	0.6		0.12	0.33					1.86			13.4		10.8	
84-102					TR	0.1														

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	PH SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->											<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 10	3.9	0.6	0.1	0.1	4.7	1.8	0.2	6.5	4.9	2		72	96						5.0	5.3
10- 31	1.8	0.2	0.1	TR	2.1	1.7	0.1	3.8	2.5	4		55	84						5.0	5.4
31- 46	0.3	TR	0.1	TR	0.4	0.1		0.5	0.5	20		80	80						5.0	5.8
46- 47	3.0	0.2	0.1	TR	3.3	2.6		5.9	4.5	2		56	73						5.1	5.7
47- 50	1.7	0.2	0.1	TR	2.0	5.4	0.6	7.4	5.1	2	1	27	39					5.1	4.5	5.1
50- 61	1.2	0.3	0.1	--	1.6	13.5	0.1	15.1	9.2	1		11	17						4.0	5.1
61- 84	0.5	0.4	0.1	TR	1.0	11.8	5.0	12.8	8.4	1		8	12						3.6	4.0
84-102						19.0	3.0	19.0	7.3										4.2	4.5
102-152						6.4	2.9	6.4	3.9										3.8	4.2
84-102	0.3	0.3	TR	TR	0.6	2.9	6.9	3.5	3.5	1		17	17						3.7	4.0

DEPTH (CM)	NA PYROPHOSPHATE EXTRACTABLE C	FE	AL	FE+AL DI-CI FE+AL	FE+AL PCT CLAY	AL+C PCT CLAY	INDEX OF ACCUM
	<- PCT OF <2MM ->			DIVIDED BY			
0- 10	0.4	TR	TR				
10- 31		TR	TR				
31- 46	0.2	TR	TR				
46- 47	0.5	TR	0.2	2.0		0.1	
47- 50	0.5	0.1	0.1	2.0		0.1	
50- 61	0.8	TR	0.2	2.0			
61- 84	0.4	TR	0.2	0.3			
84-102							
102-152							
84-102							

Narrative Pedon Description

Pedon: Corozo
NSSL pedon number: 40A1260
Pedon ID: S73PR-145-003
Series classification: Sandy over clayey, aniso, siliceous over kaolinitic, isohyperthermic Typic Alorthods
Revised classification as of April 01, 2001: Fine-loamy over clayey, mixed, superactive, isohyperthermic Entic Alorthods
Location: Vega Baja Municipio, Puerto Rico; Norte Soil Conservation District; Arecibo Soil Survey Area; Camp Tortuguero; 600 meters west of officer's club on Highway 687
Latitude: Unknown
Longitude: Unknown
Elevation: 10 meters
Slope: 4 percent
Drainage: Well drained
Geomorphic setting: Plain
Vegetation: Grass and herbaceous cover
Particle-size control section: 61 to 84 cm
Described and sampled by: L.H. Rivera on November 8, 1973

A11—0 to 10 cm; gray (10YR 6/1) fine sand, 15 percent black (10YR 2/1) dry; single grain; loose, nonsticky, nonplastic; many fine roots; very strongly acid; clear wavy boundary. 40A9591

A12—10 to 31 cm; gray (10YR 5/1) fine sand, 15 percent black (10YR 2/1) dry; single grain; loose, nonsticky, nonplastic; common fine roots; very strongly acid; clear wavy boundary. 40A9592

A2—31 to 46 cm; brown (10YR 5/3) and gray (10YR 6/1) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; thin band about 1 cm thick of fine sand; very strongly acid; abrupt smooth boundary. 40A9593

B11h—46 to 47 cm; black (10YR 2/1) sandy loam; single grain; loose, nonsticky, nonplastic; very strongly acid; abrupt smooth boundary. 40A9594

B12h—47 to 50 cm; very dark grayish brown (10YR 3/2) sandy loam; single grain; loose, nonsticky, nonplastic; very strongly acid; clear wavy boundary. 40A9595

B13h—50 to 61 cm; very dark brown (10YR 2/2) sandy loam; single grain; loose, nonsticky, nonplastic; very strongly acid; abrupt irregular boundary. 40A9596

B2t—61 to 84 cm; pale brown (10YR 6/3) and brown (7.5YR 5/2) clay; moderate coarse prismatic structure; firm, slightly sticky, moderately plastic; prisms dominantly 5 to 10 cm in diameter but range from 2.5 to 13 cm; plates 0.6 to 1.9 cm thick in the upper part of the horizon; horizontally oriented lamellae in the lower part of the horizon; very strongly acid; clear wavy boundary. 40A9597

B31m—84 to 102 cm; brown (10YR 5/3) and brown (7.5YR 4/4) loamy sand; massive; extremely firm, extremely hard, strongly cemented, nonsticky, nonplastic; very strongly acid; gradual wavy boundary. 40A9598

B32—102 to 152 cm; light gray (2.5Y 7/2) sandy loam; massive; very firm, extremely hard, nonsticky, slightly plastic; very strongly acid. 40A9599

B31m—84 to 102 cm; 84 to 102 cm; brown (10YR 5/3) and brown (7.5YR 4/4) loamy sand; massive; extremely firm, extremely hard, strongly cemented, nonsticky, nonplastic; very strongly acid; gradual wavy boundary. 40A9600 Subsample.

Almirante: S73PR-145-002

Primary Characterization Data

Vega Baja Municipio, Puerto Rico

Sampled as: Almirante; very-fine, kaolinitic, isohyperthermic Plinthic Hapludox

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1259, Samples 40A 9582–9590

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .05-.05	-3-- TOTAL SAND .05-2	-4-- TOTAL FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE LT .002-.02	-7-- SILT COARSE .02-.05	-8-- SAND VF .05-.10	-9-- SAND F .10-.25	-10- SAND M .25-.50	-11- SAND C .5-1	-12- SAND VC 1-2	-13- COARSE FRACS (MM) 2-5	-14- COARSE FRACS (MM) 5-20	-15- COARSE FRACS (MM) 20-75	-16- WEIGHT .1-75	-17- >2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - -					<- PCT OF <75MM(3B1)->				
40A9582S	0- 15	Ap1	77.1	5.9	17.0	39.2		4.7	1.2	2.0	9.1	3.9	1.8	0.2	--	--	--	15	--
40A9583S	15- 28	Ap2	79.9	6.4	13.7			4.6	1.8	1.6	7.3	3.1	1.5	0.2	--	--	--	12	--
40A9584S	28- 48	B21t	85.0	7.0	8.0	38.6		4.9	2.1	1.1	4.5	1.7	0.5	0.2	--	--	--	7	--
40A9585S	48- 71	B22t	82.2	8.7	9.1			6.6	2.1	1.8	4.8	1.6	0.7	0.2	--	--	--	7	--
40A9586S	71- 81	B23t	78.9	15.5	5.6	38.8		11.0	4.5	1.5	2.2	0.8	0.6	0.5	--	--	--	4	--
40A9587S	81-114	B24t	73.8	17.1	9.1			11.8	5.3	3.9	3.1	1.0	0.7	0.4	--	--	--	5	--
40A9588S	114-163	B25t	73.1	15.7	11.2	35.5		10.5	5.2	3.7	3.9	1.5	1.2	0.9	--	--	--	7	--
40A9589S	114-163	B25t	68.7	19.6	11.7			13.0	6.6	4.4	5.4	1.5	0.4	--	--	--	--	7	--
40A9590S	114-163	B25t	68.2	21.1	10.7			14.2	6.9	4.5	3.7	1.3	0.9	0.3	--	--	--	6	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - -	COLE OVEN DRY 4A1h - -	WHOLE SOIL 4D1 -> CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	2.43				7.0	1.7		0.14	0.35				1.30	1.44	--			30.0	27.3	0.04
15- 28	1.88				7.4	1.7		0.12	0.36				1.35	1.51	--			31.1	29.1	0.03
28- 48	0.97				8.1	1.8		0.08	0.35	62	31		1.32	1.52					29.6	
48- 71	0.57				8.1	1.8		0.12	0.40				1.05	1.19	--			38.3	32.9	0.06
71- 81	0.52				10.4	1.6		0.09	0.41	64	22		1.24	1.37					32.6	
81-114	0.34				10.3	1.1		0.09	0.44				1.44	1.51					32.2	
114-163	0.18				8.5	1.2		0.10	0.38				1.48	1.56					28.1	
114-163	0.24				9.0	1.4			0.41										28.3	
114-163	0.18				10.9	1.3			0.41										27.7	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5A3b	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM	<20MM 8I	(- - - -PH - - -) SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->									PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 15	2.0	0.1	TR	0.5	2.6	20.3	3.6	22.9	10.9	TR		11	24						3.6	3.6
15- 28	0.7	TR	--	0.4	1.1	20.5	3.9	21.6	9.2	TR		5	12						3.6	3.6
28- 48	0.4	TR	--	0.3	0.7	19.2	3.9	19.9	6.5	TR		4	11						3.3	3.6
48- 71	0.6	0.1	--	0.3	1.0	17.8	3.1	18.8	9.6	TR		5	10						3.5	3.8
71- 81	1.4	0.1	--	0.4	1.9	15.1	1.9	17.0	7.1	TR	TR	11	27					4.5	3.6	4.0
81-114	3.9	0.2	--	0.3	4.4	10.5	0.3	14.9	6.8	TR		30	65						4.6	4.9
114-163	1.8	0.1	--	0.1	2.0	11.4	1.8	13.4	7.1	TR		15	28							
114-163																				
114-163																				

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - - ->											<- -PCT- ->			
0- 15															
15- 28															
28- 48															
48- 71															
71- 81	1.8	0.3	0.4	0.3	--	--		--	1.1		1.3	66.7	TR	0.4	
81-114															
114-163															
114-163															
114-163															

Narrative Pedon Description

Pedon: Almirante
NSSL pedon number: 40A1259
Pedon ID: S73PR-145-002
Field classification: Very-fine, kaolinitic, isohyperthermic Plinthic Hapludox
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isohyperthermic Plinthic Kandiudox
Location: Vega Baja Municipio, Puerto Rico; Norte Soil Conservation District; Arecibo Soil Survey Area; 320 meters east of kilometer marker 4.0 on Highway 160
Latitude: Unknown
Longitude: Unknown
Elevation: 80 meters
Geomorphic setting: Valley by a hill
Slope: 2 percent
Drainage: Well drained
Vegetation: Crop cover
Particle-size control section: 28 to 78 cm
Described and sampled by: L.H. Rivera on November 6, 1973

Ap1—0 to 15 cm; dark yellowish brown (10YR 4/4) clay; weak fine subangular blocky structure parting to weak fine granular; firm, slightly sticky, moderately plastic; many fine roots; very strongly acid; clear smooth boundary. 40A9582

Ap2—15 to 28 cm; continuous in 80 percent of pit with an average thickness of 13 cm; dark yellowish brown (10YR 4/4) and brownish yellow (10YR 6/8) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; many fine pores; patchy clay films; 1 percent fine and medium black (10YR 2/1) carbonate concretions; very strongly acid; clear irregular boundary. 40A9583

B21t—28 to 48 cm; 20 percent dark yellowish brown (10YR 4/4) and 80 percent brownish yellow (10YR 6/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; many fine pores; common fine quartz grains; patchy clay films; 1 percent fine black (10YR 2/1) carbonate concretions; very strongly acid; clear smooth boundary. 40A9584

B22t—48 to 71 cm; brownish yellow (10YR 6/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; many fine pores; common fine quartz grains; patchy clay films; 1 percent fine black (10YR 2/1) carbonate concretions; very strongly acid; clear wavy boundary. 40A9585

B23t—71 to 81 cm; 5 to 30 cm in thickness with an average thickness of 10 cm; red (2.5YR 4/6) clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; many fine pores; patchy clay films; 1 percent fine black (10YR 2/1) carbonate concretions; very strongly acid; clear wavy boundary. 40A9586

B24t—81 to 114 cm; 50 percent yellowish brown (10YR 5/8) and 50 percent red (2.5YR 5/6) clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; patchy clay films; 15 to 18 percent plinthite; very strongly acid; diffuse wavy boundary. 40A9587

B25t—114 to 163 cm; 10 percent yellow (10YR 7/6), 10 percent yellowish red (5YR 4/6), 20 percent brownish yellow (10YR 6/8), and 60 percent red (2.5YR 5/6) clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; 20 to 25 percent plinthite; patchy clay films; very strongly acid. 40A9588

B25t—114 to 163 cm; subsample 1. 40A9589

B25t—114 to 163 cm; subsample 2. 40A9590

Naranjo: S73PR-145-004

Primary Characterization Data

Vega Baja Municipio, Puerto Rico

Sampled as: Naranjo

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A1270, Samples 40A 9653–9658

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002 -.05	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - VF .05 -.10	- -SAND- - F .10 -.25	M .25 -.50	- - - -) C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						( ) - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				
40A9653S	0- 20	Ap													--	--	--		--
40A9654S	20- 30	B1	33.7	30.7	35.6			20.5	10.2	7.5	15.6	5.0	4.3	3.2	--	--	--	28	--
40A9655S	30- 43	B2	25.6	33.8	40.6			23.6	10.2	6.3	15.7	7.4	6.9	4.3	--	--	--	34	--
40A9656S	43- 56	B3	39.7	30.3	30.0			20.5	9.8	4.7	9.6	5.5	5.6	4.6	--	--	--	25	--
40A9657S	56-104	C1	45.2	33.2	21.6			--	33.2	2.8	6.2	3.7	4.4	4.5	--	--	--	19	--
40A9658S	104-152	C2													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20																				
20- 30	0.67				1.4	0.1		0.58	0.39										13.2	
30- 43	0.35				0.7	0.1		0.59	0.42	35	17								10.7	
43- 56	0.35				1.0	0.1		0.55	0.36										14.2	
56-104	0.21				1.0	0.1		0.54	0.34	46	26								15.4	
104-152																				

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	6G9a	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5A3b PCT	SAR 5G1	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM 8I	<20MM	(- - - -PH - - -) SAT PASTE 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G						- - - - - - - - - ->			PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 20																				
20- 30		0.5	0.2	0.2		--			19.4	1		100	5	38					7.4	8.4
30- 43		0.4	0.3	0.2		--			15.2	2	TR	100	6	44				7.7	7.4	8.0
43- 56		0.5	0.2	0.3		--			21.8	1		100	5	39					7.3	8.0
56-104		0.6	0.2	0.3		--			24.3	1	TR	100	5	39				7.6	7.4	8.0
104-152																				

DEPTH (CM)	(- - - - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - -) CA	MG	NA	K	CO3	HCO3	F	CL	SO4	NO2	NO3	H2O	TOTAL SALTS EST.	PRED. ELEC. COND. MMHOS /cm	ELEC. COND. MMHOS /cm
	< - - - - - - - - - - - - - -MEQ / LITER											<- -PCT- ->			
0- 20															
20- 30															
30- 43	9.3	0.1	0.8	TR	--	2.8		0.5	2.7		0.8	41.5	TR	1.0	
43- 56											0.5				
56-104	6.0	0.1	0.6	TR	--	1.6		--	1.9			52.3	TR	0.7	
104-152															

Narrative Pedon Description

Pedon: Naranjo
NSSL pedon number: 40A1270
Pedon ID: S73PR-145-004
Field classification: None given
Revised classification as of April 01, 2001: Naranjo; clayey, carbonatic, isohyperthermic Inceptic Haprendolls
Pedon purpose: Full pedon description
Location: Vega Baja Municipio, Puerto Rico; Norte Soil Conservation District; Arecibo Soil Survey Area; 350 meters south of kilometer marker 3.2 on Highway 646
Latitude: Unknown
Longitude: Unknown
Geomorphic setting: Hill
Elevation: 150 meters
Slope: 15 percent
Drainage: Well drained
Vegetation: Pangolagrass
Particle-size control section: 25 to 100 cm
Described and sampled by: L.H. Rivera on January 14, 1974

Ap—0 to 20 cm; very dark grayish brown (10YR 3/2) clay; moderate fine granular structure; firm, slightly sticky, moderately plastic; many fine roots; many fine soft limestone fragments; few seashell fragments; strong effervescence; clear smooth boundary. 40A9653

B1—20 to 30 cm; yellowish brown (10YR 5/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; many fine roots; many fine soft limestone fragments; few seashell fragments; strong effervescence; clear smooth boundary. 40A9654

B2—30 to 43 cm; yellowish brown (10YR 5/6) clay; weak medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; many fine soft limestone fragments; strong effervescence; clear wavy boundary. 40A9655

B3—43 to 56 cm; brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6) clay; weak fine subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; common medium lime splotches; violent effervescence; gradual wavy boundary. 40A9656

C1—56 to 104 cm; brownish yellow (10YR 6/8) and yellowish brown (10YR 5/6) clay; 3 percent prominent light gray (10YR 7/1) mottles; massive; firm, slightly sticky, moderately plastic; many lime splotches; violent effervescence; gradual wavy boundary. 40A9657

C2—104 to 152 cm; pink (7.5YR 7/4), brownish yellow (10YR 6/8), light gray (10YR 7/1), and very pale brown (10YR 8/3) clay; massive; friable, slightly sticky, moderately plastic; many lime splotches; violent effervescence. 40A9658

Yabucoa Municipio

Ingenio: S63PR-151-001

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Ingenio; clayey, mixed, isohyperthermic Oxic Tropudults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 583, Samples 40A 4269–4275

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-	-	- - - -)		(-COARSE FRACS (MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM		(	) - - - - - - - - - - - -					->	<- PCT OF <75MM(3B1)->			SOIL
40A4269S	0- 18	Ap		35.3	29.4	35.3			24.0	5.4	4.5	10.1	9.0	11.2	0.5	--C	--C	--	31	--
40A4270S	18- 38	B21t		44.4	34.2	21.4			28.1	6.1	3.9	6.5	4.7	5.6	0.7	--C	--C	--	17	--
40A4271S	38- 79	B22t		32.3	46.6	21.1	8.3		35.6	11.0	6.2	5.9	3.6	4.4	1.0	--C	--C	--	15	--
40A4272S	79-102	B3		23.4	50.2	26.4			37.2	13.0	7.4	7.1	4.5	6.0	1.4	--C	--C	--	19	--
40A4273S	102-130	C1		18.2	51.7	30.1	4.4		37.6	14.1	8.9	8.7	5.3	6.1	1.1	--C	--C	--	21	--
40A4274S	130-193	C2		16.6	54.3	29.1			40.3	14.0	7.8	8.4	5.1	6.6	1.2	--C	--C	--	21	--
40A4275S	193-279	C3		14.8	53.0	32.2			38.2	14.8	8.9	8.5	5.5	7.3	2.0	--C	--C	--	23	--

	ORGN TOTAL		EXTR TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC	-	- ->	CM/CM	<- -	-PCT OF <2MM		- ->	CM/CM
0- 18	2.08	0.177			3.2			0.30	0.53			1.21	1.36	1.45	--	38.7		25.8	18.8	0.10
18- 38	0.78	0.076			2.6			0.21	0.51			1.25	1.38	1.48	--	36.6		27.5	22.8	0.06
38- 79	0.34	0.036			4.9			0.28	0.54			1.29	1.32	1.38	--	29.1		26.9	17.6	0.12
79-102	0.25				4.7			0.36	0.62			1.25	1.25	1.29	--	27.0		27.7	14.5	0.17
102-130	0.17				4.7			0.45	0.64			1.14	1.14	1.17	--	30.3		29.1	11.7	0.20
130-193	0.10				4.3			0.47	0.63				1.10						10.5	
193-279	0.05				4.5			0.59	0.70										10.3	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - - -	-PCT	- -	- ->					1:2	1:1
0- 18	3.0	1.5	0.3	1.2	6.0	12.7	0.4	18.7	10.7	6.4	6	32	56					4.3		4.8
18- 38	1.7	1.5	0.4	0.2	3.8	11.2	2.2	15.0	9.3	6.0	37	25	41					3.7		4.6
38- 79	1.2	1.3	0.4	0.1	3.0	11.1	4.3	14.1	8.9	7.3	59	21	34					3.7		4.6
79-102	0.9	1.2	0.3	0.1	2.5	11.0	5.1	13.5	8.4	7.6	67	19	30					3.8		4.7
102-130	0.8	1.0	0.2	0.1	2.1	10.4	5.1	12.5	8.1	7.2	71	17	26					3.8		4.7
130-193	0.2	0.9	0.2	0.2	1.5	10.3	4.9	11.8	7.8	6.4	77	13	19					3.9		4.7
193-279	0.4	0.7	0.1	0.3	1.5	11.0	5.9	12.5	8.7	7.4	80	12	17					3.9		4.7

Narrative Pedon Description

Pedon: Ingenio

NSSL pedon number: 40A0583

Pedon ID: S63PR-151-001

SSIR #12 pedon ID: S63PR-12-6

Field classification: Clayey, mixed, isohyperthermic Oxic Tropudults

Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Typic Hapludults

Location: Yabucoa Municipio, Tejas ward, Puerto Rico; Este Soil Conservation District; 4.9 kilometers southwest from Humacao, 1.0 kilometers south-southwest from Surillo school; aerial photograph GS-LR-13-105

Soil survey area: PR689—Humacao Area, Puerto Rico Eastern Part

Latitude: Unknown

Longitude: Unknown

Slope: 30 percent; backslope of the second surface above the local drainage. The landscape consists of narrow interfluve summit remnants with steep side slopes.

Drainage, runoff, and permeability: Well drained, medium runoff, and moderate permeability

Vegetation: Pangolagrass; used as pasture

Particle-size control section: 18 to 68 cm

Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccheciamp on September 18, 1963

Notes: The Ap, B22t, and C1 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; yellowish brown (10YR 5/4) silty clay loam; 21 percent medium distinct strong brown (7.5YR 5/6) redoximorphic features; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; few fine black grains; few fine quartz grains; very strongly acid; clear smooth boundary. 40A4269

B21t—18 to 38 cm; red (2.5YR 5/6) silty clay; moderate medium and coarse prismatic structure; friable, slightly sticky, moderately plastic; common fine roots; common fine pores; continuous yellowish red (5YR 4/6) coatings on vertical faces of peds and discontinuous coatings on horizontal faces of peds; few krotovinas 5 mm in diameter; very strongly acid; clear smooth boundary. 40A4270

B22t—38 to 79 cm; red (2.5YR 4/6) clay; moderate medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine pores; continuous reddish brown (2.5YR 5/4) coatings on vertical faces of peds and discontinuous coatings on horizontal faces of peds; few krotovinas 2 to 5 mm in diameter; strongly acid; gradual smooth boundary. 40A4271

B3—79 to 102 cm; red (2.5YR 4/6) silty clay; weak medium and coarse subangular blocky structure; very friable, nonsticky, slightly plastic; common fine roots; common fine pores; discontinuous reddish brown (2.5YR 4/4) coatings on faces of peds; small pieces fail abruptly upon slight pressure; few krotovinas 2.5 cm in diameter with a thick clay coating; field moisture of 30.1 percent; very strongly acid; clear smooth boundary. 40A4272

C1—102 to 130 cm; 50 percent dark yellowish brown (10YR 4/4) silty clay loam and 50 percent saprolite; massive; very friable, nonsticky, nonplastic; common fine roots; common fine pores; very strongly acid; gradual smooth boundary. 40A4273

C2—130 to 193 cm; yellowish brown (10YR 5/4) silt loam; massive; very friable, nonsticky, nonplastic; 10 percent clay films in root channels and/or pores; many fine weathered feldspar grains; few dead roots with clay and organic coatings in root channels; very strongly acid; diffuse smooth boundary. 40A4274

C3—193 to 279 cm; white (10YR 8/1) silt loam; massive; very friable, nonsticky, nonplastic; many fine feldspar grains; very strongly acid. 40A4275

Mayo: S63PR-151-001

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Mayo; coarse-loamy, mixed, isohyperthermic Typic Dystropepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 533, Samples 40A 3966–3971

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05-.002	SAND 2-.05	FINE .0002-.002	CO3 LT .002	(- -CLAY- -) FINE .02-.002	COARSE .05-.02	(- -SILT- -) VF .10-.05	F .25-.10	(- - - - -SAND- - - - - -) M .50-.25	C 1-.50	VC 2-1	(-COARSE FRACS (MM)-)(>2MM) 5-2	20-5	WEIGHT - - - - .1-75	75-.1	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - -					<- PCT OF <75MM(3B1)->			
40A3966S	0- 20	Ap	10.9	17.9	71.2			10.5	7.4	11.3	18.1	9.4	16.6	15.8	1C	4C	--	62	5
40A3967S	20- 46	AC	5.6	15.3	79.1			8.4	6.9	13.4	24.6	11.5	17.2	12.4	1C	5C	--	68	6
40A3968S	46- 69	C1	4.9	17.5	77.6		0.2	10.5	7.0	12.1	17.8	8.6	17.0	22.1	1C	5C	--	68	6
40A3969S	69- 86	2C2	6.9	15.1	78.0			10.3	4.8	9.9	18.7	11.0	21.3	17.1	TRC	2C	--	69	2
40A3970S	86-112	3C3	11.2	15.0	73.8			9.8	5.2	10.7	20.0	10.2	18.0	14.9	TRC	3C	--	64	3
40A3971S	112-152	4C4	14.4	14.9	70.7			8.7	6.2	13.1	25.8	11.8	13.6	6.4	TRC	1C	--	58	1

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC -	1/3 BAR 4A1d	COLE OVEN DRY 4A1h - ->	WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF	1/10 BAR 4B1c	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	1.79	0.130			0.7			0.91	0.75			1.36		1.39		22.1	20.2		8.2	
20- 46	0.60	0.047			0.8			0.82	0.84			1.44		1.43		16.3	16.1		4.7	
46- 69	0.12				0.5			0.71	0.65			1.49		1.47		15.3	14.5		3.2	
69- 86	0.05				0.6			0.58	0.54										3.7	
86-112	0.05				0.7			0.46	0.45										5.0	
112-152	0.04				0.9			0.41	0.40										5.8	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR AL 6H5a	6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 20	0.3	0.5	TR	0.3	1.1	19.8	2.3	20.9	9.9	3.4	68	5	11				4.1		4.7
20- 46	0.2	0.5	TR	0.3	1.0	10.6	1.5	11.6	4.6	2.5	60	9	22				4.2		4.5
46- 69	0.3	0.2	0.1	0.3	0.9	5.4	1.2	6.3	3.5	2.1	57	14	26				4.2		4.8
69- 86	0.9	0.3	0.1	0.3	1.6	4.7	1.6	6.3	4.0	3.2	50	25	40				3.8		4.8
86-112	1.8	0.7	0.1	0.3	2.9	5.4	1.4	8.3	5.1	4.3	33	35	57				3.7		4.6
112-152	4.2	0.8	0.1	0.3	5.4	3.4	0.2	8.8	5.9	5.6	4	61	92				4.4		4.2

Narrative Pedon Description

Pedon: Mayo

NSSL pedon number: 40A533

Pedon ID: S63PR-151-001

SSIR #12 pedon ID: S63PR-12-1

Field classification: Coarse-loamy, mixed, isohyperthermic Typic Dystropepts

Revised classification as of April 01, 2001: Coarse-loamy, mixed, active, isohyperthermic Humic Dystrudepts

Location: Este Soil Conservation District, Puerto Rico; 4.2 km north from town of Yabucoa, 1.9 km northwest from intersection of Highway 905 and 3; aerial photograph GS-LR-9-19

Latitude: 18°05’34" north

Longitude: 65°52’47" west

Vegetation: Cultivated; used for sugarcane

Slope: 10 percent; on an alluvial fan inset below the pediment slope on which pedon S63PR-12-3 is located

Drainage, runoff, and permeability: Well drained, rapid runoff, and rapid permeability

Parent material: Residuum or very local colluvium from volcanic rocks, supposedly high in manganese

Described and sampled by: W.E. McKenzie, R.B. Grossman, and R.A. Boccheciamp on September 16, 1963

Notes: The Ap, AC, and 2C2 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. The soil was at about field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 20 cm; very dark brown (10YR 2/2) loam; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; field moisture of 22.2 percent; strongly acid; clear smooth boundary. 40A3966

AC—20 to 46 cm; dark brown (10YR 3/3) sandy loam; massive; soft, very friable, nonsticky, nonplastic; common fine quartz grains; common fine partially weathered feldspar grains; common fine black concretions; field moisture of 17.1 percent; strongly acid; clear smooth boundary. 40A3967

C1—46 to 69 cm; brown to dark brown (10YR 4/3) sandy loam; massive; soft, very friable, nonsticky, nonplastic; common fine quartz grains; common fine partially weathered feldspar grains; common fine black concretions; field moisture of 16.2 percent; strongly acid; gradual smooth boundary. 40A3968

2C2—60 to 86 cm; pale brown (10YR 6/3) loamy sand; massive; soft, very friable, nonsticky, nonplastic; common fine quartz grains; few fine shiny flakes; many fine dark grains attracted by magnet; common fine partially weathered feldspar grains; strongly acid; abrupt smooth boundary. 40A3969

3C3—86 to 112 cm; pale brown (10YR 6/3) stratified loamy sand and sandy loam; massive; loose, nonsticky, nonplastic; common fine quartz grains; few fine dark grains; common fine partially weathered feldspar grains; strongly acid; abrupt smooth boundary. 40A3970

4C4—112 to 152 cm; brown (10YR 5/3) loam; massive; very friable, nonsticky, slightly plastic; many fine quartz grains; common fine dark grains; common fine partially weathered feldspar grains; few fine black shiny and flaky grains; strongly acid; 40A3971

Limones: S63PR-151-002

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Limones; clayey, kaolinitic, isohyperthermic Orthoxic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 577, Samples 40A 4223–4231

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4223S	0- 13	Ap		46.6	14.7	38.7			11.9	2.8	3.5	10.5	9.8	13.3	1.6	--C	--C	--	35	--
40A4224S	13- 23	B1		53.3	13.9	32.8			11.4	2.5	3.0	9.1	8.3	11.2	1.2	--C	--C	--	30	--
40A4225S	23- 41	B21t		59.0	17.9	23.1	20.9		16.1	1.8	2.0	5.9	6.0	8.5	0.7	--C	--C	--	21	--
40A4226S	41- 66	B22t		54.3	27.1	18.6			24.3	2.8	1.9	4.5	4.4	7.1	0.7	--C	--C	--	17	--
40A4227S	66-102	B3		46.3	35.4	18.3			30.3	5.1	3.2	5.1	3.6	5.8	0.6	--C	--C	--	15	--
40A4228S	102-137	C1		37.8	38.5	23.7	5.7		33.2	5.3	4.2	6.8	4.6	7.0	1.1	--C	--C	--	19	--
40A4229S	137-183	C2		33.0	39.4	27.6			32.5	6.9	4.8	7.0	5.0	9.4	1.4	--C	--C	--	23	--
40A4230S	183-244	C3		21.8	43.1	35.1	5.9		35.8	7.3	6.1	9.1	6.3	12.1	1.5	--C	--C	--	29	--
40A4231S	244-305	C4		17.2	45.5	37.3			37.3	8.2	6.5	9.9	6.9	12.2	1.8	--C	--C	--	31	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 13	2.85	0.234			5.6			0.22	0.52			1.11	1.27	1.42	--	46.2		31.8	24.4	0.09
13- 23	1.90	0.182			5.8			0.17	0.49			1.13	1.26	1.39	--	43.5		31.2	26.0	0.07
23- 41	1.00	0.093			6.9			0.12	0.47			1.22	1.30	1.42	--	40.6		33.8	28.0	0.08
41- 66	0.51	0.042			8.3			0.12	0.50			1.39	1.43	1.52	--	31.9		29.3	27.2	0.03
66-102	0.35	0.027			7.3			0.14	0.52			1.41	1.43	1.51	--	30.2		28.3	23.9	0.06
102-137	0.26				6.8			0.19	0.56			1.36	1.38	1.46	--	31.2		29.1	21.2	0.11
137-183	0.23				6.2			0.18	0.59			1.33	1.34	1.39	--	30.8		29.2	19.4	0.13
183-244	0.18				5.4			0.27	0.66										14.3	
244-305	0.09				4.5			0.33	0.76										13.1	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- - ->	<- - - -	-PCT	- - - ->						1:2	1:1
0- 13	2.7	1.6	0.1	0.3	4.7	14.2	0.4	18.9	10.1	5.1	8	25	47					4.4		4.9
13- 23	1.5	1.6	0.1	0.2	3.4	13.8	0.6	17.2	8.9	4.0	15	20	38					4.1		4.7
23- 41	0.7	1.1	0.1	0.3	2.2	13.7	1.2	15.9	7.0	3.4	35	14	31					4.0		4.6
41- 66	0.2	0.9	0.1	0.2	1.4	12.7	1.8	14.1	6.3	3.2	56	10	22					3.8		4.6
66-102	--	0.7	0.1	0.1	0.9	12.2	3.4	13.1	6.6	4.3	79	7	14					3.8		4.7
102-137	--	0.6	0.1	0.1	0.8	11.6	4.9	12.4	7.0	5.7	86	6	11					3.8		4.6
137-183	--	0.4	0.1	TR	0.5	10.1	3.8	10.6	5.8	4.3	88	5	9					3.8		4.6
183-244	--	0.4	0.1	TR	0.5	9.2	3.5	9.7	5.8	4.0	88	5	9					3.8		4.6
244-305	--	0.3	0.1	TR	0.4	8.3	4.8	8.7	5.7	5.2	92	5	7					3.9		4.6

Narrative Pedon Description

Pedon: Limones

NSSL pedon number: 40A0577

Pedon ID: S63PR-151-002

SSIR #12 pedon ID: S63PR-12-2

Field classification: Clayey, kaolinitic, isohyperthermic Orthoxic Tropohumults

Revised classification as of April 01, 2001: Fine, kaolinitic, isohyperthermic Typic Kandiudox

Location: Este Soil Conservation District, Puerto Rico; 3 kilometers west of the town of Yabucoa, 31 meters north of kilometer marker 14.2 on Highway 182, in a field of pangolagrass; aerial photograph GS-LR-9-25

Latitude: 18°04’50" north

Longitude: 65°56’20" west

Slope: 35 percent; near the lateral axis of a 30-meter-wide interfluve; landscape consists of narrow, concordant interfluves with steep side slopes.

Vegetation: Pangolagrass; used as pasture

Drainage, runoff, and permeability: Moderately well drained, rapid runoff, and moderate permeability

Parent material: Residuum from plutonic rocks

Particle-size control section: 23 to 66 cm

Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccheciamp on September 16, 1963

Notes: The Ap, B21t, and C1 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 13 cm; dark yellowish brown (10YR 4/4) silty clay loam; 1 percent fine distinct strong brown (7.5YR 5/8) and 1 percent fine distinct olive gray (5Y 5/2) redoximorphic features; weak fine and medium subangular blocky structure; friable, nonsticky, moderately plastic; common fine roots; red (2.5YR 5/6) coatings in root channels and/or pores; few fine quartz grains; strongly acid; clear smooth boundary. 40A4223

B1—13 to 23 cm; dark yellowish brown (10YR 4/4) silty clay; 1 percent fine faint strong brown (7.5YR 5/8) redoximorphic features; weak fine subangular blocky structure; friable, nonsticky, moderately plastic; common fine roots; 10 percent patchy clay films; few fine quartz grains; few fine black grains; very strongly acid; clear smooth boundary. 40A4224

B21t—23 to 41 cm; yellowish brown (10YR 5/6) clay; 21 percent medium distinct red (2.5YR 4/8) redoximorphic features; moderate medium and coarse subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; continuous yellowish brown (10YR 5/6) clay films on faces of peds and in pores; 1 percent fine black (10YR 2/1) dark concretions; small pieces fail semiplastically upon slight pressure between fingers; common fine quartz grains; very strongly acid; clear smooth boundary. 40A4225

B22t—41 to 66 cm; yellowish red (5YR 5/6) clay; moderate medium and coarse subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; tubular pores; continuous strong brown (7.5YR 5/6) clay films on faces of peds; small pieces fail semiplastically upon slight pressure between fingers; root and worm channels; few fine black grains; common fine quartz grains; very strongly acid; gradual smooth boundary. 40A4226

B3—66 to 102 cm; yellowish red (5YR 4/6) clay; weak medium subangular blocky structure; friable, slightly sticky, moderately plastic; few fine roots; patchy strong brown (7.5YR 5/6) clay films in root channels and/or pores; small pieces fail semiplastically upon slight pressure between fingers; few fine quartz grains; few fine black grains; 20 percent saprolite; very strongly acid; gradual smooth boundary. 40A4227

C1—102 to 137 cm; red (2.5YR 4/8) silty clay saprolite; massive; friable, nonsticky, moderately plastic; few fine roots; clay films in root channels and/or pores; many weathered feldspar grains; many quartz grains; very strongly acid; gradual smooth boundary. 40A4228

C2—137 to 183 cm; silty clay saprolite, red (2.5YR 4/8) rubbed; massive; friable, nonsticky, moderately plastic; few fine roots; many fine quartz grains; common fine soft black grains; many weathered feldspar grains; very strongly acid; gradual smooth boundary. 40A4229

C3—183 to 244 cm; silty clay loam saprolite, red (2.5YR 4/8) rubbed; massive; friable, nonsticky, slightly plastic; many weathered feldspar grains; many fine quartz grains; very strongly acid; gradual smooth boundary. 40A4230

C4—244 to 305 cm; silty clay loam saprolite, red (2.5YR 4/8) rubbed; massive; friable, nonsticky, slightly plastic; many weathered feldspar grains; many fine quartz grains; very strongly acid. 40A4231

Josefa: S63PR-151-004

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Josefa; fine, mixed, nonacid, isohyperthermic Aeric Tropaquepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 532, Samples 40A 3958–3965

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM					( ) - - - - - - - - - - - - ->							<- PCT OF <75MM(3B1)->				
40A3958S	0- 23	Ap	27.4	32.6	40.0			20.3	12.3	13.3	13.3	4.4	5.9	3.1	--C	--C	--	27	--
40A3959S	23- 38	B21	26.0	35.7	38.3			21.2	14.5	17.2	13.9	3.1	3.1	1.0	--C	--C	--	21	--
40A3960S	38- 63	B22	31.3	49.7	19.0			33.3	16.4	13.6	3.8	1.0	0.6	--	--C	--C	--	5	--
40A3961S	63- 86	B23	31.9	54.5	13.6			37.8	16.7	10.0	2.3	0.8	0.4	0.1	--C	--C	--	4	--
40A3962S	86-102	2C1g	37.4	37.6	25.0			25.6	12.0	12.9	9.5	1.6	0.9	0.1	--C	--C	--	12	--
40A3963S	102-150	3C2	15.3	29.8	54.9			16.5	13.3	25.7	23.4	3.3	1.8	0.7	--C	--C	--	29	--
40A3964S	150-178	4C3g	55.3	31.4	13.3			27.9	3.5	3.7	5.4	2.1	1.7	0.4	--C	--C	--	10	--
40A3965S	178	5C4													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF	DITH-CIT EXTRACTABLE MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d <- - G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	1.21	0.116			2.2			0.54	0.53			1.38	1.48	1.55	--	30.1		23.5	14.5	0.13
23- 38	0.66	0.070			2.3			0.54	0.59			1.39	1.46	1.52	--	27.4		22.4	15.3	0.10
38- 63	0.41	0.047			2.4			0.57	0.61			1.26	1.35	1.48	--	35.7		29.5	19.2	0.14
63- 86	0.32	0.040			3.0			0.58	0.66			1.24	1.32	1.44	--	36.0		29.3	20.9	0.11
86-102	0.45	0.046			2.4			0.46	0.56				1.30						21.1	
102-150	0.12				2.5			0.59	0.75				1.30						11.5	
150-178	0.28				2.3			0.37	0.47			1.09	1.09	1.67	--	51.6		35.2	25.8	0.10
178																				

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	PH CACL2 .01M 1:2 8C1f	PH H2O 1:1 8C1f
	<- - - - - - - - - - - -MEQ / 100 G					- - -		- - -	- - -	- - ->	<- - - - -PCT		- - ->						
0- 23	10.5	2.3	0.3	0.2	13.3	10.5	0.3	23.8	14.9	13.6	2	56	89				4.5		5.3
23- 38	12.0	2.9	0.3	0.1	15.3	7.4		22.7	14.1			67	100				5.0		6.1
38- 63	14.3	5.3	0.4	0.1	20.1	6.2		26.3	17.9			76	100	--			5.2		6.5
63- 86	13.6	7.1	0.4	0.1	21.2	7.3		28.5	18.4			74	100	--			5.0		6.3
86-102	11.7	7.1	0.3	0.1	19.2	7.4		26.6	17.1			72	100	--			5.2		6.3
102-150	6.6	4.2	0.2	0.1	11.1	4.3		15.4	9.1			72	100	--			5.3		6.4
150-178	11.3	9.1	0.5	0.3	21.2	6.7		27.9	20.3			76	100				5.1		6.2
178																			

Narrative Pedon Description

Pedon: Josefa (inactive series)
NSSL pedon number: 40A532
Pedon ID: S63PR-151-004
SSIR #12 pedon ID: S63PR-12-4
Field classification: Fine, mixed, nonacid, isohyperthermic Aeric Tropaquepts
Revised classification as of April 01, 2001: Fine, mixed, semiactive, isohyperthermic Udollic Endoaqualfs
Location: Este Soil Conservation District, Puerto Rico; 2.4 km east from town of Yabucoa, 10.9 km south of Humacao, 1.9 km southeast of Central Roig, 9 meters east of the intersection of farm roads; aerial photograph GS-LR-9-07
Latitude: 18°05’02" north
Longitude: 65°52’11" west
Slope: Nearly level (0 to 2 percent); on the flood plain along the Guayanes River. This surface is at somewhat higher elevation than Maunabo S63PR-12-5. The pedons S63PR-12-3 and Mayo S63PR-12-1 occur on the associated uplands.
Drainage, runoff, and permeability: Somewhat poorly drained, slow runoff, and slow permeability
Vegetation: Sugarcane in cropland
Parent material: Fine- to medium-textured sediments derived from plutonic rocks
Depth to water table: 168 cm
Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccechiamp on September 17, 1963
Notes: The Ap, B22, and 3C2 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. Family texture was based on clay percentage estimated as 2.5 times the 15-bar water content.

Ap—0 to 23 cm; dark brown (10YR 3/3) silty clay; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; few fine black concretions; few fine quartz grains; few wormcasts; field moisture of 31.2 percent; strongly acid; abrupt smooth boundary. 40A3958

B21—23 to 38 cm; dark brown (10YR 4/3) silty clay loam; many fine distinct reddish brown (5YR 4/4) redoximorphic concentrations; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin patchy clay films; small pieces fail semiplastically upon slight pressure between fingers; common fine roots; few fine black concretions; few fine yellowish platy grains; few small krotovinas; field moisture of 30.2 percent; very strongly acid; clear smooth boundary. 40A3959

B22—38 to 63 cm; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and few fine distinct reddish brown (5YR 4/4) redoximorphic concentrations; weak coarse subangular blocky structure; firm, slightly sticky, slightly plastic; thin discontinuous clay films; small pieces fail semiplastically upon slight pressure between fingers; few fine roots; common fine pores; organic stains along old root channels; few fine yellowish

platy grains; field moisture of 37.2 percent; very strongly acid; clear smooth boundary. 40A3960

B23—63 to 86 cm; mixed grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) silty clay; few fine distinct dark reddish brown (5YR 3/4) redoximorphic concentrations; weak medium and coarse subangular blocky structure; firm, slightly sticky, slightly plastic; thin discontinuous clay films; few fine roots; common fine pores; few fine black concretions; few fine yellowish platy grains; organic stains along roots channels; field moisture of 41.8 percent; very strongly acid; abrupt smooth boundary. 40A3961

2C1g—82 to 102 cm; gray (5Y 5/1) clay with thin lenses of coarse sand; many medium distinct reddish brown (5YR 4/4) redoximorphic concentrations; weak coarse subangular blocky structure; very firm, slightly sticky, plastic; few fine roots; few fine pores; organic stains along roots channels; very strongly acid; abrupt smooth boundary. 40A3962

3C2—102 to 150 cm; grayish brown (2.5Y 5/2) very fine sandy loam; common medium distinct strong brown (7.5YR 5/6) and few fine distinct reddish brown (5YR 3/4) redoximorphic concentrations; massive; very friable, nonsticky, nonplastic; few fine roots; common fine yellowish platy grains; very strongly acid; abrupt smooth boundary. 40A3963

4C3g—150 to 178 cm; greenish gray (5BG 6/1) clay; many coarse distinct strong brown (7.5YR 5/8) redoximorphic concentrations; massive with few pressure faces; very firm, sticky, plastic; few fine roots; very strongly acid; clear wavy boundary. 40A3964

5C4—178 cm; coarse-textured materials. 40A3965

Maunabo: S63PR-151-005

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Maunabo; fine, mixed, acid, isohyperthermic Typic Tropaquepts

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 531, Samples 40A 3952–3957

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND -2	FINE .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .02	COARSE -.05	(- - - - - -SAND- - - - - -) VF .10	F .25	M .50	C -1	VC -2	(-COARSE FRACS (MM)-)(>2MM) WEIGHT - - - - 5 -5	20 -20	75 -75	WT % OF .1- 75 WHOLE
			<- - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->			SOIL
40A3952S	0- 10	Ap	45.7	32.8	21.5			25.7	7.1	6.7	7.8	2.8	3.0	1.2	--C	--C	--	15	--
40A3953S	10- 25	A12	47.7	32.1	20.2			25.1	7.0	6.9	7.4	2.5	2.6	0.8	--C	--C	--	13	--
40A3954S	25- 38	B1g	48.9	32.9	18.2			26.0	6.9	7.0	7.0	1.9	1.6	0.7	--C	--C	--	11	--
40A3955S	38- 56	B2g	47.2	32.9	19.9	19.0		25.0	7.9	8.3	8.4	1.9	1.1	0.2	--C	--C	--	12	--
40A3956S	56- 99	B3g	36.8	38.2	25.0			26.3	11.9	11.4	10.3	2.3	0.9	0.1	--C	--C	--	14	--
40A3957S	99-122	2Cg	10.9	10.3	78.8			7.0	3.3	7.0	42.8	20.6	6.6	1.8	--C	--C	--	72	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE CM/CM 4D1	(- - -WATER CONTENT - -) WHOLE SOIL MOIST 4B4 <- -	FIELD BAR 4B1c -PCT OF	1/10 BAR 4B1c <2MM	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 10	2.44	0.187			1.3			0.42	0.45			1.15	1.35	1.49	--	42.2		28.0	20.7		0.10
10- 25	1.64	0.159			1.3			0.38	0.43			1.27	1.40	1.59	--	34.8		27.0	20.6		0.09
25- 38	1.38	0.142			1.2			0.38	0.43			1.23	1.35	1.52	--	36.2		27.9	20.8		0.10
38- 56	0.89	0.097			1.0			0.36	0.44			1.34	1.48	1.68	--	32.7		25.0	20.7		0.06
56- 99	0.35	0.042			1.5			0.36	0.47			1.31	1.41	1.57	--	34.8		27.6	17.4		0.14
99-122	0.11				0.1			0.48	0.48										5.2		

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																	1:2	1:1
0- 10	7.6	1.7	0.4	0.3	10.0	18.3	2.9	28.3	19.4	12.9	22	35	52				3.5		4.3
10- 25	10.5	2.2	0.6	0.1	13.4	13.1	0.7	26.5	18.2	14.1	5	51	74				3.9		4.8
25- 38	9.5	2.6	1.1	0.1	13.3	13.4	0.9	26.7	18.6	14.2	6	50	72				3.7		4.7
38- 56	9.7	3.8	1.6	0.1	15.2	8.4	--	23.6	17.0			64	89				4.5		5.3
56- 99	7.2	3.7	0.9	0.2	12.0	6.4	0.2	18.4	13.3	12.2	2	65	90				4.5		5.2
99-122	2.4	1.7	0.3	0.1	4.5	3.1	0.2	7.6	5.2	4.7	4	59	87				4.3		5.0

SAMPLE NUMBER	< - CLAY MINERALOGY (<.002mm) -> FRACT ION < - - - - - X-RAY - - - - - ->< - - - THERMAL - - - ->< - - - - - - - ELEMENTAL - - - - - - - ->< - -> EGME INTER RETN PRETA TION
	< - - - - - - - - - - - - - ->< - - - - - - - ->< - DTA - ->< - TGA - -> SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O < >
	<- - >< - - - - peak size - - - - ->< - - - Percent - - - ->< - - - - - - - - - Percent - - - - - - - ->< - -><mg/g>< - >
40A3955	TCLY KK 4 MT 2 KK40

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite MT montmorillon
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Maunabo

NSSL pedon number: 40A531

Pedon ID: S63PR-151-005

SSIR #12 pedon ID: S63PR-12-5

Field classification: Fine, mixed, acid, isohyperthermic Typic Tropaquepts

Revised classification as of April 01, 2001: Clayey over loamy, mixed, semiactive, isohyperthermic Typic Endoaquepts

Location: Este Soil Conservation District, Puerto Rico; 5.0 km northeast from town of Yabucoa, 457 meters northeast from intersection of Highways 905 and 3; aerial photograph GS-LR-9-19

Latitude: 18°04’36" north

Longitude: 65°52’16" west

Slope: Nearly level (2 percent); on a flood plain along a river

Drainage, runoff, and permeability: Poorly drained, slow runoff, and slow permeability

Vegetation: Sugarcane

Parent material: Fine-textured sediments derived from plutonic rocks

Depth to water table: 100 cm

Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Bocceciamp on September 17, 1963

Notes: The Ap and B1g horizons were sampled for the Bureau of Public roads. Reaction was determined by Soiltex. The soil was slightly above field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 10 cm; light brownish gray (10YR 6/2) clay; few fine faint strong brown (7.5YR 5/6) redoximorphic concentrations; massive; very firm, slightly sticky, plastic; common fine roots; few fine quartz grains; few fine black grains; field moisture of 45.2 percent; strongly acid, gradual smooth boundary. 40A3952

A12—10 to 25 cm; grayish brown (10YR 5/2) clay; few medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; massive; very firm, slightly sticky, plastic; red coatings on old root channels; common fine roots; few fine pores; few black grains; field moisture of 39.4 percent; strongly acid; gradual smooth boundary. 40A3953

B1g—25 to 38 cm; gray (5Y 5/1) clay; common medium distinct strong brown (5YR 5/8) redoximorphic concentrations; weak medium subangular blocky structure; very firm, slightly sticky, plastic; dark and red coatings along root channels; common fine roots; few fine quartz grains; few fine black grains; field moisture of 42.2 percent; strongly acid; gradual smooth boundary. 40A3954

B2g—38 to 56 cm; light gray (5Y 6/1) clay; common medium distinct yellowish brown (10YR 5/8) redoximorphic concentrations; weak coarse subangular blocky structure; very firm, slightly sticky, plastic; dark coatings along root

channels; few fine roots; common fine pores; few fine quartz grains; field moisture of 41.3 percent; strongly acid; gradual smooth boundary. 40A3955

B3g—56 to 99 cm; greenish gray (5BG 6/1) silty clay; many medium distinct strong brown (7.5YR 5/6) and dark red (2.5YR 3/6) redoximorphic concentrations along root channels; massive; very firm, slightly sticky, plastic; few fine roots; common fine quartz grains; common black grains; strongly acid; gradual smooth boundary. 40A3956

2Cg—99 to 122 cm; greenish gray (5BG 6/1) sandy loam; massive; very friable, nonsticky, nonplastic; many fine shiny grains; strongly acid. 40A3957

Candelero: S63PR-151-006

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Candelero; fine-loamy, mixed, isohyperthermic Aeric Tropaqualfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 561, Samples 40A 4110–4118

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	(- -CLAY- -) FINE LT .0002	CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) 2 -5	5 -20	WEIGHT - - - - 20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM							( ) - - - - - - - - - - - -					<- PCT OF <75MM(3B1)->				
40A4110S	0- 18	Ap	13.5	16.4	70.1			7.0	9.4	11.7	18.6	9.5	17.4	12.9	--C	--C	--		58	--
40A4111S	18- 28	B1	32.7	15.8	51.5			7.5	8.3	10.0	14.6	7.1	12.1	7.7	--C	--C	--		41	--
40A4112S	28- 38	B21tg	36.9	14.2	48.9	26.5		8.1	6.1	9.1	13.9	7.0	12.0	6.9	--C	--C	--		40	--
40A4113S	38- 61	B22tg	31.2	14.8	54.0			8.0	6.8	9.4	14.3	7.5	13.7	9.1	--C	--C	--		45	--
40A4114S	61- 86	B23tg	28.8	14.3	56.9			7.3	7.0	9.6	14.7	8.2	14.9	9.5	--C	--C	--		47	--
40A4115S	86-127	B31	19.7	11.2	69.1	15.5		5.4	5.8	8.6	15.9	8.6	18.3	17.7	--C	--C	--		60	--
40A4116S	127-163	B32	20.1	14.4	65.5			7.5	6.9	9.5	15.1	8.7	17.9	14.3	--C	--C	--		56	--
40A4117S	163-229	C1	15.5	12.5	72.0			5.3	7.2	11.1	19.6	11.8	18.0	11.5	--C	--C	--		61	--
40A4118S	229-292	C2	21.2	13.2	65.6			6.9	6.3	8.9	16.3	10.2	18.6	11.6	--C	--C	--		57	--

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - -	COLE WHOLE SOIL 4D1 -> CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 18	0.64	0.052			1.2			0.45	0.43			1.66	1.67	1.68	--	17.2		12.8	5.8	0.12
18- 28	0.31	0.043			1.4			0.32	0.38			1.41	1.54	1.70	--	28.0		19.3	12.3	0.11
28- 38	0.20				1.1			0.34	0.36			1.43	1.54	1.80	--	28.1		21.3	13.2	0.12
38- 61	0.11				1.0			0.44	0.36			1.60	1.62	1.90	--	22.0		20.4	11.1	0.15
61- 86	0.04				0.8			0.48	0.29				1.70						8.3	
86-127	0.01				0.6			0.61	0.39			1.92	1.84	1.95	--	9.9		12.4	7.6	0.09
127-163	0.01				0.5			0.54	0.40				1.80						8.1	
163-229	--				0.5			0.52	0.39										6.1	
229-292	--				0.8			0.54	0.42										9.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->											<- - - - -PCT - - - ->						1:2	1:1
0- 18	--	0.2	TR	0.1	0.3	12.0	2.3	12.3	6.1	2.6	88	2	5				3.8		4.2
18- 28	1.8	0.6	0.1	0.1	2.6	13.4	5.4	16.0	10.6	8.0	67	16	25				3.5		4.3
28- 38	5.3	2.1	0.2	0.2	7.8	11.5	2.8	19.3	12.5	10.6	26	40	62				3.6		4.6
38- 61	7.9	4.4	0.2	0.3	12.8	4.4		17.2	13.6			74	94				4.8		5.5
61- 86	7.4	5.7	0.2	0.3	13.6	3.7		17.3	13.7			79	99				5.3		6.2
86-127	6.5	5.4	0.3	0.3	12.5	2.2		14.7	12.1			85	100				5.2		6.5
127-163	5.8	4.9	0.4	0.3	11.4	2.6		14.0	10.8			81	100				5.3		6.5
163-229	4.3	3.6	0.3	0.2	8.4	2.6		11.0	8.0			76	100				5.8		6.7
229-292	6.0	5.2	0.4	0.3	11.9	2.9		14.8	11.4			80	100				5.6		6.7

Narrative Pedon Description

Pedon: Candelero

NSSL pedon number: 40A0561

Pedon ID: S63PR-151-006

SSIR #12 pedon ID: S63PR-12-8

Field classification: Fine-loamy, mixed, isohyperthermic Aeric Tropaqualfs

Revised classification as of April 01, 2001: Fine-loamy, mixed, semiactive, isohyperthermic Typic Albaqualfs

Location: Este Soil Conservation District, Puerto Rico; 5.4 km north from town of Yabucoa, 1.5 km north of intersection of Highways 905 and 3; aerial photograph GS-LR-9-19

Latitude: 18°05’49" north

Longitude: 65°51’11" west

Slope: 8 percent

Drainage: Somewhat poorly drained

Geomorphic setting: Alluvial fan

Particle-size control section: 27 to 77 cm

Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccheciamp on September 18, 1963

Notes: The Ap, B22tg, and B31 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. The soil was above field capacity when sampled. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 18 cm; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; few fine black grains; few concretions 2 to 3 mm in diameter; extremely acid; clear smooth boundary. 40A4110

B1—18 to 28 cm; gray (10YR 6/1) clay; 21 percent medium distinct yellowish brown (10YR 5/8) and 21 percent medium distinct dark red (2.5YR 3/6) redoximorphic features; weak coarse subangular blocky structure; very firm, slightly sticky, moderately plastic; few fine roots; black (10YR 2/1) coatings in root channels and/or pores and discontinuous gray (10YR 6/1) clay films on faces of peds; common fine quartz grains; extremely acid; clear smooth boundary. 40A4111

B21tg—28 to 38 cm; gray (10YR 6/1) clay; 21 percent medium distinct yellowish brown (10YR 5/6) redoximorphic features; weak medium subangular blocky structure; very firm, slightly sticky, moderately plastic; few fine roots; discontinuous gray (10YR 6/1) clay films on faces of peds and black (10YR 2/1) coatings in root channels and/or pores; common fine quartz grains; few fine black grains; many weathered feldspar grains and ferromagnesian grains; very strongly acid; gradual smooth boundary. 40A4112

B22tg—38 to 61 cm; greenish gray (5GY 6/1) clay; 1 percent fine distinct reddish brown (5YR 4/3) and 3 percent medium distinct brownish yellow (10YR 6/6) redoximorphic features; weak coarse subangular blocky structure; very firm,

slightly sticky, moderately plastic; few fine roots; discontinuous greenish gray (5G 6/1) clay films on faces of peds and black (10YR 2/1) coatings in root channels and/or pores; many fine quartz grains; few fine black grains; many weathered feldspar grains and ferromagnesian grains; strongly acid; gradual smooth boundary. 40A4113

B23tg—61 to 86 cm; light greenish gray (5GY 7/1) clay; 3 percent fine distinct greenish gray (5BG 6/1), 3 percent medium distinct yellowish brown (10YR 5/8), and 3 percent medium distinct grayish brown (10YR 5/2) redoximorphic features; weak coarse prismatic structure; very firm, slightly sticky, slightly plastic; discontinuous clay films on vertical faces of peds; many fine quartz grains; few fine black grains; many weathered feldspar grains and ferromagnesian grains; slightly acid; clear smooth boundary. 40A4114

B31—86 to 127 cm; dark yellowish brown (10YR 4/4) sandy clay loam; 3 percent medium distinct yellowish brown (10YR 5/6) and 3 percent medium distinct greenish gray (5GY 6/1) redoximorphic features; massive; friable, slightly sticky, nonplastic; many fine quartz grains; many weathered feldspar grains; common fine black grains; slightly acid. 40A4115

B32—127 to 163 cm; dark yellowish brown (10YR 4/4) sandy clay loam; 3 percent medium distinct yellowish brown (10YR 5/6) and 3 percent medium distinct greenish gray (5GY 6/1) redoximorphic features; massive; friable, slightly sticky, nonplastic; many fine quartz grains; many weathered feldspar grains; common fine black grains; split from above horizon for sampling; slightly acid. 40A4116

C1—163 to 229 cm; dark brown (7.5YR 3/3), reddish brown (5YR 5/3), and yellowish brown (10YR 5/6) stratified sand to sandy clay. 40A4117

C2—229 to 292 cm; dark brown (7.5YR 3/3), reddish brown (5YR 5/3), and yellowish brown (10YR 5/6) stratified sand to sandy clay; split from above horizon for sampling. 40A4118

Jagueyes: S63PR-151-007

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Jagueyes; fine-loamy, mixed, isohyperthermic Oxic Tropudults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 585, Samples 40A 4280–4288

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4280S	0- 20	Ap		16.6	9.7	73.7			6.3	3.4	5.9	25.0	18.8	18.8	5.2	--C	--C	--	68	--
40A4281S	20- 36	A3		24.5	9.7	65.8			6.1	3.6	5.8	22.0	16.0	14.6	7.4	--C	--C	--	60	--
40A4282S	36- 46	B1		32.0	9.9	58.1			6.7	3.2	4.4	16.2	12.3	13.5	11.7	TRC	1C	--	54	1
40A4283S	46- 66	B21t		39.0	16.4	44.6	14.5		14.2	2.2	2.5	8.3	8.2	14.6	11.0	TRC	1C	--	43	1
40A4284S	66- 94	B22t		30.7	24.4	44.9			21.0	3.4	3.0	6.3	6.6	15.3	13.7	TRC	1C	--	42	1
40A4285S	94-132	B3		28.8	26.1	45.1	9.1		22.2	3.9	4.2	7.2	6.9	16.0	10.8	TRC	1C	--	41	1
40A4286S	132-180	C1		24.2	30.0	45.8			25.1	4.9	4.7	10.5	10.1	13.6	6.9	TRC	1C	--	42	1
40A4287S	180-241	C2		14.9	33.8	51.3			26.8	7.0	6.3	14.9	14.7	12.2	3.2	--C	--C	--	45	--
40A4288S	241-305	C3		12.9	32.3	54.8	2.1		24.7	7.6	8.8	19.5	15.0	9.4	2.1	--C	--C	--	46	--

	ORGN TOTAL		EXTR TOTAL		(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- -	G/CC -	- ->	CM/CM	<- -	-PCT OF <2MM		- ->	CM/CM
0- 20	1.43	0.114			0.6			0.31	0.42			1.41	1.46	1.47	--	21.7		13.3	6.9	0.09
20- 36	0.24	0.045			0.9			0.14	0.41			1.69	1.72	1.73	--	16.0		12.2	10.1	0.04
36- 46	0.22				1.0			0.13	0.40			1.64	1.65	1.68	--	18.2		15.6	12.9	0.04
46- 66	0.16				1.7			0.17	0.45			1.58	1.60	1.66	--	22.0		19.8	17.4	0.04
66- 94	0.08				1.4			0.23	0.48			1.72	1.73	1.77	--	17.4		16.2	14.8	0.02
94-132	0.06				1.3			0.23	0.47				1.60						13.5	
132-180	0.06				0.9			0.26	0.48			1.54	1.55	1.58	--	21.9		18.7	11.7	0.11
180-241	0.04				0.8			0.38	0.50										7.4	
241-305	0.01				0.5			0.29	0.51										6.6	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - -				->	<- - - -	-PCT	- - -	->				1:2	1:1
0- 20	--	0.5	0.1	0.1	0.7	8.0	1.2	8.7	5.1	1.9	63	8	14					4.1		4.7
20- 36	0.2	0.5	TR	0.1	0.8	6.1	0.9	6.9	3.4	1.7	53	12	24					4.0		4.5
36- 46	0.1	0.5	TR	0.1	0.7	6.6	1.7	7.3	4.0	2.4	71	10	17					3.7		4.6
46- 66	0.1	0.8	0.1	0.1	1.1	11.0	5.2	12.1	6.8	6.3	83	9	16					3.5		4.5
66- 94	--	0.5	TR	0.1	0.6	9.8	6.1	10.4	7.1	6.7	91	6	8					3.5		4.5
94-132	--	0.4	TR	0.1	0.5	8.6	6.4	9.1	6.5	6.9	93	5	8					3.6		4.5
132-180	--	0.5	TR	0.1	0.6	8.9	6.4	9.5	6.2	7.0	91	6	10					3.6		4.5
180-241	--	0.4	TR	0.2	0.6	7.2	6.3	7.8	5.7	6.9	91	8	11					3.7		4.5
241-305	--	0.5	TR	0.1	0.6	5.2	3.3	5.8	3.8	3.9	85	10	16					3.9		4.6

Narrative Pedon Description

Pedon: Jagueyes
NSSL pedon number: 40A0585
Pedon ID: S63PR-151-007
SSIR #12 pedon ID: S63PR-12-10
Field classification: Fine-loamy, mixed, isohyperthermic Oxic Tropudults
Revised classification as of April 01, 2001: Fine-loamy, kaolinitic, isohyperthermic Typic Kanhapludults
Location: Puerto Rico; 7.5 kilometers southwest from Humacao and 7.7 kilometers north from Yabucoa, 451 meters west from road junction at Mr. Santiago's farm, Tejas Ward, Yabucoa town; aerial photograph GS-LR-13-103
Latitude: Unknown
Longitude: Unknown
Average annual precipitation: 2,032 mm
Slope: 5 percent; on the saddle along the longitudinal axis of a 31-meter wide interfluve; on the third surface above the local drainage
Vegetation: Sweet potatoes and tanniers
Drainage: Moderately well drained
Parent material: Residuum or very local colluvium from plutonic rocks
Particle-size control section: 45 to 93 cm
Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccheciamp on September 19, 1963
Notes: The Ap, B21t, and C1 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. The area was forested until 10 years before sampling. The thick surface was probably due to low intensity in use and stability of the surface. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 20 cm; dark grayish brown (2.5Y 4/2) loam; weak fine granular structure; very friable, soft, nonsticky, nonplastic; common fine roots; field moisture of 24.4 percent; very strongly acid; clear smooth boundary. 40A4280

A3—20 to 36 cm; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable, soft, slightly sticky, slightly plastic; common fine roots; 1 percent medium dark concretions; field moisture of 18.7 percent; very strongly acid; clear smooth boundary. 40A4281

B1—36 to 46 cm; yellowish brown (10YR 5/8) clay; 1 percent fine faint strong brown (7.5YR 5/6) and 1 percent fine faint yellowish brown (10YR 5/4) redoximorphic features; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; patchy clay films; 1 percent medium dark concretions and 3 percent fine dark concretions; small pieces fail semiplastically upon slight pressure between fingers; field moisture of 16.0 percent; very strongly acid; clear smooth boundary. 40A4282

B21t—46 to 66 cm; yellow (10YR 7/6) clay; 21 percent fine distinct dark red (2.5YR 3/6) and 21 percent medium distinct red (2.5YR 4/8) redoximorphic features; moderate medium subangular blocky structure; firm, slightly sticky,

slightly plastic; common fine roots; continuous clay films; 1 percent medium dark concretions; small pieces fail semiplastically upon slight pressure between fingers; many weathered feldspar grains; field moisture of 24.3 percent; very strongly acid; clear smooth boundary. 40A4283

B22t—66 to 94 cm; yellow (10YR 7/6) and red (2.5YR 4/8) clay and clay loam; 1 percent fine faint brownish yellow (10YR 6/8) redoximorphic features; weak coarse subangular blocky structure; firm, nonsticky, moderately plastic; common fine roots; discontinuous clay films; small pieces fail semiplastically upon slight pressure between fingers; many weathered feldspar grains; field moisture of 20.1 percent; very strongly acid; gradual smooth boundary. 40A4284

B3—94 to 132 cm; red (2.5YR 4/8) and brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; patchy clay films and continuous brownish yellow (10YR 6/8) coatings; many fine quartz grains; few fine black grains; very strongly acid; gradual smooth boundary. 40A4285

C1—132 to 180 cm; red (2.5YR 5/8), 50 percent silty clay loam and 50 percent saprolite; massive; friable, nonsticky, slightly plastic; many fine weathered feldspar grains; very strongly acid; gradual wavy boundary. 40A4286

C2—180 to 241 cm; red (2.5YR 5/8) silty clay loam saprolite; massive; friable, nonsticky, slightly plastic; strongly acid; gradual smooth boundary. 40A4287

C3—241 to 305 cm; red (2.5YR 5/6) clay loam saprolite; massive; friable, nonsticky, slightly plastic; strongly acid. 40A4288

Jagueyes: S63PR-151-008

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Jagueyes; fine-loamy, mixed, isohyperthermic Oxic Tropudults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 586, Samples 40A 4289–4293

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4289S	0- 18	A1		33.0	16.9	50.1			14.4	2.5	2.9	8.4	8.6	18.0	12.2	TRC	2C	--	48	2
40A4290S	18- 33	B21t		38.6	19.9	41.5	11.0		17.1	2.8	2.4	5.4	5.8	14.8	13.1	TRC	2C	--	40	2
40A4291S	33- 69	B22t		33.6	27.4	39.0			23.2	4.2	3.1	4.4	4.4	12.9	14.2	TRC	2C	--	37	2
40A4292S	69-112	B3		30.2	30.3	39.5			24.4	5.9	4.8	5.3	3.6	11.9	13.9	TRC	2C	--	36	2
40A4293S	112-142	C														--	--	--		--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT	<0.4MM	<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.02	0.121			1.2			0.17	0.46										15.2	
18- 33	0.39	0.049			1.3			0.12	0.44										17.1	
33- 69	0.21				1.3			0.13	0.50										16.7	
69-112	0.13				1.2			0.14	0.51										15.5	
112-142																				

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ / 100 G		- - - - - - - - - - ->				<- - - - -PCT		- - - ->						1:2	1:1
0- 18	0.4	0.8	0.1	0.1	1.4	7.8	1.4	9.2	5.7	2.8	50	15	25					3.9		4.4
18- 33	--	0.7	TR	0.1	0.8	9.3	2.3	10.1	4.6	3.1	74	8	17					3.6		4.1
33- 69	--	0.7	TR	0.1	0.8	6.6	3.0	7.4	4.3	3.8	79	11	19					3.6		4.2
69-112	--	0.4	TR	0.1	0.5	7.1	2.9	7.6	4.3	3.4	85	7	12					3.8		4.5
112-142																				

Narrative Pedon Description

Pedon: Jagueyes

NSSL pedon number: 40A0586

Pedon ID: S63PR-151-008

SSIR #12 pedon ID: S63PR-12-11

Field classification: Fine-loamy, mixed, isohyperthermic Oxic Tropudults

Revised classification as of April 01, 2001: Fine, kaolinitic, isohyperthermic Typic Kanhapludults

Location: Puerto Rico; satellite site 30.5 meters northwest of Jagueyes loam S63PR-12-10

Latitude: Unknown

Longitude: Unknown

Slope: 40 percent; on a steep backslope

Vegetation: Native grasses and weeds; used as pasture

Drainage, runoff, and permeability: Moderately well drained, medium to rapid runoff, and moderate permeability

Parent material: Residuum or very local side slope colluvium from plutonic rocks

Particle-size control section: 17 to 67 cm

Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccheciamp on September 19, 1963

Notes: The A1, B22t, and C horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. Several checks were made for depth to saprolite in the area. This soil may be on the deep side, but not by too much. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

A1—0 to 18 cm; brown (10YR 5/3) clay loam; weak fine granular structure; friable, soft, slightly sticky, slightly plastic; many fine roots; many fine quartz grains; strongly acid; clear smooth boundary. 40A4289

B21t—18 to 33 cm; reddish yellow (5YR 6/6) and yellowish brown (10YR 5/4) clay; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; common fine roots; patchy clay films; small pieces fail semiplastically upon slight pressure between fingers; strongly acid; clear smooth boundary. 40A4290

B22t—33 to 69 cm; light red (2.5YR 6/6) and light reddish brown (5YR 6/4) clay; weak medium subangular blocky structure; firm, nonsticky, slightly plastic; common fine roots; patchy clay films; small pieces fail semiplastically upon slight pressure between fingers; strongly acid; clear smooth boundary. 40A4291

B3—69 to 112 cm; light red (2.5YR 6/8) clay; weak coarse subangular blocky structure; friable, nonsticky, slightly plastic; common fine roots; 10 percent saprolite; strongly acid; clear smooth boundary. 40A4292

C—112 to 142 cm; silty clay loam; massive; friable, nonsticky, slightly plastic; variegated colors of the saprolite; many weathered feldspar grains; strongly acid. 40A4293

Limones: S63PR-151-009

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Limones; clayey, kaolinitic, isohyperthermic Orthoxic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 578, Samples 40A 4232–4236

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) 2 -5	-14- COARSE FRACS (MM) 5 -20	-15- COARSE FRACS (MM) 20 -75	-16- COARSE FRACS (MM) .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						( ) - - - - - - - - - - - -						<- PCT OF <75MM(3B1)->				
40A4232S	0- 10	Ap	51.0	24.3	24.7			19.9	4.4	3.8	8.0	6.3	6.2	0.4	--C	--C	--	21	--
40A4233S	10- 33	B21t	58.6	22.4	19.0			18.4	4.0	3.2	6.2	4.6	4.8	0.2	--C	--C	--	16	--
40A4234S	33- 61	B22t	53.8	24.4	21.8	20.2		20.0	4.4	3.7	6.5	5.1	6.0	0.5	--C	--C	--	18	--
40A4235S	61- 84	B3													--	--	--		--
40A4236S	84- 0	C													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b 5.4	AL 6G7a OF	MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1 0.28	15 BAR 8D1 0.53	ATTERBERG LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT	1/3 BAR 4B1c OF	15 BAR 4B2a <2MM	WRD WHOLE SOIL 4C1 - -> CM/CM
0- 10	3.08	0.223			5.4			0.28	0.53										26.9	
10- 33	1.40	0.134			6.2			0.22	0.49										28.8	
33- 61	0.72	0.084			6.0			0.21	0.52										27.9	
61- 84																				
84- 0																				

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-EXTR CITY 6H5a	AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1d	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 10	1.3	1.4	0.1	0.4	3.2	22.5	5.4	25.7	14.5	8.6	63	12	22				3.6		4.3
10- 33	0.6	1.5	0.1	0.1	2.3	19.7	7.2	22.0	12.8	9.5	76	10	18				3.6		4.4
33- 61	0.3	1.5	0.1	TR	1.9	18.1	6.7	20.0	11.5	8.6	78	9	17				3.7		4.6
61- 84																			
84- 0																			

Narrative Pedon Description

Pedon: Limones
NSSL pedon number: 40A578
Pedon ID: S63PR-151-009
SSIR #12 pedon ID: S63PR-12-9
Field classification: Clayey, kaolinitic, isohyperthermic Orthoxic Tropohumults
Revised classification as of April 01, 2001: Fine, kaolinitic, isohyperthermic Typic Hapludox
Location: Este Soil Conservation District, Puerto Rico; 3 km west of town of Yabucoa, 31 meters north of kilometer marker 14.2 on Highway 182 in a field of pangolagrass; aerial photograph GS-LR-9-25. This is a satellite site 46 meters east of Limones clay S63PR-12-2.
Latitude: Unknown
Longitude: Unknown
Slope: 50 percent; on a side slope beneath the interfluve summit on which S63PR-12-2 is located
Vegetation: Pangolagrass in pastureland
Drainage, runoff, and permeability: Moderately well drained, medium to rapid runoff, and moderate permeability
Parent material: Residuum or local colluvium from plutonic rocks
Described and sampled by: W.E. McKinzie, R.B. Grossman, and R.A. Boccheciamp on September 19, 1963
Notes: The Ap and B3 horizons were sampled for the Bureau of Public Roads. Reaction was determined by Soiltex. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 10 cm; reddish brown (5YR 4/4) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; many fine quartz grains; strongly acid; clear smooth boundary. 40A4232

B21t—10 to 33 cm; red (2.5YR 4/8) clay; few fine distinct red (2.5YR 3/6) and yellowish red (10YR 5/6) redoximorphic features; moderate medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films; small pieces fail semiplastically upon slight pressure between fingers; common fine roots; few fine white platy grains; few fine quartz grains; very strongly acid; clear smooth boundary. 40A4233

B22t—33 to 61 cm; red (2.5YR 5/8) clay; few fine distinct dark red redoximorphic features; moderate medium subangular blocky structure; friable, nonsticky, plastic; very thin patchy clay films; small pieces fail semiplastically; few fine roots; common fine quartz grains; few fine platy grains; common fine krotovinas filled with yellowish brown soil; very strongly acid; clear smooth boundary. 40A4234

B3—61 to 84 cm; red (2.5YR 5/6) silty clay; 10 percent saprolite; common fine distinct dark red redoximorphic features; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; few fine roots; common fine quartz grains; very strongly acid; gradual smooth boundary. 40A4235

C—84 cm; variegated red, dark red, yellowish brown, and yellow silty clay saprolite, red (2.5YR 5/8) rubbed; massive; friable, nonsticky, slightly plastic; many weather feldspar grains; many fine dark grains; very strongly acid. 40A4236

Parcelas: S88PR-151-001

Primary Characterization Data

Yabucoa Municipio, Puerto Rico

Sampled as: Parcelas; fine, mixed, isohyperthermic Vertic Hapludalfs

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 367, Samples 88P 1863–1870

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	COARSE .02 -.05	(- -SILT- -) VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) 2 -5	5 -20	WEIGHT - - - - 20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P1863S	0- 20	A	43.2	25.7	31.1	30.9		12.7	13.0	11.0	12.1	4.9	2.3	0.8	1	TR	--	21	1
88P1864S	20- 39	Bt	57.8	17.5	24.7	33.3		10.2	7.3	9.3	9.3	3.6	1.9	0.6	TR	TR	--	15	TR
88P1865S	39- 61	Bw1	53.1	19.9	27.0	28.7		11.1	8.8	9.6	10.1	3.9	1.7	1.7	TR	2	--	19	2
88P1866S	61-107	Bw2	50.3	25.3	24.4	26.3		12.4	12.9	6.9	10.9	4.0	1.5	1.1	TR	TR	--	17	TR
88P1867S	107-135	Bw3	45.4	27.4	27.2	21.7		13.8	13.6	11.8	10.2	3.4	1.2	0.6	TR	TR	--	15	TR
88P1868S	135-170	Bw4	43.9	31.2	24.9	18.5		13.7	17.5	9.4	10.2	3.8	1.2	0.3	TR	TR	--	15	TR
88P1869S	170-204	2Bk	35.3	30.8	33.9	11.7		15.9	14.9	13.9	12.6	4.8	1.8	0.8	1	TR	--	21	1
88P1870S	204-225	2C	27.8	35.4	36.8	13.7		15.3	20.1	13.8	15.9	4.9	1.8	0.4	TR	TR	--	23	TR

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	(RATIO/CLAY)	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC - -	OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	2.65	0.266	--		3.3	0.3	0.1	0.63	0.56		60	32		1.13	1.58	0.118			39.5	24.3	0.17
20- 39	0.80	0.082	--		2.7	0.3	0.1	0.54	0.47					1.19	1.78	0.143			41.9	27.1	0.18
39- 61	0.42	0.046	--		2.7	0.3	0.1	0.61	0.40					1.31	1.87	0.125			36.4	21.4	0.19
61-107	0.20		--		2.8	0.3	0.1	0.66	0.38					1.43	1.93	0.105			30.7	19.2	0.16
107-135	0.10		--		2.2	0.2	0.1	0.72	0.38		55	36		1.56	1.97	0.081			25.8	17.1	0.14
135-170	0.08		--		2.2	0.1	0.1	0.71	0.33					1.64	2.02	0.072			23.0	14.6	0.14
170-204	0.04		2		1.4	0.1	0.1	0.73	0.36					1.69	1.99	0.055			20.6	12.8	0.13
204-225	0.03		6		1.6	0.1	0.1	0.88	0.39					1.62	1.85	0.045			20.5	10.8	0.16

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->											<- - - - -PCT - - - ->						1:2	1:1
0- 20	9.9	5.7	0.2	0.2	16.0	20.1	1.1	36.1	27.2	17.1	6	44	59				3.9	4.4	4.8
20- 39	17.4	7.4	0.4	0.2	25.4	12.9	0.4	38.3	31.2	25.8	2	66	81				4.2	4.8	5.5
39- 61	19.6	9.2	0.5	0.3	29.6	6.8		36.4	32.5			81	91				4.9	5.7	6.4
61-107	20.5	10.0	0.5	0.3	31.3	4.6		35.9	33.0			87	95				5.2	6.2	6.9
107-135	21.6	10.0	0.5	0.3	32.4	2.8		35.2	32.9			92	98				5.6	6.7	7.2
135-170	21.9	8.9	0.6	0.3	31.7	2.9		34.6	31.0			92	100	TR			5.9	7.0	7.4
170-204		7.4	0.6	0.3		--			25.7			100	100	5			6.9	7.6	8.1
204-225	18.9	5.6	0.7	0.2	25.4	1.5		26.9	24.5			94	100	TR			5.9	7.1	7.9

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i						DTA 7A6	TGA 7A4b	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	ELEMENTAL 7C3	EGME RETN 7D2	INTER PRETA TION
		<- - - - - - peak size - - - - -						- - - Percent - - -									Percent - - - - - - -	<mg/g>	
88P1864	TCLY	KK 4	MT 3	VR 2	MM 2	GE 2					22.0	11.3			0.3				
88P1866	TCLY	KK 3	MT 3	VR 2	MM 2	GE 1					22.0	12.2			0.3				
88P1867	TCLY	KK 3	MT 3	VR 2	MM 1	GE 1					21.0	11.3			0.3				
88P1869	TCLY	KK 3	VR 2	GE 1							20.0	10.2			0.3				

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite MT montmorillon VR vermiculite MM mont-mica GE goethite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER 0.06 BAR 4B1c	1-BAR 4B1a	CONTENT- -) 2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) MIN SOIL CONT	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2	m m ->	<- P P M	->	< - - - - - - - - - -			- - P E R C E N T			
88P1863	1	0.21	1.29	0.08	0.25	43						28.6			75
88P1864	2	0.09	0.52	0.08	0.30	47						33.1			
88P1865	3	0.06	0.34	0.08	0.24	38						31.2			
88P1866	4	0.04	0.38	0.09	0.27	33						29.0			
88P1867	5	0.04	0.32	0.12	0.15	22						26.0			
88P1868	6	0.04	0.38	0.12	0.13	20						23.8			
88P1869	7	0.02	0.15	0.07	0.09	13						19.8			
88P1870	8	0.02	0.16	0.08	0.08	13						17.6			

SAMPLE NO.	HZ NO	<- - - PIPETTE - - ><- HYDROMETER - ->					
		CLAY 3A1c	SILT	SAND	CLAY	SILT SML	SAND
		<- - -		- - ->	<- - -		- - ->
			o f	< 2 m m			
88P1863	1						
88P1864	2						
88P1865	3						
88P1866	4						
88P1867	5						
88P1868	6						
88P1869	7						
88P1870	8						

Narrative Pedon Description

Pedon: Parcelas
NSSL pedon number: 88P0367
Pedon ID: S88PR-151-001
Field classification: Fine, mixed, isohyperthermic Vertic Hapludalfs
Revised classification as of April 01, 2001: Fine, mixed, active, isohyperthermic Vertic Hapludalfs
Location: Yabucoa Municipio, Puerto Rico; 0.8 km east of junction of Highways 3 and 901 on Highway 901, 30.5 meters south in cropland
Latitude: 18°02’43" north
Longitude: 52°30’23" west
Elevation: 16 meters
Physiography: Mountain valleys or canyons
Geomorphic position: On middle third of component
Slope: 4 percent with a convex north aspect
Average annual precipitation: 2,030 mm; udic moisture regime
Major Land Resource Area: 272—Humid Coastal Plains
Drainage and permeability: Well drained and slow permeability
Vegetation: Unidentified crops in cropland
Erosion: Slight
Particle-size control section: 20 to 70 cm
Parent material: Alluvium from igneous-granite material
Diagnostic features: Ochric epipedon at 0 to 20 cm; argillic horizon at 20 to 170 cm
Described and sampled by: D. Williams and G. Acevedo during February 1988

A—0 to 20 cm; dark brown (7.5YR 3/2) clay; moderate fine subangular blocky structure parting to moderate fine granular; friable, sticky, plastic; many fine roots throughout; moderately acid; 1 percent gravel; clear wavy boundary. 88P1863

Bt1—20 to 39 cm; dark reddish brown (5YR 3/4) clay; moderate medium subangular blocky structure; very firm, very sticky, very plastic; common fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; few fine rounded iron-manganese concretions; slightly acid; 1 percent gravel; clear smooth boundary. 88P1864

Bt2—39 to 61 cm; reddish brown (5YR 4/4) clay; moderate medium angular blocky structure parting to moderate medium subangular blocky; very firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; common discontinuous distinct pressure faces; few fine rounded iron-manganese concretions; slightly acid; 1 percent gravel; clear smooth boundary. 88P1865

Bt3—61 to 107 cm; brown to dark brown (7.5YR 4/4) clay; moderate coarse angular blocky structure parting to moderate medium angular blocky; very

firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; common discontinuous distinct pressure faces; few fine rounded iron-manganese concretions; neutral; 1 percent gravel; gradual smooth boundary. 88P1866

Bt4—107 to 135 cm; reddish brown (5YR 4/4) clay; moderate medium angular blocky structure parting to moderate medium subangular blocky; very firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; common discontinuous distinct pressure faces; common discontinuous distinct intersecting slickensides; few fine rounded iron-manganese concretions; neutral; 1 percent gravel; gradual smooth boundary. 88P1867

Bt5—135 to 170 cm; reddish brown (5YR 4/3) clay; moderate coarse angular blocky structure parting to moderate medium angular blocky; very firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; common discontinuous distinct clay films on vertical and horizontal faces of peds; common discontinuous distinct pressure faces; few discontinuous distinct intersecting slickensides; common fine platelike soft masses of iron-manganese; mildly alkaline; 1 percent gravel; clear smooth boundary. 88P1868

2Bk—170 to 204 cm; dark brown (7.5YR 3/4) clay loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky, plastic; few fine tubular pores; common discontinuous distinct clay films on vertical faces of peds; common medium rounded soft masses of carbonate and common medium platelike soft masses of iron-manganese; moderately alkaline; 1 percent gravel; clear smooth boundary. 88P1869

2Bw—204 to 225 cm; brown to dark brown (10YR 4/3) sandy clay loam; moderate coarse prismatic structure parting to weak coarse subangular blocky; friable, slightly sticky, slightly plastic; common fine tubular pores; few fine rounded soft masses of carbonate and common flakes of mica; moderately alkaline. 88P1870

Chapter 5
Soils of the Perhumid Climatic Zones of Puerto Rico

This chapter presents data, descriptions, and metadata for 18 soils of the perhumid zones of Puerto Rico. Soils of the perhumid zones of Puerto Rico have an aquic, udic, or perudic moisture regime. They generally occur above elevations of 650 meters (fig. 3). Average annual precipitation is more than 2,000 millimeters (80 inches). Soils of the perhumid zones of Puerto Rico have an isothermic soil temperature regime. Although a few soils sampled in Puerto Rico have been assessed as having an isomesic soil temperature regime, it is thought that they are likely to have an isothermic temperature regime. Soil orders presented in this chapter are Inceptisols (7 pedons), Oxisols (7 pedons), Ultisols (3 pedons), and Histosols (1 pedon).

Data are arranged by municipio. The pedon ID numbers reflect the online National Soil Survey Laboratory database. The number of pedons for each municipio is as follows:

Municipio	Number of pedons
Guayama	1
Naguabo	1
Ponce	1
Río Grande	13
San Germán	1
Yauco	1

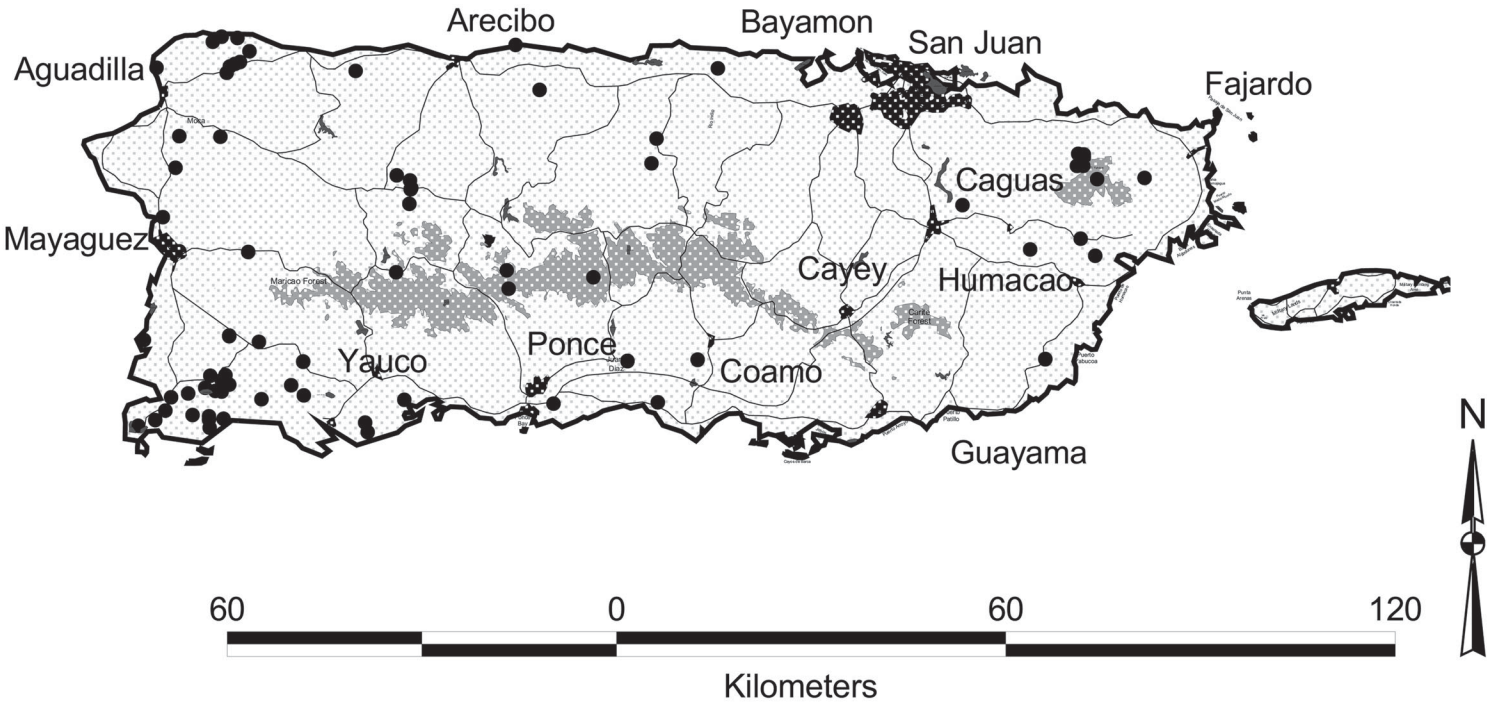

Figure 3.—Location of the isothermic soil temperature zone in Puerto Rico (gray interior).

Guayama Municipio

Los Guineos: S61PR-057-001

Primary Characterization Data

Guayama Municipio, Puerto Rico

Sampled as: Los Guineos; clayey, mixed, isothermic Typic Tropohumults

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 572, Samples 40A 4183–4189

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(	) - - - - - - - - - - - - - ->					<- PCT OF <75MM(3B1)->				SOIL
40A4183S	0- 13	Ap		37.6	38.1	24.3			21.7	16.4	12.2	9.0	1.8	1.1	0.2	--C	--C	--	12	--
40A4184S	13- 38	B21t		45.1	33.4	21.5			19.1	14.3	10.6	8.0	1.8	0.8	0.3	--C	--C	--	11	--
40A4185S	38- 61	B22t		50.9	29.2	19.9			17.7	11.5	8.9	7.5	1.9	1.3	0.3	--C	--C	--	11	--
40A4186S	61- 86	B31t		59.8	26.9	13.3			18.2	8.7	5.6	5.2	1.3	0.9	0.3	--C	--C	--	8	--
40A4187S	86-122	B32t		56.6	28.3	15.1			19.3	9.0	5.6	6.2	1.7	1.1	0.5	--C	--C	--	9	--
40A4188S	86-122	B32t		56.4	28.6	15.0			20.0	8.6	5.8	6.2	1.5	1.1	0.4	--C	--C	--	9	--
40A4189S	86-122	B32t		56.5	28.7	14.8			20.1	8.6	5.5	6.2	1.8	1.1	0.2	--C	--C	--	9	--

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 13	3.85	0.321			2.7			0.42	0.59										22.0	
13- 38	1.25	0.124			3.8			0.27	0.55										25.0	
38- 61	0.70	0.080			5.1			0.29	0.54										27.6	
61- 86	0.61	0.071			6.7			0.26	0.53										31.4	
86-122	0.49	0.057			6.3			0.28	0.51										29.1	
86-122	0.50	0.061			5.4			0.28	0.49										27.4	
86-122	0.46	0.050			7.4			0.29	0.48										27.2	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.	COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1d	8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- ->	<- - - -	-PCT	- - - ->					1:2	1:1
0- 13	2.0	2.6	0.2	0.6	5.4	18.7	3.0	24.1	15.7	8.4	36	22	34				3.7		4.4
13- 38	0.1	2.2	0.1	0.1	2.5	15.7	5.9	18.2	12.3	8.4	70	14	20				3.5		4.3
38- 61	--	0.9	0.1	0.1	1.1	19.2	8.0	20.3	14.6	9.1	88	5	8				3.4		4.6
61- 86	0.2	1.0	0.1	0.1	1.4	22.9	10.2	24.3	15.3	11.6	88	6	9				3.3		4.6
86-122	--	0.8	0.1	0.1	1.0	22.6	10.4	23.6	16.1	11.4	91	4	6				3.3		4.4
86-122	--	0.8	0.2	0.1	1.1	22.3	11.2	23.4	15.6	12.3	91	5	7				3.4		4.3
86-122	--	0.8	0.2	0.1	1.1	23.1	11.0	24.2	16.1	12.1	91	5	7				3.4		4.3

Narrative Pedon Description

Pedon: Los Guineos

NSSL pedon number: 40A0572

Pedon ID: S61PR-057-001

SSIR #12 pedon ID: S61PR-13-2

Field classification: Clayey, mixed, isothermic Typic Tropohumults

Series classification: Very-fine, kaolinitic, isothermic Humic Hapludox

Revised classification as of April 01, 2001: Fine, mixed, semiactive, isothermic Typic Haplohumults

Location: Sudeste Soil Conservation District, Puerto Rico; 274 meters southeast of school on Highway 179, about 15 meters south of road (350 meters beyond kilometer marker 14.1)

Latitude: 17°59’12" north

Longitude: 66°02’20" west

Geomorphic position: On backslope of interfluve

Slope: 35 percent; 15 meters beneath interfluve summit on a backslope that leads directly to a major drainageway

Vegetation: Native aluminum plant, palm tree, ferns, and carpetgrass in pastureland

Parent material: Residuum or very local colluvium from volcanic rocks

Particle-size control section: 12 to 62 cm

Described and sampled by: R.B. Grossman, W.E. McKinzie, R.A. Boccheciamp, and J. Juarez on December 11, 1961

Notes: Very few micropores are in the peds. Roots tend to penetrate peds and do not follow cleavage planes. Thickness of yellow surface ranges from 30 to 100 cm. See Soil Survey Investigations Report No. 12, August 1967, for a detailed narrative on mineralogy.

Ap—0 to 13 cm; brown (10YR 4/3) clay loam; 3 percent fine distinct yellowish brown (10YR 5/6) redoximorphic features; weak fine granular structure; friable, slightly sticky, slightly plastic; very strongly acid; clear smooth boundary. 40A4183

B21t—13 to 38 cm; yellowish brown (10YR 5/6) clay; 1 percent fine distinct yellowish red (5YR 5/8) redoximorphic features; moderate coarse subangular blocky structure; very firm, slightly sticky, slightly plastic; common patchy clay films on faces of peds; 21 percent wormcasts; very strongly acid; gradual smooth boundary. 40A4184

B22t—38 to 61 cm; reddish yellow (7.5YR 6/8) clay; 3 percent medium distinct red (2.5YR 4/6) redoximorphic features in ped interiors; moderate coarse subangular blocky structure; very firm, slightly sticky, moderately plastic; patchy clay films in root channels and/or pores and continuous clay films on faces of peds; very strongly acid; gradual wavy boundary. 40A4185

B31t—61 to 86 cm; red (2.5YR 4/6) and strong brown (7.5YR 5/8) clay; weak fine and medium subangular blocky structure; very firm, slightly sticky, moderately plastic; few patchy clay films in root channels and/or pores and patchy clay

films on vertical faces of peds; very strongly acid; gradual wavy boundary. 40A4186

B32t—86 to 122 cm; red (2.5YR 4/6) and reddish yellow (7.5YR 6/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, moderately plastic; 10 percent patchy clay films on vertical faces of peds and 10 percent patchy clay films in root channels and/or pores; very strongly acid. 40A4187

B32t—86 to 122 cm; yellow parts of B32t horizon. 40A4188

B32t—86 to 122 cm; red parts of B32t horizon. 40A4189

Naguabo Municipio

Utuado: S85PR-103-001

Primary Characterization Data

Naguabo Municipio, Puerto Rico

Sampled as: Utuado; coarse-loamy, mixed, isothermic Typic Dystrochrepts

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 252, Samples 86P 1455–1459

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			PCT OF <2MM (3A1)												PCT OF <75MM(3B1)				
86P1455S	0- 3	A	16.9	21.0	62.1			11.1	9.9	12.0	19.4	18.0	11.2	1.5	TR	TR	--	50	TR
86P1456S	3- 15	Bt1	17.1	20.2	62.7			10.8	9.4	12.5	18.6	18.0	11.6	2.0	TR	--	--	50	17
86P1457S	15- 30	Bt2	15.2	19.7	65.1			10.5	9.2	12.1	18.5	17.1	12.0	5.4	1	TR	--	53	18
86P1458S	30- 69	C	2.8	24.0	73.2			12.2	11.8	17.0	24.8	16.4	10.8	4.2	TR	--	--	56	--
86P1459S	69-127	Cr	2.2	19.2	78.6			9.9	9.3	14.9	21.4	17.7	16.1	8.5	1	TR	--	64	55

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	PERCENT OF <2MM						PCT <0.4MM		G/CC			CM/CM	PCT OF <2MM				CM/CM
0- 3	5.69							0.91	1.07										18.0	
3- 15	3.20							0.61	0.79										13.5	
15- 30	1.50							0.48	0.64										9.8	
30- 69	0.17							2.96	2.21										6.2	
69-127	0.14							4.27	2.55										5.6	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	MEQ / 100 G										PCT						1:2	1:1
0- 3	4.4	1.7	0.2	0.3	6.6	16.1	0.4	22.7	15.4	7.0	6	29	43				4.8	5.4
3- 15	2.3	0.8	0.1	0.1	3.3	13.0	0.9	16.3	10.5	4.2	21	20	31				4.6	5.2
15- 30	0.9	0.5	0.1	TR	1.5	8.6	0.9	10.1	7.3	2.4	38	15	21				4.5	5.2
30- 69	0.6	0.4	0.1	TR	1.1	5.4	2.0	6.5	8.3	3.1	65	17	13				4.3	5.1
69-127	0.6	0.7	0.1	--	1.4	7.4	3.9	8.8	9.4	5.3	74	16	15				4.2	5.2

Narrative Pedon Description

Pedon: Utuado

NSSL pedon number: 86P0252

Pedon ID: S85PR-103-001

Field classification: Coarse-loamy, mixed, isothermic Typic Dystrochrepts

Revised classification as of July 01, 1999: Utuado; coarse-loamy, mixed, active, isothermic Aquic Humic Dystrudepts

Location: Naguabo Municipio, Puerto Rico; Caribbean National Forest; 46 meters west of kilometer marker 14 on Road 191

Latitude: 18°17’38" north

Longitude: 65°47’32" west

Elevation: 750 meters

Slope: 65 percent with a convex north aspect

Average annual precipitation: 3,810 mm; udic moisture regime

Parent material: Residuum that weathered from granodiorite of the Río Grande stock

Described and sampled by: Unknown authors during July 1985

O—3 to 0 cm; many fine and medium and many coarse roots.

A—0 to 3 cm; dark brown (10YR 3/3) gravelly loam; moderate very fine and fine subangular blocky structure; common fine and medium and common coarse roots; many fine interstitial pores; 20 percent gravel; strongly acid; abrupt smooth boundary. 86P1455

Bt1—3 to 15 cm; dark brown (10YR 3/3) loam; weak fine and medium subangular blocky structure; strong brown (7.5YR 5/8), gray (10YR 5/1), and very dark gray (5YR 3/1) redoximorphic features; few very fine and few fine and medium roots; common medium tubular pores; few faint clay films; 10 percent stones; very strongly acid; clear smooth boundary. 86P1456

Bt2—15 to 30 cm; dark yellowish brown (10YR 4/4) loam; gray (10YR 5/1) redoximorphic features; moderate fine and medium subangular blocky structure; few very fine and fine roots; few fine tubular pores; very strongly acid; 10 percent stones; abrupt smooth boundary. 86P1457

C—30 to 69 cm; yellowish brown (10YR 5/6) sandy loam; weak fine and medium subangular blocky structure; common very fine and fine and common medium roots; few fine tubular pores; very strongly acid; gradual smooth boundary. 86P1458

Cr—69 to 127 cm; white (10YR 8/1), brownish yellow (10YR 6/8), and black (N 2/0) very stony sandy loam; massive; common very fine and fine and common medium and coarse roots; few fine tubular pores; 40 percent stones; very slightly effervescent with dilute HCl; very strongly acid. 86P1459

Ponce Municipio

Mucara: S86PR-113-002

Primary Characterization Data

Ponce Municipio, Puerto Rico

Sampled as: Mucara; fine-loamy, mixed, isothermic Typic Eutropepts

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 300, Samples 86P 1770–1775

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	>2MM WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
86P1770S	0- 15	A	38.1	43.7	18.2	7.8		32.4	11.3	6.1	4.9	2.3	2.1	2.8	1	2	3V	17	6
86P1771S	15- 29	Bw1	28.7	42.9	28.4	5.5		32.2	10.7	9.0	7.1	3.7	2.8	5.8	3	9	2V	31	14
86P1772S	29- 45	Bw2	22.7	40.8	36.5	4.8		29.6	11.2	11.5	10.1	5.8	4.5	4.6	2	4	2V	31	8
86P1773S	45- 58	Bw3	20.6	40.4	39.0	5.0		28.6	11.8	10.9	8.3	5.1	5.0	9.7	2	6	32V	57	40
86P1774S	58- 88	Bw4	18.0	40.3	41.7	4.1		28.0	12.3	13.1	12.7	7.3	4.7	3.9	4	7	9V	43	20
86P1775S	88-120	Bw5	14.2	40.0	45.8	3.8		27.8	12.2	12.6	12.7	8.4	6.2	5.9	3	5	2V	40	10

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 15	3.65	0.311			1.9	0.2	0.1	1.00	0.67				0.96	1.25	0.090			49.4	25.6	0.22
15- 29	0.74	0.080			1.6	0.2	0.1	0.93	0.66				1.05	1.14	0.026			40.1	18.9	0.21
29- 45	0.36	0.072			1.4	0.2	0.1	1.08	0.74	45	13		1.16	1.27	0.029			36.5	16.9	0.22
45- 58	0.27				1.3	0.1	0.1	1.20	0.76				1.30	1.43	0.024			33.2	15.6	0.17
58- 88	0.19				1.2	0.1	0.1	1.33	0.78				1.26	1.38	0.027			35.4	14.0	0.24
88-120	0.10				1.3	0.1	0.1	1.75	0.92	39	10		1.31	1.43	0.028			34.1	13.0	0.26

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->					1:2	1:1
0- 15	22.9	7.1	--	1.1	31.1	10.1		41.2	38.0			75	82				5.1	5.9	6.3
15- 29	14.7	5.4	--	0.8	20.9	7.7		28.6	26.7			73	78				4.6	5.7	6.3
29- 45	15.8	4.8	--	0.5	21.1	5.5		26.6	24.6			79	86				4.3	5.8	6.5
45- 58	15.1	4.8	0.1	0.2	20.2	5.1		25.3	24.7			80	82				4.2	5.7	6.4
58- 88	16.1	4.4	0.2	0.1	20.8	4.7		25.5	24.0			82	87				4.2	5.8	6.5
88-120	16.4	4.3	0.2	0.1	21.0	3.9		24.9	24.8			84	85				4.2	5.8	6.5

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 (Percent) SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
86P1772	TCLY	KK 2 MT 1 VM 1	KK39				7.0			0.6			
86P1775	TCLY	KK 2 VM 2	KK15				6.7			0.4			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	THERMAL TGA 7A4b (Percent)	TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)	INTERPRETATION
86P1772	VFS				4	AR52 FK16 FP15 AM 6 BT 5 OP 2	
86P1772	VFS					RA 2 ZE 1 EP 1	
86P1775	VFS				2	AR60 FP17 AM11 FK 6 BT 2 ZE 1	
86P1775	VFS					OP 1 RA 1 EP 1	

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm; VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:
KK kaolinite; MT montmorillon; VM vermici-mica; AR wthr aggrega; FK potas feldsp; FP plag-feldspa;
AM amphibole; BT biotite; OP opaques; RA resist-aggre; ZE zeolite; EP epidote

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Mucara
NSSL pedon number: 86P0300
Pedon ID: S86PR-113-002
Field classification: Fine-loamy, mixed, isothermic Typic Eutropepts
Revised classification as of April 01, 2001: Fine-loamy, mixed, superactive, isohyperthermic Dystric Eutrudepts[1]
Location: Ponce Municipio, Puerto Rico; 26 km north of Ponce; 5.5 km east on Highway 143 from junction with Highway 10 then 1 km south and 76 meters east
Latitude: 18°09’15" north
Longitude: 66°39’15" west
Elevation: 670 meters
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus
Geomorphic position: Backslope of a head slope; on upper third of component
Slope: 55 percent with a convex southeast aspect
Average air temperature: Annual—20 °C
Average annual precipitation: 2,540 mm; udic moisture regime
Major Land Resource Area: 270—Humid Mountains and Valleys
Drainage, runoff, and permeability: Well drained, very rapid runoff, and moderate permeability
Vegetation: Unspecified grasses in pastureland
Erosion: Slight
Particle-size control section: 25 to 100 cm
Parent material: Residuum from igneous-basic material
Diagnostic features: Ochric epipedon at 0 to 15 cm; cambic horizon at 15 to 88 cm
Map unit: MUF2—Mucara silty clay, 40 to 60 percent slopes, eroded
Described and sampled by: D. Williams, L.H. Rivera, J. Torres, G. Acevedo, and W. Lynn during February 1986

A—0 to 15 cm; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine granular structure parting to moderate medium granular; slightly hard, friable; many fine and few medium roots throughout; few fine discontinuous tubular pores; few wormcasts; neutral; 1 percent igneous gravel; clear smooth boundary. 86P1770

Bw1—15 to 29 cm; dark yellowish brown (10YR 4/4) silty clay loam; weak medium subangular blocky structure parting to moderate medium granular; hard, friable, sticky, plastic; common fine roots throughout; few fine discontinuous tubular pores; common discontinuous faint organic coatings on vertical and horizontal faces of peds; few wormcasts filled with material from the A horizon; 2 percent igneous gravel; neutral; gradual smooth boundary. 86P1771

[1] Soil temperature data from the Maricao Forest suggests that this soil has an isothermic temperature regime.

Bw2—29 to 45 cm; yellowish brown (10YR 5/4) silty clay loam; few medium distinct and few medium faint redoximorphic features; weak medium subangular blocky structure parting to weak fine subangular blocky; hard, friable, sticky, plastic; few fine roots throughout; few fine discontinuous tubular pores; few patchy faint organic coatings in root channels and/or pores; few fine rounded dark concretions and few wormcasts; 2 percent igneous gravel; neutral; clear irregular boundary. 86P1772

Bw3—45 to 58 cm; yellowish brown (10YR 5/4) gravelly loam; few medium faint and few medium distinct redoximorphic features; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots throughout; few fine discontinuous tubular pores; few discontinuous distinct manganese or iron-manganese coatings on vertical faces of peds; few fine rounded dark concretions; 20 percent igneous gravel; neutral; clear smooth boundary. 86P1773

Bw4—58 to 88 cm; yellowish brown (10YR 5/4) loam; few medium faint and few medium distinct redoximorphic features; weak coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots throughout; few discontinuous distinct manganese or iron-manganese coatings on vertical faces of peds; few fine rounded dark concretions and common soft masses of iron; 5 percent igneous gravel; slightly acid; diffuse boundary. 86P1774

Bw5—88 to 120 cm; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure; very hard, firm, slightly sticky, slightly plastic; common continuous distinct manganese or iron-manganese coatings on vertical and horizontal faces of peds; 1 percent igneous gravel; neutral; diffuse boundary. 86P1775

Bw6—120 to 163 cm; horizon not described.

Río Grande Municipio

Los Guineos: S81PR-003-002

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Los Guineos; very-fine, kaolinitic, isothermic Humic Hapludox

SSL—Project: 81P 75, (CP81PR160)

—Pedon: 81P 323, Samples 81P 1667–1684

—General methods: 1B1A, 2A1, 2B

-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
			CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON	LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)		.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
81P1667S	0- 17	A1	67.7	26.6	5.7			21.5	5.1	2.6	2.3	0.6	0.1	0.1	30	3	--	35	33
81P1668S	17- 42	B21t	75.7	20.3	4.0			16.4	3.9	2.0	1.2	0.4	0.2	0.2	TR	TR	--	2	--
81P1669S	42- 67	B22t	67.4	28.9	3.7			24.7	4.2	2.0	1.5	0.2	TR	--	--	--	--	2	--
81P1670S	67- 88	B23t	61.4	34.1	4.5			29.2	4.9	2.1	1.9	0.4	0.1	TR	--	--	--	2	--
81P1671S	88-114	B3	51.7	40.1	8.2			34.2	5.9	4.1	3.4	0.6	0.1	TR	--	--	--	4	--
81P1672S	114-163	C	44.7	47.3	8.0			41.0	6.3	3.7	3.1	0.8	0.3	0.1	--	--	--	4	--
81P1673S	0- 10	A1	68.2	26.0	5.8			21.7	4.3	2.6	3.0	TR	0.2	TR	9	--	--	12	9
81P1674S	10- 20	A1	67.5	26.0	6.5			20.4	5.6	3.2	2.4	0.6	0.2	0.1	--	--	--	3	--
81P1675S	20- 30	B21	76.0	19.6	4.4			15.6	4.0	2.3	1.6	0.3	0.2	TR	--	--	--	2	--
81P1676S	30- 40	B21	75.4	20.9	3.7			16.0	4.9	1.8	1.0	0.4	0.2	0.3	--	--	--	2	--
81P1677S	40- 50	B22	73.2	23.6	3.2			20.2	3.4	1.7	1.2	0.2	0.1	TR	--	--	--	1	--
81P1678S	50- 60	B22	68.3	29.3	2.4			26.4	2.9	1.3	0.9	0.2	TR	TR	--	--	--	1	--
81P1679S	60- 70	B23	64.0	31.8	4.2			28.9	2.9	1.9	1.8	0.4	0.1	TR	--	--	--	2	--
81P1680S	70- 80	B23	56.4	38.3	5.3			32.2	6.1	2.8	2.0	0.4	0.1	--	--	--	--	2	--
81P1681S	80- 90	B3													--	--	--		--
81P1682S	90-100	B3													--	--	--		--
81P1683S	100-110	C													--	--	--		--
81P1684S	110-120	C													--	--	--		--

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH																				
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT	<0.4MM	<- -	G/CC	- - ->	CM/CM	<- -	-PCT OF	<2MM	- ->	CM/CM
0- 17	4.01	0.367			7.1	0.9	0.1	0.36	0.51	71	20		0.25	0.51	0.250		328.5	316.3	34.2	0.68
17- 42	1.13	0.131			7.6	1.1	TR	0.17	0.51				0.90	1.32	0.136		70.3	68.8	38.8	0.27
42- 67	0.82	0.079			9.3	1.1	TR	0.20	0.57	89	34		0.96	1.24	0.089		63.8	62.7	38.6	0.23
67- 88	0.76				8.0	0.9	TR	0.22	0.55				1.04	1.31	0.080		55.4	54.2	34.0	0.21
88-114	0.53				6.0	0.7	TR	0.27	0.57				1.05	1.27	0.065		54.6	53.5	29.3	0.25
114-163	0.40				5.3	0.6	TR	0.29	0.54				1.01	1.19	0.056		57.6	56.0	24.2	0.32
0- 10					6.8	0.8			0.50										33.9	
10- 20					7.1	0.9			0.50										33.8	
20- 30					7.0	0.9			0.47										35.8	
30- 40					7.6	1.2			0.52										39.0	
40- 50					9.1	1.2			0.56										40.7	
50- 60					7.6	0.9			0.57										38.9	
60- 70					9.0	1.0			0.55										35.4	
70- 80					8.2	0.9			0.60										33.9	
80- 90					6.2	0.7													30.2	
90-100					5.5	0.6													29.2	
100-110					5.7	0.6													27.2	
110-120					5.9	0.6													24.4	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM	ACID- EXTR AL		(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS RES. CACO3 <2MM	OHMS /CM	COND. MMHOS /CM	(- - - -PH - - -) NAF	CACL2 .01M	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1			8C1f	8C1f
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a									8I	8C1d		
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 17	11.8	1.5	TR	0.4	13.7	18.9	0.4	32.6	24.4	14.1	3	42	56				8.4	4.9	4.9
17- 42	1.7	0.9	--	TR	2.6	15.2	2.9	17.8	12.9	5.5	53	15	20				9.1	5.0	4.8
42- 67	0.5	0.3	--	TR	0.8	16.2	5.1	17.0	13.6	5.9	86	5	6				9.3	5.2	4.8
67- 88	0.3	0.2	--	TR	0.5	16.3	7.0	16.8	13.3	7.5	93	3	4				9.3	4.9	4.6
88-114	0.3	0.2	TR	0.1	0.6	15.7	8.8	16.3	13.9	9.4	94	4	4				9.6	4.9	4.6
114-163	0.1	0.1	--	0.1	0.3	14.5	8.5	14.8	13.1	8.8	97	2	2				9.6	4.9	4.6

SAMPLE NUMBER	FRACTION	X-RAY 7A2i peak size				THERMAL DTA 7A6	THERMAL TGA 7A4b Percent	ELEMENTAL SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7C3 Percent	INTER PRETA TION 7D2 mg/g
81P1667	TCLY	KK 4	GE 1			KK66				13.7			0.3			
81P1668	TCLY	KK 4	GE 2	VR 1		KK63				15.7			0.3			
81P1669	TCLY	KK 4	GE 2			KK57				20.0			0.3			
81P1670	TCLY	KK 4	GE 2			KK56				18.6			0.3			
81P1671	TCLY	KK 4	GE 1			KK57				15.7			0.3			
81P1672	TCLY	KK 4	GE 1	CL 1		KK56				14.3			0.4			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm
MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite CL chlorite
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Los Guineos
NSSL pedon number: 81P0323
Pedon ID: S81PR-003-002
Field classification: Very-fine, kaolinitic, isothermic Humic Hapludox
Revised classification as of March 01, 2001: Very-fine, kaolinitic, isothermic Typic Kandiudox
Location: Río Grande Municipio; Puerto Rico
Latitude: Unknown
Longitude: Unknown
Geomorphic position: Hillside of mountains
Slope: 15 percent with an aspect of 0 degrees (north)
Drainage: Moderately well drained
Parent material: Residuum from sandstone material
Surface fragments: 1 percent
Described and sampled by: G. Acevedo and L.H. Rivera on August 1, 1981
Notes: Matrix colors are for moist ped exteriors.

A1—0 to 17 cm; brown (7.5YR 4/4) clay; moderate fine granular structure; friable, moderately sticky, slightly plastic; many fine roots; very strongly acid; clear smooth boundary. 81P1667

B21t—17 to 42 cm; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure parting to moderate coarse subangular blocky; firm, moderately sticky, moderately plastic; common fine roots; few fine tubular pores; 30 percent continuous clay films on faces of peds; very strongly acid; clear smooth boundary. 81P1668

B22t—42 to 67 cm; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; few fine tubular pores; 10 percent patchy clay films on faces of peds; very strongly acid; gradual smooth boundary. 81P1669

B23t—67 to 88 cm; red (2.5YR 5/8) clay; moderate medium subangular blocky structure; firm, moderately sticky, moderately plastic; few fine roots; few fine tubular pores; 10 percent patchy clay films on faces of peds; very strongly acid; gradual smooth boundary. 81P1670

B3—88 to 114 cm; red (2.5YR 5/8) clay; weak fine subangular blocky structure; firm, moderately sticky, slightly plastic; few fine tubular pores; very strongly acid; gradual smooth boundary. 81P1671

C—114 to 163 cm; red (2.5YR 4/8) clay, yellowish red (5YR 4/6) dry; weak fine subangular blocky structure; firm, moderately sticky, slightly plastic; few fine tubular pores; very strongly acid. 81P1672

A1—0 to 10 cm; incremental subsample. 81P1673
A1—10 to 20 cm; incremental subsample. 81P1674
B21—20 to 30 cm; incremental subsample. 81P1675
B21—30 to 40 cm; incremental subsample. 81P1676

B22—40 to 50 cm; incremental subsample. 81P1677
B22—50 to 60 cm; incremental subsample. 81P1678
B23—60 to 70 cm; incremental subsample. 81P1679
B23—70 to 80 cm; incremental subsample. 81P1680
B3—80 to 90 cm; incremental subsample. 81P1681
B3—90 to 100 cm; incremental subsample. 81P1682
C—100 to 110 cm; incremental subsample. 81P1683
C—110 to 120 cm; incremental subsample. 81P1684

Moteado: S87PR-119-001

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Moteado; clayey, oxidic, isothermic Typic Kanhaplaquults

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 302, Samples 87P 1531–1536

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -2	CLAY FINE LT .002	CO3 LT .002	SILT FINE .02	SILT COARSE .05	SAND VF .10	SAND F .25	SAND M .5	SAND C -1	SAND VC -2	COARSE FRACS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
87P1531S	0- 13	A	47.2	20.0	32.8	29.3		15.6	4.4	5.8	4.6	3.3	5.6	13.5	11	1	--	36	12
87P1532S	13- 30	Btg1	48.4	19.3	32.3	29.3		13.3	6.0	5.5	4.2	2.8	6.2	13.6	2	--	--	28	2
87P1533S	30- 54	Btg2	59.5	21.1	19.4	33.5		16.8	4.3	8.5	0.7	2.6	3.1	4.5	1	--	--	12	1
87P1534S	54- 66	Bt1	63.6	25.7	10.7	29.3		20.0	5.7	3.6	2.5	1.4	1.7	1.5	--	--	--	7	--
87P1535S	66-100	Bt2	64.8	29.9	5.3	29.1		24.3	5.6	2.0	1.3	0.7	0.5	0.8	1	--	--	4	1
87P1536S	100-133	B'tg	59.1	36.6	4.3	30.0		31.4	5.2	2.0	1.0	0.4	0.3	0.6	--	--	--	2	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	LIMITS - LL 4F1 PCT	PI 4F <0.4MM	FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	OVEN DRY 4A1h CM/CM	WHOLE SOIL 4D1	FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	5.37	0.288			5.0	0.7	--	0.38	0.58				0.90	1.12	0.072			40.6	27.6	0.11
13- 30	4.54	0.238			4.5	0.7	--	0.29	0.55				1.07	1.31	0.069			41.3	26.6	0.16
30- 54	4.29	0.176			6.2	0.9	--	0.21	0.50	63	19		1.05	1.31	0.076			47.8	29.6	0.19
54- 66	0.95	0.049			10.4	1.1	--	0.11	0.50				1.11	1.40	0.080			47.9	31.6	0.18
66-100	0.40				7.7	0.9	--	0.11	0.48				1.20	1.41	0.055			40.5	31.1	0.11
100-133	0.39				5.9	0.7	--	0.14	0.51				1.21	1.43	0.057			40.0	30.4	0.12

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - - ->< - - - - -PCT - - - ->																	1:2	1:1
0- 13	0.5	0.5	0.1	0.2	1.3	22.4	2.9	23.7	18.1	4.2	69	5	7				4.0	4.2	4.7
13- 30	0.2	0.4	0.1	0.1	0.8	19.5	3.1	20.3	14.1	3.9	79	4	6				4.0	4.1	4.7
30- 54	0.4	0.5	0.1	--	1.0	20.5	3.8	21.5	12.4	4.8	79	5	8				4.0	4.1	4.8
54- 66	0.5	0.3	0.1	--	0.9	13.1	2.3	14.0	6.9	3.2	72	6	13				4.0	4.2	4.8
66-100	0.2	0.3	0.1	TR	0.6	11.9	2.8	12.5	7.4	3.4	82	5	8				3.9	4.2	4.8
100-133	0.5	0.9	0.2	0.1	1.7	13.4	3.3	15.1	8.5	5.0	66	11	20				3.8	4.1	4.6

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i						DSC 7A6		TGA 7A4b		SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRETA TION
		<- - - - - - peak size - - - -						Percent - - -						Percent - - -					<mg/g>	
87P1532	TCLY	KK 4	GI 3	VR 1	MT 1	LE 1	KK77	GI 1	KK61	GI 2				9.0			0.1			
87P1533	TCLY	KK 4	GI 2	GE 2	VR 1		KK74	GI 4						12.7			0.1			
87P1535	TCLY	KK 4	GE 2	GI 2	VR 1		KK72	GI 2						14.3			0.1			

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i						THERMAL DTA 7A3b		TGA 7A4b		TOT RE		OPTICAL GRAIN COUNT 7B1a								INTER PRETA TION
		Peak Size						Percent						Percent								
87P1533	VFS	QZ 5	GI 2									93	QZ56	FE26	GI 7	OT 3	BT 2	MG 2				
87P1533	VFS												PO 2	TA 1	PR 1	ZRtr	MStr	GNtr				
87P1533	VFS												CLtr	FKtr								

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

KK	kaolinite	GI	gibbsite	VR	vermiculite	MT	montmorillon	LE	lepidocrocit	QZ	quartz
GE	goethite	FE	iron oxides	OT	other	BT	biotite	MG	magnetite	PO	plant opal
TA	talc	PR	pyroxene	ZR	zircon	MS	muscovite	GN	garnet	CL	chlorite
FK	potas feldsp										

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Moteado

NSSL pedon number: 87P0302

Pedon ID: S87PR-119-001

Field classification: Clayey, oxidic, isothermic Aeric Kanhaplaquults

Revised classification as of March 01, 2001: Very-fine, kaolinitic, isothermic Aeric Kanhaplaquults

Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; Noreste Soil and Water Conservation District

Latitude: 18°18’46" north

Longitude: 66°48’54" west

Geomorphic position: On lower third of component

Elevation: 680 meters

Slope: 30 percent with a convex southwest aspect

Major Land Resource Area: 270—Humid Mountains and Valleys

Average air temperature: Annual—17 °C; summer—19 °C; winter—16 °C

Average soil temperature: Annual—19 °C; summer—21 °C; winter—18 °C

Vegetation: Palo Colorado Forest species

Drainage, runoff, and permeability: Poorly drained, rapid runoff, and slow permeability

Surface stoniness: Class 2

Erosion: Slight

Particle-size control section: 13 to 63 cm

Diagnostic features: Ochric epipedon at 0 to 13 cm; argillic horizon at 13 to 133 cm; lithic contact at 133 cm

Surface Cover: 20 to 30 percent stones and cobbles

Parent material: Volcanic sandstone

Described and sampled by: L. Huffaker and D. Williams during April 1987

Notes: Matrix colors are for moist ped interiors.

O—2 to 0 cm; organic and leaf mat with 8 cm of aerial roots; many fine and many medium roots throughout.

A—0 to 13 cm; grayish brown (10YR 5/2) clay; few fine distinct redoximorphic features; moderate fine subangular blocky structure parting to weak fine granular; very friable, sticky, plastic; many medium and many fine roots throughout; common fine interstitial and tubular pores; common large wormcasts filled with grayish brown (10YR 5/2) silt; clear smooth boundary. 87P1531

Btg1—13 to 30 cm; dark grayish brown (2.5Y 4/2) clay; common medium distinct and common coarse distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable, sticky, plastic; common fine and common medium roots throughout; common medium interstitial and tubular pores; common continuous distinct coatings on vertical and horizontal faces of peds; yellowish brown

redoximorphic features along root channels; common large wormcasts filled with dark yellowish brown (10YR 4/4) silt; clear smooth boundary. 87P1532

Btg2—30 to 54 cm; 70 percent dark grayish brown (2.5Y 4/2), 15 percent light olive brown (2.5Y 5/6), and 15 percent gray (5Y 5/1) clay; common coarse prominent redoximorphic features; moderate medium prismatic structure parting to moderate medium subangular blocky; firm, very sticky, very plastic; few roots; common fine and common medium interstitial and tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; common wormcasts 8 mm in diameter filled with dark reddish brown (5YR 2.5/2) silt and organic matter and coated with (2.5Y 4/6) material; clear smooth boundary. 87P1533

Bt1—54 to 66 cm; yellowish brown (10YR 5/8) clay; common fine prominent and few coarse distinct redoximorphic features; weak medium prismatic structure parting to weak medium subangular blocky; firm, sticky, very plastic; few fine and few medium interstitial and tubular pores; common continuous distinct coatings on vertical faces of peds; common 8 mm wormcasts filled with gray (10YR 5/1) silt and coated with strong brown (7.5YR 4/6) material; thin (8 mm) discontinuous brittle layer; clear smooth boundary. 87P1534

Bt2—66 to 100 cm; light olive brown (2.5Y 5/6) clay; common medium distinct and common coarse prominent redoximorphic features; weak medium subangular blocky structure; firm, sticky, very plastic; few fine and few medium interstitial and tubular pores; common discontinuous distinct coatings on vertical faces of peds; few fine irregular soft masses of iron; few large wormcasts; few old root channels; clear smooth boundary. 87P1535

B′tg—100 to 133 cm; olive gray (5Y 4/2) clay; common medium prominent redoximorphic features; weak medium subangular blocky structure; few fine and few medium interstitial and tubular pores; common discontinuous distinct coatings on vertical faces of peds; reddish material along old root channels and along ped faces; few large wormcasts; few fine rounded soft masses of iron; abrupt smooth boundary. 87P1536

R—133 cm; bedrock. Not sampled.

Yunque-like: S87PR-119-002

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Yunque-like; clayey, oxidic, isothermic Typic Kanhaplohumults

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 303, Samples 87P 1537–1543

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) WEIGHT 2 -5	COARSE FRACS (MM) WEIGHT 5 -20	COARSE FRACS (MM) WEIGHT 20 -75	COARSE FRACS (MM) WEIGHT .1- 75	>2MM WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
87P1537S	0- 12	A	75.4	21.5	3.1	41.3		16.5	5.0	1.4	0.8	0.4	0.3	0.2	--	--	--	2	--
87P1538S	12- 38	Bt1	75.5	21.7	2.8	39.3		18.6	3.1	1.4	0.7	0.3	0.3	0.1	TR	--	--	1	--
87P1539S	38- 72	Bt2	62.8	34.1	3.1	24.7		30.4	3.7	2.2	0.6	0.1	0.1	0.1	--	--	--	1	--
87P1540S	72- 80	Bw1	44.3	47.8	7.9	13.7		42.5	5.3	4.0	2.1	0.9	0.6	0.3	--	--	--	4	--
87P1541S	80-124	Bw2	37.1	50.0	12.9	11.6		43.3	6.7	5.8	4.2	2.1	0.8	--	--	--	--	7	--
87P1542S	124-150	Bw3	33.5	51.3	15.2	9.6		45.5	5.8	6.3	4.9	2.7	1.3	--	--	--	--	9	--
87P1543S	77- 80	Bsm													4	14	41		59

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a OF	EXTRACTABLE MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	BULK DENSITY 1/3 BAR 4A1d -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 12	4.55	0.344			5.1	0.8	--	0.21	0.48			0.85	1.22	0.128				63.1	36.0	0.23
12- 38	3.11	0.214			5.4	0.9	--	0.15	0.48			0.99	1.30	0.095				53.7	36.6	0.17
38- 72	1.55	0.090			9.4	1.2	--	0.14	0.55	73	25	1.01	1.27	0.079				53.6	34.7	0.19
72- 80	0.37	0.009			8.3	0.8	--	0.15	0.60	58	18	1.28	1.41	0.033				35.4	26.7	0.11
80-124	0.19	0.009			5.5	0.5	TR	0.22	0.68			1.18	1.27	0.025				42.5	25.4	0.20
124-150	0.15				4.8	0.5	TR	0.22	0.68			1.21	1.34	0.035				38.7	22.8	0.19
77- 80					14.2	0.9	--												25.4	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																	1:2	1:1
0- 12	0.2	0.4	0.2	0.1	0.9	24.7	4.3	25.6	16.1	5.2	83	4	6				3.9	4.1	4.5
12- 38	0.1	0.2	0.1	TR	0.4	19.3	3.8	19.7	11.2	4.2	90	2	4				4.0	4.1	4.5
38- 72	0.1	0.1	0.2	--	0.4	14.7	2.6	15.1	8.9	3.0	87	3	4				4.0	4.2	4.7
72- 80	0.1	TR	0.1	--	0.2	9.0	25.0	9.2	6.6	25.2	99	2	3				4.0	4.3	5.0
80-124	0.1	TR	0.2	--	0.3	6.0	29.0	6.3	8.0	29.3	99	5	4				3.9	4.2	4.9
124-150	--	0.1	0.1	--	0.2	9.7	3.3	9.9	7.4	3.5	94	2	3				3.9	4.2	5.0
77- 80																			

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY peak size 7A2i	X-RAY peak size	X-RAY peak size	THERMAL Percent 7A6	THERMAL Percent	DSC	TGA	ELEMENTAL Percent SiO2	ELEMENTAL Percent AL2O3	ELEMENTAL Percent Fe2O3	ELEMENTAL Percent MgO	ELEMENTAL Percent CaO	ELEMENTAL Percent K2O	ELEMENTAL Percent Na2O	EGME 7C3	INTER RETN 7D2	PRETA TION
87P1538	TCLY	KK 5	GE 2		KK84	GI 2					10.6							
87P1539	TCLY	KK 4	GE 2		KK76	GI 4	KK55	GI 6			17.2							
87P1540	TCLY	KK 3	GE 2	HE 1	KK75	GI 2					14.3							
87P1541	TCLY	KK 3	GE 2	HE 1	KK75	GI 2	KK55	GI 3			14.3							
87P1543	TCLY	KK 3	GE 2	TA 2	KK62	GI 3					24.3							

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY Peak Size	X-RAY	THERMAL Percent 7A3b	THERMAL Percent	DTA	TGA	TOT RE	OPTICAL Percent 7A4b	OPTICAL Percent	OPTICAL Percent	GRAIN COUNT 7B1a	GRAIN COUNT	GRAIN COUNT	INTER PRETA TION
87P1539	VFS	QZ 4	GI 2	KK 2	GE 2				99	FE49	QZ25	KK22	GI 2	FK 1	PO 1	
87P1539	VFS									MGtr						

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

KK kaolinite GE goethite GI gibbsite QZ quartz FE iron oxides FK potas feldsp

PO plant opal MG magnetite HE hematite TA talc

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Yunque-like
NSSL pedon number: 87P0303
Pedon ID: S87PR-003-002
Field classification: Clayey, oxidic, isothermic Typic Kanhaplohumults
Revised classification as of July 01, 1999: Yunque; very-fine, kaolinitic, isothermic Humic Hapludox
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; Noroeste Soil and Water Conservation District; Fallon-Lovelock Area
Latitude: 18°18’44" north
Longitude: 66°48’54" west
Elevation: 680 meters
Slope: 30 percent with a convex southwest aspect
Vegetation: Palo Colorado Forest species
Major Land Resource Area: 270—Humid Mountains and Valleys
Average air temperature: Annual—17 °C; summer—19 °C; winter—16 °C
Average soil temperature: Annual—19 °C; summer—21 °C; winter—18 °C
Drainage, runoff, and permeability: Moderately well drained, rapid runoff, and moderately rapid permeability
Surface stoniness: Class 1
Erosion: Slight
Parent material: Volcanic sandstone
Particle-size control section: 12 to 62 cm
Diagnostic features: Ochric epipedon at 0 to 12 cm; argillic horizon at 12 to 72 cm; discontinuous petroferric horizon at 77 to 80 cm
Described and sampled by: L. Huffaker and D. Williams during April 1987
Notes: Matrix colors are for moist ped interiors.

O—3 to 0 cm; many fine and many medium roots throughout; abrupt smooth boundary.

A—0 to 12 cm; dark yellowish brown (10YR 4/6) clay; weak fine subangular blocky structure; friable, sticky, plastic; many fine and many medium roots throughout; common large wormcasts filled with organic material; clear smooth boundary. 87P1537

Bt1—12 to 38 cm; yellowish brown (10YR 5/8) clay; few fine distinct and few medium distinct redoximorphic features; weak coarse subangular blocky structure parting to weak medium subangular blocky; firm, sticky, very plastic; common fine and common medium roots throughout; common fine interstitial and tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; common large wormcasts filled with organic material; reddish redoximorphic concentrations along root channels; common large wormcasts filled with organic material; clear smooth boundary. 87P1538

Bt2—38 to 72 cm; yellowish brown (10YR 5/8) clay; few fine distinct and few coarse prominent redoximorphic features; weak medium prismatic structure parting to weak medium subangular blocky; firm, sticky, very plastic; few fine

and few medium interstitial and tubular pores; common continuous distinct coatings on vertical and horizontal faces of peds; abrupt smooth boundary. 87P1539

Bw1—72 to 80 cm; 70 percent yellowish red (5YR 5/8) and 30 percent strong brown (7.5YR 5/8) clay loam; few fine distinct redoximorphic features; weak medium platy structure; very friable, weakly cemented, sticky, plastic; discontinuous weakly cemented zone at 77 to 80 cm; abrupt smooth boundary. 87P1540

Bw2—80 to 124 cm; strong brown (7.5YR 5/8) clay; common coarse prominent redoximorphic features; massive; friable, sticky, plastic; fracture planes have manganese coatings; 30 percent unaltered fragments; gradual boundary. 87P1541

Bw3—124 to 150 cm; 60 percent yellowish red (5YR 5/8), 30 percent strong brown (7.5YR 5/8), and 10 percent white (10YR 8/2) clay loam; massive; friable, sticky, plastic; fracture planes have manganese coatings; 40 percent unaltered fragments. 87P1542

Bsm—77 to 80 cm; petroferric; satellite sample. 87P1543

Dwarf: S87PR-119-003

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Dwarf; fine, kaolinitic, isomesic Aeric Tropaquepts

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 304, Samples 87P 1544–1552

—General methods: 1B1A, 2A1, 2B

SAMPLE NO. (-1--)	DEPTH (CM) (-2--)	HORIZON (-3--)	TOTAL: CLAY LT .002 (-4--)	TOTAL: SILT .002 -.05 (-5--)	TOTAL: SAND .05 -2 (-6--)	CLAY: FINE LT .0002 (-7--)	CLAY: CO3 LT .002 (-8--)	SILT: FINE .002 -.02 (-9--)	SILT: COARSE .02 -.05 (-10-)	SAND: VF .05 -.10 (-11-)	SAND: F .10 -.25 (-12-)	SAND: M .25 -.50 (-13-)	SAND: C .5 -1 (-14-)	SAND: VC 1 -2 (-15-)	COARSE FRACS (MM) WEIGHT: 2 -5 (-16-)	WEIGHT: 5 -20 (-17-)	WEIGHT: 20 -75 (-18-)	WEIGHT: .1- 75 (-19-)	(>2MM) WT % OF WHOLE SOIL (-20-)
			<- - - PCT OF <2MM (3A1)											- - ->	<- PCT OF <75MM(3B1)			->	SOIL
87P1544S	0- 9	Oa													--	--	--		--
87P1545S	9- 24	A	6.6	23.0	70.4	2.4		16.6	6.4	6.2	10.1	13.8	25.6	14.7	TR	--	--	64	--
87P1546S	24- 40	Bw1	33.2	58.8	8.0	7.9		52.7	6.1	2.5	1.8	1.4	1.7	0.6	TR	--	--	5	--
87P1547S	40- 67	Bw2	43.0	52.1	4.9	13.2		47.8	4.3	1.6	1.4	0.9	1.0	--	--	--	--	3	--
87P1548S	67- 89	Bw3	45.5	46.8	7.7	16.5		42.1	4.7	3.5	2.4	1.0	0.5	0.3	--	--	--	4	--
87P1549S	89-110	Bsc	29.3	44.5	26.2	9.7		37.8	6.7	4.9	5.4	5.1	6.0	4.8	--	--	--	21	--
87P1550S	110-133	B’w1	26.5	71.0	2.5	10.3		66.6	4.4	1.0	0.6	0.4	0.3	0.2	--	--	--	1	--
87P1551S	133-153	B’w2	27.5	66.8	5.7	7.9		61.3	5.5	1.5	1.0	0.8	1.1	1.3	--	--	--	4	--
87P1552S	47-110														--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 9	22.2	1.314			1.0	0.4	--						0.39	0.84	0.291			131.3	52.3	0.31
9- 24	11.7	0.807			0.7	0.5	--	6.59	6.45				0.40	1.01	0.362			172.9	42.6	0.52
24- 40	9.42	0.435			0.8	0.4	--	0.90	0.99				0.73	1.01	0.114			73.6	32.7	0.30
40- 67	7.17	0.265			2.0	0.6	--	0.49	0.76				0.88	1.06	0.064			59.7	32.5	0.24
67- 89	4.25				7.7	1.2	--	0.30	0.78				1.01	1.19	0.056			55.1	35.5	0.20
89-110	1.23				6.0	1.0	--	0.33	0.88				1.13	1.29	0.045			46.7	25.7	0.24
110-133	0.97				5.8	0.6	--	0.31	0.75				1.13	1.20	0.020			48.5	19.8	0.32
133-153	0.57				10.6	0.6	--	0.29	0.69				1.16	1.26	0.028			47.8	19.0	0.33
47-110																				

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - MEQ / 100 G									- - ->	<- - -PCT		- - ->					1:2	1:1
0- 9	0.6	1.7	0.3	0.2	2.8	71.6	7.1	74.4	54.2	9.9	72	4	5				3.9	3.7	4.6
9- 24	--	0.2	--	TR	0.2	49.4	7.9	49.6	43.5	8.1	98	TR	TR				3.7	3.9	4.5
24- 40	--	0.1	--	--	0.1	34.2	6.3	34.3	29.8	6.4	98	TR	TR				3.9	4.1	4.7
40- 67	--	0.1	--	--	0.1	29.7	5.5	29.8	21.0	5.6	98	TR	TR				4.0	4.2	4.9
67- 89	--	TR	--	--	TR	25.2	4.5	25.2	13.7	0.2	2250	TR	TR				4.1	4.2	5.0
89-110	--	0.2	TR	--	0.2	16.6	3.0	16.8	9.7	3.2	94	1	2				4.0	4.2	5.0
110-133	--	0.2	--	--	0.2	11.8	4.8	12.0	8.3	5.0	96	2	2				3.9	4.1	4.8
133-153	--	0.1	--	--	0.1	11.0	5.0	11.1	8.0	5.1	98	1	1				3.9	4.0	4.7
47-110																			

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)			THERMAL DSC 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 mg/g	INTERPRETATION
87P1547	TCLY	KK 3	GE 1		KK52 GItr	KK65 GI 2			7.9						
87P1551	TCLY	KK 3	GE 2	LE 2	KK54 GI 4				27.2						

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          < - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE      ION <                       ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                < - - - - - 7A2i - - - - -><  - 7A3b - -><  - 7A4b - -><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER    < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
87P1547    VFS   QZ 3  GI 2  KK 2                                 96  KK61  QZ11  GI11  FE 5  MG 5  BT 3
87P1547    VFS                                                       RA 2  PO 1  PR 1  TAtr  FKtr

FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm            VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    QZ  quartz          GI  gibbsite        KK  kaolinite       GE  goethite         FE  iron oxides      MG  magnetite
    BT  biotite         RA  resist-aggre    PO  plant opal      PR  pyroxene         TA  talc            FK  potas feldsp
    LE  lepidocrocit
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Dwarf
NSSL pedon number: 87P0304
Pedon ID: S87PR-119-003
Field classification: Fine, kaolinitic, isomesic Aeric Tropaquepts
Revised classification as of March 01, 2001: Very-fine, mixed, isomesic Humic Haplaquox[2]
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; Noroeste Soil and Water Conservation District
Latitude: 18°17’37" north
Longitude: 66°47’44" west
Elevation: 995 meters
Physiography: Upland slope in mountains or deeply dissected plateaus
Slope: 18 percent with a convex south aspect
Major Land Resource Area: 270—Humid Mountains and Valleys
Depth to water table: 20 cm; perched
Average air temperature: Annual—16 °C; summer—18 °C; winter—15 °C
Average soil temperature: Annual—14 °C; summer—16 °C; winter—13 °C
Drainage, runoff, and permeability: Somewhat poorly drained, moderate runoff, and moderately slow permeability
Erosion: Slight
Particle-size control section: 25 to 100 cm
Vegetation: Dwarf Forest species
Parent material: Volcanic sandstone
Diagnostic features: Histic horizon at 0 to 9 cm; umbric horizon at 9 to 24 cm; cambic horizon at 24 to 89 cm
Described and sampled by: L. Huffaker and D. Williams during April 1987
Notes: Matrix colors are for moist ped interiors.

Oa—0 to 9 cm; very dark grayish brown (10YR 3/2) muck, dark grayish brown (10YR 4/2) rubbed; weak fine subangular blocky structure; very friable; many medium and many coarse roots throughout; common fine interstitial and tubular pores; very strongly acid; boundary not identified. 87P1544

A—9 to 24 cm; dark brown (10YR 3/3) mucky silt loam; few medium distinct redoximorphic features; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; many medium and many fine roots throughout; common fine and common medium interstitial and tubular pores; few dark brown (7.5YR 3/2) and brown (7.5YR 4/4) stains along root channels; boundary not identified. 87P1545

Bw1—24 to 40 cm; dark grayish brown (2.5Y 4/2) silt loam; weak medium subangular blocky structure parting to weak fine subangular blocky; very friable, slightly sticky, slightly plastic; common medium and common fine

[2] The data establishing the presence of an isomesic temperature regime in Puerto Rico are limited. The exact elevation where this regime starts is thought to be at more than 1,065 meters (3,500 feet). The regime is in the Caribbean National Forest in the eastern part of Puerto Rico.

roots throughout; common fine and common medium interstitial and tubular pores; many dark brown (7.5YR 3/4) and strong brown (7.5YR 4/6) stains along root channels; common large wormcasts filled with very dark grayish brown (10YR 3/2) material; very strongly acid; boundary not identified. 87P1546

Bw2—40 to 67 cm; olive gray (5Y 4/2) silty clay loam; common coarse distinct redoximorphic features; weak medium subangular blocky structure parting to weak fine subangular blocky; very friable, slightly sticky, slightly plastic; common fine and common medium roots; common fine and common medium interstitial and tubular pores; few patchy distinct organic coatings in root channels and/or pores; common large wormcasts filled with very dark grayish brown (10YR 3/2) material; boundary not identified. 87P1547

Bw3—67 to 89 cm; olive (5Y 4/4) clay; few coarse distinct and common fine distinct redoximorphic features; weak coarse angular blocky structure; friable, sticky, plastic; few fine roots; few fine and few medium interstitial and tubular pores; few discontinuous distinct pressure faces on horizontal faces of peds; common medium irregular iron-manganese concretions and few coarse irregular iron-manganese concretions; many large wormcasts filled with very dark grayish brown (2.5Y 3/2) silt; few old roots; boundary not identified. 87P1548

Bsc—89 to 110 cm; olive brown (2.5Y 4/4) clay; common coarse prominent and many medium prominent redoximorphic features; weak coarse angular blocky structure; firm, sticky, plastic; few fine and few medium interstitial and tubular pores; common discontinuous distinct organic coatings on faces of peds; few discontinuous distinct pressure faces on horizontal faces of peds; few old roots; common large wormcasts; boundary not identified. 87P1549

B′w1—110 to 133 cm; olive (5Y 5/6) silt loam; few fine distinct, few coarse prominent, and few medium prominent redoximorphic features; massive; friable, slightly sticky, plastic; few fine and few medium interstitial and tubular pores; few large worm holes filled with very dark grayish brown (2.5Y 3/2) and light olive brown (2.5Y 5/4) material; few old root channels; boundary not identified. 87P1550

B′w2—133 to 153 cm; 70 percent strong brown (7.5YR 5/6) and 30 percent yellowish brown (10YR 5/8) silty clay loam; many coarse prominent and few medium prominent redoximorphic features; massive; friable, slightly sticky, plastic; few fine and few medium interstitial and tubular pores; few medium irregular iron-manganese concretions; few large worm channels filled with (5YR 3/2) material. 87P1551

Palm: S87PR-119-004

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Palm; clayey-skeletal, oxidic, isothermic Aeric Tropaquepts

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 305, Samples 87P 1553–1556

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -2	TOTAL FINE .0002	CLAY CO3 LT .002	SILT FINE .002	SILT COARSE .02	SAND VF .05	SAND F .10	SAND M .25	SAND C .5	SAND VC 1	COARSE FRACS (MM) 2	COARSE FRACS (MM) 5	COARSE FRACS (MM) 20	>2MM WEIGHT .1-	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
87P1553S	0- 18	Oa	32.4	50.4	17.2	13.6		38.1	12.3	10.0	6.1	0.7	0.4	--	TR	TR	--	7	TR
87P1554S	18- 41	Bw1	32.9	40.9	26.2	15.5		32.0	8.9	7.8	7.3	4.4	3.3	3.4	TR	TR	--	18	TR
87P1555S	41- 72	Bw2	35.9	42.5	21.6	15.5		32.8	9.7	7.2	5.4	3.2	3.0	2.8	TR	1	37V	47	78
87P1556S	72-144	Bw3	37.5	43.1	19.4	12.1		33.5	9.6	7.0	4.7	2.6	2.3	2.8	TR	3	42V	52	82

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR TOTAL P 6S3	TOTAL S 6R3a	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	COLE OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- - ->	CM/CM		<- - -PCT OF <2MM			- ->	CM/CM
0- 18	13.3	0.668			3.7	0.6	TR	1.25	1.31				0.70	1.04	0.141			71.9	42.6	0.21
18- 41	10.4	0.617			3.8	0.7	TR	1.39	0.97				0.65	1.06	0.177			90.7	32.0	0.38
41- 72	2.07	0.139			6.2	0.9	TR	0.47	0.66				1.11	1.27	0.017			48.7	23.8	0.11
72-144	1.48	0.122			7.1	1.0	TR	0.42	0.65				0.87	1.03	0.021			69.1	24.4	0.15

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 18	19.3	2.4	--	--	21.7	39.5	0.5	61.2	40.5	22.2	2	35	54				4.6	4.9	5.3
18- 41	10.3	1.9	0.1	0.2	12.5	42.8	2.7	55.3	45.6	15.2	18	23	27				4.0	4.4	4.8
41- 72	2.0	0.7	--	0.2	2.9	19.3	1.0	22.2	16.9	3.9	26	13	17				4.2	4.5	5.1
72-144	1.5	0.5	TR	0.1	2.1	18.3	0.6	20.4	15.8	2.7	22	10	13				4.4	4.7	5.3

< - CLAY MINERALOGY (<.002mm) ->

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY peak size	X-RAY	THERMAL DSC	THERMAL TGA	ELEMENTAL SiO2	ELEMENTAL AL2O3	ELEMENTAL Fe2O3	ELEMENTAL MgO	ELEMENTAL CaO	ELEMENTAL K2O	ELEMENTAL Na2O	EGME RETN	INTER PRETA TION
				7A6	7A4b	7C3								7D2	
87P1555	TCLY	KK 3	GI 2 GE 2 VR 1	KK54	GI 6	KK41	GI12		13.7					mg/g	

< - SAND - SILT MINERALOGY (2.0-0.002mm) ->

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY Peak Size	X-RAY	THERMAL DTA	THERMAL TGA	THERMAL 7A3b	THERMAL 7A4b	TOT RE	OPTICAL 7B1a	GRAIN COUNT VFS	GRAIN COUNT QZ 3	GRAIN COUNT GR 2	GRAIN COUNT KK 2	GRAIN COUNT FD 2	GRAIN COUNT 72	GRAIN COUNT GI22	GRAIN COUNT RA19	GRAIN COUNT GN15	GRAIN COUNT BT11	GRAIN COUNT QZ11	GRAIN COUNT HN 6	INTER PRETA TION
87P1555											VFS	CR 1					AR 5	KK 5	FK 4	PR 1	FP 1	GS 1	

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

QZ	quartz	GR		KK	kaolinite	FD	feldspar	CR	cristobalite
GI	gibbsite	GE	goethite	VR	vermiculite	RA	resist-aggre	GN	garnet
BT	biotite	HN	hornblende	AR	wthr aggrega	FK	potas feldsp	PR	pyroxene
FP	plag-feldspa	GS	glass						

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Palm
NSSL pedon number: 87P0305
Pedon ID: S87PR-119-004
Field classification: Clayey-skeletal, oxidic, isothermic Aeric Tropaquepts
Revised classification as of March 01, 2001: Clayey-skeletal, mixed, active, acid, isothermic Aquandic Humaquepts
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; Noroeste Soil and Water Conservation District
Latitude: 18°18’21" north
Longitude: 66°47’45" west
Elevation: 900 meters
Geomorphic position: On middle third of component
Slope: 55 percent with a convex west aspect
Major Land Resource Area: 270—Humid Mountains and Valleys
Average air temperature: Annual—16 °C; summer—18 °C; winter—15 °C
Average soil temperature: Annual—18 °C; summer—20 °C; winter—17 °C
Drainage, runoff, and permeability: Poorly drained, rapid runoff, and moderately slow permeability
Surface stoniness: Class 1
Erosion: Slight
Vegetation: Palm Forest species
Surface fragments: 70 percent cobbles
Particle-size control section: 25 to 100 cm
Parent material: Volcanic sandstone
Diagnostic features: Umbric horizon at 0 to 18 cm; cambic horizon at 18 to 144 cm
Described and sampled by: L. Huffaker and D. Williams during April 1987
Notes: Matrix colors are for moist ped interiors.

Oa—0 to 18 cm; dark reddish brown (5YR 3/2) mucky loam; few fine distinct redoximorphic features; weak medium subangular blocky structure parting to weak fine subangular blocky parting to moderate fine granular; very friable, nonsticky, slightly plastic; many very fine and many fine roots throughout; few very fine and few fine interstitial and tubular pores; very strongly acid; clear smooth boundary. 87P1553

Bg1—18 to 41 cm; black (5Y 2/2) loam; weak medium subangular blocky structure parting to weak fine subangular blocky; very friable, nonsticky, plastic; common very fine and common medium roots throughout; common very fine and few fine interstitial and tubular pores; common discontinuous distinct coatings on vertical and horizontal faces of peds; common large (6 mm) wormcasts coated with dark yellowish brown (10Y 3/6) material and filled with black (N 2/0) material; dark reddish brown (5YR 3/3) along root channels; clear smooth boundary. 87P1554

Bg2—41 to 72 cm; olive (5Y 5/3) very stony clay; common coarse distinct redoximorphic concentrations; weak coarse angular blocky structure; firm,

sticky, plastic; few very fine and few medium roots throughout; few fine interstitial and tubular pores; few discontinuous distinct pressure faces on horizontal faces of peds; 20 percent cobbles; 10 percent gravel; 30 percent stones; gradual wavy boundary. 87P1555

Bg3—72 to 144 cm; olive (5Y 5/3) very stony clay; common coarse distinct and few medium distinct redoximorphic concentrations; massive; firm, sticky, plastic; few fine interstitial and tubular pores; 20 percent cobbles; 10 percent gravel; 30 percent stones. 87P1556

Picacho: S87PR-119-005

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Picacho; fine-loamy, mixed, isothermic Typic Humitropepts

SSL—Project: 87P 65, (CP87PR108)

—Pedon: 87P 306, Samples 87P 1557–1561

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4-- TOTAL CLAY LT .002	-5-- TOTAL SILT .002 -.05	-6-- TOTAL SAND .05 -2	-7-- CLAY FINE LT .0002	-8-- CLAY CO3 LT .002	-9-- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS WEIGHT 2 -5	-17- 5 -20	-18- 20 -75	-19- .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
87P1557S	0- 3	A	18.6	14.4	67.0	8.6		9.4	5.0	8.2	23.6	26.5	7.9	0.8	TR	TR	--	59	TR
87P1558S	3- 18	Bt1	20.2	14.1	65.7	9.4		9.2	4.9	8.2	23.1	26.1	7.5	0.8	--	--	--	57	--
87P1559S	18- 30	Bt2	20.5	15.2	64.3	9.4		10.6	4.6	7.8	20.5	23.0	8.3	4.7	TR	--	6V	59	6
87P1560S	30- 60	Bw1	22.6	15.9	61.5	8.5		11.5	4.4	8.9	18.7	19.4	9.4	5.1	1	TR	--	53	1
87P1561S	60-145	Bw2	14.6	23.7	61.7	4.8		16.8	6.9	13.4	17.1	13.2	10.1	7.9	2	--	7V	53	25

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 3	5.32	0.241			2.0	0.2	--	0.78	0.82										15.2	
3- 18	4.31	0.203			2.0	0.2	--	0.58	0.72				1.32	1.42	0.025			24.7	14.5	0.13
18- 30	1.44	0.090			2.5	0.2	--	0.26	0.63				1.42	1.49	0.016			20.6	13.0	0.10
30- 60	1.00	0.066			2.0	0.2	--	0.27	0.60				1.29	1.37	0.020			28.4	13.5	0.19
60-145	0.29	0.022			2.3	0.3	0.1	0.60	0.92	47	13		1.30	1.39	0.019			28.3	13.5	0.17

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									- ->	<- - - - -PCT		- - - ->					1:2	1:1
0- 3	2.0	1.0	--	0.2	3.2	18.8	1.3	22.0	14.5	4.5	29	15	22				3.9	4.2	4.8
3- 18	1.3	0.9	--	TR	2.2	16.0	1.5	18.2	11.8	3.7	41	12	19				3.9	4.2	4.9
18- 30	0.1	0.2	--	--	0.3	8.1	1.5	8.4	5.4	1.8	83	4	6				4.0	4.2	4.9
30- 60	--	0.1	--	--	0.1	8.7	1.6	8.8	6.1	1.7	94	1	2				4.0	4.3	5.0
60-145	TR	0.3	--	TR	0.3	9.6	2.6	9.9	8.7	2.9	90	3	3				3.9	4.3	5.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
87P1559	TCLY	KK 5 GI 2 GE 1 VR 1 LE 1	KK59 GI 3	KK49 GI 2			9.4						
87P1561	TCLY	KK 4 GI 2 GE 1	KK29 GI 3				8.7						

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	THERMAL TGA 7A4b (Percent)	OPTICAL TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)	INTERPRETATION
87P1559	FS				87	QZ84 HN 4 BT 4 FK 3 OT 3 OP 2	
87P1559	FS					QC 1 MStr VRtr	

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm   FS Fine Sand, 0.1-0.25mm

MINERAL INTERPRETATION:

KK	kaolinite	GI	gibbsite	GE	goethite	VR	vermiculite	LE	lepidocrocit	QZ	quartz
HN	hornblende	BT	biotite	FK	potas feldsp	OT	other	OP	opaques	QC	clay-coat qz
MS	muscovite										

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Picacho
NSSL pedon number: 87P0306
Pedon ID: S87PR-119-005
Field classification: Fine-loamy, mixed, isothermic Typic Humitropepts
Revised classification as of March 01, 2001: Fine-loamy, kaolinitic, isothermic Aquic Dystrudepts
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; Noroeste Soil and Water Conservation District; Highway 199 near kilometer marker 13.9
Latitude: 18°17’44" north
Longitude: 66°47’38" west
Elevation: 760 meters
Geomorphic position: On upper third of component
Slope: 65 percent with a convex east aspect
Vegetation: Palo Colorado Forest species
Major Land Resource Area: 270—Humid Mountains and Valleys
Average air temperature: Annual—17 °C; summer—19 °C; winter—16 °C
Average soil temperature: Annual—19 °C; summer—21 °C; winter—18 °C
Drainage, runoff, and permeability: Moderately well drained, rapid runoff, and moderate permeability
Erosion: Slight
Parent material: Granodiorite
Particle-size control section: 3 to 53 cm
Diagnostic features: Ochric epipedon at 0 to 3 cm; argillic horizon at 3 to 30 cm
Described and sampled by: R. Rolling and D. Williams during April 1987
Notes: Matrix colors are for moist ped interiors.

A—0 to 3 cm; reddish brown (5YR 4/3) clay; leaf mat and aerial roots on surface; many fine distinct and common coarse distinct redoximorphic features; moderate fine subangular blocky structure; very friable, sticky, plastic; many very fine roots throughout and many medium roots throughout; few fine tubular pores; few very fine quartz crystals; clear smooth boundary. 87P1557

Bt1—3 to 18 cm; brown to dark brown (7.5YR 4/2) clay; common medium distinct redoximorphic features; moderate medium subangular blocky structure; firm, sticky, plastic; common medium and common very fine roots throughout; few fine tubular pores; few patchy distinct iron stains in root channels and/or pores; few fine quartz grains; few large wormcasts filled with very dark grayish brown (10YR 3/2) material; clear smooth boundary. 87P1558

Bt2—18 to 30 cm; reddish yellow (7.5YR 6/6) clay; many fine distinct redoximorphic features; weak medium subangular blocky structure; firm, sticky, plastic; common very fine roots throughout; common fine tubular pores; 3 percent gravel; few large (4 to 6 mm) wormcasts filled with brown (7.5YR 4/2) clay; common fine quartz grains; clear smooth boundary. 87P1559

Bw1—30 to 60 cm; yellowish brown (10YR 5/6) clay; few fine distinct redoximorphic features; weak fine subangular blocky structure; friable, sticky, plastic; few very fine roots throughout; common fine and common very fine tubular pores; few patchy distinct coatings in root channels and/or pores; many very fine chips of mica; clear wavy boundary. 87P1560

Bw2—60 to 145 cm; 15 percent brown to dark brown (10YR 4/3), 40 percent yellowish red (5YR 4/6), and 25 percent brown (7.5YR 5/4) cobbly loam; massive; very friable, nonsticky, plastic; few very fine roots; few very fine tubular pores; many very fine chips of mica; 5 percent pockets of (10YR 6/6) loam; 5 percent gravel; 10 percent cobbles. 87P1561

Guayabota: S85PR-119-002

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Guayabota; fine-silty, mixed, isothermic Lithic Tropaquepts

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 251, Samples 86P 1451–1454

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(3A1) - - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				SOIL
86P1451S	0- 3	A		28.3	64.5	7.2			55.7	8.8	2.8	2.0	1.2	1.0	0.2	TR	1	--		5	1
86P1452S	3- 10	Bw		29.6	63.7	6.7			55.5	8.2	2.5	1.6	0.7	0.8	1.1	1	1	--		6	2
86P1453S	10- 23	Bt1		32.8	62.7	4.5			54.4	8.3	2.0	1.3	0.5	0.4	0.3	--	--	--		2	--
86P1454S	23- 36	Bt2		16.8	20.3	62.9			10.3	10.0	12.1	19.1	18.3	10.9	2.5	1	5	3		55	9

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)				(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 3	9.58								0.98										27.8	
3- 10	5.33								0.65										19.2	
10- 23	2.94								0.45										14.8	
23- 36	2.14								1.11										18.6	

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS RES.		COND.	(- - - -PH - - -)	
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS	MMHOS	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM	/CM	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1	8I	8C1f	8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 3																	3.7	4.1
3- 10																	3.8	4.3
10- 23																	4.1	4.6
23- 36																	4.0	4.5

Narrative Pedon Description

Pedon: Guayabota

NSSL pedon number: 86P0251

Pedon ID: S85PR-119-002

Field classification: Fine-silty, mixed, isomesic Lithic Tropaquepts

Series classification: Clayey, mixed, subactive, acid, isothermic, shallow Typic Humaquepts

Revised classification as of April 01, 2001: Clayey, mixed, acid, isohyperthermic, shallow Typic Humaquepts[3]

Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 91 meters west of Palo Colorado Road

Latitude: Unknown

Longitude: Unknown

Elevation: 660 meters

Slope: 17 percent with a convex west aspect

Average annual precipitation: 3,560 mm; aquic moisture regime

Described and sampled by: L. Daniels, L. Huffaker, and unknown authors during July 1985

O—5 to 0 cm; many very fine and fine and many medium and coarse roots; roots on surface-rootmat.

A—0 to 3 cm; black (N 2/0) silty clay loam; strong very fine and fine subangular blocky structure; many very fine and fine and many medium and coarse roots; many very fine tubular pores; very strongly acid; abrupt smooth boundary. 86P1451

Bw—3 to 10 cm; black (N 2/0) silty clay; moderate fine and medium subangular blocky structure; many very fine and many fine and medium roots; common fine and medium tubular pores; few faint clay films on faces of peds; very strongly acid; clear smooth boundary. 86P1452

Bt1—10 to 23 cm; black (N 2/0) silty clay; yellowish (7.5YR 5/8) redoximorphic features; moderate medium and coarse subangular blocky structure; common very fine and common fine and medium roots; few very fine and fine tubular pores; few distinct clay films on faces of peds and in pores; very strongly acid; clear smooth boundary. 86P1453

Bt2—23 to 36 cm; black (N 2/0) clay; weak medium and coarse subangular blocky structure; few fine roots; few fine and common medium and coarse tubular pores; few faint clay films on faces of peds; 5 percent gravel; strong brown (7.5YR 5/8) and dark olive gray (5Y 3/2) mottling; very strongly acid; clear smooth boundary. 86P1454

Cr—36 to 81 cm; black (N 2/0) soft vertically fractured mudstone; few fine roots. Not sampled.

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[3] Soil temperature data from the Maricao Forest suggests that this soil has an isothermic temperature regime.

Los Guineos: S85PR-119-004

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Los Guineos; very-fine, kaolinitic, isothermic Oxic Humitropepts

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 253, Samples 86P 1460–1464

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND -2	TOTAL FINE .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACS (MM) WEIGHT 2-5	5-20	20-75	>75MM .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->				
86P1460S	0- 3	A	80.0	16.0	4.0	43.1		11.6	4.4	1.5	1.2	0.7	0.4	0.2	--	--	--	2	--
86P1461S	3- 13	Bw	82.5	14.1	3.4	39.5		10.3	3.8	1.3	0.9	0.6	0.5	0.1	--	--	--	2	--
86P1462S	13- 41	Bt1	81.8	15.4	2.8	34.9		12.3	3.1	1.4	0.9	0.4	0.1	--	--	--	--	1	--
86P1463S	41- 84	Bt2	52.4	34.7	12.9	12.9		28.1	6.6	4.9	5.2	1.6	0.9	0.3	TR	--	--	8	TR
86P1464S	84-178	C	36.3	47.6	16.1	7.3		38.7	8.9	6.3	6.6	1.7	0.8	0.7	--	--	--	10	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT OF <2MM -->	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- - G/CC - - ->	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF <2MM - ->	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
0- 3	10.9							0.49	0.55										43.6	
3- 13	5.90							0.25	0.49										40.1	
13- 41	2.96							0.13	0.50										40.9	
41- 84	0.86							0.17	0.62										32.3	
84-178	0.45							0.20	0.75										27.4	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-EXTR ITY 6H5a	AL 6G9a	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 3	3.2	3.6	0.4	0.3	7.5	40.3	4.4	47.8	39.2	11.9	37	16	19				3.8	4.4
3- 13	0.7	1.3	0.2	0.2	2.4	26.6	3.9	29.0	21.0	6.3	62	8	11				4.0	4.6
13- 41	0.1	0.4	0.1	0.1	0.7	18.4	3.4	19.1	11.0	4.1	83	4	6				4.0	4.5
41- 84	0.1	0.1	TR	TR	0.2	15.5	2.0	15.7	9.0	2.2	91	1	2				4.2	4.6
84-178	0.1	0.1	TR	TR	0.2	13.3	2.5	13.5	7.2	2.7	93	1	3				4.2	4.7

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size					THERMAL DSC 7A6 Percent						ELEMENTAL TGA 7A4b Percent							EGME RETN 7D2 mg/g	INTER PRETA TION
86P1462	TCLY	KK 5	GE 2	VR 1		KK59	GI 2					15.7									

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Los Guineos
NSSL pedon number: 86P0253
Pedon ID: S85PR-119-004
Field classification: Very-fine, kaolinitic, isothermic Oxic Humitropepts
Series classification: Very-fine, kaolinitic, isothermic Humic Hapludox
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isothermic Humic Hapludox
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 46 meters southwest of Bridge Road 911
Latitude: Unknown
Longitude: Unknown
Elevation: 560 meters
Slope: 18 percent with a convex northeast aspect
Average air temperature: Annual—21.1 °C
Average annual precipitation: 2,670 mm; udic moisture regime
Described and sampled by: L. Daniels, L. Huffaker, and unknown authors during July 1985

A—0 to 3 cm; dark brown (10YR 3/3) clay; strong fine subangular blocky structure; many very fine and many fine and medium roots; many very fine and fine interstitial pores; strongly acid; abrupt smooth boundary. 86P1460

Bw—3 to 13 cm; dark yellowish brown (10YR 4/4) clay; strong fine and medium subangular blocky structure; common fine and medium and common coarse roots; common fine tubular pores; root and worm channels filled with dark grayish brown (10YR 4/2) material; strongly acid; clear smooth boundary. 86P1461

Bt1—13 to 41 cm; dark yellowish brown (10YR 4/4) clay; yellowish red (5YR 5/8) redoximorphic features; strong coarse subangular blocky structure; common fine and medium roots; common fine tubular pores; strongly acid; clear smooth boundary. 86P1462

Bt2—41 to 84 cm; red (2.5YR 4/8) clay; brownish yellow (10YR 6/6) redoximorphic concentrations; moderate medium subangular blocky structure; few fine roots; common fine tubular pores; few faint clay films on faces of peds; very strongly acid; clear smooth boundary. 86P1463

C—84 to 180 cm; red (2.5YR 4/8) clay; brownish yellow (10YR 6/6) redoximorphic concentrations; massive; few fine roots; few fine tubular pores; very strongly acid; clear smooth boundary. 86P1464

Dwarf: S85PR-119-007

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Dwarf; loamy, mixed, isomesic Dysic Tropofolists

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 256, Samples 86P 1475–1479

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-	-	- - - -)		(-COARSE FRACS (MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - -				PCT OF <2MM			(3A1)	- - - - - - - - - - - -				<- PCT OF <75MM(3B1)->				SOIL
86P1475S	5- 23	Oa1		3.1	7.4	89.5			2.7	4.7	2.5	5.4	9.1	16.8	55.7	--	--	--	87	--
86P1476S	23- 53	Oa2		1.8	24.5	73.7			12.6	11.9	7.7	10.1	11.7	20.7	23.5	1	1	--	67	2
86P1477S	53- 69	Bw		15.4	57.4	27.2			44.3	13.1	4.2	4.4	4.6	7.0	7.0	2	8	--	31	10
86P1478S	69-109	2Cr		19.1	52.9	28.0			42.3	10.6	3.7	3.9	3.6	5.8	11.0	2	4	--	29	6
86P1479S	109-145	3R		16.7	56.2	27.1			50.9	5.3	1.4	1.9	3.3	7.6	12.9	2	5	--	31	7

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT	- -)		(RATIO/CLAY)	(ATTERBERG)		(- BULK	DENSITY	-)	COLE	(- - -WATER	CONTENT		- -)	WRD
	C	N	P	S		EXTRACTABLE		15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT	<0.4MM	<- - G/CC	- -	->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
5- 23	25.2							26.13	30.03										93.1	
23- 53	20.6			0.14				34.06	30.50										54.9	
53- 69	6.97							1.18	1.11										17.1	
69-109	1.59								0.90										17.1	
109-145	0.34								0.67										11.2	

	(- NH4OAC	EXTRACTABLE	BASES -)			ACID-	EXTR	(- - -	-CEC	- - -)	AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - -	-PH	- - -)
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS		CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM		.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9a	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I		8C1f	8C1f
	<- - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - -				->	<- - - -	-PCT	- - -	->				1:2	1:1
5- 23	3.2	2.9	1.0	0.5	7.6	61.6	6.3	69.2	81.0	13.9	45	11	9						3.5	4.1
23- 53	0.6	0.4	0.2	0.1	1.3	67.7	10.0	69.0	61.3	11.3	88	2	2						3.6	4.3
53- 69	0.4	0.2	0.2	TR	0.8	27.2	4.1	28.0	18.1	4.9	84	3	4						4.2	5.0
69-109																			4.2	4.8
109-145																			4.4	5.1

Narrative Pedon Description

Pedon: Dwarf

NSSL pedon number: 86P0256

Pedon ID: S85PR-119-007

Field classification: Loamy, mixed, isomesic Dysic Tropofolists

Revised classification as of March 01, 2001: Dysic, isomesic Lithic Haplosaprists[4]

Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 183 meters east, airplane trail, Road 27

Latitude: Unknown

Longitude: Unknown

Slope: 15 percent with a convex northwest aspect

Average air temperature: Annual—14.4 °C

Average annual precipitation: 4,570 mm; aquic moisture regime

Particle-size control section: 53 to 69 cm

Diagnostic features: Histic horizon at 0 to 53 cm; cambic horizon at 53 to 69 cm; paralithic contact at 69 cm; lithic contact at 109 cm

Described and sampled by: L. Daniels, L. Huffaker, and unknown authors during July 1985

Oi—0 to 5 cm; aerial roots and moss; many very fine and fine and many medium and coarse roots. Not sampled.

Oa1—5 to 23 cm; very dark brown (10YR 2/2) silt loam; moderate very fine and fine subangular blocky structure; many very fine and fine and many medium and coarse roots; common fine tubular pores; very strongly acid; clear smooth boundary. 86P1475

Oa2—23 to 53 cm; very dark brown (10YR 2/2) silt loam; moderate fine and medium subangular blocky structure; common very fine and fine and common medium roots; common very fine and fine tubular pores; 5 percent gravel; strong smell of sulfur; very strongly acid; gradual smooth boundary. 86P1476

Bw—53 to 69 cm; olive gray (5Y 5/2) gravelly clay loam; weak medium subangular blocky structure; few fine roots; few fine tubular pores; dark grayish brown (10YR 4/2) redoximorphic features; 15 percent gravel; 15 percent cobbles; strongly acid; gradual smooth boundary. 86P1477

2Cr—69 to 109 cm; olive gray (5Y 5/2) very gravelly clay; massive; few very fine roots; common fine tubular pores; very dark grayish brown (10YR 3/2), olive (5Y 5/3), and yellowish brown (10YR 5/8) redoximorphic features; 40 percent gravel; strongly acid; abrupt wavy boundary. 86P1478

3R—109 to 140 cm; red (2.5YR 4/8) highly fractured fine-grained sandstone bedrock; light olive brown (2.5Y 5/4) redoximorphic features. 86P1479

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[4] The data establishing the presence of an isomesic temperature regime in Puerto Rico are limited. The exact elevation where this regime starts is thought to be at more than 1,065 meters (3,500 feet). The regime is in the Caribbean National Forest in the eastern part of Puerto Rico.

Verenda: S85PR-119-009

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Verenda; coarse-loamy, mixed, isomesic Histic Tropaquept

SSL—Project: 86P 47, (RP86PR079) Caribbean National Forest

—Pedon: 86P 258, Samples 86P 1485–1488

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002 <- - - - - - - - - - - - - - PCT OF <2MM	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - VF .05 -.10 (3A1)	F .10 -.25	-SAND- - M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACS (MM)-)(>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75 <- PCT OF <75MM(3B1)->	WT % OF WHOLE SOIL
86P1485S	30- 10	Oa1	3.3	18.2	78.5			10.7	7.5	4.6	8.6	13.4	24.1	27.8	--	--	--	74	--
86P1486S	10- 0	Oa2	2.9	38.1	59.0			26.6	11.5	4.2	6.8	10.7	18.9	18.4	8	5	--	61	13
86P1487S	0- 31	Btg	13.6	61.5	24.9			49.9	11.6	3.0	3.5	4.0	6.6	7.8	5	1	--	27	6
86P1488S	31- 67	2BC	15.3	48.5	36.2			41.6	6.9	2.6	3.7	5.3	8.1	16.5	5	2	--	38	66

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT <0.4MM	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	COLE OVEN DRY 4A1h	WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
30- 10	22.9							18.15	22.48										74.2	
10- 0	9.54							8.10	8.41										24.4	
0- 31	1.39							0.46	0.81										11.0	
31- 67	0.53							0.57	0.78										12.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9a	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - - -MEQ / 100 G							- - - - - - - - - - ->			<- - - - -PCT - - - ->							
30- 10	2.1	1.6	0.5	0.3	4.5	65.6	9.2	70.1	59.9	13.7	67	6	8				3.6	4.3
10- 0	0.4	0.2	0.1	TR	0.7	29.4	4.6	30.1	23.5	5.3	87	2	3				4.1	4.6
0- 31	0.2	0.1	0.1	TR	0.4	8.6	1.8	9.0	6.3	2.2	82	4	6				4.4	5.0
31- 67	0.2	0.1	0.1	TR	0.4	8.0	1.1	8.4	8.7	1.5	73	5	5				4.5	5.2

Narrative Pedon Description

Pedon: Verenda (inactive series)
NSSL pedon number: 86P0258
Pedon ID: S85PR-119-009
Field classification: Coarse-loamy, mixed, isomesic Histic Tropaquepts
Revised classification as of April 01, 2001: Fine-loamy, mixed, semiactive, isomesic Histic Humaquepts[5]
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 200 yards east, airplane Road 27
Latitude: Unknown
Longitude: Unknown
Elevation: 990 meters
Slope: 45 percent with a convex southwest aspect
Average annual precipitation: 4,570 mm; aquic moisture regime
Average air temperature: Annual—14.4 °C
Particle-size control section: 25 to 67 cm
Diagnostic features: Histic horizon at 0 to 35 cm; cambic horizon at 0 to 31 cm; paralithic contact at 67 cm
Described and sampled by: Unknown authors during July 1985

Oi—35 to 30 cm; aerial roots; many fine roots and many medium and coarse roots. Not sampled.

Oa1—30 to 10 cm; very dark brown (10YR 2/2) silt loam; moderate fine subangular blocky structure; many very fine and fine and many coarse roots; many fine interstitial pores; strongly acid; clear smooth boundary. 86P1485

Oa2—10 to 0 cm; dark brown (10YR 3/3) silt loam; moderate medium subangular blocky structure; few fine and medium roots; few fine tubular pores; few prominent clay films; 5 percent gravel; very strongly acid; gradual wavy boundary. 86P1486

Btg—0 to 31 cm; light gray (2.5Y 7/2) silty clay loam; brownish yellow (10YR 6/6) redoximorphic concentrations; weak fine subangular blocky structure; few fine roots; many very fine tubular pores; common distinct clay films between sand grains; 5 percent gravel; strongly acid; clear wavy boundary. 86P1487

2BC—31 to 67 cm; brownish yellow (10YR 6/8) clay loam; red (2.5YR 5/8) redoximorphic concentrations; weak fine and medium subangular blocky structure; few fine roots; common very fine tubular pores; few prominent clay films on faces of peds; 50 percent gravel; strongly acid; clear wavy boundary. 86P1488

3Cr—67 to 97 cm; red (2.5YR 4/8) weathered sandstone bedrock.

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[5] The data establishing the presence of an isomesic temperature regime in Puerto Rico are limited. The exact elevation where this regime starts is thought to be at more than 1,065 meters (3,500 feet). The regime is in the Caribbean National Forest in the eastern part of Puerto Rico.

Los Guineos: S86PR-119-010

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Los Guineos; clayey, mixed, isothermic Typic Palehumults

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 303, Samples 86P 1792–1800

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-4- TOTAL CLAY LT .002	-5- TOTAL SILT .002 -.05	-6- TOTAL SAND .05 -2	-7- CLAY FINE LT .0002	-8- CLAY CO3 LT .002	-9- SILT FINE .002 -.02	-10- SILT COARSE .02 -.05	-11- SAND VF .05 -.10	-12- SAND F .10 -.25	-13- SAND M .25 -.50	-14- SAND C .5 -1	-15- SAND VC 1 -2	-16- COARSE FRACS WEIGHT 2 -5	-17- WEIGHT 5 -20	-18- WEIGHT 20 -75	-19- WEIGHT .1- 75	-20- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1)											- - - - - - - - - - - - - ->	<- PCT OF <75MM(3B1)			->	
86P1792S	0- 3	A	79.5	16.2	4.3	42.4		12.2	4.0	1.5	1.5	0.9	0.4	--	TR	TR	--	3	TR
86P1793S	3- 8	Bw	83.9	13.2	2.9	42.7		11.0	2.2	1.1	0.8	0.4	0.3	0.3	1	--	--	3	1
86P1794S	8- 23	Bt1	83.0	13.7	3.3	39.4		11.4	2.3	1.4	0.9	0.5	0.3	0.2	TR	--	--	2	--
86P1795S	23- 45	Bt2	79.9	16.7	3.4	32.4		13.4	3.3	1.5	1.0	0.4	0.3	0.2	--	--	--	2	--
86P1796S	45- 80	Bt3	56.3	35.0	8.7	15.0		28.0	7.0	3.5	3.4	1.0	0.5	0.3	--	--	--	5	--
86P1797S	80-110	Bw1	43.0	40.6	16.4	10.1		33.0	7.6	6.3	7.3	1.9	0.6	0.3	--	--	--	10	--
86P1798S	110-155	Bw2	36.0	50.9	13.1	6.6		42.1	8.8	6.0	5.2	1.1	0.5	0.3	--	--	--	7	--
86P1799S	155-187	Bw3	21.6	50.4	28.0	4.4		39.3	11.1	11.7	9.4	3.0	2.3	1.6	--	--	--	16	--
86P1800S	187-237	Bw4	17.7	52.0	30.3			41.1	10.9	12.7	12.3	3.3	1.4	0.6	--	--	--	18	--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a	DITH-CIT EXTRACTABLE MN 6D2a	(RATIO/CLAY) CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	(ATTERBERG) LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1c	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT	OF <2MM		-->			PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 3	12.4	0.714			6.4	0.9	--	0.52	0.60										48.0	
3- 8	7.65	0.504			8.0	1.0	--	0.31	0.55				0.71	1.09	0.153			71.9	46.4	0.18
8- 23	3.91	0.256			9.2	1.0	--	0.17	0.55				0.95	1.31	0.113			62.4	45.5	0.16
23- 45	2.64	0.162			10.4	1.1	--	0.13	0.53	90	41		1.00	1.32	0.097			60.6	42.5	0.18
45- 80	1.01	0.048			11.9	1.1	TR	0.15	0.61				1.24	1.44	0.051			41.9	34.5	0.09
80-110	0.58				10.8	1.2	TR	0.19	0.67				1.34	1.48	0.034			37.3	28.9	0.11
110-155	0.46				11.0	0.9	TR	0.23	0.75	74	24		1.33	1.47	0.034			37.5	27.0	0.14
155-187	0.33				10.8	0.7	TR	0.32	0.94				1.24	1.33	0.024			38.0	20.2	0.22
187-237	0.17				11.6	1.1	0.1	0.32	1.14										20.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - - -MEQ / 100 G									- - - - - - - - - - - - - ->	<- - - - - -PCT		- - - - ->					1:2	1:1
0- 3	3.6	3.9	0.2	0.4	8.1	43.1	4.6	51.2	41.2	12.7	36	16	20				3.5	3.8	4.3
3- 8	1.0	1.6	--	0.2	2.8	32.6	4.0	35.4	26.4	6.8	59	8	11				3.7	3.9	4.4
8- 23	0.2	0.6	--	0.1	0.9	21.1	4.0	22.0	14.5	4.9	82	4	6				3.8	4.0	4.3
23- 45	0.1	0.3	--	0.1	0.5	17.3	3.5	17.8	10.7	4.0	88	3	5				3.8	4.0	4.4
45- 80	0.1	0.1	--	--	0.2	15.6	2.8	15.8	8.3	3.0	93	1	2				3.9	4.5	4.5
80-110	--	0.1	--	--	0.1	15.0	2.3	15.1	8.2	2.4	96	1	1				4.0	4.6	4.7
110-155	--	0.1	--	--	0.1	13.9	3.5	14.0	8.1	3.6	97	1	1				3.9	4.4	4.7
155-187	--	0.1	--	--	0.1	11.5	3.8	11.6	6.9	3.9	97	1	1				4.0	4.1	4.7
187-237		0.1	0.2	--		13.7	3.2		5.7				11	1				4.4	4.8

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 / TGA 7A4b (Percent)	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 (mg/g)	INTERPRETATION
				ELEMENTAL 7C3 (Percent)								
86P1795	TCLY	KK 5 GE 2	KK49 GI 3			20.0			0.1			
86P1798	TCLY	KK 4 GE 2	KK51 GI 3			20.0						

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Los Guineos
NSSL pedon number: 86P0303
Pedon ID: S86PR-119-010
Field classification: Clayey, mixed, isothermic Typic Palehumults
Series classification: Very-fine, kaolinitic, isothermic Humic Hapludox
Revised classification as of April 01, 2001: Very-fine, kaolinitic, isothermic Humic Hapludox
Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 46 meters southwest of bridge on road 911; UTM Zone 20: 2,027,040 m northing and 201,475 m easting
Latitude: 18°18’47" north
Longitude: 65°49’27" west
Elevation: 555 meters
Physiography: Hillside or mountainside in mountains or deeply dissected plateaus
Geomorphic position: Shoulder crested hills
Slope: 15 percent with a convex east aspect
Average air temperature: Annual—20 °C
Average annual precipitation: 2,000 mm; udic moisture regime
Major Land Resource Area: 270—Humid Mountains and Valleys
Drainage, runoff, and permeability: Well drained, moderate runoff, and moderate permeability
Vegetation: Palo Colorado Forest species
Surface stoniness: Class 0
Erosion: Slight
Particle-size control section: 8 to 58 cm
Parent material: Residuum from sandstone material
Diagnostic features: Umbric horizon at 0 to 8 cm; argillic horizon at 8 to 80 cm
Map unit: LYF—Los Guineos-Yunque-Stonyland steep
Described and sampled by: D. Williams, G. Acevedo, W. Lynn, and L. Huffaker during February 1986
Notes: Classification may be Palehumults.

A—0 to 3 cm; dark yellowish brown (10YR 4/4) clay covered by a thin leaf-and-root mat; moderate medium granular structure parting to moderate fine granular; friable, sticky, plastic; many fine and common very fine roots throughout; few fine discontinuous tubular pores; many continuous faint organic coatings on vertical and horizontal faces of peds; extremely acid; clear smooth boundary. 86P1792

Bw—3 to 8 cm; yellowish brown (10YR 5/4) clay; moderate fine subangular blocky structure; friable, very sticky, very plastic; common fine and common medium roots throughout; common very fine discontinuous tubular pores; few patchy faint clay films on vertical and horizontal faces of peds and common patchy faint coatings on vertical and horizontal faces of peds; few coarse roots; few wormcasts; very strongly acid; clear smooth boundary. 86P1793

Bt1—8 to 23 cm; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure parting to moderate coarse subangular blocky; firm, very sticky, very plastic; common fine and common medium roots throughout; common medium discontinuous and common fine discontinuous tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; few coarse roots; few wormcasts; very strongly acid; clear smooth boundary. 86P1794

Bt2—23 to 45 cm; brownish yellow (10YR 6/6) clay; common fine distinct redoximorphic features; moderate coarse subangular blocky structure; firm, very sticky, very plastic; common fine and common medium roots throughout; few fine discontinuous tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; few wormcasts; very strongly acid; clear wavy boundary. 86P1795

Bt3—45 to 80 cm; red (2.5YR 4/6) clay; many coarse distinct redoximorphic features; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; firm, very sticky, very plastic; few fine roots throughout; few medium discontinuous tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; few wormcasts; very strongly acid; gradual boundary. 86P1796

Bw1—80 to 110 cm; red (2.5YR 4/6) clay; common medium distinct redoximorphic features; weak coarse subangular blocky structure; firm, very sticky, very plastic; few fine roots throughout; few medium discontinuous tubular pores; few discontinuous distinct clay films on vertical faces of peds; very strongly acid; gradual boundary. 86P1797

Bw2—110 to 155 cm; 60 percent strong brown (7.5YR 5/6) and 30 percent yellowish red (5YR 4/6) clay; few medium distinct redoximorphic features; weak very coarse subangular blocky structure; firm, sticky, plastic; few fine roots throughout; few medium discontinuous tubular pores; few discontinuous faint clay films on vertical faces of peds; very strongly acid; clear smooth boundary. 86P1798

Bw3—155 to 187 cm; 60 percent strong brown (7.5YR 5/6) and 30 percent yellowish red (5YR 4/6) clay loam; few pockets of highly weathered saprolite; weak very coarse subangular blocky structure; friable, sticky, plastic; few medium discontinuous tubular pores; very few patchy distinct coatings in root channels and/or pores; very strongly acid; gradual boundary. 86P1799

Bw4—187 to 237 cm; yellowish red (5YR 4/6) loam; few pockets of highly weathered saprolite; friable, sticky, plastic; few medium discontinuous tubular pores; very strongly acid. 86P1800

Yunque: S86PR-119-011

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Yunque; clayey, mixed, isothermic Typic Tropohumults

SSL—Project: 86P 61, (CP86PR110) Caribbean Area

—Pedon: 86P 304, Samples 86P 1801–1807

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1- TOTAL CLAY LT .002	-2- TOTAL SILT .002 -.05	-3- TOTAL SAND .05 -2	-4- CLAY FINE LT .0002	-5- CLAY CO3 LT .002	-6- SILT FINE .002 -.02	-7- SILT COARSE .02 -.05	-8- SAND VF .05 -.10	-9- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->				SOIL
86P1801S	0- 5	A	70.7	18.1	11.2	41.2		13.5	4.6	2.1	2.4	1.9	2.1	2.7	1	TR	--	10	1
86P1802S	5- 26	Bt1	81.9	14.6	3.5	42.3		11.4	3.2	1.2	0.9	0.5	0.5	0.4	--	--	--	2	--
86P1803S	26- 58	Bt2	84.3	13.8	1.9	30.8		11.0	2.8	0.8	0.5	0.4	0.2	--	TR	--	--	1	--
86P1804S	58-102	Bt3	79.8	19.3	0.9	18.8		17.4	1.9	0.5	0.3	0.1	--	--	--	--	--	TR	--
86P1805S	102-130	Bw1	57.6	35.4	7.0	12.1		29.2	6.2	3.5	2.0	0.9	0.5	0.1	--	--	--	3	--
86P1806S	130-152	Bw2	55.7	37.0	7.3	8.9		31.9	5.1	2.3	1.9	1.2	1.2	0.7	--	--	--	5	--
86P1807S	152-162	Cr													--	--	--		--

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 5	11.5				5.0	0.8	--		0.62										43.9	
5- 26	2.73				7.1	0.7	--		0.52										42.9	
26- 58	1.59				8.8	1.0	--		0.52										44.0	
58-102	0.78				8.8	1.1	--		0.53										42.3	
102-130	0.45				10.4	1.1	TR		0.58										33.4	
130-152	0.29				7.6	0.9	TR		0.54										29.9	
152-162																			11.5	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G										<- - - - -PCT - - - ->						1:2	1:1
0- 5																	3.8	4.1
5- 26																	4.2	4.3
26- 58																	4.0	4.4
58-102																	4.1	4.6
102-130																	4.3	4.6
130-152																	4.1	4.7
152-162																	4.6	5.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DSC 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2 <mg/g>	INTERPRETATION
86P1803	TCLY	KK 4 GE 2 VR 1 LE 1	KK43 GI 2				15.7			0.1			

FRACTION INTERPRETATION:
TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:
KK kaolinite GE goethite VR vermiculite LE lepidocrocit GI gibbsite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Yunque

NSSL pedon number: 86P0304

Pedon ID: S86PR-119-011

Field classification: Clayey, mixed, isothermic Typic Tropohumults

Revised classification as of April 01, 2001: Very-fine, kaolinitic, isothermic Humic Hapludox

Location: Río Grande Municipio, Puerto Rico; Caribbean National Forest; 30.5 meters southwest of bridge on Highway 911 over Rio Espiritu Santo; UTM zone 20: 2,207,060 m northing and 201,540 m easting

Latitude: 18°18’47" north

Longitude: 65°49’25" west

Elevation: 535 meters

Physiography: Hillside or mountainside in mountains or deeply dissected plateaus

Geomorphic position: Backslope of a side slope; on lower third of component

Slope: 50 percent with a convex east aspect

Average annual precipitation: 2,000 mm; udic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Drainage, runoff, and permeability: Moderately well drained, rapid runoff, and slow permeability

Vegetation: Palo Colorado Forest species

Surface stoniness: Class 0

Erosion: Slight

Particle-size control section: 5 to 55 cm

Parent material: Residuum from sandstone material

Diagnostic features: Umbric horizon at 0 to 5 cm; argillic horizon at 5 to 102 cm

Described and sampled by: D. Williams, G. Acevedo, W. Lynn, and L. Huffaker during February 1986

A—0 to 5 cm; dark brown (10YR 3/3) clay; moderate fine granular structure; friable; many fine roots throughout; clear smooth boundary. 86P1801

Bt1—5 to 26 cm; yellowish brown (10YR 5/6) clay; common fine distinct redoximorphic features; moderate fine subangular blocky structure parting to moderate medium subangular blocky; firm, very sticky, very plastic; common fine and few medium roots throughout; many continuous distinct coatings on vertical and horizontal faces of peds; clear smooth boundary. 86P1802

Bt2—26 to 58 cm; yellowish brown (10YR 5/8) clay; common medium distinct redoximorphic features; moderate coarse subangular blocky structure; firm, very sticky, very plastic; common fine and few medium roots throughout; many continuous distinct coatings on vertical and horizontal faces of peds; clear smooth boundary. 86P1803

Bt3—58 to 102 cm; yellowish brown (10YR 5/8) clay; common medium distinct and few fine distinct redoximorphic features; moderate coarse subangular blocky structure; firm, very sticky, very plastic; common fine roots throughout;

many continuous distinct coatings on vertical and horizontal faces of peds; clear wavy boundary. 86P1804

Bw1—102 to 130 cm; red (10R 4/8) clay; many fine distinct redoximorphic features; weak very coarse subangular blocky structure; firm, very sticky, very plastic; few fine roots throughout; few discontinuous faint coatings on vertical faces of peds; gradual boundary. 86P1805

Bw2—130 to 152 cm; red (10R 4/8) clay; many medium distinct and few coarse distinct redoximorphic features; weak very coarse subangular blocky structure; firm, sticky, plastic; abrupt wavy boundary. 86P1806

Cr—152 to 162 cm; paralithic materials. 86P1807

Ciales: S88PR-119-001

Primary Characterization Data

Río Grande Municipio, Puerto Rico

Sampled as: Ciales; clayey, mixed, isothermic Aeric Umbric Umbraquults

SSL—Project: 88P 72, (CP88PR111) Puerto Rico 1988

—Pedon: 88P 369, Samples 88P 1877–1886

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACS (MM) 2 -5	COARSE FRACS (MM) 5 -20	COARSE FRACS (MM) 20 -75	COARSE FRACS (MM) .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P1877H	0- 23	Oa	27.7	38.1	34.2	6.0		26.3	11.8	10.8	21.4	0.9	0.4	0.7	--	--	--	23	--
88P1878S	23- 40	Btg1	29.3	17.8	52.9	12.2		12.3	5.5	6.9	17.7	18.2	8.4	1.7	--	--	--	46	--
88P1879S	40- 64	Btg2	29.9	18.6	51.5	12.8		12.0	6.6	6.7	17.3	17.7	7.8	2.0	TR	--	--	45	TR
88P1880S	64- 91	Bt	14.4	22.0	63.6	4.7		13.5	8.5	9.6	16.4	15.1	11.4	11.1	2	TR	--	55	2
88P1881S	91-110	Bw	11.1	29.2	59.7	2.8		15.9	13.3	10.1	16.6	12.9	11.0	9.1	3	--	--	51	3
88P1882S	110-143	Bh&Bw	14.8	42.7	42.5	3.1		28.3	14.4	11.1	11.4	9.3	6.8	3.9	TR	--	--	31	TR
88P1883S	143-185	C Yell	4.6	24.0	71.4	1.0		12.7	11.3	10.7	22.0	18.7	12.2	7.8	3	TR	--	62	3
88P1884S	143-185	C Red	8.6	36.0	55.4	1.9		19.8	16.2	12.7	18.8	10.6	8.0	5.3	1	--	--	43	1
88P1885M	110-143	Bh													TR	--	--		TR

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM	EXTRACTABLE MN 6D2a -->	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT	LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM	WRD WHOLE SOIL 4C1 - -> CM/CM
0- 23	15.9	0.577	--		4.5	0.3	--	1.16	0.75				1.13	1.30	0.048			37.0	20.9	0.18
23- 40	3.78	0.126	--		2.6	0.2	--	0.31	0.62	51	17		1.17	1.33	0.044			38.5	18.3	0.24
40- 64	2.79	0.104	--		3.2	0.3	--	0.24	0.43				1.28	1.45	0.042			36.5	12.9	0.30
64- 91	0.64	0.034			2.8	0.5	TR	0.77	0.74				1.15	1.24	0.025			34.1	10.6	0.27
91-110	0.32		5		2.6	0.4	0.1	0.68	0.91		NP		1.14	1.18	0.011			34.9	10.1	0.28
110-143	0.14		TR		3.2	0.5	0.5	0.44	0.89				1.21	1.33	0.032			38.7	13.1	0.31
143-185	0.07		17		1.6	0.3	0.1	2.13	1.98		NP		1.06	1.10	0.012			30.0	9.1	0.22
143-185	0.07		--		3.5	0.4	0.1	0.67	1.15	39	2		1.11	1.13	0.006			27.1	9.9	0.19
110-143	0.11		--																12.1	
110-143	0.18		--																13.4	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->											<- - - - -PCT - - - ->						1:2	1:1
0- 23	0.7	0.7	0.3	0.2	1.9	49.2	3.6	51.1	32.0	5.5	65	4	6				3.9	4.0	4.7
23- 40	0.3	0.4	0.1	TR	0.8	13.5	2.2	14.3	9.2	3.0	73	6	9				3.9	4.0	4.8
40- 64	0.2	0.4	0.1	TR	0.7	11.3	1.9	12.0	7.3	2.6	73	6	10				4.0	4.1	4.9
64- 91	0.1	0.1	0.1	TR	0.3	13.1	1.4	13.4	11.1	1.7	82	2	3				4.3	4.4	4.8
91-110	0.1	0.2	0.1	TR	0.4	10.4	1.9	10.8	7.5	2.3	83	4	5				4.1	4.3	4.9
110-143	0.1	0.2	0.1	TR	0.4	8.5	2.7	8.9	6.5	3.1	87	4	6				4.0	4.2	5.0
143-185	0.1	0.2	0.2	0.1	0.6	9.8	2.6	10.4	9.8	3.2	81	6	6				4.0	4.3	5.0
143-185	0.2	0.2	0.2	TR	0.6	6.4	3.0	7.0	5.8	3.6	83	9	10				4.0	4.2	4.9
110-143																	4.0	4.3	5.0

	NA PYROPHOSPHATE EXTRACTABLE ALUMINUM
110-143	TR 0.1

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	X-RAY 7A6	X-RAY 7A4b	THERMAL DTA	THERMAL TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRETA TION
		peak size			Percent				Percent					mg/g	
88P1878	TCLY	KK 5	GI 2	VR 2	LE 1			25.0	7.4			0.2			
88P1881	TCLY	KK 5	GI 2	VR 1	LE 1			23.0	10.2			0.1			
88P1883	TCLY	KK 3	MI 1					20.0	6.1						
88P1884	TCLY	KK 3	GE 1					20.0	8.4						

FRACTION INTERPRETATION: TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION: KK kaolinite GI gibbsite VR vermiculite LE lepidocrocit MI mica GE goethite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE EXTRACTION FE 6C9a	SI 6V2	AL 6G12	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2	m m ->	<- P P M	->	< - - - - - - - - - - - P E R C E N T						o f	< 2	m m - - - - - - -			><20mm	<PCT>
88P1877	1	0.89	3.54	0.03	0.29	97			13.19												
88P1878	2	0.02	0.74	0.02	0.17	40			3.35			23.6									
88P1879	3	0.10	0.89	0.03	0.18	34			2.56			22.8									
88P1880	4	0.06	0.62	0.39	0.84	54			0.69			18.8									
88P1881	5	0.08	0.52	0.21	0.58	49			0.35			19.7									
88P1882	6	0.10	0.54	0.05	0.33	31			0.20			25.8									
88P1883	7	0.03	0.27	0.18	0.51	40			0.08			16.4									
88P1884	8	0.02	0.17	0.04	0.16	33			0.11			19.6									
88P1885	9								0.17				17.0								
88P1886	10								0.23				18.5								

Narrative Pedon Description

Pedon: Ciales

NSSL pedon number: 88P0369

Pedon ID: S88PR-119-001

Field classification: Clayey, mixed, isothermic Aeric Umbric Umbraquults

Revised classification as of April 01, 2001: Fine-loamy, isotic, acid, isothermic Histic Humaquepts

Location: Río Grande Municipio, Puerto Rico; junction of Highways 191 and 990 at kilometer marker 130, about 610 meters southwest of Highway 191 on Trade Winds Trail

Latitude: 18°17’38" North

Longitude: 65°47’41" West

Elevation: 785 meters

Geomorphic position: Shoulder of a nose slope; on middle third of component

Slope: 20 percent with a convex northeast aspect

Average annual precipitation: 3,810 mm; aquic moisture regime

Major Land Resource Area: 270—Humid Mountains and Valleys

Drainage, runoff, and permeability: Somewhat poorly drained, rapid runoff, and slow permeability

Vegetation: Unidentified species in ungrazed forestland

Erosion: Slight

Particle-size control section: 23 to 73 cm

Parent material: Residuum from igneous-granite material

Diagnostic features: Histic horizon at 0 to 23 cm; argillic horizon at 23 to 110 cm; spodic horizon at 110 to 143 cm

Described and sampled by: D. Williams and L. Huffaker during February 1988

Oa—0 to 23 cm; dark reddish brown (5YR 3/3) mucky loam; few fine faint redoximorphic features; moderate fine subangular blocky structure parting to moderate fine granular; friable, slightly sticky, slightly plastic; many medium and many fine roots throughout; common large earthworm holes filled with black (N 2/0) material; yellowish red (5YR 5/8) material surrounds the large worm holes; abrupt smooth boundary. 88P1877

Btg1—23 to 40 cm; dark gray (5Y 4/1) clay; common medium distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; common medium and common fine roots throughout; common fine interstitial and tubular pores; common continuous distinct clay films on vertical faces of peds; few flakes of mica; common large wormholes filled with black (N 2/0) material; clear smooth boundary. 88P1878

Btg2—40 to 64 cm; olive gray (5Y 5/2) clay; common medium distinct and few fine distinct redoximorphic features; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm, sticky, plastic; common fine roots throughout; common fine tubular pores; common continuous distinct clay films on vertical faces of peds; common fine rounded

soft masses of iron-manganese and few flakes of mica; few large wormholes filled with black (N 2/0) material; few quartz grains; clear smooth boundary. 88P1879

Bt—64 to 91 cm; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine tubular pores; 5 to 10 percent highly weathered parent material; clear wavy boundary. 88P1880

Bw—91 to 110 cm; yellowish brown (10YR 5/6) loam; few medium distinct redoximorphic features; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine interstitial and tubular pores; common flakes of mica; clear wavy boundary. 88P1881

Bh&Bw—110 to 143 cm; weak coarse subangular blocky structure; many flakes of mica; clear smooth boundary. 88P1882

C Yell—143 to 185 cm; dark yellowish brown (10YR 4/4) sandy loam; few fine distinct redoximorphic features; very friable, nonsticky, nonplastic; few medium roots throughout; clear wavy boundary. 88P1883

C Red—143 to 185 cm; red (2.5YR 4/6) loam; friable, slightly sticky, slightly plastic; few fine roots throughout; common fine tubular pores. 88P1884

Bh—110 to 143 cm; dark brown (7.5YR 3/2) loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few medium roots throughout; common fine tubular pores; clear smooth boundary. 88P1885

Bw—110 to 143 cm; brown to dark brown (7.5YR 4/4) loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few medium roots throughout; common fine tubular pores; clear smooth boundary. 88P1886

San Germán Municipio

Maresua: S01PR-125-001

Primary Characterization Data

San Germán Municipio, Puerto Rico

Sampled as: Maresua; clayey-skeletal, mixed, isothermic Typic Eutrudepts

SSL—Project: 1P 166, (CP01PR157) San Germán Area Soil Survey

—Pedon: 1P1039, Samples 1P 5281–5285

—General methods: 1B1A, 2A1, 2B

			-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
						(- - -TOTAL	- - -)	(- -CLAY-	-)	(- -SILT-	-)	(- - - -	- -SAND-	-	- - -	- -)	(-COARSE FRACS	(MM)-)	(>2MM)			
						CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - -	- WEIGHT	- - - -		WT
SAMPLE	DEPTH	HORIZON				LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)					.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
						<- - - -	- - - -	- - - -	- - -	PCT OF <2MM	(3A1) - -	- - - -	- - - -	- - - -	- - - -	- - -	- ->	<- PCT OF	<75MM(3B1)	->		SOIL
1P5281S	0- 8	A				29.2	30.0	40.8			19.5	10.5	6.1	7.6	7.5	10.0	9.6	25	4	--	54	29
1P5282S	8- 33	Bw				37.4	34.5	28.1			23.7	10.8	6.4	5.7	5.0	8.7	2.3	31	42	7	84	80
1P5283S	33- 64	Bt				42.7	30.3	27.0			20.8	9.5	5.6	7.3	6.4	5.5	2.2	31	45	4	84	80
1P5284S	64-114	Cr																--	--	--		--
1P5285S	3- 0	Oi/Oe				34.2	40.6	25.2			26.0	14.6	8.3	7.6	5.4	3.2	0.7	--	5	13	32	18

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT	- -)		(RATIO/CLAY)		(ATTERBERG)		(- BULK	DENSITY -)		COLE	(- - -WATER	CONTENT	- -)		WRD
	C	N	P	S		EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B4b	6S3e	6R3d	6C2h	6G7g	6D2g	8D1	8D1	4F1	4F	4A5	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT	<0.4MM	<- -	G/CC -	- ->	CM/CM	<- -	-PCT OF	<2MM	- ->	CM/CM
0- 8		0.329		0.04	3.9	0.2	0.1	1.20	0.75				0.83	1.27	0.130			57.6	21.9	0.26
8- 33		0.270		0.03	3.9	0.2	0.1	1.05	0.64										24.1	
33- 64		0.095		0.01	4.6	0.2	0.2	0.89	0.59				1.18	1.60	0.035			32.3	25.1	0.03
64-114																				
3- 0		1.059		0.13	2.6	0.1	0.1	2.31	2.58										62.3	

	(- NH4OAC	EXTRACTABLE	BASES -)		ACID-			(- -CEC-	-)	EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - -	-PH -	- -)
	CA	MG	NA	K	SUM	ITY		SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES			CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2i	6O2h	6P2f	6Q2f		6H5a		5A3a	5A8b	5D2	5E	5C3	5C1	6E1h	6E4b	6F1a	6F4	8C1b	8C1f	8C1f
	<- - -	- - -	- - -	- - -MEQ	/ 100 G	- - -	- - -	- - -	- ->	PCT		<- -PCT-	>	<- -PCT	->	<- -PCT	->		1:2	1:1
0- 8	10.6	19.9	0.3	0.7	31.5	5.9		37.4	35.1	1	TR	84	90					6.8	6.3	6.5
8- 33	6.2	24.5	0.3	0.7	31.7	9.3		41.0	39.4	1		77	80						6.1	6.6
33- 64	2.7	29.8	0.5	0.4	33.4	6.9		40.3	38.2	1		83	87						6.0	6.6
64-114																				
3- 0	48.6	36.9	1.9	1.9	89.3	12.2		101.5	79.1	2	1	88	100					6.5	6.5	6.7

	(- -NA	PYROPHOSPHATE	EXTRACTABLE-	-)			(- -)
							INDEX
	C	FE	AL	FE+AL	FE+AL	AL+C	OF
DEPTH				(- -DIVIDED	BY- -)		ACCUM
(CM)	6A5a	6C8c	6G1z	DI-CI	PCT	PCT	
	<- PCT	OF <2MM	->	FE+AL	CLAY	CLAY	
0- 8		TR	TR				
8- 33		TR	--				
33- 64		TR	--				
64-114							
3- 0		--	TR				

```
        < - - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - ->
        FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - - -><  - -> EGME INTER
SAMPLE   ION  <                            >< - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <     > RETN PRETA
              <  - - - - - -  7A2i - - - - - - -><  - 7A6b -  ><  - 7A4c -  ><  - - - - - - - - - - 7C4a- - - - - - - - - -><     >  7D2  TION
NUMBER  <- -  >< - - - - peak size - - - - - -><  - - - Percent - - - -><  - - - - - - - - - - Percent - - - - - - - - -><  - -><mg/g><  - >
 1P5283   TCLY  MI 4  MT 3  KK 2  VR 2  GE 1
```

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:

MI mica   MT montmorillon   KK kaolinite   VR vermiculite   GE goethite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J1c	OXALATE EXTRACTION FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4d	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2f	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY	SILT SML	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T	o f	< 2	m m ->	<- P P M	->	< - - - - - - - - - - - P E R C E N T						o f	< 2	m m - - - - - - -			><20mm	<PCT>
1P5281	1	0.04	0.28	0.06	0.14	18			3.58												
1P5282	2	0.04	0.32	0.06	0.16	18			2.70												
1P5283	3	0.03	0.25	0.05	0.15	21			1.04												
1P5284	4																				
1P5285	5	0.05	0.18	0.04	0.08	5			24.61				88.4								

Narrative Pedon Description

Pedon: Maresua
NSSL pedon number: 1P1039
Pedon ID: S01PR-125-001
Field classification: Clayey-skeletal, mixed, isothermic Typic Eutrudepts
Revised classification as of January 30, 2003: Clayey-skeletal, magnesic, isohyperthermic Typic Argiudolls
Location: San Germán Municipio, Puerto Rico
Latitude: 18°05’0.35" North
Longitude: 67°02’0.57" West
Major Land Resource Area: 270—Humid Mountains and Valleys
Elevation: 110 meters
Slope: 55 percent with an aspect of 140 degrees
Drainage: Well drained
Described and sampled by: J.L. Lugo and S. Rios on May 1, 2001
Notes: Paragravel sample numbers are 01P5284 and 01P5285.

Oi/Oe—3 to 0 cm; twigs, leaves, sticks, and bark. 1P5285S

A1—0 to 8 cm; very dark grayish brown (10YR 3/2) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; firm, slightly hard, slightly sticky, moderately plastic; common coarse and common very fine to medium roots; common very fine vesicular and irregular pores; neutral; clear smooth boundary. 01P5281

Bw—8 to 33 cm; very dark grayish brown (10YR 3/2) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium subangular blocky structure; firm, slightly hard, slightly sticky, moderately plastic; common fine and medium and common coarse roots; common fine irregular and common fine tubular pores; neutral; clear smooth boundary. 01P5282

Bt—33 to 64 cm; dark reddish brown (5YR 3/3) clay, dark reddish brown (5YR 3/2) dry; massive; firm, slightly hard, slightly sticky, moderately plastic; common fine to coarse roots between peds; common very fine interstitial pores; neutral; abrupt wavy boundary. 01P5283

Cr—64 to 114 cm; soft, semiconsolidated (weathered) serpentinite rock; abrupt smooth boundary. 01P5284

Yauco Municipio

Los Guineos: S01PR-153-001

Primary Characterization Data

Yauco Municipio, Puerto Rico

Sampled as: Los Guineos; very-fine, kaolinitic, isothermic Inceptic Hapludox

SSL—Project: 1P 166, (CP01PR157) San Germán Area Soil Survey

—Pedon: 1P1038, Samples 1P 5273–5280

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002 <- PCT OF <2MM	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE -.05 -.05	-8-- SAND VF -.10 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACS (MM) WEIGHT 2 -5	-14- COARSE FRACS (MM) WEIGHT 5 -20	-15- COARSE FRACS (MM) WEIGHT 20 -75	-16- >2MM WT .1- 75 % OF WHOLE SOIL
1P5273S	0- 10	Ap	57.7	32.0	10.3			26.1	5.9	3.1	2.9	2.0	1.5	0.8	--	--	--	7 --
1P5274S	10- 36	A	59.3	33.7	7.0			27.6	6.1	2.4	1.8	1.3	1.1	0.4	--	--	--	5 --
1P5275S	36- 53	Bt1	55.7	35.3	9.0			27.9	7.4	2.3	2.3	2.0	1.3	1.1	--	--	--	7 --
1P5276S	53- 83	Bt2	48.5	39.1	12.4			23.3	15.8	3.6	4.7	3.3	0.7	0.1	--	--	--	9 --
1P5277S	83-112	Bt3	61.7	32.4	5.9			26.1	6.3	2.0	1.6	1.1	0.9	0.3	--	--	--	4 --
1P5278S	112-152	Bt4	42.2	41.8	16.0			32.1	9.7	6.5	5.1	2.5	1.6	0.3	--	--	--	9 --
1P5279S	152-188	C	31.3	42.6	26.1			32.1	10.5	6.6	7.5	5.8	4.7	1.5	--	--	--	19 --
1P5280S	125-125	C	48.4	38.1	13.5			29.0	9.1	4.7	4.2	2.8	1.5	0.3	--	--	--	9 --

DEPTH (CM)	-1-- ORGN C 6A1c PCT	-2-- TOTAL N <2MM	-3-- EXTR P 6S3e PPM	-4-- TOTAL S 6R3d <- PERCENT	-5-- DITH-CIT EXTRACTABLE FE 6C2h OF	-6-- DITH-CIT EXTRACTABLE AL 6G7g <2MM -->	-7-- DITH-CIT EXTRACTABLE MN 6D2g	-8-- RATIO/CLAY CEC 8D1	-9-- RATIO/CLAY 15 BAR 8D1	-10- ATTERBERG LL 4F1 PCT	-11- ATTERBERG PI 4F <0.4MM	-12- BULK DENSITY FIELD MOIST 4A5 <- -	-13- BULK DENSITY 1/3 BAR 4A1d G/CC	-14- BULK DENSITY OVEN DRY 4A1h - - ->	-15- COLE WHOLE SOIL 4D1 CM/CM	-16- WATER CONTENT FIELD MOIST 4B4 <- -	-17- WATER CONTENT 1/10 BAR 4B1c -PCT	-18- WATER CONTENT 1/3 BAR 4B1c OF <2MM	-19- WATER CONTENT 15 BAR 4B2a - ->	-20- WRD WHOLE SOIL 4C1 CM/CM
0- 10		0.417		0.06	10.5	1.4	0.2	0.46	0.48				1.09	1.33	0.069			36.3	27.7	0.09
10- 36		0.235		0.08	10.8	1.6	0.2	0.27	0.46				1.21	1.38	0.045			34.5	27.2	0.09
36- 53		0.124		0.08	14.1	1.5	0.2	0.22	0.51				1.21	1.33	0.032			34.6	28.2	0.08
53- 83		0.109		0.09	15.0	1.5	TR	0.29	0.76				1.14	1.29	0.042			42.3	37.0	0.06
83-112		0.106		0.08	14.3	1.4	TR	0.24	0.61				1.13	1.26	0.037			42.4	37.7	0.05
112-152		0.050		0.08	12.7	1.0	TR	0.27	0.70				1.23	1.32	0.024			38.1	29.4	0.11
152-188		0.032		0.08	11.2	0.9	0.1	0.41	0.87				1.14	1.16	0.006			39.9	27.2	0.14
125-125		0.090		0.09	14.3	1.1	TR	0.29	0.65										31.6	

DEPTH (CM)	-1-- NH4OAC EXTRACTABLE BASES CA 5B5a 6N2i	-2-- NH4OAC EXTRACTABLE BASES MG 5B5a 6O2h	-3-- NH4OAC EXTRACTABLE BASES NA 5B5a 6P2f	-4-- NH4OAC EXTRACTABLE BASES K 5B5a 6Q2f	-5-- NH4OAC EXTRACTABLE BASES SUM BASES -MEQ /	-6-- ACID- ITY 6H5a 100 G	-7-- EXTR AL 6G9c	-8-- CEC SUM CATS 5A3a	-9-- CEC NH4- OAC 5A8b	-10- CEC BASES + AL 5A3b - - ->	-11- AL SAT 5G1	-12- BASE SAT- SUM 5C3 -PCT	-13- BASE SAT- NH4 OAC 5C1	-14- CO3 AS CACO3 <2MM 6E1h	-15- RES. OHMS /CM 8E1	-16- COND. MMHOS /CM 8I	-17- PH NAF 8C1d	-18- PH CACL2 .01M 1:2 8C1f	-19- PH H2O 1:1 8C1f
0- 10	5.5	2.9	0.3	0.6	9.3	23.0	1.3	32.3	26.4	10.6	12	29	35	TR		0.16	9.1	4.5	4.9
10- 36	0.9	0.7	0.2	0.2	2.0	20.9	1.7	22.9	16.2	3.7	46	9	12			0.05	9.5	4.4	5.0
36- 53	0.5	0.6	0.2	0.1	1.4	17.3	1.1	18.7	12.1	2.5	44	7	12			0.01	9.8	4.5	5.2
53- 83	0.4	0.4	0.1	0.1	1.0	16.8	0.7	17.8	14.3	1.7	41	6	7			--	9.8	4.4	5.3
83-112	0.4	0.4	0.1	0.1	1.0	17.2	1.4	18.2	14.5	2.4	58	5	7			0.01	9.7	4.3	5.1
112-152	0.3	0.3	0.3	0.1	1.0	17.0	5.0	18.0	11.5	6.0	83	6	9			0.01	9.8	4.3	5.3
152-188	0.1	0.3	0.3	0.1	0.8	17.1	5.5	17.9	12.9	6.3	87	4	6			0.02	9.9	4.3	5.2
125-125	0.3	0.3	0.2	0.1	0.9	17.5	3.0	18.4	13.9	3.9	77	5	6			0.02	9.8	4.3	5.2

DEPTH (CM)	-1-- NA PYROPHOSPHATE EXTRACTABLE C 6A5a <- PCT	-2-- FE 6C8c OF <2MM	-3-- AL 6G1z ->	-4-- FE+AL DI-CI FE+AL	-5-- FE+AL PCT CLAY	-6-- AL+C PCT CLAY	-7-- INDEX OF ACCUM
				(- -DIVIDED BY- -)			
0- 10		1.7	0.6	0.2	TR		
10- 36		0.9	0.3	0.1			
36- 53		0.2	0.1				
53- 83		--	0.1	--	--		
83-112		--	0.1	--	--		
112-152		--	0.1	--	--		
152-188		--	0.1	--	--		
125-125		--	0.1	--	--		

```
           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - -  7A2i - - - - - -><  - 7A6b - ><  - 7A4c - ><  - - - - - - - - - 7C4a- - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><mg/g><  - >
 1P5275     TCLY  KK 2  GE 2  GI 1  VR 1                    KK40  GE30
 1P5276     TCLY  KK 2  GE 1  GI 1  HE 1                    GE56  KK37
MINERAL INTERPRETATION: KK  kaolinite        GE  goethite         GI  gibbsite         VR  vermiculite      HE  hematite
RELATIVE PEAK SIZE: 5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- -)(- - - - WATER DISPERSIBLE - - - -) MIN   AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - ><  - HYDROMETER - > SOIL STABL
             DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ  8J1c  6C9b  6V2b 6G12b  6S4d  6S5   6D3b  6A2f  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
 1P5273  1  0.19  1.09  0.06  0.52    66         6.0  4.92
 1P5274  2  0.13  1.00  0.06  0.64    81         4.0  1.98
 1P5275  3  0.08  0.70  0.06  0.60    84         2.3  1.08
 1P5276  4  0.10  0.58  0.06  0.45    83         0.7  0.92
 1P5277  5  0.50  0.56  0.06  0.43    81         0.8  0.90
 1P5278  6  0.05  0.39  0.06  0.41    75         0.5  0.31
 1P5279  7  0.05  0.50  0.07  0.50    77         0.6  0.22
 1P5280  8  0.06  0.33  0.05  0.32    78          TR  0.47
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Narrative Pedon Description
Pedon: Los Guineos
NSSL pedon number: 01P1038
Pedon ID: S01PR-153-001
Field classification: Very-fine, kaolinitic, isothermic Inceptic Hapludox
Series classification: Very-fine, kaolinitic, isothermic Humic Hapludox
Location: Yauco Municipio, Puerto Rico
Major Land Resource Area: 270—Humid Mountains and Valleys
Latitude: 18°08’00.33" north
Longitude: 66°48’00.35" west
Elevation: 845 meters
Geomorphic position: Backslopes
Slope: 30 percent with an aspect of 215 degrees; concave upslope and linear across the slope
Drainage: Well drained
Described and sampled by: J.L. Lugo and S. Rios on November 2, 2000

Ap—0 to 10 cm; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; firm, moderately sticky, moderately plastic; common fine and medium and common coarse roots; common fine and medium tubular pores; 5 percent rock fragments; very strongly acid; clear smooth boundary. 01P5273

A—10 to 36 cm; strong brown (7.5YR 4/6) clay; moderate fine and medium subangular blocky structure; friable, moderately sticky, moderately plastic; common fine and medium roots; common fine and medium tubular pores; 5 percent rock fragments; very strongly acid; clear wavy boundary. 01P5274

Bt1—36 to 53 cm; red (2.5YR 4/6) clay; moderate fine and medium angular blocky structure parting to subangular blocky; firm, moderately sticky, moderately plastic; common fine and medium roots; common fine and medium tubular pores; 5 percent rock fragments; very strongly acid; clear smooth boundary. 01P5275

Bt2—53 to 83 cm; red (2.5YR 4/8) clay; strong medium angular blocky structure; firm, moderately sticky, moderately plastic; common fine and medium roots; common fine and medium tubular pores; 3 percent continuous clay films on all faces of peds; 5 percent rock fragments; very strongly acid; clear smooth boundary. 01P5276

Bt3—83 to 112 cm; red (2.5YR 4/8) clay; moderate fine and medium angular blocky structure; firm, moderately sticky, moderately plastic; common fine and medium roots; common fine and medium tubular pores; 2 percent discontinuous clay films on all faces of peds; 5 percent rock fragments; very strongly acid; abrupt wavy boundary. 01P5277

Bt4—112 to 152 cm; red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine and medium tubular pores; 2 percent discontinuous clay films on all faces of peds; 8 percent rock fragments; very strongly acid; abrupt irregular boundary. 01P5278

C—152 to 188 cm; massive; mottled saprolite. 01P5279 and 01P5280

Chapter 6
Background and Sampling History for the U.S. Virgin Islands

Background

History

The Virgin Islands were visited by Christopher Columbus during his second visit to the new world. He landed near the Salt River in St. Croix (Santa Cruz) in 1493. Columbus sailed 65 kilometers north and sighted additional cays and islands that he named the Virgin Islands, but there is no evidence that he landed on the islands of St. Thomas or St. John. In 1718, Denmark initiated plantation agriculture on St. John Island. By the mid-1700s, virtually all of the original forest had been cut down. By 1800, nearly one-half of the island was occupied by secondary vegetation. By 1917, when the United States purchased the island from Denmark for $27 million, only 425 hectares of sugarcane (Saccharum officinarum L.) were in cultivation. Sugarcane was produced on the island and harvested by slaves from the 1700s until slavery was abolished in 1848. A few acres of sugarcane continued to be raised by the freed St. Johnians until the mid-1900s. Most of the sugarcane plantations were converted to pastureland until the 1950s when external interest commenced in the form of a vacation "paradise." Today, nearly all of St. John Island is covered by tropical vegetation. All of the woody vegetation is a secondary forest classified as dominantly a subtropical moist forest with dry evergreen woodland and semi-evergreen seasonal forest.

Location and Size

The United States Virgin Islands consist of St. Croix, St. John, St. Thomas, and about 50 smaller islands that range in size from a cluster of small rocks to about 240 hectares. The land area of St. John Island is 4920.9 hectares. The Virgin Islands are about 1,770 kilometers southeast of Miami, Florida. They lie in the tropics at a latitude of about 18° north and a longitude of about 64° west. St. John Island is 3.2 kilometers east of St. Thomas Island and about 65 kilometers north of St. Croix Island. The Lameshur Bay Watershed study area for the Soil Conservation Service/National Park Service Global Change Project is on the south side of St. John Island. It is about 97 hectares and is in the Virgin Islands National Park. Elevations range from sea level to 389 meters.

Moisture and Temperature

Data recorded on St. John Island from 1972 to 1989 show the mean annual precipitation to be about 114 centimeters with two seasonal peaks. The most significant peak occurs in September, October, and November, and the second peak occurs in April and May. The highest mean monthly precipitation is 18.9 centimeters in November, and the lowest is 5.0 centimeters in March. Air

temperature extremes range from 37.2 °C in September and October to 15.0 °C in May. The average annual air temperature is 27.5 °C. The soil temperature regime is isohyperthermic for all areas of the U.S. and British Virgin Islands. The soil moisture regimes are ustic throughout the Virgin Islands, although some portions of St. Croix Island have soils that are borderline to the aridic moisture regime (Mount et al., 1992a).

Geology of St. Croix Island

St. Croix is on the Puerto Rico-Virgin Islands platform, which is an isolated piece of crust in the tension zone between the North Atlantic plate and the Caribbean plate. The oldest rocks on St. Croix are Cretaceous volcaniclastics extruded under the sea, commonly forming layers similar to sedimentary deposits. The volcaniclastics were intruded by a hornblende gabbro dated by Krypton-Argon to be 66±3 million years old (near the Cretaceous-Tertiary boundary). Subsequent uplift caused the island to become emergent. Associated complex faulting caused tilting and disruption of the volcanic sediment layers. Reefs formed offshore around the emergent island. There appear to be at least two stages of uplift with the consequent sets of reefs. The oldest reef limestones are Miocene (Lynn, 2000).

Geomorphology-Sedimentology of St. Croix Island

The volcaniclastics weather to form a saprolitic grus, which fractures near the surface but tends to remain in place (Lynn, 2000). The soil-colluvium mantle in upland positions generally ranges from 0 to 1 meter in thickness. Steep-sided hills with sharp ridges rise from 150 to 340 meters (500 to 1,100 feet) above current sea level. Erosion channels or guts form narrow, v-notch valleys that have a sharp change in slope where they enter the lowland. The pieces of fractured volcanics remain hard and impervious between fractures and thus form a significant component in alluvial and beach sediments derived from the volcaniclastics. The gabbro is considerably more prone to weathering and erosion than the volcaniclastics. The in-place grus breaks readily into a fine gravel, mostly less than 2 centimeters in diameter. An example is along the road rising out of the Parasol Valley along its eastern perimeter. The Parasol Valley floors on the gabbro and forms a bowl-shaped valley with erosion channels leading upslope in all directions from the valley except southward. Because of the ustic climate and high base saturation, the gabbro weathers to smectitic clays. The resulting alluvial clays are by far the major contributor to fans that blanket much of the lowland along the southern half of western St. Croix. Deposition of the fans might be considered continuous from the time the igneous rocks first emerged above the sea. There may, however, have been two periods of accelerated erosion and deposition following episodic uplift: one when the volcanics first emerged and a second when the first (Miocene) reefs were uplifted. If the episodic uplift scenario is correct, there should be alluvial fan sediments associated with each uplift. The high shrink-swell potential of the clays give rise to soils that classify in the Vertisol order or in vertic subgroups of Soil Taxonomy.

The oldest areas of reef limestone form subparallel ridges that extend east-west

in the southern coastal plain of west-central St. Croix. The ridges have narrow, flat tops at elevations around 60 meters. The ridges have limestone layers about 30 centimeters thick. Where observed, the layers seem to be fractured. Most of the carbonate layers are thinner and/or softer than the limestone layers. In the upper meter, the material is fractured to such an extent that roots are not deterred. Side slopes of the ridges generally are concave and merge with sediments on the next lower coastal plain surface.

Most of the coastal plain is underlain by carbonate sediments, probably deltaic, playa, or lagoon fill or some combination of these. The surface has not been breached by alluvial channels.

Sampling History

The first USDA investigation in the U.S. Virgin Islands was done by James Thorp in the 1930s (Thorp, 1932). In his 28-page report, Thorp paints a remarkable mental picture of the soils on St. Croix Island. One photograph shows Mount Eagle and Blue Mountain to be entirely denuded of vegetation and in agricultural production. Although only two photographs are in Thorp's 1932 publication, he could not have chosen a better image than the cultivated mountains of St. Croix. In the 1990s, agriculture dwindled. The peaks of Mount Eagle and Blue Mountain are now extensively covered with tropical vegetation. Thorp collected 24 soil samples for pH determinations. His data were presented in his 1932 publication.

Thirty-two years passed before soils were again sampled in the U.S. Virgin Islands. R.B. Grossman and W.E. McKinzie described seven soils on St. Croix and one soil on St. Thomas from September 21 to 25, 1964. Data for these eight pedons were first published in Soil Survey Investigations Report No. 12 (Soil Survey Staff, 1967).

In 1988, four soils were described and sampled on St. Thomas Island by D. Williams and others. It is uncertain what the purpose was for this sampling project, but presumably the data were for baseline information.

As a result of the NRCS Global Change Initiative, 15 soils on St. John Island were described and sampled during September of 1991. This effort was led by H.R. Mount, B.D. Hudson, and W.C. Lynn from the National Soil Survey Center. B.C. Dubee, G. Acevedo, and J.R. Davis provided assistance. This project resulted in soil climate monitoring at four sites in Lameshur Bay (Mount et al., 1992b).

Also in 1991, five pedons were described and sampled on St. Croix Island by J.R. Davis for additional baseline data for the Soil Survey Update of the U.S. Virgin Islands.

In 1992, W.C. Lynn described and sampled 12 soils on St. Croix Island. The purpose of this sampling project was to provide data for the Soil Survey Update for the U.S. Virgin Islands. These descriptions are among the most detailed of any sampling project in the NRCS Caribbean Area. Assisting him were B.C. Dubee, J.R. Davis, and C.L. Santiago from the NRCS Caribbean Soils Staff.

Sampling was completed in the Virgin Islands in 1994 when two pedons were collected on St. John Island by J.R. Davis.

Figure 4 shows the location of georeferenced soils in the U.S. Virgin Islands.

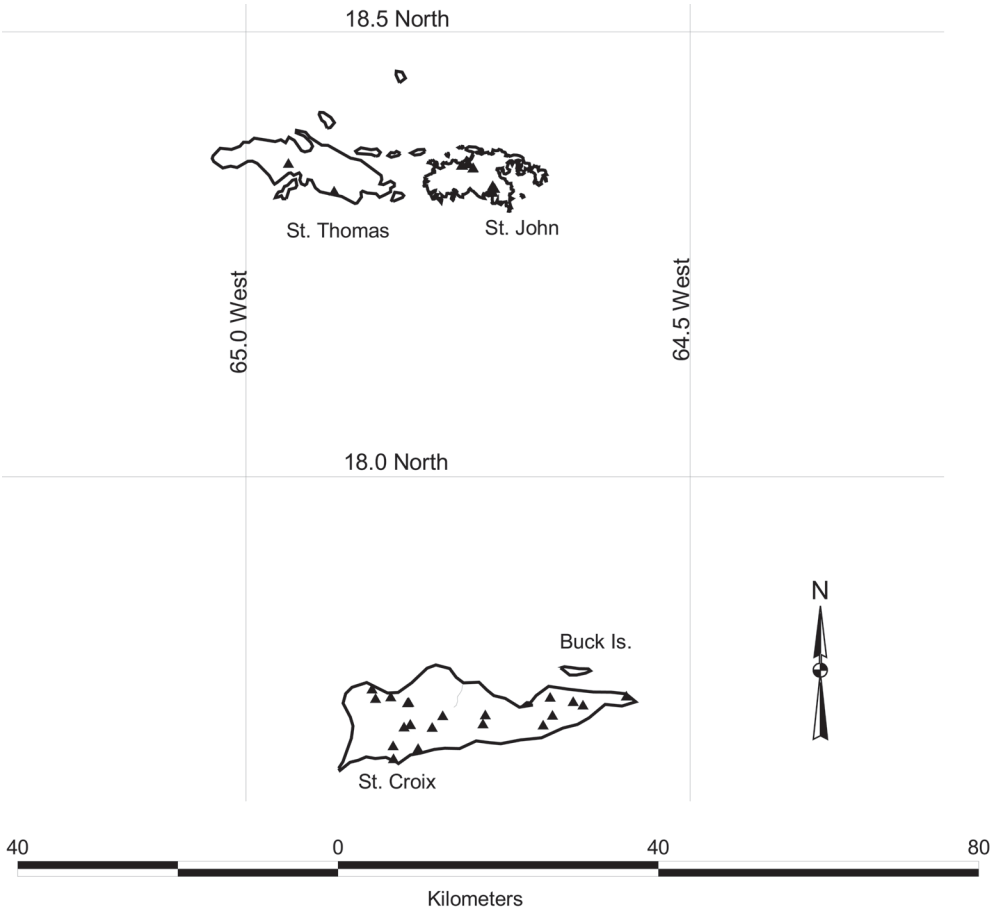

Figure 4.—Location of the sampling sites on St. Croix, St. John, and St. Thomas Islands.

References

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Chapter 7
Soils of St. Croix Island, Virgin Islands

This chapter presents data and descriptions for 22 soils on St. Croix Island. The distribution of sampling is the best for any of the Virgin Islands (see fig. 4, chapter 6). The most detailed descriptions of any sampling project in the NRCS Caribbean Area are included in this chapter (S92VI-010-001 to S92VI-010-012). Most of the soils on St. Croix are Mollisols, but the south side of the island has extensive areas of Vertisols. All of the soils have an isohyperthermic temperature regime. Soil moisture regimes range from aquic in wet areas along the coastline to aridic on the sandy or sandy-skeletal soils of East Point. The aridic moisture regime, however, has not been traditionally recognized on St. Croix Island, and none of the soils in this report identify this moisture regime.

Soils orders sampled on St. Croix Island include Mollisols (13 pedons), Inceptisols (3 pedons), Vertisols (2 pedons), Entisols (1 pedon), and Histosols (1 pedon).

Sion: S92VI-010-001

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Sion; fine-loamy, carbonatic, isohyperthermic Typic Calciustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 459, Samples 92P 2781–2786

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
	(- - -TOTAL - - -)					(- -CLAY- -)			(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACTIONS(MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
92P2781S	0- 18	Ap		49.3	29.5	21.2	16.5	8.1	21.5	8.0	4.0	5.1	4.3	4.4	3.4	2	5	3	25	10
92P2782S	18- 38	ABk		49.7	30.4	19.9	12.4	7.3	21.9	8.5	4.4	5.5	4.8	3.6	1.6	1	1	--	17	2
92P2783S	38- 53	BCk		50.3	29.8	19.9	13.8	16.7	22.3	7.5	4.0	5.5	4.5	3.9	2.0	1	1	--	18	2
92P2784S	53- 89	CBk1		42.3	44.0	13.7	11.2	25.6	36.5	7.5	3.7	3.7	3.6	2.1	0.6	TR	--	--	10	TR
92P2785S	89-130	CBk2		39.2	48.4	12.4	10.3	22.8	39.3	9.1	2.6	3.4	3.1	2.4	0.9	1	--	--	11	1
92P2786S	130-163	Ck		24.8	33.6	41.6	7.2	12.0	23.3	10.3	11.2	14.4	9.3	4.8	1.9	4	4	--	36	8

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 18	2.57				0.5	0.1	TR	0.73	0.45				1.28	1.54	0.060			33.7	22.4	0.14
18- 38	1.61				0.7	0.1	0.1	0.69	0.43				1.29	1.61	0.076			30.8	21.4	0.12
38- 53	0.98				0.4	0.1	TR	0.51	0.38				1.24	1.58	0.083			32.4	19.3	0.16
53- 89	0.42				0.2	TR	--	0.30	0.33				1.26	1.31	0.013			28.6	13.8	0.19
89-130	0.37				0.2	TR	--	0.32	0.34				1.30	1.37	0.018			25.1	13.3	0.15
130-163	0.18				0.3	TR	TR	0.42	0.40				1.34	1.38	0.009			18.8	10.0	0.11

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 18		3.8	0.3	2.0				35.8	1	TR	100	100	40				7.4	7.3	7.4
18- 38		3.0	0.5	0.9				34.5	1	1	100	100	38				7.5	7.6	8.0
38- 53		2.1	0.3	0.6				25.6	1		100	100	54					7.7	8.1
53- 89		1.3	0.3	0.3				12.6	2		100	100	79					7.7	8.2
89-130		1.3	0.2	0.3				12.7	2		100	100	78					7.7	8.3
130-163		1.6	0.2	0.3				10.3	2		100	100	77					7.7	8.2

	(- - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - -)																	PRED.	
						TOTAL	ELEC.	ELEC.											
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	SALTS	COND.	COND.	
DEPTH						EST.	8A3a	8I											
(CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS	
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm	
0- 18	8.2	1.0	0.9	0.4	--	6.7	--	2.6				0.6	--	--	73.7	TR	0.97	0.43	
18- 38	4.5	0.5	1.2	0.1	--	4.5	0.2	1.2				0.3	--	--	69.7	TR	0.59	0.29	
38- 53								0.23											
53- 89								0.17											
89-130								0.16											
130-163								0.14											

```
            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2781      TCLY  MT 3  CA 3  KK 2  MI 2                                    16.0  11.6              1.0                    SMEC
92P2783      TCLY  MT 3  CA 3  KK 2  MI 2  GE 1                               13.0   6.4              1.2                    SMEC
92P2786      TCLY  MT 3  CA 3  KK 2                                           10.0   5.0              0.9                    SMEC
MINERAL INTERPRETATION:
    MT  montmorillon     CA  calcite          KK  kaolinite        MI  mica             GE  goethite
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON): SMEC = Smectite
PEDON MINERALOGY
    BASED ON CLAY:  Montmorillonitic
    FAMILY MINERALOGY:  Carbonatic
    COMMENTS: Montmorillonite contains some hydroxy interlayers; resists collapse at 300 degrees c, but not at 500 degrees c.
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
              DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO        <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - ><20mm><PCT>
92P2781  1 29.8
92P2782  2 29.3
92P2783  3 25.5
92P2784  4 24.5
92P2785  5 23.3
92P2786  6 15.5
```

Narrative Pedon Description

Pedon: Sion

NSSL pedon number: 92P459

Pedon ID: S92VI-010-001

Field classification: Fine-loamy, carbonatic, isohyperthermic Typic Calciustolls

Revised classification as of January 01, 1995: Sion; fine-loamy, carbonatic, isohyperthermic Typic Calciustolls

Location: St. Croix Island, Virgin Islands; about 152 meters east of the LaReine ruins on toeslope adjacent to nearly level gut

Latitude: 17°44’08" north

Longitude: 64°46’46" west

Elevation: 49 meters

Surface fragments: 1.0 percent

Slope: 2 percent with an aspect of 110 degrees, length of 46 meters, and upslope length of 23 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Primary earth cover: Artificial cover of urban and built-up structures

Particle-size control section: 25 to 102 cm

Diagnostic features: Mollic epipedon at 0 to 18 cm; calcic horizon at 18 to 163 cm

Geographically associated soils: Aguilita, Glynn, Hesselberg, and Pozo Blanco

Described and sampled by: W.C. Lynn and J.R. Davis on March 1, 1992

Notes: Microrelief consisted of nearly level alluvial and colluvial deposits between residual carbonatic hills in the lower toeslope position. Concentrations consisted of secondary carbonate nodules (usually uncrushable by hand) that accumulated in old insect pores and root pores. The pit was excavated about 1 month prior to describing. One-half inch wide cracks occurred to the base of the CBk1 horizon.

A—0 to 18 cm; dark brown (10YR 3/3) clay; 3 percent fine and medium faint dark yellowish brown (10YR 3/4) mottles; moderate medium and coarse granular structure; slightly hard, moderately sticky, slightly plastic; many fine and medium roots throughout; many medium and coarse high-continuity vesicular and tubular pores; 30 percent discontinuous distinct very pale brown (10YR 7/3) carbonate coats on faces of peds and in pores and 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 1 percent medium and coarse cylindrical carbonate threads, 21 percent medium and coarse cylindrical wormcasts, and 3 percent medium and coarse spherical wormcasts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; strong effervescence; clear wavy boundary. 92P2781

ABk—18 to 38 cm; dark yellowish brown (10YR 3/4) clay; 3 percent fine and medium faint dark brown (10YR 3/3) and 3 percent fine and medium faint dark yellowish brown (10YR 4/4) mottles; strong medium subangular blocky structure; hard, moderately sticky, moderately plastic; many fine roots throughout; many medium and coarse high-continuity vesicular and tubular

pores; 30 percent discontinuous distinct very pale brown (10YR 7/3) carbonate coats on faces of peds and in pores and 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 1 percent medium and coarse cylindrical carbonate threads, 21 percent medium and coarse cylindrical wormcasts, and 3 percent medium and coarse spherical insect casts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; strong effervescence; clear wavy boundary. 92P2782

BCk—38 to 53 cm; dark yellowish brown (10YR 4/4) clay loam; 3 percent fine and medium faint yellowish brown (10YR 5/4) and 3 percent fine and medium prominent very pale brown (10YR 8/2) mottles; strong coarse subangular blocky structure; hard, moderately sticky, slightly plastic; common fine and common coarse roots between peds; many medium and coarse high-continuity vesicular and tubular and common medium and coarse high-continuity continuous tubular pores; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores and 75 percent continuous distinct very pale brown (10YR 8/2) carbonate coats on faces of peds and in pores; 21 percent medium and coarse cylindrical carbonate threads, 3 percent medium and coarse cylindrical wormcasts, and 3 percent medium and coarse spherical insect casts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; violent effervescence; abrupt wavy boundary. 92P2783

CBk1—53 to 89 cm; very pale brown (10YR 7/4) loam; 3 percent fine and medium faint very pale brown (10YR 8/3) and 3 percent fine and medium prominent very pale brown (10YR 8/2) mottles; massive; slightly hard, very sticky, slightly plastic; few fine roots between peds; common medium and coarse moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct dark yellowish brown (10YR 4/4) organic stains in root channels and/or pores and 75 percent continuous faint very pale brown (10YR 8/2) carbonate coats throughout; 21 percent medium and coarse cylindrical carbonate threads, 1 percent medium and coarse cylindrical wormcasts, and 1 percent medium and coarse spherical insect casts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; violent effervescence; clear smooth boundary. 92P2784

CBk2—89 to 130 cm; yellow (10YR 7/6) silty clay loam; 3 percent fine and medium faint very pale brown (10YR 7/4) and 21 percent fine and medium prominent very pale brown (10YR 8/2) mottles; massive; slightly hard, very sticky, slightly plastic; few fine roots between peds; common fine and medium moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct dark yellowish brown (10YR 4/4) organic stains in root channels and/or pores and 75 percent continuous faint very pale brown (10YR 8/2) carbonate coats throughout; 21 percent fine and medium cylindrical carbonate threads, 1 percent fine and medium cylindrical wormcasts, and 1 percent fine and medium spherical insect casts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; violent effervescence; clear smooth boundary. 92P2785

C—130 to 163 cm; brownish yellow (10YR 6/6) silty clay loam; 3 percent fine and medium faint yellow (10YR 7/6) and 21 percent fine and medium prominent very pale brown (10YR 8/2) mottles; massive; slightly hard, slightly sticky, slightly plastic; few fine roots in cracks; many very fine and fine moderate-continuity vesicular pores; 10 percent discontinuous distinct dark yellowish brown (10YR 4/4) organic stains in root channels and/or pores and 75 percent continuous faint very pale brown (10YR 8/2) carbonate coats throughout; 3 percent fine and medium cylindrical carbonate threads, 1 percent fine and medium cylindrical wormcasts, and 1 percent fine and medium spherical insect casts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; violent effervescence. 92P2786

Sion: S92VI-010-002

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Sion; fine-loamy, carbonatic, isohyperthermic Typic Calciustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 460, Samples 92P 2787–2792

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND -2	FINE .0002	CO3 .002	(- -CLAY- -) FINE .002	COARSE -.05	(- -SILT- -) VF -.10	F -.25	(- - - - - -SAND- - M -.50	C -1	VC -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
92P2787S	0- 15	Apk	50.4	23.3	26.3	23.2	10.0	15.6	7.7	4.6	5.4	6.2	6.7	3.4	3	4	1	28	8
92P2788S	15- 30	ABk	51.3	21.1	27.6	24.2	11.4	14.6	6.5	5.0	5.7	6.4	7.3	3.2	3	2	6	31	11
92P2789S	30- 41	Bk	47.8	20.2	32.0	23.5	17.2	14.1	6.1	4.2	6.5	7.4	8.7	5.2	7	22	17	61	46
92P2790S	41- 61	CBk	33.6	19.9	46.5	8.2	28.4	14.5	5.4	5.0	10.5	14.6	11.4	5.0	9	27	18	73	54
92P2791S	61- 81	Ck1	16.2	29.7	54.1	0.9	14.3	21.3	8.4	7.1	12.5	14.0	14.0	6.5	19	14	--	64	33
92P2792S	81-137	Ck2	16.2	47.4	36.4	0.8	13.9	38.2	9.2	6.0	8.6	8.7	8.5	4.6	4	4	--	36	8

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	3.14				0.3	0.1	TR	0.77	0.48				1.14	1.38	0.063			27.5	24.1	0.04
15- 30	2.02				0.3	0.1	TR	0.67	0.45				1.10	1.37	0.072			36.1	23.0	0.14
30- 41	1.56				0.3	0.1	TR	0.53	0.46				1.08	1.30	0.046			36.4	22.2	0.11
41- 61	0.81				0.1	TR	--	0.19	0.45				0.97	0.97	--			46.4	15.2	0.21
61- 81	0.31				TR	TR	--	0.17	0.51				1.28	1.28	--			34.7	8.3	0.27
81-137	0.26				TR	TR	--	0.22	0.44				1.08	1.08	--			40.5	7.2	0.35

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES 6H5a	ACID- ITY	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 15		4.2	0.4	1.3				38.6	1	TR	100	100	39				7.4	7.6	7.9
15- 30		3.3	0.4	0.7				34.6	1	1	100	100	42				7.5	7.6	8.0
30- 41		2.3	0.4	0.6				25.3	1	1	100	100	53				7.6	7.7	8.1
41- 61		1.0	0.3	0.2				6.4	3	1	100	100	89				7.6	7.7	8.1
61- 81		1.3	0.2	0.1				2.8	7		100	100	91					7.7	8.2
81-137		1.8	0.4	0.1				3.5	10		100	100	93					7.7	8.2

DEPTH (CM)	(- - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 EST. 6J1b	TOTAL ELEC. F 8A3a	CL 6U1a	ELEC. 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	PRED. COND. MMHOS	COND. MMHOS
	<- MEQ / LITER ->															<- -PCT- ->		/cm	/cm
0- 15	11.4	1.5	1.2	0.1		9.1	0.7	2.7					1.3	--	--	74.9	0.1	1.24	0.48
15- 30	8.3	0.8	1.3	0.1		6.0	0.6	2.7					0.4	--	--	70.9	TR	0.96	0.41
30- 41	6.6	0.7	1.7	--	--	6.2	0.6	1.7					0.2	--	--	73.3	TR	0.81	0.35
41- 61	4.5	0.5	1.8	--	--	3.8	TR	2.0					0.6	--	--	58.7	TR	0.67	0.32
61- 81				--	--	TR		0.20											
81-137				--	--	TR		0.24											

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            < - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            >< - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2788      TCLY  MT 3  CA 3  MI 2  KK 2  VR 1                                15.0   7.1               1.7                    SMEC
92P2789      TCLY  MT 3  CA 3  MI 2  KK 2  VR 1                                14.0   5.7               1.4                    SMEC
92P2791      TCLY  CA 5                                                         1.4   0.7               0.1                    CARB
MINERAL INTERPRETATION:  MT  montmorillon     CA  calcite          MI  mica             KK  kaolinite        VR  vermiculite
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):   SMEC = Smectite               CARB = Carbonatic
PEDON MINERALOGY
    BASED ON CLAY:  Montmorillonitic
    FAMILY MINERALOGY:  Carbonatic
    COMMENTS: Montmorillonite contains some hydroxy interlayers; resists collapse at 300 degrees c, but not at 500 degrees c.
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
              DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
92P2787  1 31.4
92P2788  2 30.2
92P2789  3 29.2
92P2790  4 24.1
92P2791  5 19.3
92P2792  6 17.7
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Narrative Pedon Description

Pedon: Sion

NSSL pedon number: 92P0460

Pedon ID: S92VI-010-002

Field classification: Sion; fine-loamy, carbonatic, isohyperthermic Typic Calciustolls

Revised classification as of January 01, 1995: Sion; coarse-loamy, carbonatic, isohyperthermic Typic Calciustolls

Location: From intersection of VI-70 and VI-64 near upper Bethlehem, 244 meters south of VI-64, east about 122 meters in a pasture

Latitude: 17°43’22" north

Longitude: 64°47’29" west

Elevation: 24 meters

Vegetation: Grass

Geomorphic setting: Toeslope of marine terrace on toeslope of upland

Surface fragments: 1.0 percent

Slope: 3 percent; concave with an aspect of 120 degrees, length of 46 meters, and upslope length of 15 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Geographically associated soils: Aguilita, Glynn, Hesselberg, and Pozo Blanco

Particle-size control section: 25 to 102 cm

Diagnostic features: Mollic epipedon at 0 to 41 cm; calcic horizon at 30 to 137 cm

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on February 2, 1992.

Notes: The matrix doesn’t effervesce as much in the upper horizon as in the lower horizons.

Apk—0 to 15 cm; very dark grayish brown (10YR 3/2) gravelly clay; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong medium and coarse granular structure; slightly hard, moderately sticky, moderately plastic; many fine and medium and few coarse roots throughout; many fine and medium high-continuity vesicular and tubular and few fine and medium low-continuity pores filled with coarse material; 30 percent discontinuous distinct pinkish gray (7.5YR 6/2) carbonate coats on faces of peds and in pores and 75 percent continuous faint very dark grayish brown (10YR 3/2) organic stains on faces of peds and in pores; 21 percent fine and medium cylindrical wormcasts, 3 percent fine and medium spherical insect casts, and 1 percent fine and medium cylindrical worm nodules; 20 percent subangular igneous rock fragments 2 to 75 mm in diameter; strong effervescence; clear wavy boundary. 92P2787

ABk—15 to 30 cm; dark brown (10YR 3/3) gravelly clay; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong fine and medium granular structure; slightly hard, moderately sticky, moderately plastic; many

fine and medium roots throughout; many fine and medium high-continuity vesicular and tubular and few fine and medium low-continuity pores filled with coarse material; 30 percent discontinuous distinct pinkish gray (7.5YR 6/2) carbonate coats on faces of peds and in pores and 75 percent continuous faint very dark grayish brown (10YR 3/2) organic stains on faces of peds and in pores; 3 percent fine and medium spherical insect casts, 1 percent fine and medium cylindrical worm nodules, and 3 percent fine and medium cylindrical wormcasts; 20 percent subangular igneous rock fragments 2 to 75 mm in diameter; strong effervescence; gradual wavy boundary. 92P2788

Bk—30 to 41 cm; brown (10YR 5/3) gravelly clay; 3 percent medium faint dark brown (10YR 3/3) mottles; moderate fine and medium subangular blocky structure; slightly hard, moderately sticky, moderately plastic; common fine and medium roots throughout; many fine and medium moderate-continuity vesicular and tubular and common fine and medium low-continuity pores filled with coarse material; 75 percent discontinuous faint very dark grayish brown (10YR 3/2) organic stains on faces of peds and in pores and 75 percent discontinuous faint pinkish white (7.5YR 8/2) carbonate coats on faces of peds and in pores; 3 percent spherical carbonate masses, 3 percent fine and medium cylindrical wormcasts, and 1 percent fine and medium spherical insect casts; 20 percent subangular igneous rock fragments 2 to 75 mm in diameter; violent effervescence; clear wavy boundary. 92P2789

CBk—41 to 61 cm; pinkish white (7.5YR 8/2) gravelly silt loam; 3 percent fine faint pinkish white (7.5YR 8/2) mottles; massive, but with insect casts and wormcasts (organic activity or alteration); moderately sticky, moderately plastic; common fine and medium roots throughout; many fine and medium vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and/or pores and 75 percent continuous faint pinkish white (7.5YR 8/2) carbonate coats on faces of peds and in pores; 3 percent fine and medium cylindrical wormcasts, 3 percent fine and medium spherical carbonate masses, and 21 percent fine and medium spherical insect casts; 65 percent subangular igneous rock fragments 2 to 75 mm in diameter; some old root channels with decomposed organic root material; violent effervescence; clear wavy boundary. 92P2790

Ck1—61 to 81 cm; pinkish white (7.5YR 8/2) silt loam; 3 percent fine faint pinkish white (7.5YR 8/2) mottles; massive; moderately sticky, moderately plastic; few fine roots throughout; common fine and medium low-continuity vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and/or pores and 75 percent continuous faint pinkish white (7.5YR 8/2) carbonate coats on faces of peds and in pores; 3 percent fine and medium spherical carbonate masses and 1 percent fine and medium spherical insect casts; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; concentration of round biological materials (suspected to be immature insects) above Ck1 contact; violent effervescence; clear wavy boundary. 92P2791

Ck2—81 to 137 cm; pinkish white (7.5YR 8/2) silt loam; 3 percent fine faint pinkish white (7.5YR 8/2) mottles; massive; moderately sticky, moderately plastic; few fine roots throughout; common fine and medium low-continuity vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and/or pores and 75 percent continuous faint pinkish white (7.5YR 8/2) carbonate coats on faces of peds and in pores; 3 percent fine and medium spherical carbonate masses; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; violent effervescence. 92P2792

Hogensborg: S92VI-010-003

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Hogensborg; fine, montmorillonitic, isohyperthermic Entic Chromusterts

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 461, Samples 92P 2793–2799

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
	(- - -TOTAL - - -)					(- -CLAY- -)			(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACTIONS(MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
92P2793S	0- 18	Ap		56.4	29.5	14.1	34.3		20.0	9.5	5.4	3.2	1.9	1.9	1.7	1	4	--	13	5
92P2794S	18- 31	A		56.2	31.0	12.8	39.4		20.3	10.7	3.2	3.4	2.1	2.2	1.9	1	1	--	11	2
92P2795S	31- 46	Bw		58.8	30.5	10.7	16.0	1.9	22.6	7.9	3.7	2.5	1.5	1.6	1.4	1	TR	--	8	1
92P2796S	46- 73	Bkss		56.9	31.4	11.7	21.0	1.9	22.8	8.6	4.1	2.8	1.6	1.8	1.4	1	--	--	9	1
92P2797S	73-102	Bss1		61.2	33.0	5.8	25.9	2.6	25.2	7.8	3.2	1.5	0.6	0.4	0.1	--	TR	--	3	TR
92P2798S	102-141	Bss2		59.9	34.7	5.4	28.7	2.2	26.5	8.2	3.1	1.4	0.4	0.3	0.2	TR	--	--	2	-
92P2799S	141-204	Bss3		55.3	33.0	11.7	29.5	0.6	24.7	8.3	3.6	2.5	1.7	2.4	1.5	1	2	--	11	3

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15		- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	2.16				1.7	0.2	0.2	0.76	0.40				1.18	1.65	0.115			30.6	22.6	0.09
18- 31	1.87				2.1	0.2	0.3	0.76	0.42				1.27	1.78	0.118			36.0	23.5	0.16
31- 46	0.96				1.2	0.1	0.2	0.62	0.40				1.26	1.91	0.148			36.7	23.8	0.16
46- 73	0.53				1.0	0.1	0.1	0.61	0.41				1.38	1.93	0.118			36.4	23.2	0.18
73-102	0.19				0.9	0.1	TR	0.57	0.41				1.28	1.98	0.157			35.2	25.1	0.13
102-141	0.09				1.6	0.1	0.1	0.56	0.41				1.32	2.02	0.152			32.7	24.3	0.11
141-204	0.03				1.9	0.1	0.1	0.70	0.41				1.38	2.01	0.131			30.2	22.4	0.11

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - -			-MEQ / 100		G - - - - - - - - - ->			PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 18		9.1	1.8	1.1		0.7		42.7	3	3		100	1				7.7	7.7	8.1
18- 31		10.1	4.3	0.8		--		42.5	8	7	100	100	1		--		7.5	7.7	8.2
31- 46		14.3	10.7	0.7				36.3	24	18	100	100	7		--		7.9	8.1	8.5
46- 73		17.6	19.4	0.7				34.9	44	28	100	100	9		--		8.2	8.3	8.5
73-102		14.3	29.9	0.7				34.6	61	40	100	100	8		--		8.4	8.4	8.4
102-141		14.7	29.8	0.6				33.3	62	41	100	100	8		--		8.3	8.4	8.4
141-204		12.4	25.1	0.6				38.8	47	39	100	100	6		--		8.4	8.5	8.5

	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - - -)PRED.																		
						TOTAL	ELEC.	ELEC.											
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	SALTS	COND.	COND.
DEPTH						EST.	8A3a	8I											
(CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm
0- 18	5.1	1.5	5.5	--	--	7.2	--	3.2				2.2	--	--	83.2	0.1	1.13	0.47
18- 31	3.5	1.2	10.6	--	--	7.9	0.4	5.2				0.9	--	--	82.6	0.1	1.43	0.69
31- 46	1.7	1.0	20.6	--	--	4.1	0.4	17.7				1.4	--	--	98.4	0.2	2.38	1.27
46- 73	1.5	1.1	31.6	--	--	3.0	--	22.7				6.5	--	--	129.9	0.3	3.43	2.78
73-102	2.4	2.7	63.1	--	--	1.6	--	43.1				24.0	--	--	141.3	0.7	6.22	5.66
102-141	2.4	2.8	66.4	--	--	1.5	--	47.2				24.1	--	--	140.5	0.7	6.50	5.32
141-204	1.3	1.2	43.6	--	--	1.8	0.5	28.3				11.3	--	--	160.3	0.5	4.44	4.26

```
            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2793      TCLY  MT 3  KK 2  MI 2  CL 1  VR 1                                19.0   9.7              1.5                    SMEC
92P2794      TCLY  MT 3  KK 3  MI 2  VR 2  CL 1                                19.0  10.2              1.4                    SMEC
92P2795      TCLY  MT 3  KK 3  MI 2  VR 2  CL 1                                25.0   8.6              1.4                    SMEC
92P2796      TCLY  MT 3  KK 3  MI 2  VR 2  FD 2                                18.0   9.2              1.3                    SMEC
92P2797      TCLY  MT 2  KK 2  QZ 2  CA 1  CL 1                                24.0   8.7              1.1                    SMEC
92P2798      TCLY  KK 2  MT 2  FD 2  QZ 2  CA 1                                18.0   8.1              0.9                    SMEC
92P2799      TCLY  MT 3  KK 3  VC 2  FD 2  QZ 2                                26.0   9.3              0.8                    SMEC
MINERAL INTERPRETATION:
    MT  montmorillon, KK kaolinite, MI mica, CL chlorite, VR  vermiculite, FD feldspar, HE  hematite, QZ  quartz, CA  calcite
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION BY HORIZON: SMEC = Smectite  PEDON MINERALOGY BASED ON CLAY: Montmorillonitic; FAMILY MINERALOGY: Montmorillonitic
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - ><  - HYDROMETER - > SOIL STABL
              DEN                   RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO        <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - -  ><20mm><PCT>
92P2793  1 29.8
92P2794  2 31.7
92P2795  3 32.2
92P2796  4 30.6
92P2797  5 34.1
92P2798  6 31.3
92P2799  7 28.7
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Narrative Pedon Description

Pedon: Hogensborg

NSSL pedon number: 92P0461

Pedon ID: S92VI-010-003

Field classification: Fine, montmorillonitic, isohyperthermic Entic Chromusterts

Revised classification as of January 01, 1995: Hogensborg; fine, smectitic, isohyperthermic Sodic Haplusterts

Soil survey area: VI690—Virgin Islands of the United States

Location: St. Croix Island, Virgin Islands; 0.6 km south of the intersection of VI-66 and VI-665 on paved road entering the housing development of Cane Estate; 38 meters west of the road

Latitude: 17°41’16" north

Longitude: 64°50’05" west

Elevation: 6 meters

Vegetation: Grass and herbaceous cover

Geomorphic setting: Toeslope of nose slope of alluvial flat on a coastal plain

Slope: 2 percent; concave with an aspect of 260 degrees, length of 23 meters, and upslope length of 15 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Geographically associated soils: Glynn, Hesselberg, and Sion

Particle-size control section: 25 to 102 cm

Surface fragments: 1.0 percent

Diagnostic features: Ochric epipedon at 0 to 18 cm; cambic horizon at 31 to 204 cm

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on March 2, 1992

Notes: The pedon has an Ochric epipedon because it does not meet the thickness criteria for a mollic epipedon. A second visit one week after sampling showed a dozen cracks in the surface in close proximity to the pit. Rock fragments are igneous.

A—0 to 18 cm; dark brown (10YR 3/3) clay; strong fine granular structure; firm, hard, very sticky, very plastic; many fine and medium and few coarse roots between peds; many fine to coarse high-continuity vesicular and tubular and few fine to coarse low-continuity pores filled with coarse material; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 21 percent medium and coarse cylindrical wormcasts and insect casts and 21 percent medium and coarse cylindrical worm nodules; 5 percent subangular gravel; clear wavy boundary. 92P2793

A2—18 to 31 cm; dark grayish brown (2.5Y 4/2) clay; 3 percent fine and medium distinct dark brown (10YR 3/3) mottles; strong fine and medium granular structure; very sticky, very plastic; many fine and medium and few coarse roots between peds; few fine and medium low-continuity pores filled with

coarse material and many fine to coarse high-continuity vesicular and tubular pores; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 3 percent fine spherical iron-manganese concretions; 21 percent medium and coarse cylindrical wormcasts and insect casts; 5 percent subangular gravel; gradual wavy boundary. 92P2794

Bw—31 to 46 cm; light olive brown (2.5Y 5/4) clay; 1 percent fine and medium distinct dark brown (10YR 3/3) and 1 percent fine distinct olive yellow (2.5Y 6/8) mottles; strong medium and coarse prismatic structure; very sticky, very plastic; few fine and medium roots in cracks; common fine to coarse moderate-continuity vesicular and tubular pores; 75 percent discontinuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 21 percent fine spherical iron-manganese concretions; 3 percent fine and medium cylindrical wormcasts and 3 percent fine and medium spherical insect casts; 5 percent subangular gravel; gradual wavy boundary. 92P2795

Bkss—46 to 73 cm; light olive brown (2.5Y 5/4) clay; 3 percent fine and medium distinct dark grayish brown (2.5Y 4/2), 3 percent fine and medium distinct pale yellow (2.5Y 7/4), and 3 percent fine and medium prominent very pale brown (10YR 8/2) mottles; strong medium and coarse prismatic structure; very sticky, very plastic; common fine and medium roots in cracks; common fine to coarse moderate-continuity vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores, 30 percent discontinuous prominent very pale brown (10YR 8/2) carbonate coats throughout, and 30 percent continuous distinct light olive brown (2.5Y 5/6) slickensides (pedogenic) on faces of peds; 21 percent fine spherical iron-manganese concretions; 3 percent fine and medium irregular carbonate masses and cylindrical wormcasts; 5 percent subangular gravel; strong effervescence; diffuse wavy boundary. 92P2796

Bss1—73 to 102 cm; light yellowish brown (2.5Y 6/4) clay; strong medium and coarse prismatic structure; very sticky, very plastic; few fine and medium roots in cracks; few fine to coarse low-continuity vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent continuous distinct light olive brown (2.5Y 5/6) slickensides (pedogenic) on faces of peds; 21 percent fine spherical iron-manganese concretions; 1 percent fine and medium spherical insect casts and 1 percent medium and coarse cylindrical wormcasts; 5 percent subangular gravel; diffuse wavy boundary. 92P2797

Bss2—102 to 141 cm; olive yellow (2.5Y 6/6) clay; strong medium and coarse prismatic structure; very sticky, very plastic; few fine and medium roots in cracks; few fine to coarse low-continuity vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent continuous distinct light olive brown (2.5Y 5/6) slickensides (pedogenic) on faces of peds; 21 percent fine spherical iron-manganese concretions; 1 percent fine and medium spherical insect casts and 1 percent medium and coarse cylindrical wormcasts; 5 percent subangular gravel; gradual wavy boundary. 92P2798

Bss3—141 to 204 cm; olive yellow (2.5Y 6/6) clay; 1 percent fine and medium faint light reddish brown (2.5YR 6/4) and 3 percent fine and medium prominent strong brown (7.5YR 5/8) mottles; strong medium prismatic structure; very sticky, very plastic; few very fine and fine roots in cracks; few fine to coarse low-continuity vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores and 10 percent continuous distinct light olive brown (2.5Y 5/6) slickensides (pedogenic) on faces of peds; 21 percent fine and medium spherical iron-manganese concretions; 1 percent fine and medium spherical insect casts and cylindrical wormcasts; 5 percent subangular gravel. 92P2799

Hesselberg: S92VI-010-004

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Hesselberg; fine, mixed, isohyperthermic Petrocalcic Paleustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 462, Samples 92P 2800–2807

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
	(- - -TOTAL - - -)					(- -CLAY- -)			(- -SILT- -)			(- - - - - -SAND- - - - - -)				(-COARSE FRACTIONS(MM)-)				(>2MM)
SAMPLE NO.	DEPTH (CM)	HORIZON	CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	FINE .02 -.02	COARSE .05 -.05	VF .10 -.10	F .25 -.25	M .50 -.50	C -1	VC -2	- - - - WEIGHT - - - - -5	-20	-75	75	.1-	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->													<- PCT OF <75MM(3B1)->				
92P2800S	0- 10	Ap	61.3	26.8	11.9	23.1		21.4	5.4	2.6	2.9	2.3	2.5	1.6	2	4	1	16		7
92P2801S	10- 23	AB	55.6	34.2	10.2	17.4		28.1	6.1	2.7	2.8	2.5	1.8	0.4	1	4	1	13		6
92P2802S	23- 30	BA	53.1	38.7	8.2	14.4	1.3	30.3	8.4	1.6	2.8	1.8	1.3	0.7	1	3	--	10		4
92P2803S	30- 43	BCk	64.6	29.6	5.8	19.1		26.2	3.4	2.1	1.8	1.1	0.6	0.2	4	2	--	9		6
92P2804S	43- 64	BCk	61.0	23.5	15.5	20.6	14.5	19.0	4.6	3.0	3.9	2.8	2.9	2.9	10	35	35	82		82
92P2805G	64- 81	Bkqm	9.8	22.2	68.0		7.9	13.0	9.2	9.2	13.1	13.9	16.6	15.2						P
92P2806S	81-124	2C	6.6	18.7	74.7		6.4	11.3	7.4	7.6	13.5	16.0	21.2	16.4	12	37	18	89		67
92P2807S	124-204	2C2	7.9	36.2	55.9		7.3	27.5	8.7	7.7	11.5	13.3	13.9	9.5	9	35	22	82		66

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE				(RATIO/CLAY) 15	(ATTERBERG) - LIMITS -		(- BULK DENSITY -) FIELD		COLE	(- - -WATER CONTENT - -)				WRD
DEPTH (CM)	6A1c PCT	6B3a <2MM	6S3 PPM	6R3b <- PERCENT	6C2b FE	6G7a AL	6D2a MN	8D1 CEC	8D1 BAR	4F1 LL	4F PI	4A3a MOIST	4A1d 1/3 BAR	4A1h OVEN DRY	4D1 WHOLE SOIL	4B4 FIELD MOIST	4B1c 1/10 BAR	4B1c 1/3 BAR	4B2a 15 BAR	4C1 WHOLE SOIL
				OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 10	3.48				1.5	0.1	0.1	0.86	0.50										30.7	
10- 23	2.30				1.6	0.1	0.1	0.91	0.54				0.93	1.29	0.112			43.7	30.0	0.12
23- 30	1.74				2.4	0.2	0.1	0.93	0.56				1.03	1.45	0.119			44.1	29.7	0.15
30- 43	0.96				2.0	0.2	0.1	0.83	0.53				1.07	1.51	0.118			42.2	34.0	0.09
43- 64	1.24				1.0	0.1	TR	0.54	0.40										24.5	
64- 81	0.25				0.1	TR	--	0.36	0.84										8.2	
81-124	0.24				TR	--	--	0.35	0.79										5.2	
124-204	0.23				TR	TR	--	0.41	0.58										4.6	

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM	ACID-ITY	(- -CEC- -) SUM CATS	NH4-OAC	EXCH NA	SAR	BASE SATURATION		CARBONATE AS CACO3		CASO4 AS GYPSUM		(- - - -PH - - -) SAT PASTE	CACL2 .01M	H2O
DEPTH (CM)	5B5a 6N2e	5B5a 6O2d	5B5a 6P2b	5B5a 6Q2b	BASES	6H5a	5A3a	5A8b	5D2 PCT	5E	5C3 SUM	5C1 NH4OAC	6E1g <2MM	6E4 <20MM	6F1a <2MM	6F4 <20MM	8C1b	8C1f 1:2	8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->|										<- -PCT- >		<- -PCT ->		<- -PCT ->				
0- 10		8.1	0.9	3.1		2.4		52.9	1	1		100	6				7.6	7.8	8.0
10- 23		6.6	1.2	1.5		1.6		50.5	2	1		100	5				7.7	7.9	8.0
23- 30		7.8	0.8	1.4				49.5	1	1	100	100	6				7.7	7.6	8.0
30- 43		7.8	0.8	1.4				53.4	1	1	100	100	1				7.7	7.7	7.9
43- 64		6.3	0.6	0.8				32.7	1	1	100	100	42				7.7	7.8	8.1
64- 81		1.9	0.3	--				3.5	7		100	100	94					7.9	8.5
81-124		2.0	0.2	--				2.3	9		100	100	95					7.9	8.6
124-204		2.7	0.3	0.1				3.2	7	1	100	100	96				7.8	7.9	8.4

	(- - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - - -)PRED.																		
	CA	MG	NA	K	CO3	TOTAL ELEC. HCO3 EST.	F 8A3a	CL 8I	PO4	Br	OAC	SO4	NO2	NO3	H2O	SALTS	ELEC. COND.	COND.
DEPTH (CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS /cm	MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 10	10.5	1.7	2.5	0.2	--	10.2	0.6	2.4				0.8	--	--	99.4	0.1	1.28	0.49
10- 23	7.3	1.2	2.2	--	--	6.5	0.7	2.2				0.6	--	--	92.6	TR	0.95	0.43
23- 30	5.2	0.9	1.7	--	--	4.3	0.2	2.2				0.6	--	--	92.2	TR	0.74	0.39
30- 43	2.6	0.5	1.2	--	--	2.6	0.1	0.9				0.4	--	--	100.2	TR	0.43	0.28
43- 64	5.0	1.0	1.8	--	--	4.2	0.3	2.6				0.5	--	--	82.3	TR	0.76	0.41
64- 81				--	--	TR		0.22										
81-124								0.16										
124-204	4.2	2.6	2.3			2.4	--	5.6				0.7	--	--	49.0	TR	0.96	0.30

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2801      TCLY  MI 2  KK 2                                                  20.0   9.3              2.3                    CMIX
92P2803      TCLY  MI 2  KK 2  MT 2  HE 1                                      27.0  10.7              2.6                    CMIX
MINERAL INTERPRETATION:  MI  mica   KK  kaolinite  MT  montmorillon  HE  hematite     RELATIVE PEAK SIZE: 2 Small   1 Very Small
INTERPRETATION (BY HORIZON):  CMIX = Mixed - Clay       PEDON MINERALOGY BASED ON CLAY: Mixed FAMILY MINERALOGY:  Mixed
    COMMENTS: 2:1 layer silicates contain some hydroxy interlayers; resist collapse at 300 and 500 degrees c.
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL         CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
              DEN                   RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>

92P2800  1 39.3
92P2801  2 38.6
92P2802  3 38.6
92P2803  4 42.4
92P2804  5 32.9
92P2805  6 12.2
92P2806  7 11.1
92P2807  8 11.0
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Narrative Pedon Description

Pedon: Hesselberg

NSSL pedon number: 92P0462

Pedon ID: S92VI-010-004

Field classification: Fine, mixed isohyperthermic Petrocalcic Paleustolls

Revised classification as of January 01, 1995: Hesselberg; fine, mixed, superactive, isohyperthermic Petrocalcic Paleustolls

Location: St. Croix Island, Virgin Islands; about 0.8 km west on VI-64 from Alexander Hamilton Airport terminal, southeast 0.2 km on unpaved lane, 46 meters east of lane in woods

Latitude: 17°41’53" north

Longitude: 64°48’24" west

Elevation: 11 meters

Geomorphic setting: Summit of interfluve of marine terrace in a coastal plain

Slope: 2 percent; convex with an aspect of 135 degrees, length of 61 meters, and upslope length of 23 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Surface fragments: 1.0 percent

Particle-size control section: 25 to 64 cm

Diagnostic features: Mollic epipedon at 0 to 23 cm; cambic horizon at 23 to 30 cm; calcic horizon at 43 to 64 cm; petrocalcic horizon at 64 to 81 cm; calcic horizon at 81 to 203 cm

Geographically associated soils: Aguilita, Glynn, Hogensborg, and Sion.

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on March 2, 1992

Notes: An estimated 40 percent of the pit is less than 20 inches deep to a restrictive Ckqm horizon. Sixty percent of the Ckqm horizon is discontinuous. Fine roots occur at the bottom of the pit (below a depth of 200 cm). One hundred percent of the pit is less than 30 inches deep to a root restrictive Bkqm horizon. The matrixes of the upper horizons are less effervescent than those of the lower horizons.

Oi—3 to 0 cm; dark grayish brown (10YR 4/2) organic material; gradual smooth boundary. Not sampled.

A—0 to 10 cm; dark reddish brown (5YR 3/3) clay; 3 percent fine and medium dark brown (10YR 3/3) mottles; strong fine and medium granular structure; hard, moderately sticky, moderately plastic; many fine and medium and few coarse roots throughout; many medium and coarse high-continuity vesicular and tubular pores; 30 percent discontinuous distinct pink (7.5YR 7/3) carbonate coats on faces of peds and in pores and 75 percent continuous distinct dark brown (10YR 3/3) organic stains on faces of peds and in pores; 3 percent fine and medium spherical carbonate nodules and insect casts and 21

percent medium and coarse cylindrical wormcasts; 5 percent limestone gravel; strong effervescence; clear wavy boundary. 92P2800

AB—10 to 23 cm; dark reddish brown (5YR 3/3) clay; 3 percent fine and medium distinct red (2.5YR 4/6) and 3 percent fine and medium reddish brown (5YR 4/3) mottles; strong fine and medium granular structure; hard, moderately sticky, moderately plastic; many fine and few medium roots throughout; many medium and coarse high-continuity vesicular and tubular pores; 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains on faces of peds and in pores and 30 percent discontinuous distinct pink (7.5YR 7/3) carbonate coats on faces of peds and in pores; 3 percent fine and medium spherical carbonate nodules and insect casts and 21 percent medium and coarse cylindrical wormcasts; 5 percent limestone gravel; strong effervescence; abrupt wavy boundary. 92P2801

BA—23 to 30 cm; red (2.5YR 4/6) silty clay; 3 percent fine and medium distinct dark reddish brown (5YR 3/3) mottles; strong medium and coarse prismatic structure; hard, moderately sticky, moderately plastic; few fine roots throughout; common medium and coarse moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent discontinuous distinct pink (7.5YR 7/3) carbonate coats on faces of peds and in pores; 3 percent fine and medium spherical carbonate nodules, 3 percent fine and medium cylindrical wormcasts, and 3 percent fine and medium spherical insect casts; 5 percent limestone gravel; strong effervescence; abrupt wavy boundary. 92P2802

BCk1—30 to 43 cm; red (2.5YR 4/6) silty clay; 3 percent medium prominent dark reddish brown (5YR 3/3) mottles; strong medium and coarse prismatic structure; hard, moderately sticky, moderately plastic; few fine roots throughout; common fine and medium moderate-continuity vesicular and tubular pores; 10 percent discontinuous distinct brown (10YR 4/3) organic stains in root channels and/or pores and 75 percent continuous distinct pink (7.5YR 7/3) carbonate coats on faces of peds and in pores; 21 percent fine and medium spherical carbonate nodules, 3 percent fine and medium cylindrical wormcasts, and 21 percent medium and coarse spherical carbonate nodules; 5 percent limestone gravel; violent effervescence; abrupt wavy boundary. 92P2803

BCk2—43 to 64 cm; yellowish red (5YR 5/8) extremely gravelly silty clay; 3 percent fine and medium faint yellowish red (5YR 5/6) and 3 percent fine and medium distinct reddish yellow (7.5YR 7/6) mottles; moderate medium and coarse subangular blocky structure; hard, slightly sticky, slightly plastic; few fine roots throughout; few fine and medium low-continuity vesicular and tubular pores; 10 percent discontinuous distinct brown (10YR 4/3) organic stains in root channels and/or pores and 75 percent continuous distinct pink (7.5YR 7/3) carbonate coats on faces of peds and in pores; 21 percent fine and medium spherical carbonate nodules, 3 percent fine and medium cylindrical wormcasts, and 1 percent fine and medium spherical insect casts; 30 percent

limestone cobbles and 70 percent subangular limestone gravel; violent effervescence; abrupt wavy boundary. 92P2804

Bkqm—64 to 81 cm; reddish yellow (7.5YR 6/6) petrocalcic material; 1 percent fine and medium distinct very pale brown (10YR 8/4) and 3 percent fine and medium faint pinkish white (7.5YR 8/2) mottles; massive; few fine roots throughout; few fine and medium low-continuity vesicular and tubular pores; 75 percent continuous distinct very pale brown (10YR 8/3) carbonate coats on faces of peds and in pores; 21 percent fine and medium spherical carbonate nodules; unspecified limestone fragments; violent effervescence; gradual wavy boundary. 92P2805

2C—81 to 124 cm; very pale brown (10YR 8/3) very gravelly silt loam; 1 percent fine and medium faint very pale brown (10YR 8/2) mottles; massive; slightly sticky, slightly plastic; few very fine and fine roots in cracks; few fine and medium low-continuity vesicular and tubular pores; 75 percent continuous faint very pale brown (10YR 8/2) carbonate coats on faces of peds and in pores; 21 percent fine and medium spherical carbonate nodules; 40 percent limestone gravel; violent effervescence; gradual wavy boundary. 92P2806

2C2—124 to 203 cm; very pale brown (10YR 8/3) gravelly silt loam; 1 percent fine and medium faint very pale brown (10YR 8/2) mottles; massive; few very fine and fine roots in cracks; few fine and medium low-continuity vesicular and tubular pores; 75 percent continuous faint very pale brown (10YR 8/2) carbonate coats on faces of peds and in pores; 21 percent fine and medium spherical carbonate nodules; 20 percent limestone gravel; violent effervescence. 92P2807

Victory: S92VI-010-005

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Victory; fine, mixed, isohyperthermic Typic Ustropepts

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 463, Samples 92P 2808–2813

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
92P2808S	0- 15	Ap	21.3	41.0	37.7	8.3		25.4	15.6	10.9	13.2	7.4	4.7	1.5	4	7	1	36	12
92P2809S	15- 28	AB	19.1	39.4	41.5	6.0		25.3	14.1	12.2	12.4	8.3	6.0	2.6	8	3	--	37	11
92P2810S	28- 36	Bw1	16.0	33.8	50.2	5.8		21.0	12.8	9.8	11.8	9.4	11.7	7.5	19	1	--	52	20
92P2811S	36- 51	Bw2	17.4	30.8	51.8	7.6		20.2	10.6	9.9	11.0	10.5	12.5	7.9	3	43	--	69	46
92P2812S	51- 84	C/B	19.5	31.1	49.4	9.6		20.3	10.8	9.3	12.0	9.4	10.2	8.5	9	49	24	89	82
92P2813S	84-122	Cr	15.8	28.8	55.4	8.0		18.5	10.3	9.6	11.4	10.5	12.5	11.4	7	48	28	91	83

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d <- - G/CC -	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c <- - -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	2.60				2.2	0.2	0.1	1.17	0.75				1.30	1.45	0.035			23.5	16.0	0.09
15- 28	1.13				1.9	0.2	0.1	1.21	0.58				1.50	1.53	0.006			20.9	11.1	0.14
28- 36	0.56				2.6	0.2	0.1	1.74	0.72				1.44	1.52	0.016			22.2	11.5	0.14
36- 51	0.44				2.3	0.2	0.1	1.64	0.70				1.46	1.54	0.012			24.3	12.1	0.12
51- 84	0.21				2.0	0.2	0.1	1.47	0.64				1.31	1.41	0.007			38.3	12.5	0.10
84-122	0.11				2.0	0.1	0.1	1.90	0.74										11.7	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES 6H5a	ACID- ITY	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 15	14.9	6.7	0.4	0.1	22.1	5.9	28.0	24.9	1	1	79	89					6.6	6.2	6.7
15- 28	14.7	5.4	0.6	0.1	20.8	5.6	26.4	23.2	2		79	90						5.6	6.3
28- 36	18.4	6.7	0.6	0.1	25.8	5.2	31.0	27.8	2		83	93						5.7	6.4
36- 51	18.6	7.3	0.6	0.3	26.8	5.2	32.0	28.5	2		84	94						5.6	6.2
51- 84	17.6	9.2	0.6	TR	27.4	4.8	32.2	28.7	2		85	95						5.9	6.5
84-122	17.6	10.9	0.9	0.1	29.5	4.4	33.9	30.0	3		87	98						6.1	6.8

DEPTH (CM)	(- - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	TOTAL HCO3 EST. 6J1b	ELEC. F 8A3a 6U1a	ELEC. CL 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	PRED. COND. MMHOS /cm	COND. MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 15	4.9	3.8	1.6	--	--	7.2	0.8	1.3				0.3	--	--	62.7	TR	0.91	0.26
15- 28								0.12										
28- 36								0.10										
36- 51								0.09										
51- 84								0.09										
84-122								0.08										

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2808      TCLY  VR 3  KK 3  VC 2  MT 1                                    16.0  10.7              0.6                    VERM
92P2809      TCLY  VR 3  KK 3  VC 2  MI 1  MT 1                              16.0  11.7              0.6                    VERM
92P2810      TCLY  VR 3  KK 3  VC 1  MT 1                                    19.0  13.2              0.5                    VERM
92P2811      TCLY  VR 4  KK 3  VC 1  GE 1  MI 1                              21.0  11.6              0.4                    VERM
92P2812      TCLY  VR 3  KK 3  GE 1  VC 1                                    24.0  10.2              0.4                    VERM
MINERAL INTERPRETATION: VR  vermiculite  KK  kaolinite    VC  verm-chlorit  MT  montmorillon   MI  mica   GE  goethite
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):  VERM = Vermiculitic
PEDON MINERALOGY
    BASED ON CLAY:  Vermiculitic
    FAMILY MINERALOGY:  Mixed
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - ><  - HYDROMETER - > SOIL STABL
              DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO        <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - -><20mm><PCT>
92P2808  1  0.06  0.37  0.02  0.14                                    19.8
92P2809  2  0.05  0.27  0.02  0.14                                    16.8
92P2810  3  0.04  0.23  0.02  0.14                                    16.6
92P2811  4  0.05  0.21  0.02  0.14                                    17.1
92P2812  5  0.04  0.19  0.02  0.12                                    16.8
92P2813  6  0.04  0.21  0.02  0.10                                    16.2
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Narrative Pedon Description

Pedon: Victory
NSSL pedon number: 92P0463
Pedon ID: S92VI-010-005
Field classification: Fine, mixed, isohyperthermic Typic Ustropepts
Revised classification as of January 01, 1995: Victory; loamy-skeletal, mixed, superactive, isohyperthermic Typic Ustropepts
Location: St. Croix Island, Virgin Islands; near Annaly intersection of VI-63 and VI-78, west 0.2 km on VI-78, 152 meters north of VI-78 in a pasture
Latitude: 17°45’18" north
Longitude: 64°51’19" west
Vegetation: Grass and herbaceous cover
Geomorphic setting: Backslope of side slope of hillside in mountains
Slope: 12 percent; convex with an aspect of 290 degrees, length of 91 meters, and upslope length of 15 meters
Elevation: 198 meters
Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C
Average annual precipitation: 1,092 mm
Drainage: Well drained
Particle-size control section: 25 to 102 cm
Diagnostic features: Ochric epipedon at 0 to 15 cm; cambic horizon at 15 to 51 cm; paralithic contact at 84 cm
Geographically associated soils: Cramer, Maho Bay, Parasol, Pozo Blanco, and Southgate
Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on March 3, 1992
Notes: Microrelief consists of lower side slope, local colluvium over igneous extrusive residuum. Adjacent drains are steep sided and deeply cut into volcanic residuum. The higher landscape “crest” positions are shallow to volcanic residuum.

A—0 to 15 cm; brown (10YR 4/3) silty clay loam; moderate fine and medium granular structure; soft, slightly sticky, slightly plastic; common fine and medium and few coarse roots throughout; many fine and medium vesicular and tubular pores; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 3 percent fine and medium cylindrical worm nodules, 21 percent fine and medium cylindrical wormcasts, and 3 percent fine and medium spherical insect casts; 5 percent subangular igneous rock fragments; noneffervescent; clear wavy boundary. 92P2808

AB—15 to 28 cm; dark yellowish brown (10YR 4/4) clay loam; 1 percent fine and medium faint yellow (10YR 7/6) mottles; weak fine subangular blocky structure; slightly hard, moderately sticky, slightly plastic; common fine and medium roots throughout; many fine and medium vesicular and tubular pores; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 21 percent fine and medium cylindrical wormcasts, 3 percent fine and medium spherical insect casts, and 3 percent fine and medium cylindrical worm nodules; 5 percent subangular igneous rock fragments 2 to 75 mm in diameter; noneffervescent; clear wavy boundary. 92P2809

Bw1—28 to 36 cm; dark yellowish brown (10YR 4/4) gravelly clay loam; 3 percent medium distinct brown (7.5YR 5/4) mottles; moderate fine and medium subangular blocky structure; slightly hard, moderately sticky, moderately plastic; common fine and medium roots throughout; common fine and medium vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores and 30 percent discontinuous faint pressure faces on all faces of peds; 3 percent fine and medium cylindrical wormcasts, 1 percent fine and medium spherical insect casts, and 1 percent fine and medium cylindrical worm nodules; 20 percent subangular igneous rock fragments 2 to 75 mm in diameter; rock fragments finely crystalline without sand; soil matrix has common rock fragments and sand grains up to the size of medium sand; noneffervescent; gradual wavy boundary. 92P2810

Bw2—36 to 51 cm; brown (7.5YR 5/4) gravelly clay loam; 1 percent fine and medium faint reddish yellow (7.5YR 6/6) and 3 percent fine and medium faint strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; slightly hard, moderately sticky, moderately plastic; few fine and medium roots throughout; common fine and medium vesicular and tubular pores; 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains on faces of peds and in pores and 30 percent discontinuous faint pressure faces on all faces of peds; 3 percent fine and medium cylindrical wormcasts, 1 percent fine and medium spherical insect casts, and 1 percent fine and medium cylindrical worm nodules; 20 percent subangular igneous rock fragments 2 to 75 mm in diameter; noneffervescent; gradual wavy boundary. 92P2811

C/B—51 to 84 cm; very pale brown (10YR 7/4) very gravelly clay loam; 3 percent medium and coarse distinct very dark gray (10YR 3/1) and 3 percent medium distinct strong brown (7.5YR 5/6) mottles; massive; few fine and medium roots in cracks; few fine and medium vesicular and tubular pores; 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent discontinuous distinct very dark grayish brown (10YR 3/2) manganese or iron-manganese stains on rock fragments; 21 percent fine and medium irregular iron-manganese masses; 1 percent fine and medium cylindrical wormcasts and 1 percent fine and medium spherical insect casts; 1 percent subangular igneous rock fragments 75 to 250 mm in diameter and 55 percent 2 to 75 mm in diameter; noneffervescent; gradual wavy boundary. 92P2812

Cr—84 to 122 cm; very pale brown (10YR 7/4) extremely gravelly clay loam; 3 percent medium and coarse distinct very dark gray (10YR 3/1) and 3 percent medium distinct strong brown (7.5YR 5/6) mottles; massive; few fine and medium roots in cracks; few fine and medium vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent discontinuous distinct very dark grayish brown (10YR 3/2) manganese or iron-manganese stains on rock fragments; 21 percent fine and medium irregular iron-manganese masses; 1 percent fine and medium cylindrical wormcasts; 20 percent subangular igneous rock fragments 2 to 150 mm in diameter and 75 percent 2 to 75 mm in diameter; noneffervescent. 92P2813

Parasol: S92VI-010-006

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Parasol; fine, mixed, isohyperthermic Typic Haplustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 464, Samples 92P 2814–2822

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -.05	TOTAL FINE -2	CLAY FINE LT .0002	SILT CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	COARSE FRACTIONS (MM) WEIGHT 5 -20	COARSE FRACTIONS (MM) WEIGHT 20 -75	COARSE FRACTIONS (MM) WT .1- 75	>2MM % OF WHOLE SOIL
			<- PCT OF <2MM (3A1) -												->	<- PCT OF <75MM (3B1) ->				
92P2814S	0- 10	Ap1	29.6	24.3	46.1	20.2		13.8	10.5	9.3	12.5	10.9	9.2	4.2	1	1	--	38	2
92P2815S	10- 33	Ap2	30.1	22.5	47.4	19.3		13.2	9.3	8.7	12.2	9.0	8.4	9.1	TR	1	--	39	1
92P2816S	33- 46	ABw	28.6	21.2	50.2	11.2		13.2	8.0	9.2	12.1	12.3	11.5	5.1	3	2	--	44	5
92P2817S	46- 59	Bw1	24.4	22.8	52.8	6.1		14.6	8.2	9.5	13.2	12.9	11.8	5.4	3	1	--	46	4
92P2818S	59- 81	Bw2	18.6	22.4	59.0	4.6		14.6	7.8	9.9	14.0	14.8	15.3	5.0	2	1	--	51	3
92P2819S	81-102	BC	5.1	13.8	81.1	2.2		8.2	5.6	5.6	12.5	18.7	26.3	18.0	--	18	--	80	18
92P2820S	102-122	C	4.3	16.0	79.7	1.7		10.5	5.6	8.4	13.3	17.0	25.6	15.4	6	1	--	73	7
92P2821S	122-163	Ck1	4.5	16.0	79.5	2.1		9.1	6.9	7.1	13.3	17.6	25.2	16.3	3	2	--	74	5
92P2822S	81- 85	SEAM	4.5	16.2	79.3	2.3		10.2	6.0	4.0	7.3	11.9	25.2	30.9	2	2	--	76	4

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	EXTR TOTAL S 6R3b <- PERCENT OF <2MM -->	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT <0.4MM	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a <- G/CC -	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1c -PCT OF <2MM	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a ->	WRD WHOLE SOIL 4C1 CM/CM
0- 10	2.88				2.3	0.2	0.1	1.36	0.59				1.27	1.58	0.075			26.5	17.4	0.12
10- 33	1.65				1.7	0.1	0.1	1.34	0.52				1.42	1.67	0.055			21.8	15.7	0.09
33- 46	0.66				1.6	0.1	0.1	1.58	0.57				1.43	1.71	0.060			26.0	16.2	0.14
46- 59	0.36				1.5	0.1	0.1	1.82	0.64				1.49	1.74	0.052			22.3	15.5	0.10
59- 81	0.21				1.5	0.1	0.1	2.56	0.71				1.57	1.74	0.034			16.5	13.2	0.05
81-102	0.09				1.3	0.1	0.1	7.37	2.02				1.58	1.66	0.015			14.0	10.3	0.05
102-122	0.06				1.4	0.1	0.1	7.98	2.26				1.68	1.82	0.026			13.2	9.7	0.06
122-163	0.05				0.8	TR	0.1	6.73	1.78				1.78	1.86	0.014			12.1	8.0	0.07
81- 85	0.09				0.7	0.1	TR	5.80	1.87										8.4	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<-				-MEQ / 100 G					->	<-		-PCT		->		1:2	1:1
0- 10	25.3	10.2	0.9	0.2	36.6	9.7		46.3	40.2			79	91			0.18	5.5	6.1
10- 33	27.2	10.5	0.8	0.2	38.7	7.5		46.2	40.3			84	96			0.15	5.8	6.5
33- 46	31.9	12.2	0.8	0.2	45.1	5.1		50.2	45.2			90	100			0.14	6.3	6.9
46- 59	32.5	11.7	0.7	0.3	45.2	4.0		49.2	44.3			92	100			0.11	6.5	7.1
59- 81	34.6	14.0	0.7	0.2	49.5	3.3		52.8	47.7			94	100			0.08	6.6	7.4
81-102	28.5	10.6	0.4	0.1	39.6	2.8		42.4	37.6			93	100			0.05	6.6	7.4
102-122	26.8	9.3	0.5	--	36.6	3.3		39.9	34.3			92	100			0.10	6.8	7.5
122-163		5.9	0.4	0.2					30.3			100	100	12		0.15	7.6	8.1
81- 85	20.1	7.3	0.4	0.1	27.9	1.3		29.2	26.1			96	100			0.05	6.7	7.7

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY				THERMAL DTA 7A6	TGA 7A4b	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRET TION
	<-					Percent					7C3					
92P2815	TCLY	VR 3	MT 3	KK 1					16.0	15.7			0.4			VERM
92P2816	TCLY	VR 3	MT 3						16.0	14.3			0.3			VERM
92P2817	TCLY	VR 3	MT 3						16.0	15.7			0.4			VERM
92P2818	TCLY	MT 3	VR 2	KK 1					11.0	15.7			0.3			SMEC
92P2819	TCLY	MT 3	VR 2	KK 1	MI 1				3.0	17.2			0.2			SMEC
92P2820	TCLY	VR 4	MT 2						1.7	14.3			0.6			VERM
92P2821	TCLY	MT 4	VR 2	VC 1	CA 1				1.1	14.3			0.2			SMEC
92P2822	TCLY	MT 3	VR 3						3.0	13.2			0.4			SMEC

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - - -><  - >
92P2815     FS                                                    9  FK46  FP33  FE 7  PR 6  OW 3  QZ 2  HN 1  BT 1        SMIX
92P2817     FS                                                   17  FK34  FP26  FE16  BT15  PR 5  AM 2  OW 2  OP 1        SMIX
92P2820     FS                                                   19  BT43  FK24  FE18  AM 6  OW 4  PR 3                    SMIX
92P2820     FS                                                       FP 2  QZ 1  OPtr  CAtr  TMtr  Ottr  HNtr
92P2821     FS                                                   11  CA27  BT25  FK14  OW14  FE10  AM 4                    SMIX
92P2821     FS                                                       FP 2  CB 2  QZ 1  PR 1
92P2822     FS                                                    1  BT57  AM25  FK11  OW 5  PR 1  FP 1                    SMIX
92P2822     FS                                                       FE 1  QZtr  OTtr  CAtr  OPtr
MINERAL INTERPRETATION:
    VR  vermiculite      MT  montmorillon     KK  kaolinite        FK  potas feldsp     FP  plag-feldspa     FE  iron oxides
    PR  pyroxene         OW  oth-weath mn     QZ  quartz           HN  hornblende       BT  biotite          OP  opaques
    GS  glass            AM  amphibole        OT  other            MI  mica             CA  calcite          TM  tourmaline
    VC  verm-chlorit     CB  carb-aggrega
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):  VERM = Vermiculitic      SMIX = Mixed - Sand       SMEC = Smectite
PEDON MINERALOGY BASED ON SAND/SILT: Mixed, BASED ON CLAY:  Montmorillonitic/borderline vermiculitic, FAMILY MINERALOGY:  Mixed
    COMMENTS: No evidence of hydroxy interlayers.
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ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
92P2814  1  0.10  0.48  0.10  0.18                                    22.5
92P2815  2  0.08  0.35  0.10  0.19                                    19.6
92P2816  3  0.07  0.25  0.12  0.24                                    22.7
92P2817  4  0.05  0.21  0.15  0.24                                    20.2
92P2818  5  0.05  0.19  0.13  0.19                                    18.3
92P2819  6  0.02  0.14  0.02  0.07                                    12.3
92P2820  7  0.02  0.13  0.02  0.06                                    12.2
92P2821  8  0.02  0.08  0.03  0.05                                    10.4
92P2822  9  0.02  0.09  0.02  0.06                                    10.9
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Narrative Pedon Description

Pedon: Parasol

NSSL pedon number: 92P0464

Pedon ID: S92VI-010-006

Location: River is on old plantation house ruin; northeast on VI-69 about 0.6 km to 90 degrees northwest bend in VI-69, about 0.8 km northwest on VI-69, and 91 meters northeast of VI-69 in a pasture

Latitude: 17°45’03" north

Longitude: 64°49’03" west

Revised classification as of January 01, 1995: Parasol; fine, smectitic, isohyperthermic Typic Haplustolls

Geomorphic setting: Footslope of side slope of alluvial fan in mountains

Slope: 10 percent; linear with an aspect of 250 degrees, length of 107 meters, and upslope length of 76 meters

Elevation: 79 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Geographically associated soils: Cramer, Glynn, Maho Bay, and Southgate

Vegetation: Grass and herbaceous cover

Surface fragments: 1.0 percent

Diagnostic features: Mollic epipedon at 0 to 33 cm; cambic horizon at 33 to 81 cm

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on February 3, 1992

Notes: Lower alluvial fan, local colluvium over igneous, intrusive residuum; no obvious microfeatures.

Ap1—0 to 10 cm; very dark brown (10YR 2/2) clay; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong fine and medium granular structure; hard, moderately sticky, moderately plastic; many fine and medium roots throughout; many medium and coarse vesicular and tubular pores; 75 percent continuous faint very dark brown (10YR 2/2) organic stains on faces of peds and in pores; 3 percent fine and medium spherical insect casts, 21 percent medium and coarse cylindrical wormcasts, and 3 percent medium and coarse cylindrical worm nodules; 5 percent subangular gravel; clear wavy boundary. 92P2814

Ap2—10 to 33 cm; identical to Ap1 horizon; gradual smooth boundary. 92P2815

ABw—33 to 46 cm; dark yellowish brown (10YR 3/4) clay; 1 percent fine distinct strong brown (7.5YR 5/8) and 3 percent fine and medium faint very dark brown (10YR 2/2) mottles; strong medium and coarse granular structure; hard, moderately sticky, moderately plastic; common fine and medium roots throughout; common fine and medium vesicular and tubular pores; 10 percent discontinuous distinct pressure faces on all faces of peds and 75 percent discontinuous faint dark brown (10YR 3/3) organic stains on faces of peds; 21

percent fine and medium cylindrical wormcasts and 3 percent fine and medium cylindrical worm nodules; 5 percent gravel; gradual wavy boundary. 92P2816

Bw1—46 to 59 cm; brown (10YR 4/3) clay; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong medium and coarse prismatic structure; slightly hard, moderately sticky, moderately plastic; few fine and medium roots in cracks; common fine and medium vesicular and tubular pores; 30 percent discontinuous distinct pressure faces on all faces of peds and 75 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and/or pores; 1 percent fine platy flakes of mica; 21 percent fine and medium cylindrical wormcasts; 65 percent subangular gravel; clear wavy boundary. 92P2817

Bw2—59 to 81 cm; brown (10YR 4/3) clay; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong medium and coarse prismatic structure; slightly hard, moderately sticky, moderately plastic; few fine and medium roots in cracks; common fine and medium vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent discontinuous distinct pressure faces on all faces of peds; 1 percent platy flakes of mica; 3 percent fine and medium cylindrical wormcasts; 5 percent subangular gravel; gradual wavy boundary. 92P2818

BC—81 to 102 cm; dark yellowish brown (10YR 4/4) sandy clay loam; 1 percent fine and medium distinct strong brown (7.5YR 5/8) mottles; weak fine and medium subangular blocky structure; soft, slightly sticky, slightly plastic; few fine and medium roots in cracks; common fine and medium vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and/or pores and 30 percent discontinuous distinct pressure faces on all faces of peds; 3 percent fine platy flakes of mica; 1 percent fine and medium cylindrical wormcasts; 5 percent gravel; clear wavy boundary. 92P2819

C—102 to 122 cm; olive brown (2.5Y 4/4) gravelly loamy sand; 1 percent fine and medium distinct strong brown (7.5YR 5/8) mottles; massive; nonsticky, nonplastic; few fine roots in cracks; common fine and medium vesicular and tubular pores; 10 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels; 1 percent fine platy flakes of mica; 20 percent subangular gravel; clear wavy boundary. 92P2820

C2—122 to 163 cm; olive brown (2.5Y 4/4) gravelly loamy sand; 1 percent fine prominent white (10YR 8/1) and 3 percent fine and medium distinct strong brown (7.5YR 5/8) mottles; massive; nonsticky, nonplastic; few fine roots in cracks; few fine and medium vesicular and tubular pores; 10 percent discontinuous faint dark brown (10YR 3/3) organic stains in root channels and 30 percent continuous distinct white (10YR 8/1) carbonate coats in root channels; 3 percent medium irregular carbonate masses; 20 percent gravel; violent effervescence. 92P2820

Hogensborg: S92VI-010-007

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Hogensborg; fine, montmorillonitic, isohyperthermic Entic Chromusterts

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 465, Samples 92P 2823–2828

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) WT .1- 75	% OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
92P2823S	0- 23	Ap	35.0	41.5	23.5	25.8		24.7	16.8	9.5	6.3	2.8	2.3	2.6	2	1	--	17	3
92P2824S	23- 48	ABss	47.5	33.8	18.7	32.6		22.2	11.6	8.3	5.3	2.5	1.3	1.3	3	1	--	14	4
92P2825S	48- 61	BAss	43.1	38.6	18.3	27.2		23.2	15.4	10.4	5.7	1.2	0.6	0.4	TR	--	--	8	TR
92P2826S	61- 92	Bss	31.4	41.7	26.9	18.2		23.0	18.7	19.4	7.1	0.3	0.1	TR	TR	--	--	7	TR
92P2827S	92-145	Bkss	39.7	34.5	25.8	15.3		21.6	12.9	10.2	9.4	3.2	2.1	0.9	4	8	--	26	12
92P2828S	145-175	2CB	23.1	33.4	43.5	15.5		20.2	13.2	10.8	11.8	9.1	6.8	5.0	6	24	2	54	32

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d <- - G/CC	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c <- - -PCT	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 23	1.53				1.6	0.1	0.1	0.90	0.51				1.39	1.65	0.058			24.3	17.7	0.09
23- 48	0.46				1.9	0.2	0.1	0.84	0.43				1.32	1.82	0.110			31.1	20.6	0.14
48- 61	0.11				2.2	0.2	0.1	0.84	0.47				1.45	1.90	0.094			26.1	20.1	0.09
61- 92	0.19				1.7	0.1	0.1	1.03	0.52				1.55	1.82	0.055			22.2	16.2	0.09
92-145	0.10				1.7	0.1	0.1	0.70	0.43				1.69	2.05	0.061			25.2	17.1	0.13
145-175	0.05				1.8	0.1	0.1	1.09	0.53				1.72	1.93	0.030			20.2	12.3	0.11

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	(- -CEC- -) SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->>								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 23	18.5	10.5	0.9	0.4	30.3	5.8	36.1	31.6	3		84	96						5.9	6.5
23- 48	23.5	14.4	1.9	0.4	40.2	3.4	43.6	39.8	5		92	100						6.6	7.4
48- 61	21.7	13.6	2.5	0.6	38.4	3.0	41.4	36.1	7		93	100	--					7.1	7.9
61- 92	18.4	11.4	3.3	0.4	33.5	0.9	34.4	32.4	9	6	97	100	TR				7.7	7.5	8.3
92-145		13.4	4.4	0.5				27.6	13	8	100	100	3		--		7.6	7.8	8.0
145-175	14.3	9.9	3.0	0.1	27.3		27.3	25.2	10	7	100	100	TR				7.8	7.6	8.2

DEPTH (CM)	(- - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	TOTAL ELEC. HCO3 EST. 6J1b	F 8A3a 6U1a	CL 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	ELEC. COND. MMHOS /cm	PRED. COND. MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 23								0.22											
23- 48								0.17											
48- 61								0.21											
61- 92	1.1	0.8	6.2	--	--	3.7	--	3.7				1.3	--	--	65.0	TR	0.83	0.33	
92-145	1.9	1.5	10.1	--	--	1.0	TR	8.9				2.4	--	--	68.8	0.1	1.45	0.72	
145-175	1.6	1.4	8.1	--	--	2.5	--	6.9				1.1	--	--	50.5	TR	1.19	0.42	

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2823      TCLY  MT 2  VR 2  KK 2  MI 1                                    21.0  12.6              0.7                    SMEC
92P2824      TCLY  MT 3  VR 3  KK 2  QZ 1                                    25.0  11.4              0.7                    SMEC
92P2825      TCLY  MT 3  VR 3  KK 2  MI 1  GE 1                              20.0  12.0              0.6                    SMEC
92P2826      TCLY  MT 3  VR 3  KK 2  MI 1                                    21.0  13.3              0.8                    SMEC
92P2827      TCLY  KK 3  MT 2  VR 2  MI 1  QZ 1                              21.0  13.4              1.0                    CMIX
92P2828      TCLY  VR 3  MT 3  KK 2  MI 1                                    19.0  12.6              0.7                    VERM
MINERAL INTERPRETATION:  MT  montmorillon   VR  vermiculite   KK  kaolinite   MI  mica      QZ  quartz     GE  goethite
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):    SMEC = Smectite              CMIX = Mixed - Clay           VERM = Vermiculitic
PEDON MINERALOGY BASED ON CLAY:  Montmorillonitic borderline to vermiculitic. FAMILY MINERALOGY:  Montmorillonitic
    COMMENTS: Some resistance to collapse of 2:1 layer silicates at 300 degrees c., not much at 500 degrees c.; evidence increases
         with depth.
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL         CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
              DEN                   RET   ACID              BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
92P2823  1 23.9
92P2824  2 28.8
92P2825  3 27.2
92P2826  4 21.1
92P2827  5 22.2
92P2828  6 15.4
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Narrative Pedon Description

Pedon: Hogensborg

NSSL pedon number: 92P0465

Pedon ID: S92VI-010-007

Field classification: Hogensborg; fine, montmorillonitic, isohyperthermic Entic Chromusterts

Revised classification as of January 01, 1995: Hogensborg; fine, smectitic, isohyperthermic Chromic Haplusterts

Location: St. Croix Island, Virgin Islands; 0.8 km east of St. Luke's Church (Grove Place) and 91.5 meters southeast in a pasture or 91.5 meters south-southeast of the intersection of VI-705 and VI-609 in a pasture

Latitude: 17°43'32" north

Longitude: 64°48'57" west

Elevation: 43 meters

Vegetation: Grass and herbaceous cover

Geomorphic setting: Toeslope of nose slope of alluvial flat is uplands

Slope: 3 percent; concave with an aspect of 110 degrees, length of 30 meters, and upslope length of 15 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Particle-size control section: 25 to 100 cm

Surface fragments: 1.0 percent

Diagnostic features: Ochric epipedon at 0 to 23 cm; cambic horizon at 23 to 145 cm

Geographically associated soils: Glynn, Hesselberg, and Sion

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on March 4, 1992

Notes: Because of the thickness of the dark surface, the pedon didn't qualify as having a mollic epipedon. Microrelief consisted *of* gilgai with less than 10 inches vertical surface variation. The profile contained less than 10% gravel throughout. Slickensides increased in size and number with depth. The surface color of the slickensides was yellowish brown (10YR 5/6).

A—0 to 23 cm; dark brown (10YR 3/3) clay; 3 percent fine and medium faint very dark grayish brown (10YR 3/2) mottles; strong fine and medium granular structure; very hard; many fine and medium and few coarse roots between peds; many fine to coarse high-continuity vesicular and tubular and few fine to coarse low-continuity pores filled with coarse material; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 21 percent medium and coarse cylindrical wormcasts, 21 percent medium and coarse spherical insect casts, and 21 percent medium and coarse cylindrical worm nodules; 5 percent subangular gravel; noneffervescent; gradual wavy boundary. 92P2823

ABss—23 to 48 cm; brown (10YR 4/3) clay; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong medium and coarse prismatic structure; very hard; many fine and medium and few coarse roots between peds; many fine to coarse high-continuity vesicular and tubular pores; 30 percent continuous distinct yellowish brown (10YR 5/6) slickensides (pedogenic) on faces of peds and 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 21 percent medium and coarse cylindrical wormcasts, 21 percent medium and coarse spherical insect casts, and 21 percent medium and coarse cylindrical worm nodules; 5 percent subangular gravel; clear wavy boundary. 92P2824

BAss—48 to 61 cm; yellowish brown (10YR 5/6) clay; 3 percent fine and medium distinct brown (10YR 4/3) and 3 percent fine and medium distinct dark brown (10YR 3/3) mottles; strong medium and coarse prismatic structure; very hard; common fine and medium roots between peds; common fine to coarse moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains on faces of peds and in pores and 30 percent continuous distinct yellowish brown (10YR 5/6) slickensides (pedogenic) on faces of peds; 3 percent fine and medium spherical iron-manganese concretions and 3 percent fine and medium irregular iron-manganese masses; 3 percent fine and medium cylindrical wormcasts; 5 percent subangular gravel; clear wavy boundary. 92P2825

Bss—61 to 92 cm; yellowish brown (10YR 5/6) clay; 1 percent fine distinct yellowish brown (10YR 5/8) and 3 percent fine and medium distinct dark brown (10YR 3/3) mottles; strong coarse prismatic structure; very hard; few fine and medium roots in cracks; few fine to coarse low-continuity vesicular and tubular pores; 10 percent continuous distinct yellowish brown (10YR 5/6) slickensides (pedogenic) on faces of peds and 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores; 3 percent fine and medium spherical iron-manganese concretions and 3 percent fine and medium irregular iron-manganese masses; 1 percent fine and medium cylindrical wormcasts; 5 percent subangular gravel; abrupt wavy boundary. 92P2826

Bkss—92 to 145 cm; brownish yellow (10YR 6/6) clay; 1 percent fine faint yellowish brown (10YR 5/6) and 3 percent medium distinct very pale brown (10YR 7/4) mottles; strong medium and coarse prismatic structure; very hard; few fine and medium roots in cracks; few fine to coarse low-continuity vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores, 10 percent continuous distinct yellowish brown (10YR 5/6) slickensides (pedogenic) on faces of peds, and 30 percent discontinuous distinct very pale brown (10YR 8/2) carbonate coats on lower surfaces of peds or rocks; 21 percent fine and medium spherical iron-manganese concretions and 21 percent fine and medium irregular iron-manganese masses; 1 percent fine and medium cylindrical wormcasts; strong effervescence, matrix non-reactive; minor gravel lenses throughout; surface of the gravel has a dark coating of manganese; 10

percent subangular gravel; strong effervescence; abrupt wavy boundary. 92P2827

2CB—145 to 175 cm; strong brown (7.5YR 5/8) clay; 1 percent fine distinct brownish yellow (10YR 6/6) mottles; massive; very hard; few very fine and fine roots in cracks; common fine to coarse moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores; 21 percent medium and coarse spherical iron-manganese concretions and 21 percent medium and coarse irregular iron-manganese masses; 3 percent medium and coarse cylindrical wormcasts; structureless, but because of numerous wormcasts the parent material is altered in place; 5 percent subangular gravel. 92P2828S

Aguilita: S92VI-010-008

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Aguilita; clayey, mixed, isohyperthermic, shallow Typic Calciustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 466, Samples 92P 2829–2834

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	TOTAL FINE LT .002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACTIONS (MM) 2-5	COARSE FRACTIONS (MM) 5-20	COARSE FRACTIONS (MM) .1-75	(>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						(3A1) - - - - - - - - - - - - - -						<- PCT OF <75MM (3B1) ->			
92P2829S	0- 15	Ap	23.6	29.6	46.8	13.4		21.6	8.0	5.0	7.0	7.9	13.2	13.7	12	32	4	70	48
92P2830S	15- 28	ABk	23.8	31.3	44.9	11.8	0.6	21.6	9.7	5.3	7.2	9.2	11.4	11.8	13	35	5	72	53
92P2831S	28- 35	CBk	23.5	28.9	47.6	11.3	1.9	20.7	8.2	4.6	7.3	8.5	13.4	13.8	9	33	25	81	67
92P2832G	35- 58	Ckm							P										
92P2833S	58- 76	Ck	21.1	35.6	43.3		11.2	27.1	8.5	5.4	6.9	7.5	11.7	11.8	14	41	2	73	57
92P2834G	76-122	C'km							P										

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a OF	EXTRACTABLE MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT	LIMITS PI 4F <0.4MM	FIELD MOIST 4A3a	1/3 BAR 4A1d <- - G/CC	OVEN DRY 4A1h - - ->	WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4	1/10 BAR 4B1c <- - -PCT	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a - ->	WHOLE SOIL 4C1 CM/CM
0- 15	2.47				0.6	TR	TR	1.15	0.62				1.49	1.81	0.042			17.9	14.6	0.03
15- 28	2.14				0.7	0.1	TR	1.13	0.61				1.82	2.09	0.025			9.0	14.5	
28- 35	1.59				0.5	TR	TR	1.00	0.56										13.1	
35- 58									4.7											
58- 76	0.65							0.75	0.63										13.2	
76-122									5.1											

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES 6H5a	ACID-ITY	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	CARBONATE AS CACO3 <20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	CASO4 AS GYPSUM <20MM 6F4	PH SAT PASTE 8C1b	PH CACL2 .01M 8C1f	PH H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->				
0- 15		2.4	0.3	0.4					27.2	1	1	100	100	36			7.3	7.5	7.9
15- 28		1.8	0.5	0.2					26.8	1	1	100	100	37			7.4	7.6	8.1
28- 35		1.7	0.7	0.2					23.4	2	2	100	100	47			7.6	7.6	8.2
35- 58				78															
58- 76		1.1	0.3	TR					15.8	2		100	100	60				7.7	8.2
76-122				76															

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 TOTAL EST. 6J1b	CL ELEC. 8A3a 6U1a	F ELEC. 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	PRED. COND. MMHOS /cm	PRED. COND. MMHOS /cm
	<- - - - - - - - - - - - - - - - - - MEQ / LITER - - - - - - - - - - - - - - - - - - ->														<- -PCT- ->			
0- 15	12.3	1.2	1.6	0.2	--	11.2	1.4	1.7				0.1	--	--	53.7	TR	1.27	0.35
15- 28	9.5	0.8	2.8	0.1	--	11.4	1.2	0.9				TR	--	--	54.5	TR	1.06	0.34
28- 35	6.1	0.6	3.3	0.1	--	6.5	0.8	1.5				0.3	--	--	51.5	TR	0.90	0.32
35- 58																		
58- 76								0.23										
76-122																		

SAMPLE NO.	HZ NO	ACID OXALATE EXTRACTION OPT DEN 8J	FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	WATER CONTENT 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	WATER DISPERSIBLE PIPETTE CLAY 3A1c	SILT	SAND	HYDROMETER CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m ->			<- P P M ->				<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - -				<- - -	- - ->	<- - -		- - ->			><20mm><PCT>
92P2829	1																				
92P2830	2																				
92P2831	3																				
92P2832	4																				
92P2833	5	17.8																			
92P2834	6																				

Narrative Pedon Description

Pedon: Aguilita

NSSL pedon number: 92P0466

Pedon ID: S92VI-010-008

Field classification: Clayey, mixed, isohyperthermic, shallow Typic Calciustolls

Revised classification as of January 01, 1995: Arawak; loamy-skeletal, carbonatic, isohyperthermic, shallow Typic Calciustolls

Location: St. Croix Island, Virgin Islands; 1/10 mile northwest on VI-811 from intersection of VI-708 and VI-811 (Constitution Hill), 1/10 mile east on side slope

Latitude: 17°44’12" north

Longitude: 64°43’54" west

Elevation: 110 meters

Geographically associated soils: Glynn, Hesselberg, Pozo Blanco, and Sion

Vegetation: Grass and herbaceous cover

Geomorphic setting: Backslope of side slope of hillside in hills

Particle-size control section: 0 to 35 cm

Surface fragments: 1.0 percent

Diagnostic features: Mollic epipedon at 0 to 28 cm; calcic horizon at 28 to 122 cm; paralithic contact at 35 cm

Slope: 22 percent convex with an aspect of 225 degrees, length of 107 meters, and upslope length of 30 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on March 4, 1992

A—0 to 15 cm; very dark grayish brown (10YR 3/2) gravelly clay, dark grayish brown (10YR 4/2) dry; 3 percent fine and medium faint dark brown (10YR 3/3) mottles; strong medium and coarse granular structure; very hard, moderately sticky, moderately plastic; common fine and medium roots throughout; many fine and medium high-continuity vesicular and tubular pores; 30 percent discontinuous distinct very pale brown (10YR 7/3) carbonate coats and 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 3 percent fine and medium irregular carbonate nodules, 3 percent fine and medium cylindrical wormcasts, and 3 percent fine and medium spherical insect casts; 5 percent angular limestone cobbles and 20 percent angular limestone gravel; strong effervescence, matrix less effervescent than coatings or concentrations of carbonate; clear wavy boundary. 92P2829

ABk—15 to 28 cm; very dark grayish brown (10YR 3/2) extremely gravelly clay, dark grayish brown (10YR 4/2) dry; 1 percent medium faint dark brown (10YR 3/3) and 3 percent fine and medium faint yellowish brown (10YR 5/4) mottles; strong medium granular structure; very hard, moderately sticky,

moderately plastic; common fine and medium roots throughout; many fine and medium moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct very pale brown (10YR 7/3) carbonate coats and 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds and in pores; 3 percent fine and medium cylindrical wormcasts, 3 percent fine and medium spherical insect casts, and 3 percent medium and coarse irregular carbonate nodules; 10 percent angular limestone cobbles and 65 percent angular limestone gravel; strong effervescence, matrix less effervescent than coatings or concentrations of carbonate; gradual wavy boundary. 92P2830

CBk—28 to 35 cm; pale brown (10YR 6/3) extremely gravelly silt loam; 1 percent fine and medium distinct dark brown (10YR 3/3) and 3 percent fine and medium distinct pinkish white (7.5YR 8/2) mottles; massive and structureless with evidence of biological alteration; very hard, moderately sticky, moderately plastic; few fine and medium roots throughout; many fine and medium moderate-continuity vesicular and tubular pores; 30 percent discontinuous distinct brown (10YR 4/3) organic stains on faces of peds and in pores and 75 percent continuous faint very pale brown (10YR 7/3) carbonate coats; 3 percent fine and medium cylindrical wormcasts, 1 percent fine and medium spherical insect casts, and 21 percent coarse and very coarse irregular carbonate nodules; 10 percent angular limestone cobbles and 65 percent angular limestone gravel; strong effervescence; gradual wavy boundary. 92P2831

Ckm—35 to 58 cm; pale brown (10YR 6/3) petrocalcic materials; 3 percent fine and medium distinct pinkish white (7.5YR 8/2) mottles; massive; very hard, nonsticky, slightly plastic; few fine roots throughout; many medium and coarse moderate-continuity vesicular and tubular pores; 75 percent continuous faint very pale brown (10YR 7/3) carbonate coats; 21 percent very coarse and extremely coarse irregular carbonate nodules; limestone paralithic rock fragments containing a high content of fossil corals; strong effervescence; diffuse wavy boundary. 92P2832

Ck—58 to 76 cm; pale brown (10YR 6/3) extremely gravelly silt loam; 3 percent fine and medium distinct pinkish white (7.5YR 8/2) mottles; massive; very hard, moderately sticky, moderately plastic; few fine roots throughout; many fine and medium moderate-continuity vesicular and tubular pores; 75 percent continuous faint very pale brown (10YR 7/3) carbonate coats; 21 percent medium and coarse irregular carbonate nodules; 10 percent angular limestone cobbles and 65 percent angular limestone gravel; high content of fossil corals; strong effervescence; diffuse wavy boundary. 92P2833

C′km—76 to 122 cm; pale brown (10YR 6/3) petrocalcic materials; 3 percent fine and medium distinct pinkish white (7.5YR 8/2) mottles; massive; very hard, nonsticky, slightly plastic; common fine and medium low-continuity vesicular and tubular pores; 75 percent continuous faint very pale brown (10YR 7/3) carbonate coats; 21 percent very coarse and extremely coarse irregular carbonate nodules; unspecified limestone fragments; paralithic rock fragments; high content of fossil corals; strong effervescence. 92P2834

Glynn: S92VI-010-009

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Glynn; fine, mixed, isohyperthermic Typic Haplustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 467, Samples 92P 2835–2842

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	(- -SILT- -) COARSE .02 -.05	VF .05 -.10	(- - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
92P2835S	0- 13	Ap	26.7	36.8	36.5	18.8		26.3	10.5	7.1	6.0	5.2	8.2	10.0	14	30	--	60	44
92P2836S	13- 30	AB	36.1	34.3	29.6	28.8		24.8	9.5	7.5	5.5	3.3	6.2	7.1	8	32	1	54	41
92P2837S	30- 43	Bw	34.6	33.4	32.0	25.7		22.5	10.9	9.0	6.8	4.5	6.9	4.8	5	15	--	38	20
92P2838S	43- 56	ABw	21.7	24.7	53.6	10.2		14.5	10.2	8.1	10.7	7.3	11.2	16.3	18	29	4	73	51
92P2839S	56- 97	2Bkw1	36.0	30.5	33.5	18.6	2.2	22.9	7.6	7.0	7.9	5.6	6.0	7.0	7	15	--	43	22
92P2840S	97-114	2Bkw2	39.5	41.7	18.8	24.1		28.0	13.7	7.8	5.2	2.1	1.9	1.8	4	4	1	19	9
92P2841S	114-145	4B	40.5	33.7	25.8	26.1		23.9	9.8	7.8	6.1	3.5	3.6	4.8	5	29	1	47	35
92P2842S	145-160	4Bkwg	38.8	34.0	27.2	19.2	1.9	27.6	6.4	5.1	6.2	5.8	5.2	4.9	6	29	2	51	37

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 13	2.99				1.9	0.1	0.1	1.06	0.59				1.45	1.62	0.026			17.2	15.8	0.01
13- 30	1.10				1.5	0.1	0.1	0.88	0.49				1.29	1.70	0.069			31.7	17.8	0.13
30- 43	0.60				1.4	0.1	0.1	0.83	0.48				1.40	1.79	0.074			27.4	16.5	0.13
43- 56	0.16				2.1	0.1	0.1	0.88	0.59				1.48	1.68	0.026			21.7	12.7	0.08
56- 97	0.09				0.5	TR	0.1	0.72	0.57				1.28	1.77	0.098			34.1	20.5	0.15
97-114	0.08				0.6	0.1	0.1	0.71	0.50				1.32	1.91	0.124			34.0	19.6	0.18
114-145	0.05				1.0	0.1	0.1	0.82	0.50				1.47	1.86	0.061			24.9	20.1	0.05
145-160	0.04				1.0	0.1	0.1	0.76	0.47				1.38	1.87	0.078			28.7	18.3	0.11

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	(- -CEC- -) SUM CATS 5A3a	NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	(- - - -PH - - -) SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->|										<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 13	17.3	10.9	1.1	0.8	30.1	6.2	36.3	28.2	3	3	83	100					6.6	6.7	7.3
13- 30	16.7	14.3	4.1	0.6	35.7	3.1	38.8	31.6	11	7	92	100	TR		--		7.0	7.2	7.9
30- 43		16.6	5.4	0.4				28.7	16	9	100	100	1		--		7.8	7.8	8.4
43- 56		11.6	6.9	0.4				19.1	30	19	100	100	2		--		8.2	8.3	8.8
56- 97		19.7	13.9	0.6				25.8	42	27	100	100	17		--		8.8	8.6	8.8
97-114		19.2	16.3	0.6				27.9	45	29	100	100	3		--		8.7	8.6	8.8
114-145		20.3	18.5	0.7				33.2	43	27	100	100	1		--		8.6	8.6	8.6
145-160		17.1	18.5	0.4				29.5	45	37	100	100	14		--		8.7	8.6	8.8

DEPTH (CM)	(- - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - -) CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	TOTAL ELEC. HCO3 EST. 6J1b	F 8A3a	ELEC. CL 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	PRED. COND. MMHOS /cm	COND. MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 13	4.1	4.4	5.4	0.3	--	10.0	TR	1.8				0.5	--	--	56.2	TR	1.20	0.36
13- 30	1.5	1.4	9.0	0.1	--	6.8	--	4.0				0.6	--	--	63.3	TR	1.15	0.51
30- 43	1.7	1.5	11.3	0.1	--	5.9	0.2	7.6				0.9	--	--	66.0	0.1	1.48	0.67
43- 56	1.0	1.1	19.8	TR	--	4.1	--	17.1				1.8	--	--	57.4	0.1	2.46	0.95
56- 97	0.7	0.8	23.8	0.1	--	3.9	0.5	17.5				5.3	--	--	126.6	0.2	2.55	2.08
97-114	0.8	1.2	29.0	0.1	--	3.6	--	22.9				5.4	--	--	126.3	0.3	3.18	2.62
114-145	1.4	1.2	30.5	0.1	--	3.0	--	24.3				3.9	--	--	143.0	0.3	3.05	2.86
145-160	0.9	1.1	36.6	0.1	--	2.8	--	27.6				4.8	--	--	145.0	0.3	3.35	3.04

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           < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE       ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                 < - - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER     <- - ><  - - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - -><  - ->
92P2835     TCLY  MT 2  VR 2  KK 2  MI 2                                      17.0  11.3              1.1                    SMEC
92P2836     TCLY  MT 3  VR 2  KK 2                                            19.0  11.4              0.9                    SMEC
92P2837     TCLY  MT 3  KK 2  VR 2  FD 2  QZ 1                                19.0  11.4              1.3                    SMEC
92P2838     TCLY  MT 3  VR 3  KK 2  FD 2  QZ 1  MI 1                          17.0  11.3              1.1                    SMEC
92P2839     TCLY  MT 3  KK 2  FD 2  QZ 2  VR 1                                18.0   9.3              1.3                    SMEC
92P2840     TCLY  MT 3  KK 2  MI 2  FD 2  VR 1  QZ 1                          17.0  10.7              1.4                    SMEC
92P2841     TCLY  MT 3  KK 2  FD 2  VR 1  MI 1 CR 1  QZ 1                     17.0  11.2              0.7                    SMEC
92P2842     TCLY  MT 2  VR 2  KK 2  FD 2  QZ 2 CR 1  MI 1                     17.0   9.9              1.1                    SMEC
92P2842     TCLY  CR 1  MI 1
MINERAL INTERPRETATION:  MT  montmorillon  VR  vermiculite  KK  kaolinite  MI  mica   FD  feldspar   QZ  quartz  CR  cristobalite
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON): SMEC = Smectite
PEDON MINERALOGY BASED ON CLAY: Montmorillonitic FAMILY MINERALOGY:  Mixed
    COMMENTS: Some evidence of hydroxy interlayers in 2:1 layer silicates; increases with depth to 104 cm.; none at 104 - 145 cm.;
              present at 145 - 160 cm.
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ACID OXALATE EXTRACTION OPTICAL DENSITY (%)

92P2835 18.4%, 92P2836 21.3%, 92P2837 20.6%, 92P2838 15.1%, 92P2839 27.0%, 92P2840 21.6%, 92P2841 22.4%, 92P2842 21.2%

Narrative Pedon Description

Pedon: Glynn

NSSL pedon number: 92P0467

Pedon ID: S92VI-010-009

Revised classification as of January 01, 1996: Glynn; fine-loamy, mixed, superactive, isohyperthermic Vertic Haplustolls

Location: St. Croix Island, Virgin Islands; 0.3 km east of the ruins at Mount Roepstorff and Southgate Farm

Latitude: 17°45’23" north

Longitude: 64°39’32" west

Elevation: 62 meters

Slope: 2 percent; concave with an aspect of 310 degrees, length of 76 meters, and upslope length of 53 meters

Vegetation: Grass and herbaceous cover

Surface fragments: 1.0 percent

Geomorphic setting: Toeslope of nose slope of alluvial fan in uplands

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Well drained

Geographically associated soils: Hesselberg, Hogensborg, Sion, and Solitude

Particle-size control section: 25 to 102 cm

Diagnostic features: Mollic epipedon at 0 to 30 cm; cambic horizon at 30 to 43 cm; calcic horizon at 56 to 97 cm

Described and sampled by: W.C. Lynn, B.C. Dubee, J.R. Davis, and C.L. Santiago on March 4, 1992

Ap—0 to 13 cm; dark brown (10YR 3/3) gravelly clay; 3 percent fine and medium very dark grayish brown (10YR 3/2) mottles; strong medium and coarse granular structure; slightly hard, very sticky, moderately plastic; common fine and medium roots throughout; many fine and medium vesicular and tubular pores; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds; 21 percent fine and medium cylindrical wormcasts, 3 percent fine insect casts, and 1 percent worm nodules; 20 percent subangular gravel; clear wavy boundary. 92P2835

ABw—13 to 30 cm; very dark grayish brown (10YR 3/2) gravelly clay; 1 percent medium faint dark yellowish brown (10YR 4/4) mottles; strong fine and medium granular structure; very hard, very sticky, moderately plastic; common fine and medium roots throughout; many fine and medium vesicular and tubular pores; 75 percent continuous faint dark brown (10YR 3/3) organic stains on faces of peds; 21 percent fine and medium cylindrical wormcasts, 3 percent insect casts, and 1 percent worm nodules; 20 percent subangular gravel; gradual wavy boundary. 92P2836

Bw—30 to 43 cm; dark yellowish brown (10YR 4/4) very gravelly clay; 3 percent medium faint dark brown (10YR 3/3) mottles; strong medium and coarse

prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots throughout; common fine and medium vesicular and tubular pores; 30 percent discontinuous faint dark brown (10YR 3/3) organic stains on faces of peds and 30 percent discontinuous faint pressure faces on faces of peds; 3 percent fine and medium spherical iron-manganese concretions; 3 percent fine and medium cylindrical wormcasts and insect casts; 40 percent subangular gravel; gradual wavy boundary. 92P2837

2Bk1—43 to 56 cm; brown (10YR 5/3) clay; 1 percent fine and medium faint very pale brown (10YR 7/3) and 3 percent fine faint dark yellowish brown (10YR 4/4) mottles; strong medium and coarse prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots throughout; common fine and medium vesicular and tubular pores; 10 percent discontinuous faint dark brown (10YR 3/3) organic stains on faces of peds, 30 percent discontinuous faint very pale brown (10YR 7/3) carbonate coats on faces of peds, and 30 percent discontinuous faint iron-manganese stains on rock fragments; 3 percent fine and medium spherical iron-manganese concretions; 3 percent fine and medium irregular carbonate masses and 1 percent fine and medium cylindrical wormcasts; 5 percent subangular gravel; strong effervescence; gradual wavy boundary. 92P2838

3Bk2—56 to 97 cm; light olive brown (2.5Y 5/4) clay; 1 percent fine and medium faint very pale brown (10YR 7/3) and 3 percent medium faint light gray (2.5Y 7/2) mottles; strong fine and medium prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots in cracks; few fine and medium vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains on faces of peds, 30 percent discontinuous faint very pale brown (10YR 7/3) carbonate coats on faces of peds, and 30 percent discontinuous distinct very dark grayish brown (10YR 3/2) iron-manganese stains on rock fragments; 3 percent fine and medium iron-manganese concretions; few fine and medium irregular carbonate masses and few fine and medium cylindrical wormcasts; 5 percent subangular gravel; strong effervescence; diffuse wavy boundary. 92P2839

3Bk3—97 to 114 cm; grayish brown (2.5Y 5/2) gravelly clay; 1 percent medium faint light gray (2.5Y 7/2) mottles; strong fine and medium prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots in cracks; few fine and medium vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains on faces of peds, 30 percent discontinuous faint very pale brown (10YR 7/3) carbonate coats on faces of peds, and 30 percent discontinuous distinct very dark grayish brown (10YR 3/2) iron-manganese stains on rock fragments; 1 percent fine iron-manganese concretions; 3 percent fine and medium irregular carbonate masses and 1 percent fine and medium wormcasts; 5 percent subangular gravel; strong effervescence; gradual wavy boundary. 92P2840

4B—114 to 145 cm; olive (5Y 5/3) gravelly clay; 1 percent fine distinct strong brown (7.5YR 4/6), 3 percent medium distinct olive brown (2.5Y 4/4), and 3 percent medium faint grayish brown (2.5Y 5/2) mottles; strong fine prismatic

structure; very hard, very sticky, moderately plastic; few fine and medium roots in cracks; few fine and medium vesicular and tubular pores; 10 percent discontinuous prominent dark brown (10YR 3/3) organic stains on faces of peds, 10 percent discontinuous distinct very pale brown (10YR 7/3) carbonate coats on faces of peds, and 30 percent discontinuous distinct very dark grayish brown (10YR 3/2) iron-manganese stains on rock fragments; 3 percent fine and medium iron-manganese masses; 1 percent fine and medium irregular carbonate masses and 1 percent fine and medium wormcasts; 20 percent subangular gravel; gradual wavy boundary. 92P2841

4Bkg—145 to 165 cm; olive gray (5Y 5/2) very gravelly clay; 1 percent medium distinct very pale brown (10YR 7/3), few medium distinct light olive brown (2.5Y 5/4), and few medium and coarse distinct reddish brown (5YR 4/4) mottles; strong fine prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots in cracks; few fine and medium vesicular and tubular pores; 10 percent discontinuous prominent dark brown (10YR 3/3) organic stains on faces of peds, 30 percent discontinuous distinct very pale brown (10YR 8/3) carbonate coats on peds, and 75 percent discontinuous distinct very dark grayish brown (10YR 3/2) iron-manganese stains on rock fragments; 21 percent fine and medium iron-manganese concretions; 3 percent fine and medium carbonate masses and 1 percent fine and medium wormcasts; 40 percent subangular gravel; strong effervescence. 92P2842

Glynn: S92VI-010-010

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Glynn; fine, mixed, isohyperthermic Typic Haplustolls

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 468, Samples 92P 2843–2849

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)			(- - - - - -SAND- -		- - - -)		(-COARSE FRACTIONS(MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
92P2843S	0- 10	Ap		26.3	29.1	44.6	13.9		19.3	9.8	9.7	8.5	7.7	10.0	8.7	4	2	1	39	7
92P2844S	10- 26	A		28.7	31.1	40.2	15.6		19.2	11.9	9.1	8.8	6.8	8.8	6.7	7	4	2	40	13
92P2845S	26- 43	AB		42.7	20.6	36.7	28.1		13.7	6.9	6.6	6.5	7.0	9.6	7.0	17	23	TR	58	40
92P2846S	43- 68	Bw		32.9	27.9	39.2	15.5		14.6	13.3	12.6	11.9	6.7	5.0	3.0	5	5	TR	34	10
92P2847S	68- 80	2C		29.5	20.5	50.0	14.8		12.5	8.0	7.9	8.7	8.4	11.9	13.1	17	10	TR	58	27
92P2848S	80-104	3Bkssb		44.9	20.1	35.0	18.4	1.3	15.5	4.6	4.2	5.6	6.7	10.8	7.7	8	9	--	43	17
92P2849S	104-140	4Ck		26.1	14.2	59.7	13.3	1.9	10.4	3.8	6.3	12.6	12.7	14.9	13.2	18	21	3	73	42

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)	(ATTERBERG)		(- BULK DENSITY -)		COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE			15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC -		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 10	2.52				1.9	0.2	0.1	0.80	0.49				1.36	1.49	0.030			18.3	12.9	0.07
10- 26	1.36				1.9	0.2	0.1	0.74	0.43				1.33	1.41	0.018			22.6	12.4	0.13
26- 43	0.42				1.8	0.2	TR	0.61	0.39				1.34	1.44	0.018			34.4	16.6	0.18
43- 68	0.24				2.0	0.2	0.1	0.64	0.42				1.57	1.75	0.034			20.3	13.8	0.10
68- 80	0.09				1.9	0.1	0.1	0.64	0.43				1.55	1.63	0.014			20.7	12.8	0.10
80-104	0.12				1.7	0.1	TR	0.56	0.43				1.52	1.86	0.061			25.4	19.4	0.08
104-140	0.07				2.1	0.1	0.1	0.66	0.45				1.72	1.80	0.010			23.2	11.8	0.14

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	(- -CEC- -)		EXCH	SAR	BASE		CARBONATE		CASO4 AS		(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	SUM	NH4-	NA		SATURATION		AS CACO3		GYPSUM		SAT	CACL2	H2O
DEPTH	5B5a	5B5a	5B5a	5B5a	BASES		CATS	OAC			SUM	NH4OAC	<2MM	<20MM	<2MM	<20MM	PASTE	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	6E4	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - -			-MEQ / 100		G - - - - - - - - -		- ->	PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 10	11.8	7.0	0.6	1.2	20.6	4.9	25.5	21.1	2	2	81	98					6.6	6.4	7.0
10- 26	12.7	6.4	0.6	0.7	20.4	4.0	24.4	21.2	3		84	96						6.2	6.9
26- 43	16.1	9.1	1.0	0.5	26.7	4.0	30.7	25.9	4		87	100						6.7	7.4
43- 68		9.4	1.3	0.4		0.6		21.0	6	3		100	1				7.7	7.6	8.2
68- 80		10.3	2.2	0.4				19.0	10	6	100	100	1				8.0	7.8	8.5
80-104		18.3	4.2	0.3				25.1	15	8	100	100	9		--		8.2	8.1	8.7
104-140		15.9	4.6	0.3				17.1	24	11	100	100	13		--		8.5	8.3	8.9

	(- - - - - - - - - - - - - - - - - - WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - - - - - - - - - -)PRED.																	
						TOTAL	ELEC.	ELEC.										
	CA	MG	NA	K	CO3	HCO3	F	CL	PO4	Br	OAC	SO4	NO2	NO3	H2O	SALTS	COND.	COND.
DEPTH						EST.	8A3a	8I										
(CM)	6N1b	6O1b	6P1b	6Q1b	6I1b	6J1b	6U1a	6K1c	6S9a	6X1a	6Y1a	6L1c	6W1a	6M1c	8A	8D5	MMHOS	MMHOS
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm
0- 10	4.4	4.1	3.6	0.9	--	7.4	--	3.8				0.8	--	--	50.8	TR	1.15	0.29
10- 26								0.18										
26- 43								0.15										
43- 68	1.3	0.8	2.9	TR	--	3.0	0.1	1.8				0.5	--	--	51.6	TR	0.60	0.30
68- 80	0.9	0.9	5.5	TR	--	3.0	0.1	3.7				0.5	--	--	44.2	TR	0.77	0.35
80-104	0.7	0.7	7.1	TR	--	3.1	0.2	4.0				0.9	--	--	68.8	TR	0.89	0.52
104-140	0.7	0.6	8.8	0.1	--	3.2	0.3	4.5				1.4	--	--	53.7	TR	1.10	0.57

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            < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - - X-RAY - - - - - - -><  - - - THERMAL - - - -><  - - - - - - - - ELEMENTAL - - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - - 7C3 - - - - - - - - -><    >  7D2  TION
NUMBER      <- - ><  - - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - - -><  - -><  - ->
92P2844      TCLY  KK 2  VR 2  MI 2  MT 1  QZ 1                                17.0  10.6               1.6                    CMIX
92P2845      TCLY  KK 3  VR 2  CL 2  MI 2  QZ 1  MT 1                           22.0  11.2               1.4                    CMIX
92P2846      TCLY  KK 3  CL 2  MT 2  MI 1  QZ 1                                20.0  10.7               1.2                    CMIX
92P2847      TCLY  MT 3  KK 3  CL 2  FD 1  QZ 1  MT 1                           19.0  10.4               1.3                    SMEC
92P2848      TCLY  MT 3  KK 3  CL 2  QZ 1  MI 1                                19.0  10.6               1.2                    SMEC
92P2849      TCLY  KK 3  MT 2  CL 2  VC 1  CA 1  FD 1                           18.0  10.7               0.9                    CMIX
MINERAL INTERPRETATION: KK  kaolinite, VR  vermiculite, MI  mica, MT montmorillon, QZ quartz, CL chlorite, FD  feldspar
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON): CMIX = Mixed - Clay           SMEC = Smectite
PEDON MINERALOGY BASED ON CLAY: Mixed (borderline montmorillonitic). FAMILY MINERALOGY:  Mixed
    COMMENTS: Only pedon in project with distinct chlorite present.
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            ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
              OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - ><  - HYDROMETER - > SOIL STABL
              DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ    8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO        <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - ><20mm><PCT>
92P2843  1 14.7
92P2844  2 14.2
92P2845  3 19.0
92P2846  4 16.3
92P2847  5 13.5
92P2848  6 23.2
92P2849  7 13.5
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Narrative Pedon Description

Pedon: Glynn
NSSL pedon number: 92P0468
Pedon ID: S92VI-010-010
Field classification: Fine, mixed, isohyperthermic Typic Haplustolls
Revised classification as of January 01, 1995: Glynn; clayey-skeletal, mixed, superactive, isohyperthermic Fluventic Haplustolls
Location: St. Croix Island, Virgin Islands; 0.5 km south of Petronella on VI-62, about 61 meters east of VI-62 in a pasture
Latitude: 17°43’31" north
Longitude: 64°40’01" west
Elevation: 15 meters
Geomorphic setting: Toeslope of nose slope of alluvial fan in uplands
Vegetation: Grass and herbaceous cover
Surface fragments: 1.0 percent
Particle-size control section: 25 to 100 cm
Diagnostic features: Mollic epipedon at 0 to 26 cm; cambic horizon at 26 to 68 cm
Slope: 3 percent; convex with an aspect of 120 degrees, length of 61 meters, and upslope length of 30 meters
Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C
Average annual precipitation: 1,092 mm
Drainage: Well drained
Geographically associated soils: Hesselberg, Hogensborg, Sion, and Solitude
Described and sampled by: W. Lynn, C.L. Santiago, B.C. Dubee, and J.R. Davis on March 5, 1992
Notes: Prismatic horizons show clay coatings on vertical ped faces. Rock fragments are igneous.

A—0 to 10 cm; dark brown (10YR 3/3) clay; 3 percent fine and medium faint very dark grayish brown (10YR 3/2) mottles; moderate medium and coarse prismatic structure; slightly hard, very sticky, moderately plastic; many fine and medium and few coarse roots throughout; many fine and medium high-continuity vesicular and tubular and few fine and medium low-continuity pores filled with coarse material; 75 percent continuous faint very dark grayish brown (10YR 3/2) organic stains on faces of peds and in pores; 21 percent fine and medium cylindrical insect casts, 21 percent fine and medium cylindrical worm nodules, and 21 percent medium and coarse cylindrical wormcasts; 5 percent subangular gravel; clear wavy boundary. 92P2843

A2—10 to 26 cm; dark brown (10YR 3/3) clay; 3 percent fine and medium faint dark yellowish brown (10YR 4/4) and 3 percent fine and medium faint yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure; slightly hard, very sticky, moderately plastic; many fine and medium and few coarse roots throughout; many fine and medium high-continuity vesicular and tubular and few fine and medium low-continuity pores filled with coarse material; 75 percent continuous faint very dark grayish brown

(10YR 3/2) organic stains on faces of peds and in pores; 21 percent fine and medium cylindrical insect casts, 21 percent fine and medium cylindrical worm nodules, and 21 percent medium and coarse cylindrical wormcasts; 5 percent subangular gravel; abrupt smooth boundary. 92P2844

AB—26 to 43 cm; dark yellowish brown (10YR 4/4) very gravelly clay; 3 percent fine and medium faint dark brown (10YR 3/3) and 3 percent fine and medium faint yellowish brown (10YR 5/6) mottles; strong fine and medium prismatic structure; slightly hard, very sticky, moderately plastic; common fine and medium roots throughout and few medium roots in cracks; common fine and medium moderate-continuity vesicular and tubular and few fine and medium low-continuity pores filled with coarse material; 30 percent discontinuous faint very dark grayish brown (10YR 3/2) organic stains on faces of peds and in pores; 3 percent fine and medium cylindrical insect casts and 3 percent medium and coarse cylindrical wormcasts; 40 percent subangular gravel; gradual wavy boundary. 92P2845

Bw—43 to 68 cm; yellowish brown (10YR 5/4) gravelly clay; 1 percent fine faint yellowish brown (10YR 5/6) and 3 percent fine distinct strong brown (7.5YR 5/6) mottles; strong fine and medium prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots throughout; common fine and medium moderate-continuity vesicular and tubular pores; 10 percent patchy distinct very dark grayish brown (10YR 3/2) organic stains in root channels and/or pores, 10 percent discontinuous distinct very dark grayish brown (10YR 3/2) manganese or iron-manganese stains on rock fragments, and 10 percent patchy distinct very pale brown (10YR 8/3) carbonate coats on faces of peds and in pores; 21 percent fine and medium spherical iron-manganese concretions; 3 percent fine and medium cylindrical wormcasts and 1 percent fine and medium cylindrical insect casts; 25 percent subangular gravel; gradual wavy boundary. 92P2846

2C—68 to 80 cm; yellowish brown (10YR 5/4) extremely gravelly clay; 1 percent fine distinct strong brown (7.5YR 5/6) and 1 percent fine faint yellowish brown (10YR 5/6) mottles; massive; very hard, very sticky, moderately plastic; few medium roots throughout; few fine and medium low-continuity vesicular and tubular pores; 10 percent discontinuous distinct dark brown (10YR 3/3) organic stains in root channels and/or pores; few fine and medium cylindrical wormcasts and insect casts; 65 percent subangular gravel; clear wavy boundary. 92P2847

3Bkssb—80 to 104 cm; light olive brown (2.5Y 5/4) very gravelly clay; 1 percent medium distinct very pale brown (10YR 8/3), 1 percent fine distinct brownish yellow (10YR 6/8), and 3 percent fine and medium faint light yellowish brown (2.5Y 6/4) mottles; strong medium and coarse prismatic structure; very hard, very sticky, moderately plastic; few fine and medium roots throughout; common fine and medium moderate-continuity vesicular and tubular pores; 30 percent continuous distinct nonintersecting slickensides on faces of peds, 75 percent discontinuous distinct very dark grayish brown (10YR 3/2) manganese or iron-manganese stains on rock fragments, and 75 percent discontinuous

faint very pale brown (10YR 8/3) carbonate coats on faces of peds; 21 percent fine and medium spherical iron-manganese concretions; 3 percent fine and medium cylindrical wormcasts and 21 percent medium and coarse irregular carbonate masses; 40 percent gravel; strong effervescence; gradual wavy boundary. 92P2848

4C—104 to 140 cm; light olive brown (2.5Y 5/4) extremely gravelly clay; 1 percent fine distinct brownish yellow (10YR 6/8) and 3 percent medium distinct very pale brown (10YR 8/3) mottles; massive; very sticky, moderately plastic; few fine and medium roots throughout; few fine and medium low-continuity vesicular and tubular pores; 75 percent discontinuous distinct very dark grayish brown (10YR 3/2) manganese or iron-manganese stains throughout and 75 percent discontinuous faint very pale brown (10YR 8/3) carbonate coats on faces of peds; 21 percent fine and medium spherical iron-manganese concretions; 3 percent fine and medium cylindrical wormcasts and 21 percent medium and coarse irregular carbonate masses; 65 percent subangular igneous rock fragments 2 to 75 mm in diameter; strong effervescence; carbonates are considered relic; nonreactive matrix. 92P2849

Solitude: S92VI-010-011

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Solitude; fine-loamy, mixed, nonacid, isohyperthermic Aeric Tropaquepts

SSL—Project: 92P 79, (CP92VI122) St. Croix, Virgin Islands

—Pedon: 92P 469, Samples 92P 2850–2855

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05 -.05	TOTAL SAND -2	TOTAL FINE .0002	CLAY CO3 .002	SILT FINE -.02	SILT COARSE -.05	SAND VF -.10	SAND F -.25	SAND M -.50	SAND C -1	SAND VC -2	COARSE FRACTIONS (MM) WEIGHT 5 -5	20 -20	75 -75	>2MM WT % OF WHOLE SOIL 75
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->			
92P2850S	0- 8	A	23.3	38.5	38.2	13.5	0.7	28.0	10.5	11.9	15.9	5.3	3.1	2.0	5	9	TR	37	14
92P2851S	8- 18	Bw1	22.6	34.5	42.9	13.1		23.5	11.0	12.3	14.5	6.3	5.2	4.6	6	17	--	47	23
92P2852S	18- 61	Bw2	13.8	29.0	57.2	8.3		18.8	10.2	13.2	18.0	11.2	8.8	6.0	10	21	4	64	35
92P2853S	61- 76	Bg	18.2	31.1	50.7	10.6		20.6	10.5	14.2	15.8	9.0	7.1	4.6	15	66	22	102	103
92P2854S	76-109	2CBg	15.0	28.9	56.1	7.9		18.0	10.9	12.8	18.4	10.3	7.8	6.8	22	58	2	90	82
92P2855S	109-127	3Cg	15.4	28.0	56.6	8.2		17.4	10.6	13.3	19.7	12.3	7.5	3.8	6	11	1	54	18

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a OF	EXTRACTABLE MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LL 4F1 PCT	ATTERBERG PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC -	BULK DENSITY OVEN DRY 4A1h - ->	COLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT OF	WATER CONTENT 1/3 BAR 4B1c <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 8	3.30				1.3	0.1	0.1	1.18	0.86				1.18	1.33	0.038			28.0	20.1	0.09
8- 18	2.28				1.5	0.1	0.1	1.03	0.63				1.23	1.36	0.030			27.0	14.2	0.14
18- 61	0.48				0.8	TR	--	0.96	0.61				1.48	1.56	0.014			18.7	8.4	0.12
61- 76	0.44				1.0	0.1	TR	0.76	0.51				1.45	1.54	--			19.8	9.3	
76-109	0.57				0.7	0.1	--	0.85	0.59				1.48	1.54	0.004			17.6	8.9	0.03
109-127	0.80				1.0	TR	TR	0.78	0.61				1.50	1.54	0.008			19.8	9.4	0.14

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	CEC-SUM CATS 5A3a	CEC-NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	BASE SATURATION NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	CARBONATE AS CACO3 <20MM 8E1	CASO4 AS GYPSUM <2MM 6F1a	CASO4 AS GYPSUM <20MM 6F4	PH SAT PASTE 8C1b	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->>										<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 8	32.1	15.1	8.4	0.4	56.0	2.6	58.6	27.6	2	13	96	100	TR		TR		6.9	7.1	7.1
8- 18	24.9	12.2	7.0	0.4	44.5	2.5	47.0	23.3	7	12	95	100	TR		TR		6.9	7.3	7.3
18- 61	10.0	7.9	6.0	0.2	24.1	0.8	24.9	13.2	11	15	97	100	--		--		7.0	7.2	7.2
61- 76	8.7	8.9	8.2	0.4	26.2	1.1	27.3	13.9	24	14	96	100	--		--		7.1	7.3	7.3
76-109	8.6	8.1	9.3	0.3	26.3	1.5	27.8	12.7	17	25	95	100	--		--		7.0	7.3	7.3
109-127	9.0	11.2	12.2	0.4	32.8	2.1	34.9	12.0	25	20	94	100			TR		6.1	6.4	6.4

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	TOTAL ELEC. EST. 8A3a	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	PRED. COND. MMHOS /cm	COND. MMHOS /cm
	<- MEQ / LITER ->															<- -PCT- ->>			
0- 8	39.4	144.3	125.2	1.2	--	9.5		--	260.2				41.3	--	--	63.4	1.1	21.10	7.88
8- 18	26.1	92.6	89.5	0.7	--	7.0		--	176.2				30.3	--	--	59.3	0.8	17.00	5.80
18- 61	21.5	98.6	120.0	0.6	--	2.7		--	184.0				34.5	--	--	38.1	0.5	17.10	3.91
61- 76	58.8	59.4	105.0	0.5	--	2.2		--	189.6				48.4	--	--	46.0	0.6	16.90	4.47
76-109	11.6	98.6	184.7	0.9	--	2.0		--	226.9				44.2	--	--	39.1	0.7	20.20	5.13
109-127	79.8	143.4	206.2	1.5	--	0.5		--	330.7				60.7	--	--	44.2	1.0	26.20	7.18

SAMPLE NUMBER	FRACT ION 7A2i	X-RAY 7A6	X-RAY 7A4b	X-RAY 7C3	X-RAY 7D2	CLAY MINERALOGY (<.002mm) DTA 6A1	TGA 6A2	SiO2 6B1	AL2O3 6B2	Fe2O3 6B3	MgO 6C1	CaO 6C2	K2O 6C3	Na2O 6C4	EGME RETN 7D2	INTER PRETA TIO
	<- - - - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - Percent - - - - - - - -><- -><- ->															
92P2851	TCLY	VR 3	KK 3	MT 2	MI 1						18.0	10.7		0.9		VERM
92P2852	TCLY	KK 3	VR 3	MT 2	MI 2						17.0	11.0		1.3		CMIX
92P2853	TCLY	KK 3	MT 3	VR 3	MI 2						17.0	11.4		1.3		CMIX
92P2854	TCLY	VR 3	KK 3	MI 2	MT 1						19.0	12.0		1.2		VERM
92P2855	TCLY	VR 3	KK 2	MT 2	MI 2	FD 1					16.0	13.3		1.5		VERM

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                     ><  - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - -><  - 7A3b - -><  - 7A4b - -><  - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
92P2852     FS                                                    5  FK53  OW28  CB 4  AM 4  FE 3  QZ 2                    SMIX
92P2852     FS                                                       FP 2  AR 1  BT 1  CAtr  OTtr  PRtr
92P2854     FS                                                    8  OW48  FK41  FE 7  FP 3  AR 1  QZ 1                    SMIX
92P2854     FS                                                       PRtr  TMtr  AMtr  CBtr
92P2855     FS                                                    7  OW47  FK42  FE 6  FP 2  AR 2  QZ 1                    SMIX
92P2855     FS                                                       CBtr  AMtr  PRtr  BTtr
MINERAL INTERPRETATION:
    VR  vermiculite      KK  kaolinite        MT  montmorillon     MI  mica             FK  potas feldsp     OW  oth-weath mn
    CB  carb-aggrega     AM  amphibole        FE  iron oxides      QZ  quartz           FP  plag-feldspa     AR  wthr aggrega
    BT  biotite          CA  calcite          OT  other            PR  pyroxene         TM  tourmaline       FD  feldspar
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):  VERM = Vermiculitic           CMIX = Mixed - Clay           SMIX = Mixed - Sand
PEDON MINERALOGY BASED ON SAND/SILT: Mixed, BASED ON CLAY: Mixed, FAMILY MINERALOGY: Mixed
    COMMENTS: Hydroxy interlayers in 2:1 layer silicates.
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           ACID OXALATE EXTRACTION OPTICAL DENSITY (%)
92P2850  1 23.7%, 92P2851  2 16.8%, 92P2852  3 10.2%, 92P2853  4 14.1%, 92P2854  5 12.9% 92P2855  6 13.9%
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Narrative Pedon Description

Pedon: Solitude

NSSL pedon number: 92P0469

Pedon ID: S92VI-010-011

Field classification: Fine-loamy, mixed, nonacid, isohyperthermic Aeric Tropaquepts

Revised classification as of January 01, 1995: Solitude; coarse-loamy, mixed, superactive, nonacid, isohyperthermic Aeric Tropic Fluvaquents

Location: St. Croix Island, Virgin Islands; near Altona, northeast on road exiting VI-82, about 0.5 km west of the intersection of VI-82 and VI-62, about 122 meters northeast across drain to northern boundary of the drain, 152 meters northwest on foot trail following the north and east border of drain/salt marsh, and 61 meters southwest into vegetated drain

Latitude: 17°44’56" north

Longitude: 64°41’25" west

Slope: 1 percent; concave with an aspect of 320 degrees, length of 46 meters, and upslope length of 23 meters

Elevation: 2 meters

Vegetation: Mangrove tree species

Geographically associated soils: Glynn, Jaucas, and Sugar Beach

Geomorphic setting: Alluvial flat in a coastal plain

Surface fragments: 1.0 percent

Particle-size control section: 25 to 102 cm

Diagnostic features: Ochric epipedon at 0 to 8 cm; cambic horizon at 8 to 61 cm

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Somewhat poorly drained

Described and sampled by: W.C. Lynn, B.C. Dubee, C.L. Santiago, and J.R. Davis on March 5, 1992

Notes: Site is on a “crabland” flat, somewhat poorly drained, alluvial fan merging with major salt marsh. Salt analysis is needed for proper placement in Aquept or Tropept suborder. Concentrations consist of organic soft dark masses that are “charcoal” fragments. Crabs are a major mixing influence throughout the profile.

A—0 to 8 cm; dark grayish brown (2.5Y 4/2) clay loam; 1 percent fine faint grayish brown (2.5Y 5/2), 3 percent fine and medium faint olive brown (2.5Y 4/4), and 3 percent fine and medium faint very dark grayish brown (2.5Y 3/2) mottles; weak fine granular structure; very friable, moderately sticky, moderately plastic; common fine and medium roots throughout; many medium and coarse high-continuity vesicular and tubular pores; 30 percent continuous faint olive brown (2.5Y 4/4) organic stains in root channels and/or pores and 75 percent continuous faint dark grayish brown (2.5Y 4/2) organic stains in root channels and/or pores; 1 percent fine and medium spherical insect casts and 3 percent medium and coarse cylindrical wormcasts; irregular surface

topography and gray surface colors are the result of crab activity; subsurface material is deposited in mounds on the surface by crabs; 5 percent subangular gravel; abrupt smooth boundary. 92P2850

Bw1—8 to 18 cm; grayish brown (2.5Y 5/2) clay loam; 1 percent fine prominent yellowish red (5YR 5/8), 3 percent fine and medium distinct very dark grayish brown (2.5Y 3/2), and 3 percent medium faint dark grayish brown (2.5Y 4/2) mottles; weak fine and medium subangular blocky structure; very friable, moderately sticky, moderately plastic; common fine and medium roots throughout; many medium and coarse high-continuity vesicular and tubular pores; 30 percent continuous faint dark grayish brown (2.5Y 4/2) organic stains in root channels and/or pores and 75 percent continuous faint yellowish red (5YR 5/8) organic stains in root channels and/or pores; 3 percent fine and medium spherical iron-manganese concretions; 1 percent fine and medium spherical insect casts and 3 percent medium and coarse cylindrical wormcasts; 5 percent gravel; abrupt smooth boundary. 92P2851

Bw2—18 to 61 cm; grayish brown (2.5Y 5/2) gravelly sandy clay loam; 1 percent fine prominent brown (7.5YR 4/4), 1 percent fine faint light yellowish brown (2.5Y 6/3), and 3 percent medium faint grayish brown (2.5Y 5/2) mottles; weak fine and medium subangular blocky structure; very friable, slightly sticky, slightly plastic; common fine roots throughout; common fine and medium moderate-continuity vesicular and tubular pores; 30 percent discontinuous faint brown (7.5YR 4/4) organic stains in root channels and/or pores; 3 percent fine and medium spherical iron-manganese concretions; 3 percent fine and medium cylindrical wormcasts and 1 percent fine and medium spherical insect casts; 20 percent subangular gravel; gradual wavy boundary. 92P2852

Bg—61 to 76 cm; grayish brown (2.5Y 5/2) extremely gravelly clay loam; 1 percent fine and medium faint light brownish gray (2.5Y 6/2), 1 percent fine prominent reddish yellow (5YR 6/8), and 3 percent medium faint grayish brown (2.5Y 5/2) mottles; weak fine and medium subangular blocky structure; very friable, moderately sticky, moderately plastic; few very fine and fine roots throughout; few fine and medium low-continuity vesicular and tubular pores; 30 percent discontinuous faint reddish yellow (5YR 6/8) organic stains in root channels and/or pores; 1 percent fine and medium spherical iron-manganese concretions and 3 percent fine and medium irregular masses of dark accumulation; 65 percent subangular gravel; gradual wavy boundary. 92P2853

2CBg—76 to 109 cm; light brownish gray (2.5Y 6/2) gravelly sandy clay loam; 1 percent fine and medium faint reddish yellow (7.5YR 6/6), 3 percent fine and medium distinct olive brown (2.5Y 4/4), and 3 percent fine and medium faint grayish brown (2.5Y 5/2) mottles; massive; very friable, slightly sticky, slightly plastic; few very fine and fine roots throughout; few fine and medium low-continuity vesicular and tubular pores; 30 percent discontinuous faint reddish yellow (7.5YR 6/6) organic stains in root channels and/or pores; 3 percent fine and medium irregular masses of dark accumulation; 20 percent subangular gravel; gradual wavy boundary. 92P2854

3Cg—109 to 127 cm; gray (5Y 5/1) silt loam; 3 percent fine and medium prominent dark gray (5Y 4/1), 3 percent fine and medium prominent reddish brown (5YR 4/4), and 3 percent fine and medium prominent strong brown (7.5YR 4/6) mottles; massive; very friable, slightly sticky, slightly plastic; few very fine and fine roots throughout; few fine and medium low-continuity vesicular and tubular pores; 30 percent discontinuous prominent strong brown (7.5YR 4/6) organic stains in root channels and/or pores and 30 percent discontinuous prominent reddish brown (5YR 4/4) organic stains in root channels and/or pores; 1 percent fine and medium irregular masses of dark accumulation; moderately fluid; ferric hydrite reddish brown (5YR 4/4); 5 percent subangular gravel and 5 percent subangular cobbles. 92P2855

Sugar Beach: S92VI-010-012

Primary Characterization Data

St. Croix Island, Virgin Islands
Sampled as: Sugar Beach; euic, isohyperthermic Fluvaquentic Troposaprist
SSL—Project: 92P 79, (CP92VI122) St. Croix Island, Virgin Islands
—Pedon: 92P 470, Samples 92P 2856–2859
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .02-.002	SILT COARSE .05-.02	SAND VF .10-.05	SAND F .25-.10	SAND M .50-.25	SAND C 1-.5	SAND VC 2-1	COARSE FRACTIONS (MM) WEIGHT 5-2	20-5	75-20	>2MM .1-75	WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM (3B1)				
92P2856H	0- 10	Oa			5	--	--		5										
92P2857H	10- 20	Cg			1	TR	--		1										
92P2858H	20- 61	Oa1			4	--	--		4										
92P2859H	61-130	Oa2			5	3	--		8										

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	COLE OVEN DRY 4A1h	WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2b	WRD WHOLE SOIL 4C1
			<- PERCENT OF <2MM -->									<- - G/CC - -		->	CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 10	42.2	6.559							55.6											
10- 20	21.3	0.406							31.4											
20- 61	35.9	0.411							34.1											
61-130	23.7	0.470							35.7											

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 8E1	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	PH SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->										<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 10	40.4	65.8	143.0	4.3	253.5	14.2	267.7	103.8	32	59	95	100					6.5	6.9	6.8
10- 20		48.8	105.4	3.4		9.6		82.9	36	52		100	1				6.9	7.3	7.1
20- 61	34.8	52.5	110.3	2.8	200.4	15.6	216.0	65.3	36	46	93	100	--				7.2	7.2	7.1
61-130	32.4	52.0	109.2	2.2	195.8	20.6	216.4	56.0	45	42	90	100					6.2	6.6	6.6

DEPTH (CM)	CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 6J1b	F 6U1a	CL 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	COND. MMHOS	COND. MMHOS
	WATER EXTRACTED FROM SATURATED PASTE																	
						TOTAL EST.	ELEC. 8A3a	ELEC. 8I										
	<- MEQ / LITER ->														<- -PCT- ->		/cm	/cm
0- 10	55.8	177.0	639.6	10.8	--	7.6	14.1	730.5				141.0	--	14.9	172.0	5.5	36.30	
10- 20	50.1	153.9	527.2	10.4	--	7.8	9.0	642.7				124.7	--	15.1	143.1	4.3	33.90	
20- 61	34.7	101.1	380.4	4.9	--	8.7	12.9	418.3				94.9	--	14.9	227.5	5.7	28.80	
61-130	35.3	97.8	343.0	3.0	--	2.2	12.9	394.3				114.0	--	--	245.6	5.8	27.30	

SAMPLE NUMBER	FRACT ION 7A2i	X-RAY peak size 7A6	THERMAL Percent 7A4b	DTA	TGA	ELEMENTAL Percent 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRETA TION
	CLAY MINERALOGY (<.002mm)													
92P2857	TCLY	KK 2	MI 2	MT 1	VC 1	VR 1			11.0	6.3		1.1		CMIX
92P2857	TCLY	QZ 1												

MINERAL INTERPRETATION:
KK kaolinite MI mica MT montmorillon VC verm-chlorit VR vermiculite QZ quartz
RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks
INTERPRETATION (BY HORIZON):
CMIX = Mixed - Clay
PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Mixed
FAMILY MINERALOGY:
COMMENTS: Hydroxy interlayers in 2:1 silicates.

Narrative Pedon Description

Pedon: Sugar Beach

NSSL pedon number: 92P0470

Pedon ID: S92VI-010-012

Field classification: Euic, isohyperthermic Fluvaquentic Troposaprists

Revised classification as of January 01, 1995: Sugar Beach; euic, isohyperthermic Fluvaquentic Troposaprists

Location: St. Croix Island, Virgin Islands; near Altona, northeast on road exiting VI-82, about 0.5 km west of the intersection of VI-82 and VI-62, about 122 meters northeast across drain to northern boundary of the drain, 305 meters northwest on foot trail following north and east border of drain/salt marsh, and 30.5 meters northwest in thickly vegetated salt marsh

Latitude: 17°45’00" north

Longitude: 64°41’26" west

Elevation: 2 meters

Geographically associated soils: Glynn, Jaucas, and Solitude

Vegetation: Black mangrove trees in wetlands

Geomorphic setting: Salt marsh in a coastal plain

Particle-size control section: 0 to 130 cm

Surface fragments: 1.0 percent

Diagnostic features: Histic epipedon at 0 to 10 cm

Slope: 1 percent; concave with an aspect of 320 degrees, length of 23 meters, and upslope length of 15 meters

Average air temperature: Annual—26.7 °C, summer—27.8 °C, winter—25.6 °C

Average annual precipitation: 1,092 mm

Drainage: Very poorly drained

Described and sampled by: W.C. Lynn, B.C. Dubee, C.L. Santiago, and J.R. Davis on March 5, 1992

Notes: Microrelief consists of nearly level, red mangrove swamp adjacent to Altona Lagoon. Red mangrove root color is apparent when exposed. Color is (7.5R 3/8) and (10R 3/6) disturbed, and (10R 2.5/1) and (7.5R 2.5/2) undisturbed. Root color after 1/2 hour exposure is (10YR 2.5/2) in the soft exterior and (7.5YR 5/4) on the hard exterior of the root. Large living crabs were observed in the organic surface layer on the second visit to the site. The profile has a moderately strong smell of hydrogen sulfide.

Oa—0 to 10 cm; black (10YR 2/1) muck; 35 percent fiber unrubbed, 10 percent rubbed; many medium and coarse roots throughout; dull reddish organic fibers (red mangrove) that change to duller red on exposure to air. 92P2856

Cg—10 to 20 cm; dark grayish brown (2.5Y 4/2) loam; 3 percent fine and medium faint black (10YR 2/1) mottles; many medium and coarse roots near the top of the horizon; may be organic with borderline mineral content, largely composed of medium and coarse root mat; 2 percent subangular igneous gravel. 92P2857

Oa1—20 to 60 cm; dark brown (7.5YR 3/2) muck; 40 percent fiber unrubbed, 10 percent rubbed; 3 percent medium and coarse distinct dark grayish brown

(10YR 4/2) mottles; few fine and medium roots throughout; dull reddish organic fibers (red mangrove) that change to duller red on exposure to air; 1 percent subangular igneous gravel. 92P2858

Oa2—60 to 120 cm; dark brown (7.5YR 3/2) muck; 40 percent fiber unrubbed, 10 percent rubbed; 5 percent minerals, probably as strata (auger sample); dull reddish organic fibers (red mangrove) that change to duller red on exposure to air; 3 percent fine and medium distinct dark grayish brown (10YR 4/2) mottles; few very fine and fine roots throughout; 2 percent subangular igneous rock fragments 2 to 75 mm in diameter. 92P2859

Glynn: S64VI-010-001

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Glynn; fine, mixed, isohyperthermic Typic Argiustolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 547, Samples 40A 4031–4038

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
	(- - -TOTAL - - -)						(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACTIONS(MM)-)(>2MM)				
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
40A4031S	0- 25	Ap		28.3	38.9	32.8		TR	23.9	15.0	10.2	9.7	3.8	5.0	4.1	1C	3C	--	26	4
40A4032S	25- 38	A12		33.3	37.6	29.1		TR	23.1	14.5	9.0	8.9	3.4	4.4	3.4	TRC	2C	--	22	2
40A4033S	38- 66	B21t		52.2	31.7	16.1		--	20.2	11.5	6.8	5.0	1.5	1.8	1.0	1C	3C	--	13	4
40A4034S	66- 94	B22t		38.7	26.3	35.0		--	12.1	14.2	15.4	13.0	3.1	2.2	1.3	TRC	2C	--	21	2
40A4035S	94-127	B3		36.1	31.0	32.9		--	17.7	13.3	10.4	9.6	3.6	5.1	4.2	TRC	2C	--	24	2
40A4036S	127-150	2B21cab		41.8	34.4	23.8		1.0	24.1	10.3	9.1	8.3	2.5	2.6	1.3	TRC	1C	--	16	1
40A4037S	150-173	2B22cab		37.2	39.7	23.1		TR	26.3	13.4	8.1	7.3	3.1	3.2	1.4	TRC	2C	--	17	2
40A4038S	173-203	3B23b		23.0	22.6	54.4		--	13.9	8.7	9.2	15.5	10.1	13.8	5.8	1C	5C	--	48	6

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	COLE OVEN DRY	WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 25	1.18	0.115			1.2			0.73	0.42				1.39	1.55	--			21.8	11.9	0.13
25- 38	0.87	0.102			1.4			0.69	0.41				1.43	1.59	--			21.2	13.7	0.10
38- 66	0.47	0.061			2.2			0.66	0.41				1.34	1.78	--			31.1	21.2	0.13
66- 94	0.20				1.9			0.74	0.37				1.60	1.80	--			20.2	14.3	0.09
94-127	0.08				1.7			0.63	0.39				1.66	2.00	--			20.4	14.1	0.10
127-150	0.08				1.7			0.55	0.35				1.58	1.98	--			23.1	14.8	0.13
150-173	0.06				1.8			0.64	0.39				1.64	1.91	--			20.0	14.6	0.09
173-203	0.04				1.7			0.76	0.42				1.54	1.60	--			13.7	9.7	0.06

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- EXTR ITY	AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SUM	SAT- NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM		COND. MMHOS /CM	(- - - -PH - - -) CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a		5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	8E1	6F1a	6F4	8C1b	8C1f 1:2	8C1f 1:1
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- - - - -PCT - - - ->									
0- 25		1.2	0.2	0.4					20.7			100	100	6						7.7
25- 38		1.8	0.2	0.4					22.9			100	100	7						7.7
38- 66		3.9	0.3	0.6					34.6			100	100	1						7.5
66- 94	26.7	4.8	0.3	0.4	32.2	3.7		35.9	28.8			90	100	TR						7.7
94-127	18.0	7.8	0.3	0.5	26.6	3.0		29.6	22.8			90	100	TR						7.6
127-150		9.1	0.4	0.5					23.0			100	100	6						7.8
150-173		9.2	0.5	0.4					23.8			100	100	6						7.8
173-203		5.0	0.4	0.3					17.4			100	100	1						8.0

Narrative Pedon Description

Pedon: Glynn

NSSL pedon number: 40A0547

Pedon ID: S64-VI-010-001

SSIR #12 pedon ID: S64VI-18-001

Field classification: Fine, mixed, isohyperthermic Typic Argiustolls

Revised classification as of January 01, 1995: Glynn; fine-loamy, mixed, superactive, isohyperthermic Fluventic Haplustolls

Location: St. Croix Island, Virgin Islands; 91 meters south of church (the southwest corner of Grove Place) to a light pole

Latitude: Unknown

Longitude: Unknown

Physiography: Alluvial fan

Slope: 3 percent with an aspect of 180 degrees

Elevation: 49 meters

Average annual precipitation: 1,016 to 1,143 mm

Permeability: Moderately slow

Drainage: Well drained

Runoff: Moderate

Parent material: Fine-textured sediments derived from the residuum of volcanic rocks

Described and sampled by: W.E. McKinzie and R.B. Grossman on September 21, 1964

Vegetation: Cultivated; used for sugarcane

Notes: The Ap, B21t, and 2B21cab horizons were sampled for the Bureau of Public Roads. The Ap and A12 horizons were near field capacity; the remaining horizons were below the wilting point. A thin, discontinuous stone line occurred between the B21t and B22t horizons. Soil temperature at a depth of 50 cm was 82°F.

Ap—0 to 25 cm; dark brown (10YR 3/3) clay loam; moderate medium granular structure; very hard, friable, slightly sticky, slightly plastic; calcareous; clear smooth boundary. 40A4031

A12—25 to 38 cm; brown to dark brown (10YR 4/3) clay loam; weak medium subangular blocky structure; firm, slightly sticky, plastic; few sand grains; calcareous; few wormcasts; clear smooth boundary. 40A4032

B21t—38 to 66 cm; reddish brown (5YR 4/4) clay; moderate medium subangular blocky structure; very firm, slightly sticky, plastic; common sand grains; calcareous; patchy clay films on vertical and horizontal faces of peds; few wormcasts; clear smooth boundary. 40A4033

B22t—66 to 94 cm; brown to dark brown (7.5YR 4/4) clay; weak medium and coarse subangular blocky structure; very firm, slightly sticky, plastic; patchy faint clay films on vertical and horizontal faces of peds and patchy faint organic coats in root channels and/or pores; neutral; common sand grains; few fine black nodules; the coarse silts and very fine sand were examined

petrographically; aggregates, apparently altered feldspar, are the most abundant component; altered epidote is common in the silt. 40A4034

B3—94 to 127 cm; yellowish brown (10YR 5/4) clay; weak coarse subangular blocky structure; firm, slightly sticky, plastic; many fine black nodules; many sand grains; few patchy clay films on vertical faces of peds; neutral; abrupt smooth boundary. 40A4035

2B21cab—127 to 150 cm; strong brown (7.5YR 5/8) clay; weak coarse subangular blocky structure; firm, slightly sticky, plastic; large blotches of secondary lime; many fine soft dark brown nodules and modules; faint yellowish brown (10YR 5/4) discontinuous coats on vertical and horizontal faces of peds; violently effervescent; gradual smooth boundary. 40A4036

2B22cab—150 to 173 cm; yellowish red (5YR 5/6) clay loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; many fine dark brown soft nodules and mottles; larger lime blotches than those in the horizon above; faint yellowish brown (10YR 5/4) discontinuous coats on vertical and horizontal faces of peds; violently effervescent; gradual smooth boundary. 40A4037

3B23b—173 to 203 cm; yellowish red (5YR 5/8) clay loam; massive; friable; many fine dark brown nodules; many sand grains; clay bridging between sand grains; slightly effervescent. 40A4038

Parasol: S64VI-010-003

Primary Characterization Data
St. Croix Island, Virgin Islands
Sampled as: Parasol; fine-loamy, mixed, isohyperthermic Udic Argiustolls
SSL—Project: 40A 1, (NL40) SSIR Samples
—Pedon: 40A 552, Samples 40A 4056–4063
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACTIONS (MM) WEIGHT 2-5	WEIGHT 5-20	WEIGHT 20-75	.1-75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
40A4056S	0- 18	Ap	31.9	24.6	43.5			13.4	11.2	10.4	14.2	6.3	7.9	4.7	TRC	1C	--	34	1
40A4057S	18- 33	A12	31.5	23.8	44.7			12.7	11.1	9.2	12.3	5.8	9.4	8.0	TRC	1C	--	36	1
40A4058S	33- 48	B2t	38.0	19.9	42.1			12.2	7.7	8.2	11.9	5.8	9.3	6.9	TRC	2C	--	35	2
40A4059S	48- 61	B2t	29.2	22.0	48.8			13.2	8.8	8.4	11.6	6.8	12.5	9.5	TRC	2C	--	42	2
40A4060S	61-102	B3	24.3	24.1	51.6			14.8	9.3	8.0	12.4	7.8	13.5	9.9	TRC	2C	--	45	2
40A4061S	102-132	C1	12.8	23.0	64.2			13.4	9.6	9.9	15.8	9.5	18.2	10.8	TRC	2C	--	55	2
40A4062S	132-157	C 2	13.3	21.9	64.8			12.8	9.1	9.6	15.8	9.6	17.1	12.7	TRC	1C	--	56	1
40A4063S	157-203	2C3	9.8	12.8	77.4			7.5	5.3	6.4	12.9	8.4	23.2	26.5	2C	12C	--	75	14

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF <2MM		-->			PCT <0.4MM		<- - G/CC		- ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	1.76	0.159			1.6			0.92	0.45			1.49	1.44	1.68	--	20.6		22.6	14.3	0.12
18- 33	1.42	0.130			1.4			0.94	0.44			1.46	1.43	1.66	--	23.4		23.4	14.0	0.13
33- 48	0.78	0.072			1.9			0.95	0.47			1.42	1.37	1.67	--	26.1		27.4	17.8	0.13
48- 61	0.50	0.058			1.3			1.23	0.52			1.46	1.42	1.62	--	23.1		24.6	15.3	0.13
61-102	0.26				1.2			1.54	0.56			1.56	1.52	1.68	--	17.9		20.9	13.5	0.11
102-132	0.11				1.3			2.25	0.77			1.62	1.52	1.63	--	7.9		16.5	9.8	0.10
132-157	0.12				0.9			2.19	0.71										9.4	
157-203	0.06				1.2			2.99	0.94										9.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5D2	AL SAT 5E	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	6F1a	COND. MMHOS /CM 6F4	PH KCL IN 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - -MEQ / 100 G									- ->	<- - - - -PCT		- - ->						1:2	1:1
0- 18	21.6	8.2	0.2	0.4	30.4	11.2	0.1	41.6	29.5	30.5	TR	73	100					4.2		5.3
18- 33	24.4	8.3	0.3	0.4	33.4	8.2		41.6	29.5			80	100					4.7		6.0
33- 48	29.8	10.6	0.4	0.4	41.2	8.2		49.4	36.0			83	100	--				4.7		6.5
48- 61	31.2	10.7	0.5	0.4	42.8	7.0		49.8	35.9			86	100	--				4.7		6.5
61-102	30.7	10.6	0.6	0.4	42.3	5.7		48.0	37.3			88	100	--				4.8		7.0
102-132	25.2	8.6	0.5	0.2	34.5	4.3		38.8	28.8			89	100	--				4.7		7.0
132-157	25.2	8.6	0.6	0.2	34.6	4.4		39.0	29.1			89	100	TR						7.3
157-203	25.4	8.7	0.4	0.1	34.6	3.7		38.3	29.3			90	100							

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY (peak size)	THERMAL DTA / TGA (Percent)	ELEMENTAL SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O (Percent)	EGME RETN	INTERPRETATION
40A4056	TCLY	MT 2 MI 3 KK 2 MM 2				
40A4056	VFS			MI 5 FD70 HN10		

Narrative Pedon Description

Pedon: Parasol

NSSL pedon number: 40A0552

Pedon ID: S64VI-010-003

SSIR #12 pedon ID: S64VI-18-3

Field classification: Fine-loamy, mixed, isohyperthermic Udic Argiustolls

Revised classification as of January 01, 1995: Parasol; fine, smectitic, isohyperthermic Typic Haplustolls

Location: St. Croix Island, Virgin Islands; 2.1 km north of hard-surfaced road on the road to the river; 30.5 meters south and 23 meters west of gate

Latitude: Unknown

Longitude: Unknown

Slope: 10 percent; west facing

Elevation: 79 meters

Average annual precipitation: 1,143 to 1,270 mm

Permeability: Moderately slow

Drainage: Well drained

Runoff: Moderate

Parent material: Moderately fine- to fine-textured sediments derived from residuum of intrusive Gabbro rocks

Described and sampled by: W.E. McKinzie and R.B. Grossman during September 1964

Vegetation: Used for sugarcane

Notes: Special caution is needed in interpreting the mineralogy at this time. The mineral identified as biotite by optical means appears to be a combination of vermiculite and montmorillonite. The Ap, B2t1, and B3 horizons were sampled for the Bureau of Public Roads.

Ap—0 to 18 cm; very dark brown (10YR 2/2) moist clay loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; few roots; many sand grains; moisture content near field capacity; neutral; clear smooth boundary. 40A4056

A12—18 to 33 cm; very dark brown (10YR 2/2) moist clay loam; weak medium subangular blocky structure parting to moderate medium granular; friable, slightly sticky, slightly plastic; few roots; many sand grains; moisture content near field capacity; neutral; clear smooth boundary. 40A4057

B2t—33 to 48 cm; brown to dark brown (10YR 4/3) moist clay; moderate medium subangular blocky structure; hard, firm, slightly sticky, plastic; few roots; discontinuous faint clay films on faces of peds and in pores; many wormcasts; many sand grains; sampled for Bureau of Public Roads; split for sampling because the upper section appeared to contain more clay; moisture content at about 50 percent of field capacity; neutral; gradual smooth boundary. 40A4058

B2t1—48 to 61 cm; brown to dark brown (10YR 4/3) moist clay; moderate medium subangular blocky structure; hard, firm, slightly sticky, plastic; few roots; discontinuous faint clay films on faces of peds and in pores; many

wormcasts; many sand grains; split for sampling because the upper section appeared to contain more clay; moisture content at about 50 percent of field capacity; neutral; gradual smooth boundary. 40A4059

B3—61 to 102 cm; dark yellowish brown (10YR 4/4) moist clay loam; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few roots; discontinuous faint coats on vertical faces of peds; many sand grains; many old root channels with very dark brown organic coatings; moisture content below the wilting point; neutral; gradual smooth boundary. 40A4060

C1—102 to 132 cm; brown to dark brown (10YR 4/3) moist loam; massive; friable, nonsticky, nonplastic; few patchy faint clay films; few feldspar crystals; moisture content below the wilting point; neutral; gradual smooth boundary. 40A4061

C2—132 to 157 cm; brown to dark brown (10YR 4/3) moist sandy loam; massive; very friable, nonsticky, nonplastic; few partially weathered feldspar crystals; moisture content below the wilting point; neutral; gradual smooth boundary. 40A4062

2C3—157 to 203 cm; brown (10YR 5/3) moist loamy sand; moisture content below the wilting point; massive; neutral. 40A4063

Hesselberg: S64VI-010-004

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Hesselberg; clayey, mixed, isohyperthermic Petrocalcic Paleustolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 560, Samples 40A 4105–4109

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND- -		- - - -)		(-COARSE FRACTIONS(MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - - PCT OF <2MM						(3A1) - - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				SOIL
40A4105S	0- 18	Ap		70.4	22.6	7.0		--	17.0	5.6	2.3	1.9	0.9	1.3	0.6	TRC	1C	--	6	1
40A4106S	18- 30	B1		57.6	34.7	7.7		--	28.8	5.9	2.5	2.1	1.1	1.3	0.7	TRC	3C	--	8	3
40A4107S	30- 43	B2		67.2	27.1	5.7		--	20.8	6.3	1.8	1.7	0.8	1.1	0.3	TRC	2C	--	6	2
40A4108S	43- 46	Ccam1				--	--	--		-										
40A4109S	46- 61	Ccam2				--	--	--		-										

	ORGN C	TOTAL N	EXTR P	TOTAL S	(- - DITH-CIT - -) EXTRACTABLE FE	AL	MN	(RATIO/CLAY) CEC	15 BAR	(ATTERBERG) - LIMITS - LL	PI	(- BULK DENSITY -) FIELD MOIST	1/3 BAR	OVEN DRY	COLE WHOLE SOIL	(- - -WATER CONTENT - -) FIELD MOIST	1/10 BAR	1/3 BAR	15 BAR	WRD WHOLE SOIL
DEPTH (CM)	6A1c	6B3a	6S3	6R3a	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT		OF	<2MM -->			PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 18	3.99	0.355			1.4			0.65	0.44				0.99	1.23	--			43.2	30.8	0.12
18- 30	2.81	0.240			1.5			0.72	0.52				1.04	1.30	--			42.5	29.7	0.13
30- 43	1.21	0.127			1.9			0.64	0.49				1.05	1.44	--			47.7	32.8	0.15
43- 46	0.30	0.033																		
46- 61	0.30																			

	(- NH4OAC EXTRACTABLE BASES -) CA	MG	NA	K	SUM BASES	ACID- EXTR ITY	AL	(- - - -CEC - - -) SUM CATS	NH4- OAC	BASES + AL	AL SAT	-BASE SAT- SUM	NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM		COND. MMHOS /CM	(- - - -PH - - -) CACL2 .01M	H2O
DEPTH (CM)	6N2e	6O2d	6P2b	6Q2b		6H5a		5A3a	5A8b	5D2	5E	5C3	5C1	6E1g	8E1	6F1a	6F4	8C1b	8C1f	8C1f
	<- - - - - - - - - -				-MEQ / 100 G		- - - - - - - - - - ->				<- - - - -PCT			- - - ->					1:2	1:1
0- 18		4.2	0.4	2.2		5.9			46.1				100	2						7.4
18- 30		4.1	0.4	1.5		5.2			41.7				100	2						7.4
30- 43		4.5	0.6	1.5					42.8			100	100	1						7.6
43- 46									8.9											
46- 61																				

Narrative Pedon Description

Pedon: Hesselberg
NSSL pedon number: 40A0560
Pedon ID: S64VI-010-004
SSIR #12 pedon ID: S64VI-18-4
Field classification: Clayey, mixed, isohyperthermic Petrocalcic Paleustolls
Revised classification as of January 01, 1995: Hesselberg; clayey, mixed, superactive, isohyperthermic, shallow Petrocalcic Paleustolls
Location: St. Croix Island, Virgin Islands; 1.1 km west of the south entrance to the airport, 143 meters south on secondary road, and 15.2 meters west of the road
Latitude: Unknown
Longitude: Unknown
Elevation: 12 meters
Average annual precipitation: 890 mm
Permeability: Moderately slow
Drainage: Well drained
Land use: Pastureland and native pasture
Runoff: Very slow
Parent material: Residuum or local colluvium from limestone
Described and sampled by: W.E. McKinzie and R.B. Grossman on September 23, 1964
Notes: Mineralogy is mixed. Mica and kaolinite are well crystallized. The clay contains small to moderate amounts of a complex, interstratified mineral including components of mica, montmorillonite, and what is probably vermiculite.

Ap—0 to 18 cm; dark reddish brown (5YR 3/3) moist silty clay; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many roots; few limestone fragments; calcareous; sampled for Bureau of Public Roads; moisture content near field capacity; mildly alkaline; clear smooth boundary. 40A4105

B1—18 to 30 cm; dark reddish brown (5YR 3/3) moist clay; moderate fine subangular blocky structure; friable, slightly sticky, plastic; many fine roots; few limestone fragments; calcareous; moisture content at about 50 percent of field capacity; mildly alkaline; clear smooth boundary. 40A4106

B2—30 to 43 cm; dark red (2.5YR 3/6) moist clay; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable, slightly sticky, plastic; common fine roots; few wormcasts; few limestone fragments; calcareous with mycelial lime; sampled for Bureau of Public Roads; moisture content below the wilting point; mildly alkaline; abrupt wavy boundary. 40A4107

Ccam1—43 to 46 cm; hard white limestone with light red (2.5YR 6/6) bands; sampled for Bureau of Public Roads. 40A4108

Ccam2—46 to 61 cm; white hard limestone; sampled for Bureau of Public Roads. 40A4109

Cramer: S64VI-010-006

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Cramer; clayey, mixed, isohyperthermic Lithic Argiustolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 549, Samples 40A 4043–4046

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND -.05	TOTAL FINE LT -2	CLAY CO3 .0002	SILT FINE .002	SILT COARSE -.02	SAND VF -.05	SAND F -.10	SAND M -.25	SAND C -.50	SAND VC -1	COARSE FRACTIONS (MM) 2 -2	5 -5	20 -20	75 -75	>2MM WT % OF 75 WHOLE SOIL
			<- PCT OF <2MM (3A1) ->												<- PCT OF <75MM (3B1) ->				
40A4043S	0- 23	A1	37.2	34.5	28.3			24.6	9.9	7.2	5.7	3.0	5.5	6.9	2C	11C	--V	31	13
40A4044S	23- 36	B1	45.5	31.3	23.2	27.2		22.3	9.0	6.8	4.9	2.2	4.8	4.5	2C	15C	--V	31	17
40A4045S	36- 51	B2t	57.8	21.0	21.2			15.1	5.9	4.3	3.4	2.1	5.2	6.2	2C	15C	--	31	17
40A4046S	51- 81	B&R	39.2	26.7	34.1			17.6	9.1	7.6	6.9	3.4	7.9	8.3	5C	30C	--	52	35

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3a	EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- G/CC		->	CM/CM	<- PCT OF <2MM			->	CM/CM
0- 23	5.06	0.415			2.3			0.81	0.44				0.12						16.5	
23- 36	1.34	0.135			3.0			0.48	0.30				1.40	1.50	--			19.5	13.5	0.06
36- 51	0.93	0.099			3.8			0.42	0.30				1.21	1.32	--			26.7	17.6	0.09
51- 81	0.72	0.084			2.5			0.50	0.34				1.28	1.37	--			24.6	13.3	0.05

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5D2	AL SAT 5E	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	6F1a	COND. MMHOS /CM 6F4	PH KCL IN 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- MEQ / 100 G										<- PCT								1:2	1:1
0- 23	24.7	7.6	0.6	0.6	33.5	6.6		40.1	30.3			84	100	--				6.0		6.8
23- 36	14.2	5.9	0.7	0.3	21.1	7.4		28.5	21.9			74	96					5.0		6.2
36- 51	16.0	6.0	1.1	0.4	23.5	8.4		31.9	24.5			74	96					4.4		5.8
51- 81	13.8	3.9	1.0	0.3	19.0	6.6		25.6	19.5			74	97					4.6		6.1

SAMPLE NUMBER	FRACT ION X-RAY TCLY	MI 3	KK 3	CM 3	THERMAL DTA KK25	TGA	ELEMENTAL SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
	<- peak size				Percent		Percent								
40A4043	TCLY	MI 3	KK 3	CM 3	KK25										

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm FCLY Fine Clay, <0.0002mm VFS Very Fine Sand, 0.05-0.10mm

CSi Coarse Silt, 0.02-0.05mm

MINERAL INTERPRETATION:

MI mica KK kaolinite CM chlorit-mica QZ quartz FD feldspar

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Cramer
NSSL pedon number: 40A0549
Pedon ID: S64VI-010-006
SSIR #12 pedon ID: S64VI-18-6
Field classification: Clayey, mixed, isohyperthermic Lithic Argiustolls
Revised classification as of January 01, 1995: Cramer; clayey, mixed, active, isohyperthermic, shallow Typic Haplustolls
Location: St. Croix Island, Virgin Islands; 2.9 km northwest of intersection of Annaly and Scenic Drive, 30.5 meters to the right of the road, and 2.1 km northeast on Scenic Drive from the rock quarry located on the northwest corner of St. Croix
Latitude: Unknown
Longitude: Unknown
Slope: 50 percent; convex; south facing
Elevation: 168 meters
Average annual precipitation: 1,270 mm
Permeability: Moderately slow
Drainage: Well drained
Vegetation: Native brush and trees presently in pasture
Runoff: Rapid
Parent material: Residuum or very local colluvium from basic volcanic rocks (Caledonia Formation)
Described and sampled by: W.E. McKinzie and R.B. Grossman on September 23, 1964
Average soil temperature: 26.1 °C at 50 cm
Notes: The A1, B2t, and R&B horizons were sampled for the Bureau of Public Roads. Fifteen percent of the A1 horizon consisted of material larger than 1.9 cm. In the B1 horizon, 10 percent was larger than 1.9 cm. The A1 horizon was at 75 percent field capacity, and the remaining horizons were below the wilting point.

A1—0 to 23 cm; dark reddish brown (5YR 3/3) gravelly clay loam; moderate medium granular structure; slightly hard, friable, nonsticky, nonplastic; 30 percent angular volcanic rock fragments 0.6 to 5 cm in diameter; clear smooth boundary. 40A4043

B1—23 to 36 cm; dark red (2.5YR 3/6) gravelly clay; weak medium subangular blocky structure parting to moderate medium granular; firm, slightly sticky, slightly plastic; common roots; 30 percent angular volcanic rock fragments 0.6 to 5 cm in diameter; clear smooth boundary. 40A4044

B2t—36 to 51 cm; dark reddish brown (2.5YR 3/4) clay; moderate fine and medium subangular blocky structure; very firm, sticky, plastic; few roots; few pressure faces; numerous volcanic rock fragments 0.6 to 5 cm in diameter; abrupt wavy boundary. 40A4045

R&B—51 to 81 cm; partially weathered (difficult to dig with a spade) greenish gray mudstone with dark reddish brown (2.5YR 3/4) clay occurring between the fracture planes and in small pockets; 15 to 20 percent red clay; no boundary designated. 40A4046

R—81 cm; bedded volcanic mudstone with red staining along a few of the fracture planes. Not sampled.

Cramer: S64VI-010-007

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Cramer; clayey, mixed, isohyperthermic Lithic Argiustolls

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 550, Samples 40A 4047–4051

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- -2-- -3-- -4-- CLAY LT .002 (TOTAL)	-5-- SILT .002 -.05 (TOTAL)	-6-- SAND .05 -2 (TOTAL)	-7-- FINE LT .0002 (CLAY)	-8-- CO3 LT .002 (CLAY)	-9-- FINE .002 -.02 (SILT)	-10- COARSE .02 -.05 (SILT)	-11- VF .05 -.10 (SAND)	-12- F .10 -.25 (SAND)	-13- M .25 -.50 (SAND)	-14- C .5 -1 (SAND)	-15- VC 1 -2 (SAND)	-16- 2 -5 (COARSE FRACTIONS (MM) WEIGHT)	-17- 5 -20	-18- 20 -75	-19- .1- 75	-20 (>2MM) WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1)											- - - - - - - - - - - - - ->	<- PCT OF <75MM(3B1)->				
40A4047S	0- 10	Ap	33.4	29.1	37.5			20.9	8.2	6.8	9.7	4.9	7.6	8.5	2C	14C	--V	42	16
40A4048S	10- 25	A3	36.7	29.5	33.8	22.7		20.7	8.8	7.1	9.8	4.9	6.4	5.6	2C	14C	--V	38	16
40A4049S	25- 36	B2t	56.4	24.4	19.2			19.0	5.4	4.2	4.8	2.5	4.2	3.5	1C	6C	--	21	7
40A4050S	36- 46	B3	58.2	23.0	18.8			16.2	6.8	4.5	4.7	2.3	3.9	3.4	1C	8C	--	22	9
40A4051S	46- 0	R			--	--	--		-										

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG - LIMITS -) LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM	- - ->			CM/CM
0- 10	2.99	0.305			2.2			0.78	0.43				1.17	1.26	0.019			25.5	14.2	0.10
10- 25	1.90	0.186			2.5			0.71	0.40				1.17						14.5	
25- 36	0.78	0.101			3.2			0.59	0.38				1.29	1.64	0.075			33.9	21.2	0.15
36- 46	0.42	0.064			2.6			0.59	0.38				1.29	1.69	0.082			34.3	22.2	0.14
46- 0																				

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL	(- - - -CEC - - -) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5D2	AL SAT 5E	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	6F1a	COND. MMHOS /CM 6F4	(- - - -PH - - -) KCL IN 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - - -MEQ	/ 100 G -								- - - - - - - - - - - ->		<- - - - -PCT - - - ->							1:2	1:1
0- 10	20.8	7.9	0.3	0.8	29.8	4.4		34.2	26.0			87	100	--				6.4		7.2
10- 25	19.2	8.0	0.5	0.4	28.1	6.4		34.5	26.0			81	100					5.6		6.5
25- 36	21.6	12.4	1.8	0.6	36.4	7.2		43.6	33.2			83	100	--				5.0		6.4
36- 46	21.5	12.8	2.5	0.6	37.4	6.7		44.1	34.6			85	100					5.0		6.4
46- 0																				

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             < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - ->
             FRACT < - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - - - -><- -> EGME INTER
SAMPLE        ION <                            >< - DTA - -><- - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <     > RETN PRETA
                  < - - - - -       - - - - - -><-        - ><-         - ><- - - - - - - - - -       - - - - - - - - - -><     >      TION
NUMBER       <- - ><- - - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - - -><- -><- ->
40A4048       TCLY  MT 2  MI 4  KK 2  MM 2  CM 2

MINERAL INTERPRETATION:
    MI  mica            KK  kaolinite        MM  mont-mica        CM  chlorit-mica     MT  montmorillon     QZ  quartz
    FD  feldspar
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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Narrative Pedon Description

Pedon: Cramer
NSSL pedon number: 40A0550
Pedon ID: S64VI-010-007
SSIR #12 pedon ID: S64VI-18-9
Field classification: Clayey, mixed, isohyperthermic Lithic Argiustolls
Revised classification as of January 01, 1995: Cramer; clayey, mixed, active, isohyperthermic, shallow Typic Argiustolls
Location: St. Croix Island, Virgin Islands; 1.6 km south of Centerline Road on the entrance road to Cotton Valley (91 meters southwest of house or 0.3 km south of dam)
Latitude: Unknown
Longitude: Unknown
Slope: 30 percent; convex; west facing
Elevation: 46 meters
Average annual precipitation: 760 mm
Permeability: Moderately slow
Drainage: Well drained
Runoff: Moderate
Parent material: Residuum or very local colluvium from basic volcanic rock
Described and sampled by: W.E. McKinzie and R.B. Grossman on September 25, 1964
Vegetation and use: Native grasses and shrubs; housing development
Notes: Five percent of the Ap horizon and 10 percent of the A3 horizon consisted of material larger than 1.9 cm. The Ap horizon was at 75 percent of field capacity, and the remaining horizons were below the wilting point.

Ap—0 to 10 cm; dark brown (7.5YR 3/2) gravelly clay loam; moderate medium granular structure; slightly hard, friable, slightly sticky, plastic; many roots; 30 percent angular volcanic rock fragments 0.6 to 5 cm in diameter; clear smooth boundary. 40A4047

A3—10 to 25 cm; dark reddish brown (5YR 3/2) gravelly clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, plastic; many roots; 40 percent angular volcanic rock fragments 0.6 to 5 cm across; clear smooth boundary. 40A4048

B2t—25 to 36 cm; reddish brown (5YR 4/4) clay; moderate coarse subangular blocky structure; very hard, firm, slightly sticky, plastic; few roots; discontinuous faint clay films and discontinuous faint pressure faces; common angular volcanic fragments 0.6 to 5 cm in diameter; clear smooth boundary. 40A4049

B3—36 to 46 cm; strong brown (7.5YR 5/6) gravelly clay; weak medium subangular blocky structure; very hard, firm, slightly sticky, slightly plastic; few roots; patchy faint clay films; 50 percent saprolite and rock fragments; clear wavy boundary. 40A4050

R—46 cm; silicified bedded volcanic siltstone or mudstone; rock fragments stained red. 40A4051

Sion: S91VI-010-001

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Sion; loamy, carbonatic, isohyperthermic Typic Calciustolls

SSL—Project: 91P 12, (RP91VI023) Virgin Island

—Pedon: 91P 68, Samples 91P 413–415

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) 75	WT .1- % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
91P 413N	0- 20	Ap	39.5	27.2	33.3		8.4	20.2	7.0	8.3	8.1	7.5	6.3	3.1					
91P 414N	20- 33	B	41.2	28.5	30.3		8.8	20.7	7.8	7.7	8.0	7.0	4.9	2.7					
91P 415N	33-127	Ck	39.1	31.9	29.0		23.6	25.3	6.6	5.5	7.3	7.5	5.1	3.6					

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC - -	OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	1.87								0.42										16.6	
20- 33	1.69								0.43										17.8	
33-127	0.46								0.38										14.7	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 20					37				7.5	7.6								
20- 33					35				7.6	8.2								
33-127					72				7.4	7.8								

Narrative Pedon Description

Pedon: Sion
NSSL pedon number: 91P0068
Pedon ID: S91VI-010-001
Field classification: Loamy, carbonatic, isohyperthermic Typic Calciustolls
Revised classification as of January 01, 1995: Sion; coarse-loamy, carbonatic, isohyperthermic Typic Calciustolls
Location: 0.3 km northeast from intersection of Routes 70 and 62, about 46 meters south in a church playground
Latitude: Unknown
Longitude: Unknown
Slope: 2 percent; southeast facing
Elevation: 34 meters
Drainage: Well drained
Erosion or deposition: None
Parent material: Marl sediments
Described and sampled by: J. Davis on July 1, 1991
Physiography: Nearly level to gently sloping

Ap—0 to 20 cm; dark brown (10YR 3/3) clay loam; moderate medium subangular blocky structure; hard; moderately alkaline; gradual wavy boundary. 91P0413

B—20 to 33 cm; brown to dark brown (10YR 4/3) clay; common medium faint mottles; moderate medium subangular blocky structure; hard; moderately alkaline; gradual wavy boundary. 91P0414

Ck—33 to 127 cm; very pale brown (10YR 7/4) silty clay marl with shells; few medium faint mottles; massive; soft; moderately alkaline; gradual wavy boundary. 91P0415

Cr—127 cm; not sampled; assumed paralithic contact.

Isaac: S91VI-010-002

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Isaac; deep, mixed Argiustolls

SSL—Project: 91P 12, (RP91VI023) Virgin Island

—Pedon: 91P 69, Samples 91P 416–420

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	(- -SILT- -) COARSE .02 -.05	(- - - - VF .05 -.10	- -SAND- - F .10 -.25	M .25 -.50	- - - -) C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) (>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
91P 416N	0- 18	A	40.3	30.5	29.2			22.4	8.1	7.7	7.1	4.6	4.2	5.6					
91P 417N	18- 23	AB	44.7	23.2	32.1			17.7	5.5	5.9	6.5	5.2	7.0	7.5					
91P 418N	23- 46	Bt1	35.2	15.8	49.0			11.8	4.0	1.8	3.3	3.7	15.8	24.4					
91P 419N	46- 97	Bt2	41.1	24.6	34.3			18.8	5.8	5.9	6.7	6.3	7.6	7.8					
91P 420N	97-183	BC	39.3	31.0	29.7			24.3	6.7	6.2	6.2	5.6	6.5	5.2					

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a OF <2MM -->	CEC 8D1	(RATIO/CLAY) 15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT <0.4MM	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c	1/3 BAR 4B1c -PCT OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 18	3.33								0.40										16.2	
18- 23	1.21								0.37										16.7	
23- 46	0.49								0.43										15.0	
46- 97	0.28								0.38										15.8	
97-183	0.10								0.38										15.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							
0- 18									6.8	7.7								
18- 23									6.4	7.2								
23- 46									6.3	8.1								
46- 97									6.3	7.4								
97-183				1					7.0	8.2								

Narrative Pedon Description

Pedon: Issac

NSSL pedon number: 91P0069

Pedon ID: S91VI-010-002

Field classification: Deep, mixed Argiustolls

Revised classification as of January 01, 1995: Victory; clayey-skeletal, mixed, superactive, isohyperthermic Typic Ustropepts

Location: St. Croix Island, Virgin Islands; Firestation Marys Fancy; 1.4 km south on gravel road west of Cotton Valley, behind house west of road

Latitude: Unknown

Longitude: Unknown

Geomorphic setting: Steep backslope in colluvial area of volcanic uplands

Slope: 20 percent; east facing

Elevation: 55 meters

Permeability: Slow

Drainage: Well drained

Vegetation: Grasses in urban and built-up land

Erosion: Slight

Parent material: Residuum from volcaniclastic bedrock

Described and sampled by: J. Davis during August 1991

Notes: The number of volcanic rock fragments, gravel, cobbles, and boulders increases with depth in the profile.

A—0 to 18 cm; reddish brown (5YR 4/3) clay loam; weak fine subangular blocky structure; friable; variable in thickness along excavation but appears to be mollic; boundary not designated. 91P0416

AB—18 to 23 cm; reddish brown (5YR 4/3) clay; common medium faint mottles; moderate fine subangular blocky structure; friable; gradual wavy boundary. 91P0417

Bt1—23 to 46 cm; yellowish red (5YR 4/6) clay; moderate fine subangular blocky structure; friable; less gravel than other horizons; gradual wavy boundary. 91P0418

Bt2—46 to 97 cm; yellowish red (5YR 4/6) clay; few medium prominent and common medium faint redoximorphic features; moderate fine subangular blocky structure; friable; many small dark mineral fragments, very pale brown (10YR 7/4) limestone fragments, and associated blotches; gravel throughout; gradual wavy boundary. 91P0419

BC—97 to 183 cm; yellowish red (5YR 5/6) clay; common fine prominent and common medium prominent mottles; moderate fine subangular blocky structure; friable; increased dark mineral and limestone fragments; boundary not designated. 91P0420

Cr—183 cm; weathered bedrock not evident on 46-meter excavation cut.

Cramer: S91VI-010-003

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Cramer; Lithic Haplustalfs

SSL—Project: 91P 12, (RP91VI023) Virgin Island

—Pedon: 91P 70, Samples 91P 421–422

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	(- - - - - -SAND- - - - - -) F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
91P 421N	0- 8	A	21.2	27.3	51.5			18.6	8.7	5.9	6.7	8.4	15.0	15.5					
91P 422N	8- 20	Bt	28.7	35.7	35.6			23.9	11.8	7.7	9.3	6.7	6.1	5.8					

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT <0.4MM	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC - -	1/3 BAR 4A1d	OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 8	3.61							1.05	0.68										14.5	
8- 20	1.87							0.60	0.42										12.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																1:2	1:1
0- 8	13.4	7.3	3.8	0.9	25.4	5.6		31.0	22.2			82	100				6.3	6.8
8- 20	8.9	6.2	2.2	0.8	18.1	4.6		22.7	17.1			80	100				6.3	7.5

Narrative Pedon Description

Pedon: Cramer
NSSL pedon number: 91P0070
Pedon ID: S91VI-010-003
Field classification: Lithic Haplustalfs
Revised classification as of January 01, 1995: Southgate; loamy-skeletal, mixed, active, isohyperthermic Lithic Ustropepts
Location: St. Croix Island, Virgin Islands; from East Point Lookout, west on Route 66 0.8 km, 68.6 meters southwest of road, on a slope
Latitude: Unknown
Longitude: Unknown
Slope: 45 percent; northeast facing
Elevation: 43 meters
Drainage: Well drained
Erosion: Moderate
Vegetation: Natural grasses and cactus
Parent material: Residuum from volcaniclastic bedrock
Described and sampled by: J. Davis during August 1991
Notes: Cramer—lithic and skeletal. Samples collected in all horizons but not in the R layer.

A—0 to 8 cm; reddish brown (5YR 4/3 to 7.5YR 4/4) clay loam; weak fine subangular blocky structure; very friable; boundary not designated. 91P0421

Bt—8 to 20 cm; reddish brown (5YR 4/4) clay; weak medium subangular blocky structure; very friable; gradual wavy boundary. 91P0422

Cr—20 to 41 cm; reddish brown (5YR 4/4) clay; unconsolidated volcanic rock; could be considered Bt/Cr as in old descriptions; contains large angular cobbles left in field; gradual wavy boundary. Not sampled.

R—41 cm; consolidated volcanic dark bedrock; similar to fragments in Cr sample. Not sampled.

Fraternidad: S91VI-010-004

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Fraternidad; fine, montmorillonitic, isohyperthermic Udic Chromusterts

SSL—Project: 91P 12, (RP91VI023) Virgin Island

—Pedon: 91P 71, Samples 91P 423–427

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
91P 423N	0- 20	Ap	58.6	26.9	14.5			17.2	9.7	4.6	3.2	2.0	2.4	2.3					
91P 424N	20- 38	Bw1	61.1	26.6	12.3			19.4	7.2	4.2	2.7	1.6	1.7	2.1					
91P 425N	38- 58	Bw2	57.9	32.6	9.5		1.9	25.3	7.4	3.3	2.2	1.3	1.4	1.3					
91P 426N	58-114	Bw3	58.9	34.7	6.4		2.2	24.4	10.3	3.4	1.9	0.6	0.3	0.2					
91P 427N	114-157	BC	41.4	26.1	32.5		2.2	18.2	7.9	6.4	10.2	6.9	4.2	4.8					

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) FE 6C2b OF	AL 6G7a <2MM -->	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LL 4F1 PCT <0.4MM	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 20	1.70							0.41											24.1	
20- 38	0.79							0.41											25.1	
38- 58	0.36							0.40											23.0	
58-114	0.09							0.38											22.5	
114-157	0.04							0.44											18.1	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 20				1					7.2	7.4								
20- 38				2					7.6	8.3								
38- 58				10					7.9	8.4								
58-114				6					8.0	8.4								
114-157				8					8.1	8.5								

Narrative Pedon Description

Pedon: Fraternidad
NSSL pedon number: 91P0071
Pedon ID: S91VI-010-004
Field classification: Fine, montmorillonitic, isohyperthermic Udic Chromusterts
Revised classification as of January 01, 1995: Hogensborg; fine, smectitic, isohyperthermic Sodic Haplusterts
Location: St. Croix Island, Virgin Islands; Williams Delight area
Latitude: Unknown
Longitude: Unknown
Geomorphic setting: Nearly level footslope in uplands
Slope: 2 percent
Elevation: 21 meters
Drainage: Well drained
Vegetation: Grasses in urban and build-up land
Erosion: Slight
Parent material: Limestone-derived marine sediments
Described and sampled by: J. Davis on August 1,1991
Notes: Restrictive moist horizons are due to clay content. Pedon appears to have fewer lime blotches than other Fraternidad pedons that have been described. Small calcite "bones" are present.

Ap—0 to 20 cm; dark grayish brown (2.5Y 4/2) clay; strong medium subangular blocky structure; hard; thickness is estimated; less than 15 percent gravel at surface; possible thin AB horizon; boundary not designated. 91P0423

Bw1—20 to 38 cm; olive brown (2.5Y 4/4) clay; strong medium and coarse prismatic structure; hard; few dark manganese concretions; gradual wavy boundary. 91P0424

Bw2—38 to 58 cm; light olive brown (2.5Y 5/6) clay; few medium faint mottles; strong medium and coarse prismatic structure; hard; lime splotches/ concretions; gradual wavy boundary. 91P0425

Bw3—58 to 114 cm; yellowish brown (10YR 5/6) clay; strong coarse prismatic structure; hard; increased dark concretions; gradual wavy boundary. 91P0426

BC—114 to 157 cm; yellowish brown (10YR 5/6) clay; strong coarse prismatic structure; hard; many dark concretions. 91P0427

Coamo: S91VI-010-005

Primary Characterization Data

St. Croix Island, Virgin Islands

Sampled as: Coamo; fine, mixed, isohyperthermic Typic Argiustolls

SSL—Project: 91P 12, (RP91VI023) Virgin Island

—Pedon: 91P 72, Samples 91P 428–433

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05 -.05	SAND -2	FINE LT .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .002 -.02	COARSE .02 -.05	(- - - - -SAND- - - - - -) VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) (>2MM) - - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - -				PCT OF <2MM			(3A1) - - - - - - - - - - - -					<- PCT OF <75MM(3B1)->				
91P 428N	0- 20	Ap	30.4	31.4	38.2		1.0	23.0	8.4	7.8	9.9	8.7	6.4	5.4					
91P 429N	20- 30	AB	35.6	28.2	36.2		2.2	20.5	7.7	6.3	8.2	7.5	7.5	6.7					
91P 430N	30- 43	Bt1	36.9	28.4	34.7		2.2	20.0	8.4	5.0	7.1	7.1	8.2	7.3					
91P 431N	43-102	Bt2	24.4	22.5	53.1		1.2	15.2	7.3	8.0	11.8	11.2	10.7	11.4					
91P 432N	102-122	BC	17.3	17.3	65.4		1.8	12.5	4.8	6.3	12.5	16.0	15.3	15.3					
91P 433N	122-183	Ck	29.5	31.2	39.3		3.7	23.0	8.2	7.4	9.0	8.5	7.7	6.7					

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(- BULK DENSITY -) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(- - -WATER CONTENT - -) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT <0.4MM		<- - G/CC	- - ->		CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 20	1.95							0.81	0.45										13.7	
20- 30	0.67							0.81	0.45										15.9	
30- 43	0.30							0.88	0.45										16.5	
43-102	0.21							1.07	0.50										12.2	
102-122	0.21							1.03	0.54										9.4	
122-183	0.10							0.69	0.44										13.0	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- ITY 6H5a	EXTR AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -				-MEQ / 100 G	- - -		- - - - - - - -		- ->	<- - -	- -PCT	- - - ->				1:2	1:1
0- 20	16.0	6.3	1.2	1.5	25.0	4.1		29.1	24.7			86	100				6.7	7.4
20- 30	19.0	8.4	0.7	0.7	28.8	3.6		32.4	28.8			89	100				6.7	7.5
30- 43	18.2	11.8	0.9	0.7	31.6	3.5		35.1	32.6			90	97				6.8	7.6
43-102	14.4	11.4	0.6	0.6	27.0	1.9		28.9	26.0			93	100				6.8	8.0
102-122		6.7	1.0	0.4		1.5			17.8				100	1			7.1	7.4
122-183		11.1	2.6	0.5					20.3			100	100	16			7.9	8.3

Narrative Pedon Description

Pedon: Coamo
NSSL pedon number: 91P0072
Pedon ID: S91VI-010-005
Field classification: Fine, mixed, isohyperthermic Typic Argiustolls
Revised classification as of January 01, 1995: Glynn; fine-loamy, mixed, superactive, isohyperthermic Fluventic Haplustolls
Location: St. Croix Island, Virgin Islands; intersection of Routes 624 and 60, about 30.5 meters east on road extending from intersection, 30.5 meters southeast to pit behind house
Latitude: Unknown
Longitude: Unknown
Slope: 4 percent
Elevation: 18 meters
Drainage: Well drained
Land use: Urban and built-up land
Erosion or deposition: Slight
Parent material: Volcanic colluvial/fluvial
Physiography: Elevated fan nearing coastal plain
Described and sampled by: J. Davis during August 1991
Notes: Some surface removed during excavation.

Ap—0 to 20 cm; very dark grayish brown (10YR 3/2) clay; strong medium subangular blocky structure; hard; definite mollic, about 7 to 15 inches around pit; boundary not designated. 91P0428

AB—20 to 30 cm; brown (10YR 5/3) clay; common medium faint mottles; strong medium subangular blocky structure; hard; 5 to 15 cm thick around pit; very dark grayish brown (10YR 3/2) along root channels and small cracks; gradual wavy boundary. 91P0429

Bt1—30 to 43 cm; brown (10YR 5/3) clay; few medium faint mottles; moderate medium and coarse prismatic structure; friable; 10 to 15 percent fine volcanic gravel; clay skins or pressure faces; gradual wavy boundary. 91P0430

Bt2—43 to 102 cm; brown (10YR 5/3) clay; common medium prominent mottles; moderate medium and coarse prismatic structure; friable; angular volcanic gravel; some areas only gravelly; clay skins or pressure faces; gradual wavy boundary. 91P0431

BC—102 to 122 cm; reddish brown (2.5YR 5/4) clay loam; few fine prominent and common medium faint mottles; moderate medium subangular blocky structure parting to massive; friable; angular volcanic gravel, few cobbles; some areas of pit are gray; clay skins or pressure faces; boundary not designated. 91P0432

Ck—122 to 183 cm; light olive brown (2.5Y 5/4) clay loam; common fine faint and common medium prominent mottles; massive; soft lime blotches. 91P0433

Chapter 8
Soils of St. John Island, Virgin Islands

This chapter presents data for 17 pedons that have been described and sampled on St. John, the smallest of the Virgin Islands. Fifteen of these pedons were sampled in 1991 in conjunction with a Global Change Project to assess soil carbon pools and soil climate. Most of the soils on St. John are Mollisols and have a high content of organic carbon. All of the soils have an isohyperthermic temperature regime. The upland soils have an ustic moisture regime. A few soils in the mangrove swamps and salt ponds have an aquic moisture regime. The upland soils are typically shallow or moderately deep to bedrock and have a clayey texture (fig. 5).

Soils orders sampled on St. John Island include Mollisols (12 pedons), Inceptisols (4 pedons), and Entisols (1 pedon).

Figure 5.—Mollisols of St. John Island commonly have a variable depth to bedrock.

Southgate: S91VI-020-001

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Southgate; loamy-skeletal, mixed, isohyperthermic Typic Ustropepts

SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands

—Pedon: 91P1189, Samples 91P 7937–7940

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->				
91P7937S	0- 11	A	14.0	25.4	60.6	6.6		18.6	6.8	6.2	7.1	9.3	17.7	20.3	--	--	45V	75	76
91P7938S	11- 33	Bw1	19.3	31.9	48.8	9.3		22.9	9.0	9.5	12.1	12.0	10.7	4.5	--	--	40V	64	73
91P7939S	33- 78	Bw2	18.4	27.1	54.5	8.2		20.7	6.4	7.9	13.3	10.7	13.4	9.2	15	19	35V	83	85
91P7940S	0- 33														9	9	20		38

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3b <- PERCENT	EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) LIMITS LL 4F1 PCT	PI 4F <0.4MM	(BULK DENSITY) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c	1/3 BAR 4B1c OF <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 11	2.27				1.3	0.1	0.1	0.71	0.51				1.23	1.36	0.013			26.7	7.1	0.10
11- 33	1.25				1.2	0.1	0.1	0.44	0.35				1.52	1.59	0.006			12.1	6.8	0.03
33- 78	0.42				1.4	0.1	TR	0.42	0.33				1.37	1.42	0.003			15.6	6.1	0.03
0- 33																			7.0	

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-EXTR ITY 6H5a	AL 6G9c	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT-NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(PH) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - -> <- - - - -PCT - - - ->																1:2	1:1
0- 11	4.1	2.9	0.1	0.3	7.4	3.1	TR	10.5	10.0			70	74				4.9	5.1
11- 33	2.6	3.0	0.4	0.1	6.1	2.9	TR	9.0	8.4			68	73				4.9	5.4
33- 78	2.2	3.2	0.3	TR	5.7	1.8	0.1	7.5	7.7	5.8	2	76	74				4.7	5.5

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	7A3b	7A4b	THERMAL DTA	TGA	7A6	7A4b	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
		CLAY MINERALOGY (<.002mm)															
		peak size			Percent						Percent						
91P7939	TCLY	KK 3	MI 2	FD 1	HE 1	QZ 1					CMIX						

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	7A3b	7A4b	THERMAL DTA	TGA	TOT RE	OPTICAL GRAIN COUNT 7B1a								INTER PRETA TION
		SAND - SILT MINERALOGY (2.0-0.002mm)														
		Peak Size			Percent			Percent								
91P7939	FS							98	QZ98	FK 1	OT 1	MItr				SMIX
91P7939	VFS							95	QZ93	FK 4	PO 2	OW 1	GStr	ZRtr		SMIX
91P7939	CSi							49	QZ46	FK24	OW10	MI 4	PR 4	FP 3		SMIX
91P7939	CSi								AM 3	BT 2	CD 2	MS 1	OP 1	OTtr		

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm FS Fine Sand, 0.1-0.25mm VFS Very Fine Sand, 0.05-0.10mm

CSi Coarse Silt, 0.02-0.05mm

MINERAL INTERPRETATION:

KK	kaolinite	MI	mica	FD	feldspar	HE	hematite	QZ	quartz	FK	potas feldsp
OT	other	PO	plant opal	OW	oth-weath mn	GS	glass	ZR	zircon	PR	pyroxene
FP	plag-feldspa	AM	amphibole	BT	biotite	CD	chalcedony	MS	muscovite	OP	opaques

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

CMIX = Mixed - Clay SMIX = Mixed - Sand

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed

BASED ON CLAY: Mixed

FAMILY MINERALOGY: Mixed (pending)

COMMENTS: Weighted ave resistant re = 89.4% re of csl = 20 % need to run csi

		ACID OXALATE EXTRACTION				PHOSPHOUS		KCL	TOTAL	(- -WATER		CONTENT- -)		(- - - - WATER DISPERSIBLE - - - -)						MIN	AGGRT
		OPT	FE	SI	AL		CIT-	MN	C	0.06	1-	2-	15	<- - PIPETTE - - ><- HYDROMETER - >						SOIL	STABL
		DEN				RET	ACID			BAR	BAR	BAR	BAR	CLAY	SILT	SAND	CLAY	SILT	SAND	CONT	<5mm
SAMPLE	HZ	8J	6C9b	6V2b	6G12b	6S4	6S5	6D3b	6A2d	4B1c	4B1a	4B1a	4B2b	<- - - 3A1c - - -><- - - SML - - ->						8F1	4G1
NO.	NO		<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
91P7937	1	0.04	0.14	0.02	0.08			4.4				11.6									
91P7938	2	0.04	0.16	0.02	0.10			3.5				11.7									
91P7939	3	0.03	0.10	0.02	0.07			2.0				10.2									
91P7940	4																				

Narrative Pedon Description

Pedon: Southgate

NSSL pedon number: 91P1189

Pedon ID: S91VI-020-001

Field classification: Loamy-skeletal, mixed, isohyperthermic Typic Ustropepts

Revised classification as of January 01, 1995: Victory; loamy-skeletal, siliceous, superactive, isohyperthermic Typic Ustropepts

Location: St. John Island, Virgin Islands; Lameshur Bay Watershed; about 975 meters northeast of Minna Hill and 1,460 meters southeast of the peak of Bordeaux Mountain as referenced from the West St. John quadsheet

Latitude: 18°19’36" north

Longitude: 64°43’17" west

Physiography: Mountainside on old volcanic mountains

Geomorphic position: On lower third of backslope of a side slope

Slope: 70 percent; west facing; convex upslope and plane across the slope; total length of 609 meters

Elevation: 43 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderately slow

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,140 mm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Surface stoniness: 45 percent

Erosion: Slight

Particle-size control section: 25 to 78 cm

Parent material: Local colluvium from igneous-fine material over solid rock from igneous-fine material

Vegetation: Species of the *Columbrina, Leuccena, Eugenia, Hilocereus, Acacia, Amyris, Bursera, Pisonic, Capparis,* and *Randia* genera

Diagnostic features: Ochric epipedon at 0 to 11 cm; cambic horizon at 11 to 78 cm; lithic contact at 78 cm

Geographically associated soils: Victory and Cramer

Described and sampled by: B.C. Dubee, H.R. Mount, B.D. Hudson, W. Lynn, and J. Davis on September 3, 1991

Notes: Leaf litter above the soil surface was not sampled. Boulders in the map unit ranged up to 1.5 meters in diameter. Rock fragments were weighed at the site, and the volumes were converted and estimated. Soil climate station was installed 3 linear meters upslope at 46 meters elevation.

Oi—1 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt broken boundary. Not sampled.

A—0 to 11 cm; brown to dark brown (7.5YR 4/3) very cobbly loam, light brown (7.5YR 6/4) dry; moderate fine granular structure; hard, friable; common very fine, fine, medium and coarse roots in mat at top of horizon; many very fine

and fine voids between rock fragments; 15 percent gravel; 45 percent cobbles; moderately acid; clear smooth boundary. 91P7937

Bw1—11 to 33 cm; strong brown (7.5YR 4/6) very cobbly loam, reddish yellow (7.5YR 6/6) dry; moderate fine subangular blocky structure; common very fine, fine, medium, and coarse roots throughout; very fine and fine voids between rock fragments; common tubular pores; common medium cylindrical wormcasts; 15 percent gravel; 45 percent cobbles; moderately acid; clear wavy boundary. 91P7938

Bw2—33 to 78 cm; strong brown (7.5YR 4/6) very cobbly loam, reddish yellow (7.5YR 6/6) dry; moderate fine subangular structure; hard, friable; common very fine, fine, medium, and coarse roots throughout; many very fine and fine voids between rock fragments; common medium tubular pores; common medium cylindrical wormcasts; 15 percent gravel; 45 percent cobbles; moderately acid; abrupt wavy boundary. 91P7939

R—78 cm; unweathered bedrock; massive; extrusive volcanic origin. 91P7940

San Anton: S91VI-020-002

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: San Anton; fine-loamy, mixed, isohyperthermic Typic Haplustolls

SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands

—Pedon: 91P1190, Samples 91P 7941–7947

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05	TOTAL SAND .05	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002	SILT COARSE .02	SILT VF .05	SAND F .10	SAND M .25	SAND C .5	SAND VC 1	COARSE FRACTIONS (MM) 2	5	20	>2MM WT .1-	% OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->				
91P7941S	0- 8	A	21.3	32.8	45.9	13.2		20.7	12.1	10.6	11.0	9.0	8.2	7.1	5	4	--	41	9
91P7942S	8- 28	AB	26.1	36.0	37.9	16.5		23.3	12.7	11.4	11.4	8.2	5.2	1.7	2	7	--	33	9
91P7943S	28- 53	Bw	28.7	31.7	39.6	18.3		21.0	10.7	9.4	10.7	8.3	6.4	4.8	5	8	1	40	14
91P7944S	53- 78	C1	18.0	21.2	60.8	11.7		13.6	7.6	8.5	17.1	16.5	13.5	5.2	7	7	--	59	14
91P7945S	78-120	C2	23.5	24.0	52.5	15.7		15.6	8.4	10.7	14.7	13.0	10.2	3.9	4	3	--	46	7
91P7946S	120-145	C3	21.8	22.5	55.7	14.0		14.5	8.0	9.4	13.6	14.1	11.8	6.8	4	10	--	54	14
91P7947S	145-150	C4	20.7	22.5	56.8	13.4		14.4	8.1	10.6	17.4	12.5	11.8	4.5	5	2	--	50	7

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a OF	MN <2MM -->	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	PI <0.4MM 4F	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 8	2.28				0.7	0.1	TR	0.78	0.46				1.37	1.48	0.025			18.0	9.8	0.11
8- 28	1.28				1.4	0.2	TR	0.65	0.37				1.57	1.67	0.020			19.1	9.6	0.14
28- 53	0.49				0.8	0.1	TR	0.55	0.32				1.57	1.71	0.026			14.9	9.3	0.08
53- 78	0.13				0.8	0.1	TR	0.63	0.39				1.60	1.71	0.020			13.6	7.0	0.10
78-120	0.10				0.8	0.1	TR	0.56	0.38										8.9	
120-145	0.06				1.0	0.1	TR	0.61	0.39										8.5	
145-150	0.06				1.0	0.1	TR	0.60	0.40										8.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	CEC- SUM CATS 5A3a	NH4- OAC 5A8b	EXCH NA 5D2 PCT	SAR 5E	BASE SATURATION SUM 5C3 <- -PCT- >	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g <- -PCT ->	<20MM 8E1	CASO4 AS GYPSUM <2MM 6F1a <- -PCT ->	<20MM 6F4	PH SAT PASTE 8C1b	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->																		
0- 8	10.3	5.2	0.3	0.6	16.4	2.8	19.2	16.6	1	2	85	99					6.2	5.6	5.8
8- 28	9.9	5.0	0.4	0.4	15.7	2.1	17.8	16.9	2		88	93						5.9	6.4
28- 53	8.9	5.5	0.5	0.3	15.2	1.4	16.6	15.8	3		92	96						6.3	7.1
53- 78	6.3	4.0	0.6	0.3	11.2	0.9	12.1	11.4	5		93	98						6.4	7.3
78-120	7.0	2.9	1.0	0.4	11.3	1.0	12.3	13.2	7		92	86						6.9	7.5
120-145	6.3	5.7	1.5	0.3	13.8	0.3	14.1	13.3	8	6	98	100	TR				7.2	7.1	7.6
145-150	5.6	7.1	1.8	0.3	14.8	0.3	15.1	12.4	11	6	98	100	TR		--		7.5	7.1	7.5

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	HCO3 TOTAL EST. 6J1b	F ELEC. 8A3a	CL ELEC. 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	COND. MMHOS /cm	PRED. COND. MMHOS /cm
	<- MEQ / LITER - - - - - - - - - - - - - - - - - - ->														<- -PCT- ->			
0- 8	5.1	3.2	3.1	0.8	--	3.7	0.2	4.4				2.0	0.5	1.7	47.3	TR	1.29	0.48
8- 28								0.20										
28- 53								0.11										
53- 78								0.12										
78-120								0.24										
120-145	2.7	2.6	10.2	0.3	--	1.0	0.4	12.1				3.5	--	0.2	35.9	TR	1.71	0.38
145-150	3.0	2.6	10.7	0.2	--	2.7	0.4	11.3				3.5	--	--	40.6	TR	1.69	0.57

SAMPLE NUMBER	FRACT ION 7A2i peak size	X-RAY DTA 7A6	THERMAL TGA 7A4b	CLAY MINERALOGY (<.002mm) SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	ELEMENTAL 7C3 Percent	EGME RETN 7D2	INTER PRETA TION
91P7943	TCLY MI 3 KK 3 MT 2 VC 2				19.0	9.0			1.6				CMIX
91P7944	TCLY MI 3 KK 3 MT 2 VC 2	FD 1			19.0	9.3			1.6				CMIX
91P7947	TCLY KK 3 MI 3 VC 2 MT 2				17.0	9.0			1.2				CMIX

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                     >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - - -><  - >
91P7943     FS                                                   99  QZ99  OTtr  OPtr  POtr                                SILI
91P7943     CSi                                                  54  QZ54  FP23  OW16  PR 5  HN 1  OPtr                    SILI
91P7943     CSi                                                      AMtr  POtr  GStr  BTtr
91P7944     FS                                                   96  QZ96  FK 3  OT 1  RAtr  POtr  MStr  BTtr              SILI
91P7944     VFS                                                  96  QZ96  FK 3  TMtr  OPtr  OWtr  POtr  AMtr              SILI
91P7947     FS                                                   96  QZ96  OT 3  FK 1  RAtr  GStr  MStr                    SILI
FRACTION INTERPRETATION:
    TCLY  Total Clay, <0.002mm     FS  Fine Sand, 0.1-0.25mm     CSi  Coarse Silt, 0.02-0.05mm   VFS   Very Fine Sand, 0.05-0.10mm
MINERAL INTERPRETATION:
    MI  mica   KK  kaolinite    MT  montmorillon     VC  verm-chlorit     QZ  quartz     OT  other    OP  opaques   PO  plant opal
    FP  plag-feldspa   OW  oth-weath mn   PR  pyroxene    HN  hornblende   AM  amphibole   GS  glass   BT  biotite    FD  feldspar
    FK  potas feldsp   RA  resist-aggre   MS  muscovite   TM  tourmaline
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< - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                     >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - - -><  - >
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON): CMIX = Mixed - Clay        SILI = Siliceous
PEDON MINERALOGY BASED ON SAND/SILT: Mixed; BASED ON CLAY: Mixed; FAMILY MINERALOGY: Mixed
    COMMENTS: Weighted ave 91P7943 re = 82.7%:  91p7944  re=89.2 %  sands are siliceous: silts are high in weartherable minerals.
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           ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
             OPT  FE    SI    AL          CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                     RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
91P7941  1  0.04  0.17  0.03  0.06                                        13.9
91P7942  2  0.04  0.17  0.04  0.08                                        14.5
91P7943  3  0.04  0.14  0.04  0.08                                        13.9
91P7944  4  0.03  0.08  0.03  0.04                                        10.3
91P7945  5  0.03  0.11  0.05  0.05                                        12.9
91P7946  6  0.03  0.10  0.04  0.04                                        12.2
91P7947  7  0.03  0.11  0.04  0.04                                        12.2
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Narrative Pedon Description

Pedon: San Anton

NSSL pedon number: 91P1190

Pedon ID: S91VI-020-002

Field classification: Loamy-skeletal, mixed, isohyperthermic Typic Haplustolls

Revised classification as of January 01, 1995: Cinnamon Bay; fine-loamy, mixed, active, isohyperthermic Typic Haplustolls

Location: St. John Island, Virgin Islands; Lameshur Bay Watershed; 36 meters northeast of salt pond and 15 meters into bottomland dry forest

Latitude: 18°19’22" north

Longitude: 64°43’24" west

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Elevation: 2 meters

Physiography: Delta in small valley

Geomorphic position: On middle third of backslope of an interfluve

Slope: 3 percent; south facing; total length of 61 meters

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,140 mm; ustic moisture regime

Drainage and permeability: Well drained and moderately high permeability

Particle-size control section: 25 to 100 cm

Parent material: Unconsolidated sediments from igneous material

Vegetation: Species of Eugenia, Melicoccus, Bourreria, Cordia, Leucaena, Amyris, Acacia, and Erythroxlyum genera

Diagnostic features: Mollic epipedon at 0 to 28 cm; cambic horizon at 28 to 53 cm

Geographically associated soils: Sugar Beach, Jaucas, and Solitude

Described and sampled by: G. Acevedo, B.C. Dubee, H.R. Mount, B.D. Hudson, W. Lynn, and J. Davis on September 3, 1991

Notes: The soil may have a high content of sodium because of its proximity to an adjacent salt pond. Soil was difficult to excavate.

Oi—1 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs; abrupt smooth boundary. Not sampled.

A—0 to 8 cm; very dark grayish brown (10YR 3/2) clay loam, dark brown (10YR 3/3) dry; moderate medium granular structure; hard, friable; common very fine and fine and few coarse roots throughout; common fine and medium tubular pores; common medium cylindrical wormcasts; 5 percent gravel; mildly alkaline; clear smooth boundary. 91P7941

AB—8 to 28 cm; dark brown (10YR 3/3) clay loam, dark brown (10YR 3/3) crushed, brown to dark brown (10YR 4/3) dry; moderate medium subangular blocky structure; hard, friable; common very fine and fine roots throughout; many very fine and fine tubular pores; common medium cylindrical wormcasts; 5 percent gravel; mildly alkaline; clear smooth boundary. 91P7942

Bw—28 to 53 cm; dark yellowish brown (10YR 4/4) clay loam, yellowish brown (10YR 5/4) dry; moderate coarse subangular blocky structure; hard, friable; few very fine to coarse roots throughout; many very fine and fine tubular

pores; few faint brown to dark brown (10YR 4/3) discontinuous organic coats on faces of peds; common medium cylindrical wormcasts; 5 percent gravel; moderately alkaline; clear smooth boundary. 91P7943

C1—53 to 78 cm; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4) dry; massive; hard; few medium roots throughout; many very fine and fine tubular pores; common medium cylindrical wormcasts; 10 percent gravel; moderately alkaline; clear smooth boundary. 91P7944

C2—78 to 120 cm; brown (10YR 5/3) clay loam, pale brown (10YR 6/3) dry; massive; hard, friable; many very fine to fine tubular pores; common medium cylindrical wormcasts; 10 percent gravel; moderately alkaline; clear smooth boundary. 91P7945

C3—120 to 145 cm; dark yellowish brown (10YR 4/4/) sandy clay loam, yellowish brown (10YR 5/4) dry; massive; hard, friable; many very fine and fine tubular pores; common medium cylindrical wormcasts; 10 percent gravel; strongly alkaline; clear smooth boundary. 91P7946

C4—145 to 150 cm; brown to dark brown (7.5YR 4/4) sandy clay loam, brown (7.5YR 5/4) dry; massive; hard, friable; many very fine and fine tubular pores; common medium cylindrical wormcasts; 10 percent gravel; moderately alkaline. 91P7947

Cramer: S91VI-020-003

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Cramer; clayey, mixed, isohyperthermic, shallow Typic Argiustolls

SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands

—Pedon: 91P1191, Samples 91P 7948–7951

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACTIONS (MM) WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - -	- - -	- - -	- - -	PCT OF <2MM	(3A1)	- - -	- - -	- - -	- - -	- - -	- - ->	<- PCT OF	<75MM	(3B1)	->	SOIL
91P7948S	0- 7	A	49.0	31.2	19.8	34.7		20.3	10.9	6.3	5.6	3.6	3.0	1.3	6	5	--	23	11
91P7949S	7- 23	Bt1	52.8	30.3	16.9	38.2		20.0	10.3	6.6	4.2	2.7	1.8	1.6	1	8	3	21	12
91P7950S	23- 30	Bt2	44.2	30.4	25.4	31.4		19.6	10.8	8.3	6.2	4.4	3.7	2.8	--	--	--V	17	-
91P7951G	30- 53	Crt							P										

Note: column numbers printed above the table run -1-- through -20, for the columns from TOTAL CLAY to (>2MM) WT.

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG - LIMITS -) LL 4F1	PI 4F	(BULK DENSITY) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(WATER CONTENT) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
				<- PERCENT	OF	<2MM	-->			PCT <0.4MM		<- - G/CC	- - ->			<- - -PCT OF	<2MM - ->			
0- 7	5.52				2.1	0.1	0.1	0.97	0.46				0.94	1.32	0.113			36.9	22.4	0.13
7- 23	2.62				2.3	0.2	0.1	0.88	0.43										22.7	
23- 30	1.48				2.0	0.1	0.1	0.94	0.44										19.5	
30- 53									21.0											

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9c	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	(BASE SAT) SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(PH) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - -	- - -	- - -	- - -	- - -MEQ	/ 100 G	- - -	- - -	- - -	- ->	<- - -	- - -PCT	- - - ->					
0- 7	29.1	14.4	0.9	0.9	45.3	9.8		55.1	47.7			82	95				6.0	6.3
7- 23	25.1	15.4	0.9	0.5	41.9	8.8		50.7	46.7			83	90				5.9	6.4
23- 30	21.4	17.1	0.7	0.4	39.6	7.9		47.5	41.4			83	96				5.9	6.5

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)			THERMAL DTA 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7949	TCLY	MT 2	VC 2	KK 2				17.0	13.0			0.7			SMEC
91P7950	TCLY	VC 3	MT 2	KK 2				17.0	12.9			0.4			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	TGA 7A4b (Percent)	OPTICAL TOT RE (Percent)	GRAIN COUNT 7B1a (Percent)						INTERPRETATION
91P7950	VFS				99	QZ98	PO 1	MS 1	OPtr	FKtr	OWtr	
91P7950	VFS					TMtr	ZRtr	PRtr	AMtr	CLtr	BTtr	
91P7950	CSi				20	FP27	PR24	OT22	QZ20	HN 5	FK 1	
91P7950	CSi					BT 1	POtr	OPtr				

FRACTION INTERPRETATION: TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm CSi Coarse Silt, 0.02-0.05mm

MINERAL INTERPRETATION:

MT montmorillon	VC verm-chlorit	KK kaolinite	QZ quartz	PO plant opal	MS muscovite
OP opaques	FK potas feldsp	OW oth-weath mn	TM tourmaline	ZR zircon	PR pyroxene
AM amphibole	CL chlorite	BT biotite	FP plag-feldspa	OT other	HN hornblende

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON): SMEC = Smectite

PEDON MINERALOGY BASED ON SAND/SILT: Mixed, BASED ON CLAY: Montmorillonitic, FAMILY MINERALOGY: Montmorillonitic

COMMENTS: Weighted ave resistant 91P7950 = 69.0%; VC apparently acts like VR for CEC

SAMPLE NO.	HZ NO	ACID OXALATE EXTRACTION OPT DEN 8J	FE 6C9b	SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1-BAR 4B1a	2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - ><- HYDROMETER - > CLAY 3A1c	SILT	SAND	CLAY	SILT	SAND	MIN SOIL CONT 8F1	GGRT TABL 5mm 4G1
		<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><CT>																			
91P7948	1	0.13	0.68	0.09	0.25							29.9									
91P7949	2	0.10	0.64	0.09	0.26							30.5									
91P7950	3	0.06	0.44	0.08	0.22							26.9									
91P7951	4																				

Narrative Pedon Description

Pedon: Cramer

NSSL pedon number: 91P1191

Pedon ID: 91VI-020-003

Field classification: Clayey, mixed, isohyperthermic, shallow Typic Argiustolls

Revised classification as of January 01, 1995: Cramer; clayey, mixed, active, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; Lameshur Bay Watershed; 229 meters northeast of ranger station and 61 meters west of Lameshur Bay trail as referenced from West St. John quadsheet

Latitude: 18°19’29" north

Longitude: 64°43’31" west

Geographically associated soils: Descalabrado, Isaac, Southgate, and Victory

Vegetation: Acacia

Geomorphic setting: Terracette on a shoulder of a side slope in mountains

Particle-size control section: 7 to 30 cm

Surface fragments: 1.0 percent

Diagnostic features: Mollic epipedon at 0 to 58 cm; argillic horizon at 18 to 76 cm; paralithic contact at 76 to 135 cm

Average air temperature: Annual—26.1 °C, summer—27.2 °C, winter—25.0 °C

Average annual precipitation: 1,143 mm

Slope: 25 percent with an aspect of 135 degrees, length of 305 meters, and upslope length of 30 meters; convex cross-slope

Elevation: 104 meters

Drainage: Well drained

Described and sampled by: G. Acevedo, H.R. Mount, B.C. Dubee, B.D. Hudson, and J. Davis on September 4, 1991

Notes: Cobbles and an occasional stone covered 10 percent of the surface. At 8:30 a.m. the air temperature was 29 °C Soil temperature was 27.5 °C (81°F) at depths of 5 and 30 cm. The pit was dug by hand with shovels and spades. It was 3.35 linear meters northwest of long-term vegetable plots of Dr. Gary Ray (U of VI). Canopy was dominated by 6-meter-tall, dry evergreen forest species. The site had been grazed in the past and used for sugarcane production. Clod samples were taken from the A, Bt1, and Bt2 horizons. The site was part of the 1991 Soil Conservation Service/National Park Service Global Change Project.

Oi—1 to 0 cm; partially decomposed organic matter; abrupt smooth boundary. Not sampled.

A—0 to 7 cm; dark reddish brown (5YR 3/2) clay loam, dark reddish brown (5YR 3/3) dry; moderate fine and medium granular structure; friable, hard; few fine, few medium, and few coarse roots throughout; many very fine and fine voids between rock fragments and many medium tubular pores; 21 percent medium cylindrical wormcasts; 10 percent angular fine crystal igneous rock fragments 2 to 75 mm in diameter; neutral; abrupt smooth boundary. 91P7948

Bt1—7 to 23 cm; dark reddish brown (5YR 3/2) clay, dark reddish brown (5YR 3/3) dry; strong fine and medium subangular blocky structure; friable, hard; common very fine and fine, many medium, and few coarse roots throughout; many fine dendritic tubular pores, many very fine and fine voids between rock fragments, and many very fine and fine tubular pores; 35 percent discontinuous faint reddish brown (5YR 4/3) clay films on rock fragments, 35 percent continuous faint dark reddish brown (5YR 3/2) clay films on faces of peds, and 35 percent continuous faint reddish brown (5YR 4/3) clay films in root channels and/or pores; 25 percent medium cylindrical wormcasts; 10 percent angular fine crystal igneous rock fragments 2 to 75 mm in diameter; neutral; clear wavy boundary. 91P7949

Bt2—23 to 30 cm; dark reddish brown (5YR 3/4) gravelly clay, dark reddish brown (5YR 3/4) crushed, reddish brown (5YR 4/4) dry; strong fine and medium subangular blocky structure; friable, hard; common fine, common medium, and common coarse roots throughout; many fine dendritic tubular pores, common very fine and fine voids between rock fragments, and many medium tubular pores; 15 percent continuous faint dark reddish brown (5YR 3/2) clay films on faces of peds, 35 percent discontinuous faint dark reddish brown (5YR 3/3) clay films on rock fragments, and 35 percent continuous faint reddish brown (5YR 4/3) clay films in root channels and/or pores; 25 percent medium cylindrical wormcasts; 20 percent angular fine crystal igneous rock fragments 2 to 75 mm in diameter; neutral; abrupt wavy boundary. 91P7950

Crt—30 to 53 cm; olive gray (5Y 5/2) and greenish gray (5BG 5/1) weathered bedrock, olive gray (5Y 5/2) and greenish gray (5BG 5/1) dry; massive; common fine and common medium roots in cracks; 55 percent continuous prominent dark reddish brown (2.5YR 3/4) clay films on rock fragments. 91P7951

Victory: S91VI-020-004

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Victory; loamy-skeletal, mixed, isohyperthermic, shallow Typic Ustropepts

SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands

—Pedon: 91P1192, Samples 91P 7952–7954

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND LT	FINE .0002	(- -CLAY- -) CO3 .002	(- -SILT- -) FINE .02	COARSE .05	VF .10	(- - - - - -SAND- - - - - -) F .25	M .5	C 1	VC 2	(-COARSE FRACTIONS(MM)-)(>2MM) - - - - WEIGHT - - - - 5	20	.1-	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->			
91P7952S	0- 8	A	18.7	46.8	34.5	10.8		35.6	11.2	6.8	6.5	5.0	8.5	7.7	4	3	19V	46	26
91P7953S	8- 30	Bw	17.1	46.9	36.0	9.5		34.8	12.1	6.4	6.2	5.4	7.0	11.0	9	30	15V	68	57
91P7954S	30- 66	Cr	13.5	39.6	46.9	5.3		30.8	8.8	8.7	8.3	8.6	10.7	10.6	--	--	--V	38	-

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3b <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- -	1/3 BAR 4A1d G/CC - -	OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- -	1/10 BAR 4B1c -PCT OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 8	4.40				1.3	0.1	0.1	1.11	0.64				1.21	1.31	0.023			16.4	12.0	0.05
8- 30	1.89				1.3	0.1	0.1	0.98	0.54				1.38	1.46	0.011			17.6	9.2	0.07
30- 66	0.73				1.0	0.1	TR	1.01	0.54										7.3	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - -> <- - - - -PCT - - - ->																	1:2	1:1
0- 8	9.7	6.8	0.4	0.4	17.3	7.8		25.1	20.8			69	83				4.9	5.3	5.5
8- 30	6.0	4.7	0.3	0.2	11.2	8.8	0.5	20.0	16.8	11.7	4	56	67				3.9	5.0	5.0
30- 66	4.7	6.1	0.2	0.1	11.1	4.6	0.4	15.7	13.6	11.5	3	71	82					5.0	5.1

< - CLAY MINERALOGY (<.002mm) ->

SAMPLE NUMBER	FRACT < - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - -><- -> EGME INTER ION < ><- DTA - -><- TGA - -> SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O < > RETN PRETA < - - - - - - 7A2i - - - - - -><- 7A6 - -><- 7A4b - -><- - - - - - - - - - 7C3 - - - - - - - - -><> 7D2 TION <- - -><- - - - peak size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- -><- ->
91P7953	TCLY	VR 3	KK 3	MT 1	MI 1	FD 1						10.0	7.4			0.5				VERM
91P7954	TCLY	VR 3	KK 3	FD 2	MT 1					VERM										

< - SAND - SILT MINERALOGY (2.0-0.002mm) ->

SAMPLE NUMBER	FRACT < - - - - - - X-RAY - - -><- - - THERMAL - - - -><- - - - - - - - OPTICAL - - - - - - - -><>INTER ION < ><- DTA - -><- TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><>PRETA < - - - - 7A2i - - - - -><- 7A3b - -><- 7A4b - -><- - - - - - - - - 7B1a - - - - - - - -><> TION <- -><- - - Peak Size - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- - - - - - - - -><- >																			
91P7953	VFS											97	QZ95	OP 1	PO 1	OW 1	FK 1	ZRtr		SMIX
91P7953	VFS												GStr	TMtr	PRtr					
91P7953	CSi											15	FP33	PR32	OT18	QZ14	OP 1	BT 1		SMIX
91P7953	CSi												FK 1	POtr	HNtr	GStr				

< - FINE EARTH MINERALOGY (<2.0mm) ->

DEPTH (cm)	FRACT < - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - - -><- -> SURF INTER ION < ><- DTA - -><- TGA - -> SiO2 AL2O3 Fe2O3 MgO CaO K2O Na2O < > AREA PRETA < - - - - - - 7A2i - - - - -><- 7A3b - -><- 7A4b - -><- - - - - - - - - 7C3 - - - - - - - - -><> TION <- -><- - - - - Peak Size - - - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - -><- -><- ->
30- 66	FETH	VR 3	KK 3	MT 2	FD 2	MI 1							7.4			0.2				
30- 66	TSND		10.2			0.3														

FRACTION INTERPRETATION: TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm CSi Coarse Silt, 0.02-0.05mm
FETH Fine Earth, <2mm TSND Total Sand, 0.05-2mm

MINERAL INTERPRETATION:

VR	vermiculite	KK	kaolinite	MT	montmorillon	MI	mica	FD	feldspar	QZ	quartz
OP	opaques	PO	plant opal	OW	oth-weath mn	FK	potas feldsp	ZR	zircon	GS	glass
TM	tourmaline	PR	pyroxene	FP	plag-feldspa	OT	other	BT	biotite	HN	hornblende

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON): VERM = Vermiculitic SMIX = Mixed - Sand

PEDON MINERALOGY BASED ON SAND/SILT: Mixed, BASED ON CLAY: Vermiculitic; FAMILY MINERALOGY: Mixed

COMMENTS: Weighted ave re: 91p7953 = 76.1%

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	EXTRACTION AL 6G12b	PHOSPHOUS RET 6S4	PHOSPHOUS CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER CONTENT- -) 0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - ><- HYDROMETER - > CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
			<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
91P7952	1	0.06	0.42	0.04	0.12							18.6									
91P7953	2	0.05	0.38	0.04	0.14			4.3				14.0									
91P7954	3	0.02	0.15	0.03	0.09			0.6													

Narrative Pedon Description

Pedon: Victory

NSSL pedon number: 91P1192

Pedon ID: 91VI-020-004

Field classification: Loamy-skeletal, mixed, isohyperthermic, shallow Typic Ustropepts

Revised classification as of January 01, 1995: Southgate; loamy-skeletal, mixed, active, isohyperthermic, shallow Typic Ustropepts

Location: St. John Island, Virgin Islands; Lameshur Bay Watershed; 183 meters south of Bordeaux Mountain pond and Lameshur Bay trail junction; about 550 meters southeast of Bordeaux Mountain as referenced from Western St. John quadsheet dated 1958; 61 meters downslope from archeological dig pit

Latitude: 18°20’20" north

Longitude: 64°43’29" west

Elevation: 342 meters

Geomorphic setting: Summit of side slope in mountains

Particle-size control section: 0 to 30 cm

Surface fragments: 0.1 percent stones

Diagnostic features: Ochric epipedon at 0 to 76 cm; cambic horizon at 20 to 76 cm; paralithic contact at 76 to 168 cm

Slope: 20 percent; concave with an aspect of 55 degrees, length of 32 meters, and upslope length of 30 meters

Average air temperature (1994): Annual—24.2 °C, summer—25.8 °C, winter—22.3 °C, Isotivity—3.4 °C.

Average soil temperature at 50 cm (1994): Annual—25.0 °C, summer—27.2 °C, winter—22.8 °C, Isotivity—4.3 °C.

Average annual precipitation: 1,160 mm

Drainage: Well drained

Vegetation: Species of the *Eugenia, Rondia, Maytenus, Anthurium, Casearia, Croton,* and *Pimenta* genera

Geographically associated soils: Cramer, Isaac, Maho Bay, and Southgate

Described and sampled by: G. Acevedo, B.C. Dubee, H.R. Mount, B.D. Hudson, W. Lynn, and J. Davis on September 4, 1991

Notes: Data pod was installed 3.35 meters from hand-dug pit at an elevation of 342 meters. Rock fragments were weighed, and volume was estimated. Clod samples were taken from the A and Bw horizons. Pedon was close to concept of the Maho Bay series. This site had more understory vegetation than 3 previous sites. The finest bay leaves (*Pimenta racemosa*) on St. John Island grow in this area.

Oi—1 to 0 cm; partially decomposed organic matter; abrupt smooth boundary. Not sampled.

A—0 to 8 cm; dark brown (10YR 3/3) loam, brown (10YR 4/3) dry; moderate fine and medium granular structure; friable, hard; many fine and many coarse roots throughout; common very fine and fine voids between rock fragments; 10

percent angular noncalcareous siltstone fragments 2 to 150 mm in diameter; neutral; clear smooth boundary. 91P7952

Bw—8 to 30 cm; dark brown (10YR 3/3) very channery clay loam, brown (10YR 4/3) crushed, brown (10YR 5/3) dry; moderate fine and medium granular structure; friable, hard; common fine, common medium, and common coarse roots throughout; common very fine and fine voids between rock fragments; 5 percent angular noncalcareous siltstone cobbles 75 to 250 mm in diameter and 35 percent angular noncalcareous siltstone pebbles 2 to 75 mm in diameter; moderately acid; abrupt wavy boundary. 91P7953

Cr—30 to 66 cm; brownish yellow (10YR 6/6) and yellowish brown (10YR 5/4) weathered bedrock, yellow (10YR 7/6) and pale brown (10YR 6/3) dry; massive; 85 percent continuous distinct light yellowish brown (10YR 6/4) coats on rock fragments. 91P7954

Solitude: S91VI-020-005

Primary Characterization Data

St. John Island, Virgin Islands
Sampled as: Solitude; fine-loamy, mixed, isohyperthermic, nonacid Aeric Tropaquepts
SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands
—Pedon: 91P1193, Samples 91P 7955–7961
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	5 -20	20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
91P7955S	0- 3	A1	12.5	27.8	59.7	7.1		13.8	14.0	15.0	15.9	12.5	10.0	6.3	10	14	--	58	24
91P7956S	3- 15	A2	13.6	25.4	61.0	8.0		14.3	11.1	14.7	16.8	12.0	10.8	6.7	13	14	3	62	30
91P7957S	15- 26	Bw1	16.0	27.9	56.1	9.4		16.0	11.9	11.6	15.4	11.9	10.7	6.5	18	11	2	62	31
91P7958S	26- 43	Bw2	17.4	27.9	54.7	12.0		16.7	11.2	13.1	15.2	12.8	8.8	4.8	4	12	3	53	19
91P7959S	43- 70	Bw3	19.9	27.4	52.7	13.2		17.2	10.2	11.7	12.5	11.1	10.0	7.4	8	18	--	56	26
91P7960S	70-145	Bg1	24.6	31.8	43.6	16.6		20.1	11.7	10.6	12.6	6.4	6.7	7.3	6	15	6	51	27
91P7961S	145-155	Bg2	18.5	28.7	52.8	12.4		17.7	11.0	9.9	13.0	10.6	10.7	8.6	17	14	--	61	31

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 3	1.22		4		0.4	0.1	--	0.82	0.47				1.51	1.57	0.011			10.1	5.9	0.05
3- 15	0.79		2		0.5	0.1	TR	0.83	0.50										6.8	
15- 26	0.45		1		0.5	0.1	TR	0.72	0.49				1.71	1.79	0.012			13.5	7.8	0.08
26- 43	0.35		2		0.5	0.1	TR	0.67	0.47				1.71	1.81	0.017			12.5	8.2	0.06
43- 70	0.21		3		0.5	0.1	TR	0.62	0.46				1.56	1.64	0.014			13.8	9.2	0.06
70-145	0.21		2		0.6	0.1	TR	0.58	0.44				1.65	1.87	0.034			18.7	10.8	0.11
145-155	0.44		4		0.4	TR	--	0.66	0.49										9.0	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	EXCH NA 5D2	SAR 5E	BASE SATURATION SUM 5C3	NH4OAC 5C1	CARBONATE AS CACO3 <2MM 6E1g	<20MM 6E4	CASO4 AS GYPSUM <2MM 6F1a	<20MM 6F4	PH SAT PASTE 8C1b	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->			1:2	1:1
0- 3	3.8	5.3	2.1	0.2	11.4	2.9	14.3	10.2	9	9	80	100			--		5.1	5.1	5.2
3- 15	3.7	6.3	3.5	0.1	13.6	2.0	15.6	11.3	15	13	87	100			--		5.8	5.9	6.0
15- 26	4.0	6.8	4.0	0.2	15.0	2.0	17.0	11.5	19	14	88	100			--		6.9	6.9	7.0
26- 43	4.1	7.2	4.3	0.2	15.8	0.3	16.1	11.6	18	15	98	100	TR		--		7.0	7.1	7.3
43- 70	4.1	7.9	5.0	0.2	17.2	0.5	17.7	12.3	20	15	97	100	TR		--		7.1	7.2	7.4
70-145	4.4	8.9	6.4	0.2	19.9	0.7	20.6	14.2	20	16	97	100	--		--		7.2	7.4	7.4
145-155	4.8	9.7	8.6	0.2	23.3	--	23.3	12.3	27	16	100	100	--		--		7.9	7.2	7.2

DEPTH (CM)	WATER EXTRACTED FROM SATURATED PASTE CA 6N1b	MG 6O1b	NA 6P1b	K 6Q1b	CO3 6I1b	TOTAL HCO3 EST. 6J1b	ELEC. F 8A3a 6U1a	ELEC. CL 8I 6K1c	PO4 6S9a	Br 6X1a	OAC 6Y1a	SO4 6L1c	NO2 6W1a	NO3 6M1c	H2O 8A	SALTS 8D5	PRED. COND. MMHOS /cm	COND. MMHOS /cm
	<- MEQ / LITER ->														<- -PCT- ->			
0- 3	11.2	24.7	37.4	0.8	--	0.3	--	61.6				13.6	--	--	32.4	0.2	6.75	1.36
3- 15	10.1	23.0	52.7	0.6	--	0.8	--	78.9				13.5	--	--	35.1	0.2	7.89	1.74
15- 26	8.2	19.2	51.8	0.3	--	1.6	--	74.4				10.9	--	--	35.7	0.2	7.50	1.69
26- 43	9.3	20.4	57.4	0.3	--	1.2	--	84.5				10.7	--	--	37.5	0.2	8.08	1.88
43- 70	11.4	23.5	61.7	0.4	--	1.0	--	91.4				12.4	--	--	41.1	0.3	8.79	2.32
70-145	15.9	37.3	83.0	0.5	--	1.3	--	134.8				15.1	--	--	41.8	0.4	12.50	3.13
145-155	29.7	96.8	124.2	0.8	--	2.7	--	235.2				28.9	--	--	41.8	0.7	19.70	4.88

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)					THERMAL DTA 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7957	TCLY	KK 3	MI 3	MT 2	VR 2	FD 1				15.0	8.3			1.3			CMIX
91P7959	TCLY	MI 3	KK 3	MT 3	VC 2	FD 1				17.0	9.2			1.5			CMIX
91P7961	TCLY	MI 3	KK 3	MT 3	VC 2	FD 2				17.0	8.6			1.4			CMIX

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           < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
           FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE       ION <                     >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                 < - - - - 7A2i - - - - >< - 7A3b - >< - 7A4b - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER     < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
91P7957     FS                                                   99  QZ99  OT 1  OPtr                                      SILI
91P7959     FS                                                   93  QZ93  OT 7  OPtr                                      SILI
91P7959     VFS                                                  99  QZ98  OP 1  OWtr  ZRtr  GStr  POtr                    SILI
91P7959     VFS                                                      TMtr  PRtr  MStr  AMtr
91P7961     FS                                                   98  QZ98  OT 2  TMtr  OPtr  FKtr                          SILI
91P7961     CSi                                                  41  QZ41  FP24  PR18  OW14  HN 2  AMtr                    SILI
91P7961     CSi                                                      FKtr  MStr  CLtr  BTtr  POtr
FRACTION INTERPRETATION: TCLY  Total Clay, <0.002mm FS Fine Sand, 0.1-0.25mm VFS Very Fine Sand, 0.05-0.10mm CSi Coarse Silt,
    0.02-0.05mm
MINERAL INTERPRETATION:
    KK  kaolinite        MI  mica            MT  montmorillon     VR  vermiculite      FD  feldspar         QZ  quartz
    OT  other            OP  opaques         VC  verm-chlorit     OW  oth-weath mn     ZR  zircon           GS  glass
    PO  plant opal       TM  tourmaline      PR  pyroxene         MS  muscovite        AM  amphibole        FK  potas feldsp
    FP  plag-feldspa     HN  hornblende      CL  chlorite         BT  biotite
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ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
             OPT  FE    SI    AL         CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                    RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>
91P7955  1  0.03  0.14  0.03  0.04                                        8.4
91P7956  2  0.02  0.10  0.03  0.03                                        9.4
91P7957  3  0.02  0.12  0.05  0.05                                       11.5
91P7958  4  0.02  0.14  0.05  0.05                                       11.4
91P7959  5  0.02  0.11  0.05  0.05                                       12.3
91P7960  6  0.02  0.19  0.06  0.06                                       15.1
91P7961  7  0.02  0.14  0.04  0.05                                       13.1
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Narrative Pedon Description

Pedon: Solitude

NSSL pedon number: 91P1193

Pedon ID: 91VI-020-005.

Field classification: Fine-loamy, mixed, nonacid, isohyperthermic Aeric Tropaquepts

Revised classification as of January 01, 1995: Solitude; fine-loamy, mixed, superactive, nonacid, isohyperthermic Aeric Tropic Fluvaquents

Location: St. John Island, Virgin Islands; Lameshur Bay Watershed; about 30.5 meters at 210 degrees downslope from Lameshur Bay Road

Latitude: 18°19’20" north

Longitude: 64°43’27" west

Elevation: 0 meters (sea level)

Vegetation: Species of the *Acacia, Bucida, Mangrove, Leucaena, Ginoria, Capparis, Randia,* and *Tamarindus* genera

Geomorphic setting: Toeslope of interfluve of salt marsh mount on a coastal plain

Slope: 3 percent; linear with an aspect of 210 degrees, length of 61 meters, and upslope length of 30 meters

Drainage: Somewhat poorly drained

Average air temperature: Annual—26 °C, summer—27 °C, winter—25 °C

Average annual precipitation: 1,140 mm

Particle-size control section: 25 to 101 cm

Diagnostic features: Ochric epipedon at 0 to 38 cm; cambic horizon at 38 to 140 cm

Geographically associated soils: Cornhill, Jaucas, and Sugar Beach

Described and sampled by: H.R. Mount, W. Lynn, and J. Davis on September 6, 1991

Notes: Free water was at a depth of 155 cm rising to 147 cm. Land crab (*Cardisoma guanhumi*) mounds were about 1 meter apart. No climate station was installed. Desert surface horizon was appearance for A1 horizon. Site will be type location for the Solitude series. Salt crusting was in the area.

A1—0 to 3 cm; light olive brown (2.5Y 5/3) sandy clay loam, light yellowish brown (2.5Y 6/3) dry; moderate thick platy structure; friable, very hard; common fine and common medium roots throughout; many fine and medium tubular pores, many fine and medium voids between rock fragments, and common medium and coarse tubular pores; 10 percent medium irregular iron-manganese masses; 10 percent medium cylindrical wormcasts; 10 percent angular gravel; neutral; abrupt smooth boundary. 91P7955

A2—3 to 15 cm; light olive brown (2.5Y 5/3) sandy clay loam, light yellowish brown (2.5Y 6/3) dry; moderate fine and medium subangular blocky structure; friable, hard; common fine roots throughout; many fine and medium voids between rock fragments; 10 percent medium irregular iron-manganese masses; 10 percent medium cylindrical wormcasts; 10 percent gravel; neutral; clear smooth boundary. 91P7956

Bw1—15 to 26 cm; 50 percent light olive brown (2.5Y 5/3) and 40 percent grayish brown (2.5Y 5/2) sandy clay loam, light olive brown (2.5Y 5/3) crushed, pale yellow (2.5Y 7/4) dry; moderate fine and medium subangular blocky structure; friable, hard; common fine and common medium roots throughout; many fine and medium voids between rock fragments and many medium and coarse tubular pores; 85 percent fine irregular iron-manganese masses; 10 percent medium and coarse cylindrical wormcasts; 10 percent angular gravel; moderately alkaline; gradual smooth boundary. 91P7957

Bw2—26 to 43 cm; 60 percent light olive brown (2.5Y 5/3) and 40 percent grayish brown (2.5Y 5/2) sandy clay loam, light olive brown (2.5Y 5/3) crushed, light yellowish brown (2.5Y 6/3) dry; 40 percent medium and coarse prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable, hard; common fine and common medium roots throughout; many fine and medium tubular pores and many fine and medium voids between rock fragments; 85 percent fine irregular iron-manganese masses; 10 percent fine and medium cylindrical wormcasts; 10 percent angular gravel; moderately alkaline; gradual smooth boundary. 91P7958

Bw3—43 to 70 cm; grayish brown (2.5Y 5/2) sandy clay loam, light yellowish brown (2.5Y 6/3) dry; 40 percent medium and coarse prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable, hard; common fine roots throughout; many fine and medium voids between rock fragments and many medium and coarse tubular pores; 85 percent fine irregular iron-manganese masses; 10 percent fine and medium cylindrical wormcasts; 10 percent angular gravel; moderately alkaline; gradual smooth boundary. 91P7959

Bg1—70 to 145 cm; grayish brown (2.5Y 5/2) clay loam, light yellowish brown (2.5Y 6/3) dry; 10 percent medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; common fine roots throughout; common fine and medium tubular pores and common fine and medium voids between rock fragments; 85 percent fine irregular iron-manganese masses; 10 percent angular gravel; moderately alkaline; gradual smooth boundary. 91P7960

Bg2—145 to 155 cm; light olive brown (2.5Y 5/3) clay loam, light yellowish brown (2.5Y 6/3) dry; 10 percent medium prominent strong brown (7.5YR 4/6) mottles; moderate medium and coarse subangular blocky structure; friable; common fine roots throughout; common fine and medium tubular pores and common fine and medium voids between rock fragments; 85 percent fine irregular iron-manganese masses; 10 percent angular gravel; moderately alkaline. 91P7961

Maho Bay: S91VI-020-006

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Maho Bay; loamy, mixed, isohyperthermic, shallow Typic Haplustolls

SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands

—Pedon: 91P1194, Samples 91P 7962–7964

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) 2 -5	COARSE FRACTIONS (MM) 5 -20	COARSE FRACTIONS (MM) 20 -75	COARSE FRACTIONS (MM) .1- 75	WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM (3B1)				
91P7962S	0- 7	A	26.7	57.4	15.9	17.2		30.2	27.2	7.4	3.6	2.0	1.6	1.3	--	11	--	19	11
91P7963S	7- 19	AB	28.0	58.5	13.5	17.2		32.4	26.1	7.3	2.9	1.6	1.1	0.6	1	3	--	10	4
91P7964S	19- 33	Bw	30.0	56.8	13.2	19.0		31.9	24.9	6.6	4.0	0.6	1.1	0.9	1	5	--	12	6

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	ORGN TOTAL N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	EXTR TOTAL S 6R3b <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2b	DITH-CIT EXTRACTABLE AL 6G7a OF	DITH-CIT EXTRACTABLE MN 6D2a <2MM -->	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT <0.4MM	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3a <- - G/CC	BULK DENSITY 1/3 BAR 4A1d	BULK DENSITY OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- - -PCT OF	WATER CONTENT 1/10 BAR 4B1c <2MM	WATER CONTENT 1/3 BAR 4B1c	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
0- 7	4.32				1.8	0.1	0.1	0.97	0.48				1.11	1.24	0.036			23.9	12.8	0.12
7- 19	2.92				1.8	0.2	0.1	0.94	0.46				1.33	1.47	0.033			21.2	12.9	0.11
19- 33	2.72				1.8	0.2	0.1	0.91	0.43				1.40	1.53	0.029			20.8	12.9	0.11

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9c	CEC SUM CATS 5A3a	CEC NH4- OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- MEQ / 100 G										<- - - - -PCT							1:2	1:1
0- 7	17.5	5.4	0.2	0.7	23.8	7.7		31.5	26.0			76	92				5.1	5.6	5.9
7- 19	19.1	6.3	0.9	0.2	26.5	6.1		32.6	26.4			81	100				5.3	6.0	6.2
19- 33	19.4	6.3	0.6	0.2	26.5	6.4		32.9	27.3			81	97				5.1	5.8	6.3

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size	X-RAY 7A6 peak size	THERMAL DTA Percent	THERMAL TGA Percent	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN	INTER PRETA TION
91P7962	TCLY	MI 3	KK 2				16.0	8.4			1.2			CMIX
91P7963	TCLY	MI 3	KK 2	VR 1	MT 1		18.0	9.2			1.2			
91P7964	TCLY	MI 3	KK 2				20.0	9.7			1.2			CMIX

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i Peak Size	X-RAY 7A3b Peak Size	X-RAY 7A4b Peak Size	THERMAL DTA Percent	THERMAL TGA Percent	TOT RE	OPTICAL GRAIN COUNT 7B1a Percent							INTER PRETA TION
91P7962	VFS						73	QZ72	OW10	BT 7	AM 5	FK 3	PR 2		SMIX
91P7962	VFS							OP 1	FP 1	HNtr	TMtr	CAtr			
91P7962	CSi						38	QZ37	BT26	FP12	FK11	AM 7	OT 5		SMIX
91P7962	CSi							OP 1	PR 1	GStr	POtr	MStr	ZRtr		
91P7963	CSi						35	QZ32	BT29	FK11	FP10	AM 8	OT 7		
91P7963	CSi							PO 2	OP 1	MStr	ZRtr				
91P7964	CSi						57	QZ54	BT23	AM 8	FK 4	CL 2	OT 2		SMIX
91P7964	CSi							PO 2	MI 2	CA 1	FP 1	PR 1	OP 1		
91P7964	CSi							GStr	GNtr	TMtr	ZRtr				

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm CSi Coarse Silt, 0.02-0.05mm

MINERAL INTERPRETATION:

MI	mica	KK	kaolinite	QZ	quartz	OW	oth-weath mn	BT	biotite	AM	amphibole
FK	potas feldsp	PR	pyroxene	OP	opaques	FP	plag-feldspa	HN	hornblende	TM	tourmaline
CA	calcite	OT	other	GS	glass	PO	plant opal	MS	muscovite	ZR	zircon
VR	vermiculite	MT	montmorillon	CL	chlorite	GN	garnet				

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

CMIX = Mixed - Clay SMIX = Mixed - Sand

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed

BASED ON CLAY: Mixed

FAMILY MINERALOGY: Mixed

		ACID OXALATE EXTRACTION				PHOSPHOUS		KCL	TOTAL	(- -WATER CONTENT- -)				(- - - - WATER DISPERSIBLE - - - -)						MIN	AGGRT
		OPT	FE	SI	AL		CIT-	MN	C	0.06	1-	2-	15	<- - PIPETTE - - ><- HYDROMETER - >						SOIL	STABL
		DEN				RET	ACID			BAR	BAR	BAR	BAR	CLAY	SILT	SAND	CLAY	SILT	SAND	CONT	<5mm
SAMPLE	HZ	8J	6C9b	6V2b	6G12b	6S4	6S5	6D3b	6A2d	4B1c	4B1a	4B1a	4B2b	<- - - 3A1c - - -><- - - SML - - ->						8F1	4G1
NO.	NO		<- P C T o f < 2 m m -><- P P M -><- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -><20mm><PCT>																		
91P7962	1	0.10	0.51	0.09	0.25																
91P7963	2	0.08	0.53	0.09	0.24																
91P7964	3	0.08	0.55	0.09	0.24																

Narrative Pedon Description

Pedon: Maho Bay

NSSL pedon number: 91P1194

Pedon ID: 91VI-020-006

Field classification: Loamy, mixed, isohyperthermic, shallow Typic Haplustolls

Revised classification as of January 01, 1995: Maho Bay; loamy, mixed, superactive, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; University of Wisconsin research plot by solar panel on Mary Point

Latitude: 18°22’13" north

Longitude: 66°44’49" west

Geographically associated soils: Cramer, Descalabrado, Isaac, and Southgate

Geomorphic setting: Backslope of side slope of hillside in mountains

Particle-size control section: 0 to 33 cm

Average air temperature: Annual—26.1 °C, summer—27.2 °C, winter—25.0 °C

Average annual precipitation: 1,118 mm

Diagnostic features: Mollic epipedon at 0 to 84 cm; paralithic contact at 84 cm

Slope: 35 percent; linear and convex with an aspect of 170 degrees, length of 381 meters, and upslope length of 229 meters

Elevation: 30 meters

Drainage: Well drained

Described and sampled by: W. Lynn and G. Ray on September 7, 1991

Notes: Soil temperature was 30 °C at a depth of 30 cm. Mollic color extends into cracks in bedrock and/or colluvium or base of pit.

Oi—1 to 0 cm; partially decomposed organic matter; abrupt smooth boundary. Not sampled.

A—0 to 7 cm; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) crushed, very dark grayish brown (10YR 3/2) dry; moderate very fine and fine granular structure; friable, slightly hard, slightly sticky, slightly plastic; many very fine and fine roots throughout; abrupt smooth boundary. 91P7962

AB—7 to 19 cm; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) crushed, brown (7.5YR 4/2) dry; moderate fine and medium granular structure; friable, slightly hard, slightly sticky, slightly plastic; common very fine and fine roots throughout; 10 percent medium cylindrical insect casts and 10 percent medium cylindrical worm nodules; clear smooth boundary. 91P7963

Bw—19 to 33 cm; black (10YR 2/1) loam, very dark gray (10YR 3/1) crushed, very dark grayish brown (10YR 3/2) dry; strong fine and medium subangular blocky structure; friable, slightly hard, slightly sticky, slightly plastic; common very fine and fine roots throughout; 10 percent medium cylindrical insect casts and 10 percent medium cylindrical worm nodules; abrupt wavy boundary. 91P7964

Cr—33 cm; weathered bedrock; massive. Not sampled.

Descalabrado: S91VI-020-007

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Descalabrado; clayey, mixed, isohyperthermic, shallow Typic Argiustolls

SSL—Project: 91P 192, (CP91VI269) St. John, Virgin Islands

—Pedon: 91P1195, Samples 91P 7965–7968

—General methods: 1B1A, 2A1, 2B

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	5 -20	20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - - PCT OF <2MM (3A1)											- - ->	<- PCT OF <75MM(3B1)			->	
91P7965S	0- 9	A	49.5	29.0	21.5	39.3		20.8	8.2	3.9	4.2	2.6	3.8	7.0	6	12	6	37	24
91P7966S	9- 27	Bt1	54.3	28.6	17.1	44.0		20.2	8.4	4.5	3.9	3.3	3.2	2.2	2	5	7	25	14
91P7967S	27- 45	Bt2	57.3	26.6	16.1	45.8		19.1	7.6	4.1	3.3	2.3	2.7	3.7	2	7	6V	25	36
91P7968S	45- 60	Crt	59.6	25.5	14.9	48.3		17.9	7.6	4.5	4.5	1.6	2.1	2.2	2	8	12V	30	91

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3b	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT	OF <2MM -->					PCT <0.4MM		<- - G/CC		- - ->	CM/CM	<- - -PCT OF <2MM			- ->	CM/CM
0- 9	4.91		1		1.5	0.2	0.2	1.11	0.53										26.3	
9- 27	2.69		--		1.7	0.2	0.2	0.92	0.49										26.4	
27- 45	1.41		TR		1.8	0.2	0.2	0.84	0.45				1.18	1.75	0.105			38.7	25.5	0.12
45- 60	0.88		--		1.9	0.2	0.1	0.79	0.44										26.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9c	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - -				-MEQ / 100 G					- - ->	<- - - - -PCT		- - - ->					1:2	1:1
0- 9	40.3	12.8	0.4	0.6	54.1	7.5		61.6	55.0			88	98				5.8	6.4	6.6
9- 27	31.3	13.1	0.5	0.4	45.3	8.5		53.8	49.7			84	91				5.2	6.0	6.4
27- 45	29.6	13.5	0.9	0.4	44.4	7.3		51.7	48.3			86	92				5.0	5.9	6.5
45- 60	27.1	13.0	1.1	0.4	41.6	8.0		49.6	47.1			84	88				4.7	5.8	6.4

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)				THERMAL DTA 7A6	TGA 7A4b	ELEMENTAL 7C3 (Percent) SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7965	TCLY	MT 3	VR 3	KK 2					19.0	8.4			0.4			SMEC
91P7966	TCLY	MT 3	VR 3	KK 2					20.0	8.7			0.3			SMEC
91P7967	TCLY	MT 3	VR 3	KK 2	MC 1				21.0	9.0			0.3			SMEC

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b	TGA 7A4b	OPTICAL TOT RE	GRAIN COUNT 7B1a (Percent)						INTERPRETATION
91P7967	VFS				7	PR58	OW29	QZ 6	FP 5	OP 1	AM 1	SMIX
91P7967	VFS					FKtr	ZRtr	GNtr				
91P7967	CSi				10	PR43	AM42	QZ10	OT 3	MI 1	POtr	SMIX
91P7967	CSi					CDtr	ZRtr	OPtr	GStr	GNtr		

FRACTION INTERPRETATION:

TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm CSi Coarse Silt, 0.02-0.05mm

MINERAL INTERPRETATION:

MT montmorillon	VR vermiculite	KK kaolinite	MC mont-chlorit	PR pyroxene	OW oth-weath mn
QZ quartz	FP plag-feldspa	OP opaques	AM amphibole	FK potas feldsp	ZR zircon
GN garnet	OT other	MI mica	PO plant opal	CD chalcedony	GS glass

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

SMEC = Smectite SMIX = Mixed - Sand

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed

BASED ON CLAY: Montmorillonitic

FAMILY MINERALOGY: Montmorillonitic

COMMENTS: Montmorillonite has hydroxy-interlayers; vermiculite may not.

		ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	(- -WATER 0.06 BAR 4B1c	1-BAR 4B1a	CONTENT- -) 2-BAR 4B1a	15 BAR 4B2b	(- - - - WATER DISPERSIBLE - - - -) <- - PIPETTE - - ><- HYDROMETER - > CLAY 3A1c	SILT	SAND	CLAY SML	SILT	SAND	MIN SOIL CONT 8F1	AGGRT STABL <5mm 4G1
SAMPLE NO.	HZ NO		<- P C T	o f	< 2	m m ->	<- P P M	->	<- - - - - - - - - - -			P E R C E N T			o f	< 2	m m - - - - - - -			><20mm	<PCT>
91P7965	1	0.09	0.72	0.13	0.29							34.8									
91P7966	2	0.09	0.83	0.14	0.32							32.7									
91P7967	3	0.08	0.53	0.15	0.29							32.6									
91P7968	4	0.09	0.91	0.16	0.24							33.9									

Narrative Pedon Description

Pedon: Descalabrado

NSSL pedon number: 91P1195

Pedon ID: 91VI-020-007

Field classification: Clayey, mixed, isohyperthermic, shallow Typic Argiustolls

Revised classification as of January 01, 1995: Susannaberg; clayey, vermiculitic, isohyperthermic, shallow Typic Haplustolls

Location: Cinnamon Bay watershed, St. John Island, Virgin Islands; 33.5 meters upslope from jeep trail

Latitude: 18°21'10" north

Longitude: 64°45'30" west

Elevation: 98 meters

Geomorphic setting: Backslope of side slope in mountains

Surface stoniness: 60 percent.

Slope: 45 percent; north facing; convex horizontal and vertical; total length of 610 meters and upslope length of 381

Average air temperature: Annual—26.1 °C, summer—27.2 °C, winter—25.0 °C

Average annual precipitation: 1,140 mm

Drainage: Well drained

Vegetation: Species of *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugeni, Andira, Clusia, Inga,* and *Mycia* genera

Geographically associated soils: Cramer, Isaac, Southgate, and Victory

Particle-size control section: 9 to 45 cm

Diagnostic features: Mollic epipedon at 0 to 114 cm; argillic horizon at 23 to 114 cm; paralithic contact at 114 cm

Described and sampled by: H.R. Mount, G. Acevedo, B.D. Hudson, and J. Davis on September 9, 1991.

Notes: Pedon was described when moist. Sixty percent of the surface was covered by cobbles, stones, and boulders. Pedon was full characterization site in Cinnamon Bay watershed. University of VI long-term vegetative plots were 22.9 meters upslope from pit. The pit was 30.5 meters upslope from a jeep trail. Clods were taken from the A and Bt horizons.

Oi—1 to 0 cm; partially decomposed organic matter; many fine, many medium, and common coarse roots throughout; abrupt smooth boundary. Not sampled.

A—0 to 9 cm; very dark brown (10YR 2/2) clay loam; moderate fine and medium subangular blocky structure; friable; many fine, many medium, and common coarse roots throughout; many fine and medium voids between rock fragments; 20 percent fine and medium spherical iron-manganese masses; 10 percent angular fine crystal igneous rock fragments 2 to 75 mm in diameter; slightly alkaline; clear smooth boundary. 91P7965

Bt1—9 to 27 cm; very dark brown (10YR 2/2) clay; moderate fine and medium subangular blocky structure; firm; common fine and common medium roots throughout; many fine and medium voids between rock fragments; 15 percent discontinuous distinct very dark brown (10YR 2/2) clay films on faces of peds;

20 percent fine and medium spherical iron-manganese masses; 10 percent fine and medium cylindrical wormcasts; 10 percent angular fine crystal igneous rock fragments 2 to 75 mm in diameter; slightly alkaline; clear wavy boundary. 91P7966

Bt2—27 to 45 cm; dark brown (10YR 3/3) gravelly clay; moderate fine and medium subangular blocky structure; firm; common fine and common medium roots throughout; many fine and medium voids between rock fragments; 15 percent discontinuous distinct very dark brown (10YR 2/2) clay films on faces of peds; 30 percent fine and medium spherical iron-manganese masses; 10 percent fine and medium cylindrical wormcasts; 20 percent angular fine crystal igneous rock fragments 2 to 75 mm in diameter; slightly alkaline; abrupt irregular boundary. 91P7967

Crt—45 cm; dark brown (10YR 3/3) weathered bedrock and clay; massive; common fine roots around fragments; common fine and medium voids between rock fragments. 91P7968

Descalabrado: S91VI-020-008

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Descalabrado; clayey, mixed, isohyperthermic, shallow Typic Argiustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1196, Samples 91P 7969–7972

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND 2-.05	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRACTIONS (MM) 2-5	COARSE FRACTIONS (MM) 5-20	COARSE FRACTIONS (MM) .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->			
91P7969S	0- 5	A	36.5	31.2	32.3			23.1	8.1	5.4	5.7	6.6	7.7	6.9	11	10	--	42	21
91P7970S	5- 23	Bt	41.3	29.7	29.0			25.0	4.7	5.7	6.8	6.4	5.9	4.2	4	14	4	40	22
91P7971S	23- 38	BC	34.7	34.8	30.5			27.8	7.0	4.9	5.2	5.8	7.7	6.9	8	14	30V	64	55
91P7972S	38- 50	Cr	33.9	40.1	26.0			32.9	7.2	5.4	4.3	4.0	5.9	6.4	18	32	--V	60	90

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT OF <2MM -->	EXTRACTABLE FE 6C2b	EXTRACTABLE AL 6G7a	EXTRACTABLE MN 6D2a	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT <0.4MM	LIMITS PI 4F	FIELD MOIST 4A3a <- - G/CC - - ->	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	FIELD MOIST 4B4 <- - -PCT OF <2MM - ->	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
0- 5	3.75	0.343	2					1.14	0.56										20.5	
5- 23	2.70	0.260	1					0.96	0.46										18.8	
23- 38	0.90	0.100	1					1.35	0.54										18.6	
38- 50	0.63	0.069	TR					1.49	0.54										18.3	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-EXTR ITY 6H5a	ACID-EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	BASE SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - - ->											<- - - - -PCT - - - ->					1:2	1:1
0- 5	28.5	10.6	0.5	0.6	40.2	6.9		47.1	41.7			85	96				6.8	7.2
5- 23	25.6	10.7	0.5	0.5	37.3	7.4		44.7	39.6			83	94				6.3	6.8
23- 38	29.9	13.3	0.8	0.3	44.3	6.5		50.8	46.9			87	94				6.1	6.8
38- 50	31.2	16.0	0.9	0.4	48.5	6.6		55.1	50.5			88	96				6.0	6.5

SAMPLE NUMBER	FRACT ION 7A2i peak size	CLAY MINERALOGY (<.002mm) X-RAY VR 3	MT 2	KK 2	VC 2	THERMAL DTA 7A6	TGA 7A4b	ELEMENTAL SiO2 7C3	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTER PRETA TION
		Percent														
91P7970	TCLY	VR 3	MT 2	KK 2	VC 2				18.0	10.2			0.6			VERM
91P7971	TCLY	VR 4	KK 2	VC 1					20.0	10.0			0.4			VERM
91P7972	TCLY	VR 4	KK 2	VC 1					19.0	9.4			0.4			VERM

MINERAL INTERPRETATION:

VR vermiculite MT montmorillon KK kaolinite VC verm-chlorit

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):

VERM = Vermiculitic

PEDON MINERALOGY

BASED ON SAND/SILT:

BASED ON CLAY: Vermiculitic

FAMILY MINERALOGY: Vermiculitic

COMMENTS:

Some evidence of chlorite-mica in Bt (91P7970)

Narrative Pedon Description

Pedon: Descalabrado

NSSL pedon number: 91P1196

Pedon ID: S91VI-020-008

Field classification: Clayey, mixed, isohyperthermic, shallow Typic Argiustolls

Revised classification as of January 01, 1995: Susannaberg; clayey, vermiculitic, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; Cinnamon Bay Watershed; 45.7 meters upslope from jeep trail

Latitude: 18°21’10" north

Longitude: 64°45’27" west

Elevation: 91 meters

Physiography: Hillside or mountainside

Geomorphic position: Lower third of a backslope of a side slope

Slope: 43 percent; convex; north facing

Average annual precipitation: 1,160 mm; ustic moisture regime

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderately slow

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Drainage: Well drained

Land use: Forestland, not grazed

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Surface stoniness: Class 2

Erosion or deposition: Slight

Runoff: None

Particle-size control section: 5 to 23 cm

Parent material: Local colluvium from igneous-fine material over solid rock from igneous-fine material

Diagnostic features: Mollic epipedon at 0 to 38 cm; argillic horizon at 5 to 23 cm; paralithic contact at 38 to 51 cm

Described and sampled by: G. Acevedo, H.R. Mount, and J. Davis on September 9, 1991

Notes: Pedon was described when moist. Twenty-five percent of the surface was covered with cobbles and stones. Pedon was reference site for NSSL lab data. Pit was 45.7 meters upslope from a jeep trail. The Cr horizon resembles saprolite. Boulder/rock outcrop ledges followed the contour but were disrupted by a gut.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt smooth boundary. Not sampled.

A—0 to 5 cm; very dark brown (10YR 2/2) clay; moderate fine and medium subangular blocky structure; friable; few coarse and common fine roots throughout; common fine and medium voids between rock fragments and few

fine and medium tubular pores; mildly alkaline; 10 percent igneous gravel; clear smooth boundary. 91P7969

Bt—5 to 23 cm; very dark brown (10YR 2/2) clay; moderate medium subangular blocky structure; friable; few coarse and common fine roots throughout; common fine and medium voids between rock fragments and few fine and medium tubular pores; few discontinuous faint clay films on faces of peds; many fine irregular soft masses of iron-manganese; mildly alkaline; 10 percent igneous gravel; clear wavy boundary. 91P7970

BC—23 to 38 cm; dark brown (10YR 3/3) gravelly clay; moderate fine subangular blocky structure; firm; few fine and few medium roots throughout; common fine and medium voids between rock fragments and common fine tubular pores; few discontinuous faint clay films on faces of peds; many medium and coarse irregular soft masses of iron-manganese and few fine and medium cylindrical wormcasts; mildly alkaline; 10 percent igneous gravel; abrupt smooth boundary. 91P7971

Cr—38 to 51 cm; 15 percent dark yellowish brown (10YR 4/4) and 85 percent yellowish brown (10YR 5/4) weathered bedrock; massive; few fine roots matted around stones; mildly alkaline. 91P7972

Cramer: S91VI-020-009

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Cramer; fine, mixed, isohyperthermic Typic Argiustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1197, Samples 91P 7973–7976

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACTIONS (MM) WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
91P7973S	0- 8	A	49.9	29.3	20.8			21.5	7.8	5.0	4.1	3.4	3.7	4.6	4	24	9V	47	37
91P7974S	8- 17	Bt1	52.7	29.5	17.8			21.8	7.7	4.8	3.9	3.1	3.2	2.8	1	6	3V	22	10
91P7975S	17- 48	Bt2	52.6	30.4	17.0			23.4	7.0	5.1	4.2	2.8	2.7	2.2	1	6	9V	26	16
91P7976S	48- 60	Bt3	53.2	27.9	18.9			20.9	7.0	4.7	3.4	3.3	3.7	3.8	3	4	9V	28	16

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	(BULK DENSITY) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(WATER CONTENT) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 8	4.73	0.443	3					0.99	0.48										23.7	
8- 17	3.45	0.358	1					0.96	0.46										24.0	
17- 48	1.64	0.175	1					0.92	0.40										21.1	
48- 60	1.21	0.265	TR					0.85	0.38										20.1	

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACIDITY 6H5a	EXTR AL 6G9b	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	(BASE SAT) SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(PH) CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->				1:2	1:1
0- 8	33.8	11.0	0.7	1.1	46.6	8.4		55.0	49.6			85	94				6.3	6.7
8- 17	31.5	17.2	1.0	0.7	50.4	10.8		61.2	50.8			82	99				5.9	6.4
17- 48	31.3	9.5	0.7	0.5	42.0	9.7		51.7	48.3			81	87				5.5	6.0
48- 60	31.3	8.6	0.8	0.5	41.2	7.9		49.1	45.2			84	91				5.8	6.6

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)					THERMAL DTA 7A6 (Percent)	TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7974	TCLY	VR 3	KK 3	MT 2	VC 2					20.0	10.3			0.9			CMIX
91P7976	TCLY	VR 3	KK 3	VC 2	GE 1					19.0	10.3			0.6			VERM

MINERAL INTERPRETATION:
VR vermiculite KK kaolinite MT montmorillon VC verm-chlorit GE goethite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON):
CMIX = Mixed - Clay SMIX = Mixed - Sand VERM = Vermiculitic

PEDON MINERALOGY
BASED ON SAND/SILT:
BASED ON CLAY: Vermiculitic
FAMILY MINERALOGY: Vermiculitic
COMMENTS:
Some evidence of chlorite-mica in Bt (91P 7974)

Narrative Pedon Description

Pedon: Cramer

NSSL pedon number: 91P1197

Pedon ID: S91VI-020-009

Field classification: Fine, mixed, isohyperthermic Typic Argiustolls

Revised classification as of January 01, 1995: Susannaberg; fine, vermiculitic, isohyperthermic Typic Haplustolls

Location: St. John Island, Virgin Islands; Cinnamon Bay Watershed; 50 meters west of small gut and about 100 meters west of pedon S91VI-020-008

Latitude: 18°21’09" north

Longitude: 64°45’35" west

Geomorphic position: Backslope of a side slope on a mountainside

Slope: 50 percent; northeast facing; convex horizontal and vertical; total length of 610 meters and upslope length of 381 meters

Elevation: 104 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderately slow

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,160 mm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Surface stoniness: 40 percent

Erosion or deposition: Slight

Runoff: None

Particle-size control section: 8 to 61 cm

Parent material: Local colluvium from igneous-fine material over solid rock from igneous-fine material

Diagnostic features: Mollic epipedon at 0 to 48 cm; argillic horizon at 8 to 61 cm; paralithic contact at 61 cm

Described and sampled by: G. Acevedo, H.R. Mount, and J. Davis on September 9, 1991

Notes: Pedon was sampled when moist. Forty percent of the surface was covered with cobbles, stones, and boulders. Boulder/rock outcrop ledges paralleled the contour and were disrupted by a nearby gut. Pedon was a reference site for NSSL lab data. The site is a moderately deep Cramer soil. The pit was described from about 2:30 to 4 p.m., and the soil temperature at 3 p.m. was 27 °C at a depth of 50 cm.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen woodland; abrupt smooth boundary. Not sampled.

A—0 to 8 cm; very dark brown (10YR 2/2) very gravelly clay; moderate fine and medium subangular blocky structure; firm; few coarse and common fine roots throughout; common fine and medium voids between rock fragments and few

coarse tubular pores; mildly alkaline; 40 percent igneous gravel; clear wavy boundary. 91P7973

Bt1—8 to 18 cm; very dark grayish brown (10YR 3/2) gravelly clay; strong fine and medium subangular blocky structure; firm; few medium and common fine roots throughout; common fine and medium voids between rock fragments and common fine to coarse tubular pores; common discontinuous faint clay films on faces of peds; many fine irregular soft masses of iron-manganese and common coarse cylindrical wormcasts; mildly alkaline; 20 percent igneous gravel; clear wavy boundary. 91P7974

Bt2—18 to 48 cm; dark brown (10YR 3/3) gravelly clay; strong medium subangular blocky structure; firm; few medium and coarse and common fine roots throughout; common fine and medium voids between rock fragments and few fine to coarse tubular pores; common discontinuous faint clay films on faces of peds; many fine irregular soft masses of iron-manganese and common coarse cylindrical wormcasts; mildly alkaline; 15 percent igneous gravel; clear smooth boundary. 91P7975

Bt3—48 to 61 cm; dark reddish brown (5YR 3/4) clay; strong coarse subangular blocky structure; very firm; few fine and few medium roots throughout; common fine and medium voids between rock fragments and common fine to coarse tubular pores; common discontinuous faint clay films on faces of peds; many fine irregular soft masses of iron-manganese and common coarse cylindrical wormcasts; mildly alkaline; 10 percent igneous gravel; soil temperature at a depth of 50 cm at 3:00 p.m. was 27 °C; abrupt wavy boundary. 91P7976

Cr—61 cm; unweathered bedrock; massive. Not sampled.

Maho Bay: S91VI-020-010

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Maho Bay; loamy, mixed, isohyperthermic, shallow Typic Haplustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1198, Samples 91P 7977–7979

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) 2 -5	COARSE FRACTIONS (MM) 5 -20	COARSE FRACTIONS (MM) 20 -75	COARSE FRACTIONS (MM) 75	WEIGHT >2MM .1- % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->				
91P7977S	0- 12	A	20.3	64.1	15.6			51.5	12.6	3.3	3.2	3.1	3.7	2.3	4	7	--V	22	18
91P7978S	12- 30	Bw	19.9	61.2	18.9			49.5	11.7	4.3	3.7	3.5	4.0	3.4	6	17	9V	42	44
91P7979S	30- 50	Cr	16.0	57.8	26.2			46.6	11.2	7.7	5.7	4.5	5.4	2.9	6	39	11	64	56

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	EXTRACTABLE FE 6C2b OF	EXTRACTABLE AL 6G7a <2MM	EXTRACTABLE MN 6D2a -->	CEC 8D1	15 BAR 8D1	LIMITS LL 4F1 PCT	LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3a <- -	BULK DENSITY 1/3 BAR 4A1d G/CC - -	BULK DENSITY OVEN DRY 4A1h ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <- -	WATER CONTENT 1/10 BAR 4B1c -PCT	WATER CONTENT 1/3 BAR 4B1c OF	WATER CONTENT 15 BAR 4B2a <2MM	WRD WHOLE SOIL 4C1 - -> CM/CM
0- 12	6.25	0.224	2					1.34	0.60										12.1	
12- 30	3.06	0.072	TR					0.86	0.41										8.2	
30- 50	0.80	0.058	--					0.85	0.43										6.8	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 6N2e	MG 6O2d	NA 6P2b	K 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	CEC SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->										<- - - - -PCT - - - ->						1:2	1:1
0- 12	6.6	6.1	0.9	0.2	13.8	19.0		32.8	27.3			42	51				4.2	4.6
12- 30	2.1	3.4	0.4	TR	5.9	16.4		22.3	17.1			26	35				4.0	4.5
30- 50	0.2	2.9	0.4	--	3.5	12.3		15.8	13.6			22	26				4.1	4.6

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i peak size	X-RAY 7A6 Percent	THERMAL DTA	THERMAL TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	ELEMENTAL 7C3 Percent	EGME RETN	INTER PRETA TION
91P7978	TCLY	KK 3 MI 2 VM 2					22.0	9.4			2.9				CMIX

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i Peak Size	X-RAY 7A3b Percent	THERMAL DTA	THERMAL TGA	TOT RE	OPTICAL 7A4b Percent	OPTICAL	GRAIN COUNT 7B1a							INTER PRETA TION
91P7978	VFS							OW89	FP 9	PR 1	POtr	BTtr	QZtr			SMIX
91P7978	VFS							AMtr								

MINERAL INTERPRETATION:

KK kaolinite MI mica VM vermici-mica OW oth-weath mn FP plag-feldspa PR pyroxene

PO plant opal BT biotite QZ quartz AM amphibole

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON): SMEC = Smectite SMIX = Mixed - Sand CMIX = Mixed - Clay

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed

BASED ON CLAY: Mixed

FAMILY MINERALOGY: Mixed

COMMENTS:

Narrative Pedon Description

Pedon: Maho Bay

NSSL pedon number: 91P1198

Pedon ID: S91VI-020-010

Field classification: Loamy, mixed, isohyperthermic, shallow Typic Haplustolls

Revised classification as of January 01, 1995: Maho Bay; loamy, mixed, superactive, isohyperthermic, shallow Ustic Ustropepts

Location: St. John Island, Virgin Islands; Maho Bay Watershed; 30.5 meters downslope from S91VI-020-011 and 61 meters downslope from S91VI-020-012

Latitude: 18°21’01" north

Longitude: 64°44’43" west

Geomorphic position: Upper third of a backslope of a side slope on a mountainside

Slope: 60 percent; east facing; convex horizontal and vertical; total length of 914 meters and upslope length of 61 meters

Elevation: 305 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderate

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 117 cm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Surface stoniness: 0.1 percent.

Erosion or deposition: Slight

Runoff: None

Particle-size control section: 0 to 30 cm

Parent material: Residuum from sandstone-siltstone material over solid rock from sandstone-siltstone material

Diagnostic features: Mollic epipedon at 0 to 30 cm; paralithic contact at 30 to 51 cm

Described and sampled by: G. Acevedo, H.R. Mount, B.D. Hudson, and J. Davis on September 10, 1991

Notes: The soil was described when dry. Colors were for exterior peds. Old road was 9.1 meters upslope and 9.1 meters downslope. Trees were uniform, and the site was probably used for sugarcane. Pedon was described in the a.m. and was a reference site for NSSL lab data. The site was about 30.5 meters downslope from S91VI-020-011.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt smooth boundary. Not sampled.

A—0 to 13 cm; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; hard, friable; few coarse and common fine roots throughout; common fine and medium voids between rock fragments and many fine and medium tubular pores; many fine and medium

cylindrical wormcasts; 5 percent channers consisting of mixed sedimentary rocks; clear wavy boundary. 91P7977

Bw—13 to 30 cm; dark brown (10YR 3/3) loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; hard, friable; few fine and few medium roots throughout; common fine and medium voids between rock fragments and many fine and medium tubular pores; many fine and medium cylindrical wormcasts; slightly acid; 12 percent channers consisting of mixed sedimentary rocks; 5 percent fragments 20 to 75 mm in diameter consisting of mixed sedimentary rocks; clear wavy boundary. 91P7978

Cr—30 to 51 cm; brown (10YR 5/3) and greenish gray (5GY 5/1) weathered bedrock composed of saprolite that crushes to loam, light brownish gray (10YR 6/2) dry; massive; few fine and few medium roots matted around stones. 91P7979

Maho Bay: S91VI-020-011

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Maho Bay; loamy, mixed, isohyperthermic, shallow Typic Haplustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1199, Samples 91P 7980–7982

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
91P7980S	0- 18	A	26.1	47.4	26.5			35.2	12.2	5.3	3.6	4.4	6.5	6.7	8	13	2V	39	35
91P7981S	18- 29	Bw	20.4	49.5	30.1			34.2	15.3	5.0	3.0	3.8	7.9	10.4	20	43	8V	78	75
91P7982S	29- 40	Cr	19.8	57.1	23.1			37.2	19.9	8.8	3.3	3.4	4.9	2.7	10	19	51V	83	89

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG - LIMITS -) LL 4F1	PI 4F	(BULK DENSITY) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(WATER CONTENT) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 18	5.68	0.359	10					1.11	0.58										15.2	
18- 29	2.32	0.138	3					0.78	0.42										8.5	
29- 40	0.83	0.055	1					0.56	0.36										7.1	

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT		- - - ->				1:2	1:1
0- 18	18.1	9.5	0.7	0.2	28.5	7.3		35.8	29.0			80	98				6.0	6.2
18- 29	3.2	5.5	0.7	0.2	9.6	11.4		21.0	16.0			46	60				4.5	5.0
29- 40	0.4	4.5	0.5	0.1	5.5	8.7		14.2	11.0			39	50				4.2	4.9

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             < - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - - - - ->
             FRACT < - - - - - - X-RAY - - - - - -><- - - THERMAL - - - -><- - - - - - - - ELEMENTAL - - - - - - - - -><- -> EGME INTER
SAMPLE        ION <                            >< - DTA - -><- - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <     > RETN PRETA
                   < - - - - - -   7A2i - - - - - -><- 7A6  - >< - 7A4b - ><- - - - - - - - - - 7C3 - - - - - - - - - -><     >  7D2  TION
NUMBER       <- - >< - - - - peak size - - - - - ><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - - -><- -><- ->
91P7981       TCLY  KK 3  VR 3  MI 3  VC 1                                       19.0   7.6               2.0                    CMIX
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             < - - - - - - - - - - - - - - - - - - - - - -  SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
             FRACT < - - - - - - X-RAY - - -><- - - THERMAL - - - -><- - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE        ION <                      >< - DTA - -><- TGA - ->TOT RE< - - - - - - GRAIN COUNT - - - - - -><                >PRETA
                   < - - - - - 7A2i - - - - -><- 7A3b - >< - 7A4b - >< - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER       < - -><- - - Peak Size - - -><- - - Percent - - - -><- - - - - - - - - Percent - - - - - - - - -><- - - - - - - - -><- - >
91P7981       VFS                                                      1  OW83  FP14  QZ 1  PR 1  POtr  BTtr                  SMIX
91P7981       VFS                                                         MItr  OPtr  GStr
MINERAL INTERPRETATION:
    KK  kaolinite        VR  vermiculite      MI  mica              VC  verm-chlorit     OW  oth-weath mn     FP  plag-feldspa
    QZ  quartz           PR  pyroxene         PO  plant opal        BT  biotite          OP  opaques          GS  glass
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON):    CMIX = Mixed - Clay           SMIX = Mixed - Sand
PEDON MINERALOGY
    BASED ON SAND/SILT:  Mixed
    BASED ON CLAY:  Mixed
    FAMILY MINERALOGY:  Mixed
    COMMENTS: Some  evidence of chlorite-mica in Bt (91P 7981)   clay mineralogy borderline vermiculitic
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Narrative Pedon Description

Pedon: Maho Bay

NSSL pedon number: 91P1199

Pedon ID: S91VI-020-011

Field classification: Loamy, mixed, isohyperthermic, shallow Typic Haplustolls

Revised classification as of January 01, 1995: Maho Bay; loamy, mixed, superactive, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; Maho Bay Watershed; 30.5 meters upslope from S91VI-020-011 and 30.5 meters downslope from S91VI-020-012

Latitude: 18°21’00" north

Longitude: 64°44’44" west

Geomorphic position: On upper third of a shoulder of a side slope in mountains

Slope: 25 percent; southeast facing; convex horizontal and vertical; total length of 914 meters and upslope length of 30.5 meters

Elevation: 317 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderate

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,160 mm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Vegetation: Species of the *Pimenta, Sabinea, Guettaria, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Surface stoniness: 0.1 percent

Erosion or deposition: Slight

Runoff: None

Particle-size control section: 0 to 28 cm

Parent material: Residuum from sandstone-siltstone material over solid rock from sandstone-siltstone material

Diagnostic features: Mollic epipedon at 0 to 28 cm; paralithic contact at 28 to 41 cm

Described and sampled by: G. Acevedo, H.R. Mount, B.D. Hudson, and J. Davis on September 10, 1991

Notes: The pedon was described in the a.m. when dry. The site was about 30.5 meters upslope from Maho Bay pedon S91VI-020-010. The leaf litter on this site was thicker than on any of the previous sites. Many trees ranging from 2 to 8 cm diameter at breast height were at the site, making a fairly uniform stand more than 10 meters tall. The site had some bamboo understory.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt smooth boundary. Not sampled.

A—0 to 18 cm; very dark brown (10YR 2/2) clay loam, dark grayish brown (10YR 4/2) dry; weak coarse granular structure parting to moderate fine subangular blocky; hard, friable; few coarse and common fine and medium roots throughout; many fine and medium voids between rock fragments and many

fine and medium tubular pores; many fine and medium cylindrical worm nodules; neutral; 1 percent fragments 20 to 75 mm in diameter consisting of mixed sedimentary rocks; 10 percent channers consisting of mixed sedimentary rocks; clear wavy boundary. 91P7980

Bw—18 to 28 cm; dark brown (10YR 3/3) very channery clay loam, grayish brown (10YR 5/2) dry; moderate very fine and fine subangular blocky structure; hard, friable; few medium and common fine roots throughout; many fine and medium voids between rock fragments and many fine and medium tubular pores; many fine and medium cylindrical worm nodules; slightly acid; 12 percent channers consisting of mixed sedimentary rocks; 6 percent fragments 20 to 75 mm in diameter consisting of mixed sedimentary rocks; clear wavy boundary. 91P7981

Cr—28 to 41 cm; brown to dark brown (10YR 4/3) weathered bedrock composed of saprolite that crushes to clay loam in the fine-earth fraction, brown (10YR 5/3) dry; massive; few fine and medium roots matted around stones; slightly acid; abrupt smooth boundary. 91P7982

Maho Bay: S91VI-020-012

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Maho Bay; loamy, mixed, isohyperthermic, shallow Typic Haplustolls

SSL—Pedon: 91P1200, Samples 91P 7983–7985

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002 (1)	TOTAL SILT .002-.05 (2)	TOTAL SAND .05-2 (3)	CLAY FINE LT .0002 (4)	CLAY CO3 LT .002 (5)	SILT FINE .002-.02 (6)	SILT COARSE .02-.05 (7)	SAND VF .05-.10 (8)	SAND F .10-.25 (9)	SAND M .25-.50 (10)	SAND C .5-1 (11)	SAND VC 1-2 (12)	COARSE FRACTIONS WEIGHT 2-5 (13)	WEIGHT 5-20 (14)	WEIGHT 20-75 (15)	WEIGHT .1-75 (16)	(>2MM) WT % OF WHOLE SOIL (17)
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
91P7983S	0- 9	A	27.0	42.3	30.7			33.7	8.6	5.9	4.3	4.9	7.6	8.0	8	13	9V	47	40
91P7984S	9- 19	Bw	24.8	41.0	34.2			34.8	6.2	5.1	4.9	5.7	8.4	10.1	14	23	37V	82	84
91P7985S	19- 40	Cr	21.0	45.6	33.4			39.2	6.4	5.0	5.4	6.6	8.8	7.6	22	26	1	63	79

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 9	6.63	0.422	3					1.16	0.57										15.3	
9- 19	3.35	0.239	1					1.00	0.43										10.6	
19- 40	0.72	0.056	4					1.31	0.52										10.9	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH CACL2 .01M 8C1f 1:2	PH H2O 8C1f 1:1
	<- - - - - - - - - - - - -MEQ / 100 G									- - - ->	<- - - - -PCT		- - - ->					
0- 9	10.9	10.6	1.1	0.3	22.9	12.4		35.3	31.3			65	73				4.8	5.4
9- 19	5.2	9.2	1.0	0.2	15.6	10.8		26.4	24.8			59	63				4.4	5.0
19- 40	2.9	12.8	2.5	0.1	18.3	11.2		29.5	27.6			62	66				4.3	4.8

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL 7C3 SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7984	TCLY	VC 3 KK 3 MI 2				19.0	10.2			1.0			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	THERMAL DTA 7A3b (Percent)	THERMAL TGA 7A4b (Percent)	OPTICAL TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)	INTERPRETATION
91P7984	VFS				3	OW69 FP25 QZ 3 PR 2 AM 1 POtr	
91P7984	VFS					MItr BTtr OPtr	

MINERAL INTERPRETATION:

VC verm-chlorit KK kaolinite MI mica OW oth-weath mn FP plag-feldspa QZ quartz
PR pyroxene AM amphibole PO plant opal BT biotite OP opaques

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed
BASED ON CLAY: Mixed
FAMILY MINERALOGY: Mixed
COMMENTS: Clay mineralogy borderline vermiculitic; VC acts like VR for cation exchange activity

Narrative Pedon Description

Pedon: Maho Bay

NSSL pedon number: 91P1200

Pedon ID: S91VI-020-012

Field classification: Loamy, mixed, isohyperthermic, shallow Typic Haplustolls

Revised classification as of January 01, 1995: Maho Bay; loamy, mixed, superactive, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; Maho Bay Watershed; 30 meters upslope from S91VI-020-011 and 60 meters upslope from S91VI-020-010

Latitude: 18°20’59" north

Longitude: 64°44’45" west

Geomorphic position: Upper third of summit interfluve in mountains

Slope: 5 percent; southeast facing; convex horizontal and vertical; total length of 914 meters and upslope length of 1.5 meters

Elevation: 329 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderate

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 117 cm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Surface stoniness: 0.1 percent.

Erosion or deposition: Slight

Runoff: None

Particle-size control section: 0 to 20 cm

Parent material: Residuum from sandstone-siltstone material over solid rock from sandstone-siltstone material

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Geographically associated soils: Victory, Cramer, and Southgate

Diagnostic features: Mollic epipedon at 0 to 20 cm; paralithic contact at 20 to 41 cm

Described and sampled by: G. Acevedo, H.R. Mount, B.D. Hudson, and J. Davis on September 10, 1991

Notes: Described from hand dug pit. The soil was dry. Pedon was described in the a.m. and was a reference site for NSSL lab data. The soil was shallower than Maho Bay soils downslope.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt smooth boundary. Not sampled.

A—0 to 10 cm; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; hard, friable; few medium and coarse and common fine roots throughout; many fine and medium voids between rock fragments and common very fine and fine tubular pores; 10 percent channers consisting of mixed sedimentary rocks; 5 percent fragments

20 to 75 mm in diameter consisting of mixed sedimentary rocks; clear smooth boundary. 91P7983

Bw—10 to 20 cm; very dark grayish brown (10YR 3/2) very channery clay loam, grayish brown (10YR 5/2) dry; moderate very fine and fine subangular blocky structure; hard, friable; few medium and common fine roots throughout; many fine and medium voids between rock fragments and many very fine and fine tubular pores; slightly acid; 20 percent fragments 20 to 75 mm in diameter consisting of mixed sedimentary rocks; 35 percent channers consisting of mixed sedimentary rocks; abrupt smooth boundary. 91P7984

Cr—20 to 41 cm; olive brown (2.5Y 4/3) weathered bedrock composed of saprolite that crushes to loam in the fine-earth fraction, light brownish gray (10YR 6/2) dry; massive; common fine roots matted around stones; moderately acid. 91P7985

Isaac: S91VI-020-013

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Isaac; fine, mixed, isohyperthermic Typic Haplustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1201, Samples 91P 7986–7988

—General methods: 1B1A, 2A1, 2B

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	WEIGHT .1- 75	(>2MM) WT % OF WHOLE SOIL
			<- - PCT OF <2MM (3A1)											- ->	<- PCT OF <75MM(3B1)			->	
91P7986S	0- 8	A	43.1	34.0	22.9			28.9	5.1	3.6	4.2	4.4	5.1	5.6	4	15	8V	41	27
91P7987S	8- 38	Bw	42.1	35.3	22.6			30.2	5.1	5.8	4.5	4.6	4.7	3.0	4	5	16V	38	25
91P7988S	38- 62	BC	26.2	29.5	44.3			24.0	5.5	7.8	8.8	10.3	11.4	6.0	8	37	25V	81	70

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG - LIMITS -) LL 4F1	PI 4F	(BULK DENSITY) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(WATER CONTENT) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 8	4.19	0.454	3					0.97	0.60										25.8	
8- 38	2.09	0.255	1					1.01	0.54										22.7	
38- 62	0.59	0.076	1					1.59	0.69										18.2	

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - -MEQ / 100 G									- - ->	<- - - - -PCT		- - - ->					1:2	1:1
0- 8	26.1	13.1	0.5	1.9	41.6	4.1		45.7	41.8			91	100				6.3	6.7	6.7
8- 38	27.5	10.8	0.5	0.9	39.7	5.8		45.5	42.7			87	93				5.7	6.4	7.0
38- 62	25.9	15.8	0.6	0.3	42.6	3.8		46.4	41.6			92	100				5.3	6.6	7.2

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i peak size	THERMAL DTA 7A6 Percent	THERMAL TGA 7A4b Percent	ELEMENTAL 7C3 SiO2 Percent	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7987	TCLY	MT 3 VR 3 KK 2 MI 1 VC 1				20.0	12.2			0.7			

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i Peak Size	THERMAL DTA 7A3b Percent	THERMAL TGA 7A4b Percent	TOT RE	OPTICAL GRAIN COUNT 7B1a Percent	INTERPRETATION
91P7987	VFS				1	OW77 FP15 PR 5 HN 1 QZ 1 BT 1	
91P7987	VFS					MStr AMtr POtr MItr	

FRACTION INTERPRETATION: TCLY Total Clay, <0.002mm VFS Very Fine Sand, 0.05-0.10mm

MINERAL INTERPRETATION:

MT montmorillon VR vermiculite KK kaolinite MI mica VC verm-chlorit OW oth-weath mn

FP plag-feldspa PR pyroxene HN hornblende QZ quartz BT biotite MS muscovite

AM amphibole PO plant opal

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed

BASED ON CLAY: Mixed

FAMILY MINERALOGY: Montmorillonitic

COMMENTS: Weighted ave resistant re = 89.4% re of csl = 20 % need to run csi

Narrative Pedon Description

Pedon: Isaac

NSSL pedon number: 91P1201

Pedon ID: S91VI-020-013

Field classification: Fine, mixed, isohyperthermic Typic Haplustolls

Revised classification as of January 01, 1995: Susannaberg; fine-loamy, mixed, superactive, isohyperthermic Typic Haplustolls

Location: St. John Island, Virgin Islands; Cinnamon Bay Watershed; 9 meters upslope from America Hill Trail

Latitude: 18°21’16" north

Longitude: 64°45’06" west

Geomorphic position: Lower third of a backslope of a side slope in mountains

Slope: 55 percent; west facing; convex horizontal andvertical; total length of 229 meters and upslope length of 213 meters

Elevation: 73 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderately slow

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,160 mm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Surface stoniness: 60 percent

Erosion or deposition: Slight

Runoff: None

Particle-size control section: 25 to 61 cm

Parent material: Local colluvium from igneous-fine material over residuum from igneous-fine material

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Diagnostic features: Mollic epipedon at 0 to 38 cm; cambic horizon at 38 to 61 cm; paralithic contact at 61 to 71 cm

Described and sampled by: G. Acevedo, H.R. Mount, B.D. Hudson, B.C. Dubee, and J. Davis on September 11, 1991

Notes: The pit was dug with shovels and spades and was a reference site for NSSL lab data. An estimated 60 percent of the surface was covered with gravel, cobbles, and stones. A few boulders were also in the area. The site was cultivated for sugarcane in the past. Most of the gravel in the A horizon was concentrated at the top.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt smooth boundary. Not sampled.

A—0 to 8 cm; very dark brown (10YR 2/2) gravelly clay, very dark brown (10YR 2/2) dry; strong fine subangular blocky structure; hard, friable; few medium and coarse and common fine roots throughout; many fine and medium voids between rock fragments and many fine and medium tubular pores; many fine

and medium and common coarse cylindrical wormcasts; neutral; 20 percent igneous gravel; 5 percent igneous rocks fragments 20 to 75 mm in diameter; clear smooth boundary. 91P7986

Bw—8 to 38 cm; very dark brown (10YR 2/2) gravelly clay, very dark grayish brown (10YR 3/2) dry; strong fine and medium subangular blocky structure; hard, firm; few fine and medium roots throughout; many fine and medium voids between rock fragments and many fine and medium tubular pores; common discontinuous faint clay films on faces of peds; many fine and medium and common coarse cylindrical wormcasts; neutral; 10 percent igneous rocks fragments 20 to 75 mm in diameter; 20 percent igneous gravel; clear wavy boundary. 91P7987

BC—38 to 61 cm; brown to dark brown (10YR 4/3) very gravelly clay, 40 percent very dark grayish brown (10YR 3/2) and 60 percent brown to dark brown (10YR 4/3) dry and crushed; moderate fine subangular blocky structure; hard, firm; few fine and medium roots throughout; common fine and medium voids between rock fragments and common fine and medium tubular pores; many coarse irregular soft masses of iron-manganese and many fine and medium cylindrical wormcasts; neutral; 20 percent igneous rocks fragments 20 to 75 mm in diameter; 35 percent igneous gravel; clear wavy boundary. 91P7988

Cr—61 to 71 cm; strong brown (7.5YR 4/6) weathered bedrock composed of saprolite that crushes to clay in the fine-earth fraction, brown to dark brown (7.5YR 4/4) dry; massive. Not sampled.

Cramer: S91VI-020-014

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Cramer; clayey, mixed, isohyperthermic, shallow Typic Argiustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1202, Samples 91P 7989–7990

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- CLAY LT .002 (TOTAL)	-2-- SILT .002 -.05 (TOTAL)	-3-- SAND .05 -2 (TOTAL)	-4-- FINE LT .0002 (CLAY)	-5-- CO3 LT .002 (CLAY)	-6-- FINE .002 -.02 (SILT)	-7-- COARSE .02 -.05 (SILT)	-8-- VF .05 -.10 (SAND)	-9-- F .10 -.25 (SAND)	-10- M .25 -.50 (SAND)	-11- C .5 -1 (SAND)	-12- VC 1 -2 (SAND)	-13- 2 -5 (COARSE FRACTIONS (MM) WEIGHT)	-14- 5 -20	-15- 20 -75	-16- .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
91P7989S	0- 10	A	45.8	28.2	26.0			24.5	3.7	2.5	2.1	2.0	5.2	14.2	1	3	17V	40	21
91P7990S	10- 36	Bt	51.7	28.9	19.4			24.1	4.8	3.0	2.6	2.5	4.5	6.8	7	17	15V	49	39

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG LIMITS) LL 4F1	PI 4F	(BULK DENSITY) FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	(WATER CONTENT) FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 10	4.47	0.408						1.05	0.60										27.3	
10- 36	2.48	0.299	TR					0.90	0.48										25.0	

DEPTH (CM)	(NH4OAC EXTRACTABLE BASES) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	(CEC) SUM CATS 5A3a	NH4-OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	(BASE SAT) SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(PH) CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - - - -MEQ / 100 G									->	<- - - - -PCT - - - ->							
0- 10	31.4	10.0	0.7	0.5	42.6	10.7		53.3	48.2			80	88				6.0	6.4
10- 36	26.1	11.1	0.7	0.4	38.3	11.4		49.7	46.7			77	82				5.3	6.1

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	DTA 7A6 (Percent)	TGA 7A4b (Percent)	SiO2 (7C3)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
91P7990	TCLY	VR 3 VC 2 KK 2 MT 2 GE 1				21.0	12.3			0.4			VERM

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (Peak Size)	DTA 7A3b (Percent)	TGA 7A4b (Percent)	TOT RE	OPTICAL GRAIN COUNT 7B1a (Percent)	INTERPRETATION
91P7990	VFS				3	OW67 FP20 PR 5 BT 3 HN 2 PO 1	SMIX
91P7990	VFS					QZ 1 OP 1 MStr GStr	

MINERAL INTERPRETATION:

VR	vermiculite	VC	verm-chlorit	KK	kaolinite	MT	montmorillon	GE	goethite	OW	oth-weath mn
FP	plag-feldspa	PR	pyroxene	BT	biotite	HN	hornblende	PO	plant opal	QZ	quartz
OP	opaques	MS	muscovite	GS	glass						

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

INTERPRETATION (BY HORIZON): VERM = Vermiculitic SMIX = Mixed - Sand

PEDON MINERALOGY

BASED ON SAND/SILT: Mixed

BASED ON CLAY: Vermiculitic

FAMILY MINERALOGY: Vermiculitic

COMMENTS: Weighted ave resistant re = 89.4% re of csl = 20 % need to run csi

Narrative Pedon Description

Pedon: Cramer

NSSL pedon number: 91P1202

Pedon ID: S91VI-020-014

Field classification: Clayey, mixed, isohyperthermic, shallow Typic Argiustolls

Revised classification as of January 01, 1995: Susannaberg; clayey, vermiculitic, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; Cinnamon Bay Watershed; about 45 meters upslope from S91VI-020-013, about 12 meters upslope from second switchback on America Hill Trail

Latitude: 18°21’17" north

Longitude: 64°45’03" west

Physiography: Hillside or mountainside

Geomorphic position: Lower third of a backslope of a side slope

Slope: 55 percent; west facing; convex horizontal and vertical; total length of 229 meters and upslope length of 183 meters

Elevation: 85 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderately slow

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,160 mm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Surface stoniness: 60 percent.

Erosion: Slight

Runoff: None

Particle-size control section: 10 to 36 cm

Parent material: Local colluvium from igneous-fine material over residuum from igneous-fine material over solid rock from igneous-fine material

Diagnostic features: Mollic epipedon at 0 to 36 cm; argillic horizon at 10 to 36 cm; paralithic contact at 36 to 61 cm

Described and sampled by: G. Acevedo, H.R. Mount, B.C. Dubee, B.D. Hudson, and J. Davis on September 11, 1991

Notes: The pit was dug with shovels and spades and was a reference site for NSSL lab data. An estimated 60 percent of the surface was covered with gravel, cobbles, stones, and boulders. The site was a Bay Rum (*Pimenta racemosa*) plantation for the sugar industry. The Crt layer was similar to an R layer in appearance.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen woodland; abrupt smooth boundary. Not sampled.

A—0 to 10 cm; very dark brown (10YR 2/2) gravelly clay loam; very dark brown (10YR 2/2) dry; strong fine subangular blocky structure; hard, firm; few coarse

and common fine and medium roots throughout; many fine and medium voids between rock fragments and many fine and medium tubular pores; many fine and medium and common coarse cylindrical wormcasts; neutral; 10 percent igneous rocks fragments 20 to 75 mm in diameter; 20 percent igneous gravel; clear smooth boundary. 91P7989

Bt—10 to 36 cm; very dark brown (10YR 2/2) gravelly clay, very dark brown (10YR 2/2) dry; strong fine and medium subangular blocky structure; hard, firm; common fine and medium roots throughout; many fine and medium voids between rock fragments and many fine and medium tubular pores; few discontinuous faint clay films on faces of peds; many fine and medium and common coarse cylindrical wormcasts; neutral; 10 percent igneous rocks fragments 20 to 75 mm in diameter; 25 percent igneous gravel; abrupt wavy boundary. 91P7990

Crt—36 to 91 cm; hard highly fractured weathered bedrock; massive; few medium roots in fractures and common fine roots in fractures in the upper part; common prominent dark reddish brown (2.5YR 3/3) moist discontinuous clay films on rock fragments; common discontinuous prominent clay films on rock fragments; neutral. Not sampled.

Cramer: S91VI-020-015

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Cramer; clayey, mixed, isohyperthermic, shallow Typic Argiustolls

SSL—Project: 91P 193, (RP91VI270) St. John, Virgin Islands-Reference

—Pedon: 91P1203, Samples 91P 7991–7992

—General methods: 1B1A, 2A1, 2B

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            -1--  -2--  -3--  -4--  -5--  -6--  -7--  -8--  -9--  -10-  -11-  -12-  -13-  -14-  -15-  -16-  -17-  -18-  -19-  -20
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                              (- - -TOTAL - - -)(- -CLAY- -)(- -SILT- -)(- - - -  - -SAND- -  - - - -)(-COARSE FRACTIONS(MM)-)(>2MM)
                               CLAY  SILT  SAND  FINE   CO3  FINE COARSE  VF     F     M     C    VC   - - - - WEIGHT - - - -   WT
SAMPLE     DEPTH   HORIZON      LT   .002  .05    LT    LT  .002  .02   .05   .10   .25    .5     1    2    5     20     .1- % OF
  NO.      (CM)                .002  -.05   -2  .0002  .002  -.02  -.05  -.10  -.25  -.50   -1     -2   -5   -20   -75    75  WHOLE
                               <- - - - - - - - - - - - PCT OF <2MM  (3A1) - - - - - - - - - - - - ->  <- PCT OF <75MM(3B1)->  SOIL
91P7991S   0-  8   A           46.8  32.8  20.4              26.8   6.0   6.2   2.7   3.0   3.7   4.8   5    17    22V     52  44
91P7992S   8- 23   Bt          46.3  33.0  20.7              25.8   7.2   5.2   4.2   3.7   3.7   3.9   3    16    29V     56  48
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            ORGN TOTAL  EXTR TOTAL (- - DITH-CIT - -)(RATIO/CLAY)(ATTERBERG )(- BULK DENSITY -) COLE (- - -WATER CONTENT - -)  WRD
             C     N      P    S       EXTRACTABLE           15   - LIMITS -  FIELD  1/3  OVEN WHOLE FIELD  1/10   1/3   15  WHOLE
 DEPTH                                FE    AL    MN    CEC   BAR   LL    PI   MOIST  BAR  DRY   SOIL MOIST   BAR   BAR   BAR  SOIL
  (CM)      6A1c  6B3a  6S3   6R3a  6C2b  6G7a  6D2a   8D1   8D1  4F1    4F   4A3a  4A1d 4A1h  4D1   4B4   4B1c  4B1c  4B2a  4C1
            PCT   <2MM   PPM <- PERCENT  OF  <2MM -->            PCT <0.4MM  <- - G/CC - - -> CM/CM  <- - -PCT OF <2MM - -> CM/CM
  0-  8     3.63 0.313     1                          1.07  0.54                                                          25.3
  8- 23     2.44 0.144     1                          1.05  0.52                                                          24.3
------------------------------------------------------------------------------------------------------------------------------------
            (- NH4OAC EXTRACTABLE BASES -) ACID- EXTR (- - - -CEC - - -)  AL   -BASE SAT- CO3 AS RES.        COND.(- - - -PH - - -)
             CA    MG    NA     K   SUM    ITY   AL   SUM   NH4-  BASES  SAT   SUM   NH4  CACO3 OHMS        MMHOS      CACL2  H2O
 DEPTH      5B5a  5B5a  5B5a  5B5a BASES              CATS   OAC  + AL               OAC  <2MM   /CM         /CM        .01M
  (CM)      6N2e  6O2d  6P2b  6Q2b        6H5a  6G9b  5A3a  5A8b  5A3b  5G1   5C3   5C1  6E1g  8E1          8I         8C1f  8C1f
            <- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - ->  <- - - - -PCT - - - ->                             1:2   1:1
  0-  8     31.1  12.9   0.6   0.6  45.2   7.6        52.8  49.9                86    91                                6.2   6.6
  8- 23     29.3  13.3   0.6   0.3  43.5   7.5        51.0  48.5                85    90                                5.8   6.4
------------------------------------------------------------------------------------------------------------------------------------
            < - - - - - - - - - - - - - - - - - - - - - - - -  CLAY MINERALOGY (<.002mm) - - - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - - - - -><  - - - THERMAL - - - -><  - - - - - - - ELEMENTAL - - - - - - - -><  - -> EGME INTER
SAMPLE        ION <                            ><  - DTA - -><  - TGA - -> SiO2 AL2O3 Fe2O3  MgO   CaO   K2O   Na2O <    > RETN PRETA
                  < - - - - -  7A2i - - - - - -><  - 7A6  - ><  - 7A4b - ><  - - - - - - - - - 7C3 - - - - - - - -><    >  7D2  TION
NUMBER      <- - -><  - - - - peak size - - - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - -><  - ->
91P7992      TCLY  MT 3  VR 2  VC 2  KK 2  GE 1                                20.0  12.7               0.3                    VERM
------------------------------------------------------------------------------------------------------------------------------------
            < - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - ->
            FRACT < - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE        ION <                     ><  - DTA - -><  - TGA - ->TOT RE<  - - - - - GRAIN COUNT - - - - - -><                >PRETA
                  < - - - - 7A2i - - - - -><  - 7A3b - -><  - 7A4b - -><  - - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER      < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
91P7992      VFS                                                  1  OW68  FP19  PR 8  BT 3  PO 1  AM 1                    SMIX
91P7992      VFS                                                     HNtr  OPtr  MStr  QZtr
MINERAL INTERPRETATION:
    MT  montmorillon     VR  vermiculite      VC  verm-chlorit     KK  kaolinite        GE  goethite         OW  oth-weath mn
    FP  plag-feldspa     PR  pyroxene         BT  biotite          PO  plant opal       AM  amphibole        HN  hornblende
    OP  opaques          MS  muscovite        QZ  quartz
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
INTERPRETATION (BY HORIZON): VERM = Vermiculitic          SMIX = Mixed - Sand
PEDON MINERALOGY
    BASED ON SAND/SILT:  Mixed
    BASED ON CLAY:  Vermiculitic
    FAMILY MINERALOGY:  Vermiculitic
    COMMENTS: Borderline montmorillonitic
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Narrative Pedon Description

Pedon: Cramer

NSSL pedon number: 91P1203

Pedon ID: S91VI-020-015

Field classification: Clayey, mixed, isohyperthermic, shallow Typic Argiustolls

Revised classification as of January 01, 1995: Susannaberg; clayey, smectitic, isohyperthermic, shallow Typic Haplustolls

Location: St. John Island, Virgin Islands; Cinnamon Bay Watershed; about 45 meters upslope from SVI91-020-014, about 12 meters upslope from America Hill Trail

Latitude: 18°21’18" north

Longitude: 64°45’03" west

Geomorphic position: Lower third of a backslope of a side slope in mountains

Slope: 50 percent; west facing; convex horizontal and vertical; total length of 229 meters and upslope length of 152 meters

Elevation: 98 meters

Major Land Resource Area: 271—Semiarid Mountains and Valleys

Permeability: Moderately slow

Average air temperature: Annual—26 °C; summer—27 °C; winter—25 °C

Average annual precipitation: 1,160 mm; ustic moisture regime

Drainage: Well drained

Land use: Forestland, not grazed

Surface stoniness: 60 percent

Erosion: Slight

Runoff: None

Particle-size control section: 8 to 23 cm

Parent material: Local colluvium from igneous-fine material over residuum from igneous-fine material over solid rock from igneous-fine material

Vegetation: Species of the *Pimenta, Sabinea, Guettarda, Cordia, Pisonic, Eugenia, Andira, Clusia, Inga,* and *Myrcia* genera

Diagnostic features: Mollic epipedon at 0 to 23 cm; argillic horizon at 8 to 23 cm; paralithic contact at 23 to 46 cm

Described and sampled by: G. Acevedo, B.D. Hudson, W. Lynn, H.R. Mount, and J. Davis on September 11, 1991

Notes: The pit was dug with shovels and spades and was a reference site for NSSL lab data. An estimated 60 percent of the surface was covered with gravel, cobbles, stones, and boulders. The site was a Bay Rum (*Pimenta racemosa*) plantation for the sugar industry. The Crt layer was similar to an R layer in appearance.

Oi—3 to 0 cm; undecomposed organic matter consisting of loose leaves and twigs of the dry evergreen forest; abrupt smooth boundary. Not sampled.

A—0 to 8 cm; very dark brown (10YR 2/2) gravelly clay loam, very dark brown (10YR 2/2) dry; strong fine and medium subangular blocky structure; hard, firm; few coarse and common fine and medium roots throughout; many fine

and medium voids between rock fragments and many fine and medium tubular pores; many fine and medium and common coarse cylindrical wormcasts; neutral; 15 percent igneous rocks fragments 20 to 75 mm in diameter; 30 percent igneous gravel, mostly concentrated on the surface of the horizon; clear smooth boundary. 91P7991

Bt—8 to 23 cm; gravelly clay, dark brown (10YR 3/3) crushed, very dark grayish brown (10YR 3/2) dry; strong fine and medium subangular blocky structure; hard, firm; few medium and coarse and common fine roots throughout; many fine and medium voids between rock fragments and many fine and medium tubular pores; few discontinuous faint clay films on faces of peds; many fine and medium and common coarse cylindrical wormcasts; neutral; 20 percent igneous rocks fragments 20 to 75 mm in diameter; 30 percent igneous gravel; abrupt wavy boundary. 91P7992

Crt—23 to 46 cm; weathered bedrock; massive; common medium roots matted in fractures and common fine roots matted in fractures in the upper part; bedrock fractured but hard; dug with extreme difficulty with spade; common prominent dark red (2.5YR 3/6) discontinuous clay films on rock fragments; many medium and coarse irregular soft masses of iron-manganese on rock fragments. Not sampled.

Maho Bay: S94VI-020-001

Primary Characterization Data

St. John Island, Virgin Islands

Sampled as: Maho Bay; loamy, mixed, isohyperthermic Typic Haplustolls

SSL—Project: 94P 148, (RP94VI256) St. John Bordeau Virgin Islands

—Pedon: 94P 841, Samples 94P 6588–6593

—General methods: 1B1A, 2A1, 2B

-1-- -2-- -3-- -4-- -5-- -6-- -7-- -8-- -9-- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS (MM) WEIGHT 2 -5	WEIGHT 5 -20	WEIGHT 20 -75	.1- 75	(>2MM) WT % OF WHOLE SOIL
			<- PCT OF <2MM (3A1)											->	<- PCT OF <75MM(3B1)			->	
94P6588H	0- 10	Oi			--	--	--		-										
94P6589S	10- 30	A	29.8	21.2	49.0	13.1		13.3	7.9	11.6	13.3	8.2	6.7	9.2	--	5	31V	60	36
94P6590S	30- 51	B	37.2	28.1	34.7	15.6		18.8	9.3	8.8	9.6	6.3	5.8	4.2	1	5	53V	70	59
94P6591S	51- 71	Bc	69.8	15.0	15.2	34.4		11.8	3.2	3.6	3.9	1.9	1.7	4.1	6	11	29V	52	46
94P6592S	71-124	Cr	20.6	35.8	43.6	5.5		30.0	5.8	7.2	9.8	10.9	10.4	5.3	1	--	--	37	1
94P6593S	124- 0	R	10.9	35.6	53.5	1.9		21.6	14.0	9.8	14.7	14.1	12.2	2.7	--	--	--	44	-

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3c	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1	PI 4F	(BULK DENSITY) FIELD MOIST 4A5	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2b	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 10	51.4	2.410			--	--	--		88.8											
10- 30	8.11	0.648			4.2	0.5	TR	0.96	0.55										16.5	
30- 51	2.36	0.192			4.8	0.5	TR	0.27	0.33										12.2	
51- 71	1.15	0.122			6.3	0.9	--	0.13	0.30										20.6	
71-124	0.18	0.043			3.0	0.1	--	0.20	0.51										10.5	
124- 0	0.17				6.5	0.3	--	0.34	0.56										6.1	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9d	CEC SUM CATS 5A3a	NH4-OAC 5A8c	BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - -MEQ / 100 G									->	<- - -PCT		- - ->						
0- 10	37.5	28.9	4.5	2.1	73.0	79.1		152.1	151.4			48	48					3.8	4.2
10- 30	7.0	5.3	1.2	0.6	14.1	19.1	3.4	33.2	28.7	17.5	19	42	49				4.1	4.3	4.7
30- 51	1.6	1.9	0.8	0.4	4.7	9.1	2.0	13.8	9.9	6.7	30	34	47				3.9	4.1	4.3
51- 71	0.6	3.0	0.9	0.2	4.7	11.1	1.6	15.8	9.1	6.3	25	30	52				3.6	3.7	4.1
71-124	0.2	1.6	1.5	0.2	3.5	3.2	1.3	6.7	4.1	4.8	27	52	85				3.4	3.6	3.6
124- 0		0.4	0.2	0.1		5.3	0.2		3.7	0.2	100		97	1			6.7	6.8	6.8

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)					THERMAL DTA 7A6b	TGA 7A4c	ELEMENTAL 7C4a SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
		peak size					Percent		Percent								
94P6589	TCLY	KK 5	MI 2	GE 2	VR 1	QZ 1											
94P6590	TCLY	KK 4	GE 2	MI 2													
94P6591	TCLY	KK 4	GE 2	HE 2	MI 2												
94P6592	TCLY	KK 4	MI 2	GE 2	HE 1												
94P6593	TCLY	HE 2	GE 2														

```
          < - - - - - - - - - - - - - - - - - - - - - - SAND - SILT MINERALOGY (2.0-0.002mm) - - - - - - - - - - - - - - - - - - - - - - ->
          FRACT < - - - - - - X-RAY - - -><  - - - THERMAL - - - -><  - - - - - - -  OPTICAL - - - - - - - - -><                >INTER
SAMPLE      ION <                      >< - DTA - -><  - TGA - ->TOT RE< - - - - - GRAIN COUNT - - - - - -><                >PRETA
                < - - - - 7A2i - - - - >< - 7A3c - >< - 7A4c - >< - - - - - - - -  7B1a - - - - - - - - -><                > TION
NUMBER    < - -><  - - - Peak Size - - -><  - - - Percent - - - -><  - - - - - - - - Percent - - - - - - - -><  - - - - - - - -><  - >
94P6589     FS                                                   79  QZ74  NX20  FE 5  PR 1  RAtr
94P6590     FS                                                   93  QZ82  NX 6  FE 6  RA 4  CD 1  OPtr
94P6590     FS                                                       PRtr  HNtr
94P6591     FS                                                   99  QZ89  FE 8  CD 2  OT 1  NXtr
94P6592     FS                                                   80  QZ61  AR20  FE10  CD 9
94P6593     FS                                                  100  HE91  QZ 9  PRtr
MINERAL INTERPRETATION:
    KK  kaolinite        MI  mica             GE  goethite         VR  vermiculite      QZ  quartz           NX  n-crystalline
    FE  iron oxides      PR  pyroxene         RA  resist-aggre     CD  chalcedony       OP  opaques          HN  hornblende
    HE  hematite         OT  other            AR  wthr aggrega
RELATIVE PEAK SIZE:   5 Very Large   4 Large   3 Medium   2 Small   1 Very Small   6 No Peaks
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ACID OXALATE EXTRACTION  PHOSPHOUS   KCL  TOTAL  (- -WATER  CONTENT- - )(- - - - WATER DISPERSIBLE - - - - ) MIN  AGGRT
             OPT  FE    SI    AL         CIT-  MN     C    0.06   1-    2-    15  <- - PIPETTE - - >< - HYDROMETER - > SOIL STABL
             DEN                   RET   ACID               BAR   BAR   BAR   BAR  CLAY  SILT  SAND  CLAY  SILT  SAND   CONT <5mm
SAMPLE  HZ   8J   6C9b  6V2b 6G12b  6S4   6S5   6D3b  6A2d  4B1c  4B1a  4B1a  4B2b <- - - 3A1c - - -><- - - SML  - - -> 8F1   4G1
  NO.   NO       <- P C T  o f < 2 m m -><- P P M  -><  - - - - - - - - - - P E R C E N T   o f  < 2 m m - - - - - - - -><20mm><PCT>

94P6588  1  0.09  0.18  0.06  0.20                                          121.3                                          9
94P6589  2  0.16  0.32  0.03  0.17    29        10.3  7.98
94P6590  3  0.08  0.32  0.02  0.12    27         3.0  2.50
94P6591  4  0.05  0.20  0.02  0.11    34         1.2  1.35
94P6592  5  0.01  0.07  0.05  0.07    18         0.5  0.18
94P6593  6  0.05  0.55  0.05  0.05    35         0.3  0.24
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Narrative Pedon Description

Pedon: Maho Bay
NSSL pedon number: 94P0841
Pedon ID: 94VI-020-001
Field classification: Loamy, mixed, isohyperthermic Typic Haplustolls
Location: St. John Island, Virgin Islands
Latitude: Unknown
Longitude: Unknown
Elevation: 366 meters
Physiography: Very steep volcanic mountains, near summit
Drainage: Well drained
Slope: 42 percent with an aspect of 40 degrees
Climate: Semiarid
Vegetation: Undefined species of a tropical forest
Parent material: Residuum from volcaniclastic bedrock
Particle-size control section: 25 to 100 cm
Surface fragments: Surface boulders are common in area (class 4).
Described and sampled by: J. Davis on June 22, 1994
Notes: The soil was described when moist. Root distribution consisted of common fine and medium to coarse. Erosion: Road cut. Coarse iron fragments and boulders occurred on surfaces and in the surface horizon.

Oi—0 to 10 cm; very dark grayish brown (10YR 3/2) organic matter; abrupt smooth boundary. 94P6588

A—10 to 30 cm; dark brown (10YR 3/3) gravelly loam; 3 percent medium faint dark brown (7.5YR 3/2) mottles; weak fine and medium granular structure; very friable; 20 percent gravel; moderately acid; clear wavy boundary. 94P6589

B—30 to 51 cm; strong brown (7.5YR 4/6) very gravelly loam; weak fine and medium subangular blocky structure; very friable; 40 percent gravel; moderately acid; clear wavy boundary. 94P6590

BC—51 to 71 cm; yellowish red (5YR 4/6) gravelly loam; 3 percent medium faint reddish brown (5YR 4/4) and 3 percent medium faint strong brown (7.5YR 4/6) mottles; weak fine and medium subangular blocky structure; very friable; 20 percent gravel; moderately acid; clear wavy boundary. 94P6591

C—71 to 102 cm; reddish brown (5YR 4/4) and yellowish red (5YR 4/6) gravelly loam; massive; very friable; 20 percent gravel; moderately acid; clear wavy boundary. Not sampled

Cr—102 to 124 cm; yellowish red (5YR 4/6), reddish brown (5YR 4/4), and brownish yellow (10YR 6/6) weathered bedrock; saprolite; gradual wavy boundary. 94P6592

R—124 cm; fractured volcanic bedrock. 94P6593

Victory: S94VI-020-002

Primary Characterization Data

St. John Island, Virgin Islands
Sampled as: Victory-like; fine-loamy, mixed, isohyperthermic, shallow Typic Ustropepts
SSL—Project: 94P 148, (RP94VI256) St. John Bordeau Virgin Islands
—Pedon: 94P 842, Samples 94P 6594–6596
—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .05-.002	TOTAL SAND -2	TOTAL FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002-.02	SILT COARSE .05-.10	SAND VF .10-.25	SAND F .25-.50	SAND M .5-1	SAND C -2	SAND VC 2-5	COARSE FRACTIONS(MM) 5-20	>2MM WEIGHT .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->		
94P6594S	0- 13	A	15.1	38.0	46.9	6.1		27.0	11.0	6.5	7.2	8.2	14.3	10.7	TR --	9V	46	9
94P6595S	13- 38	BC	13.1	37.3	49.6	4.8		27.3	10.0	7.1	7.9	7.4	11.0	16.2	16 18	27V	78	61
94P6596S	38- 48	C	9.9	34.1	56.0	3.2		25.1	9.0	7.9	9.4	9.4	13.7	15.6	26 27	--	76	53

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B4a <2MM	EXTR TOTAL P 6S3 PPM	TOTAL S 6R3c <- PERCENT	EXTRACTABLE FE 6C2b OF	AL 6G7a <2MM -->	MN 6D2a	CEC 8D1	15 BAR 8D1	LL 4F1 PCT	PI 4F <0.4MM	MOIST 4A5 <- -	BAR 4A1d G/CC - -	DRY 4A1h ->	SOIL MOIST 4D1 CM/CM	FIELD BAR 4B4 <- -	1/10 BAR 4B1c -PCT	1/3 BAR 4B1c OF	15 BAR 4B2a <2MM -	WHOLE SOIL 4C1 -> CM/CM
0- 13	5.95				0.4	0.1	TR	1.54	0.79										11.9	
13- 38	1.65				0.3	0.1	TR	0.76	0.42										5.5	
38- 48	0.35				0.3	TR	--	0.68	0.42										4.2	

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES -MEQ /	ACID ITY 6H5a 100 G	EXTR AL 6G9d	CEC SUM CATS 5A3a	NH4- OAC 5A8c	BASES + AL 5A3b	AL SAT 5G1	BASE SUM 5C3	SAT- NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	CACL2 .01M 8C1f 1:2	H2O 8C1f 1:1
	<- - - - - - - - - - -										<- - - -		-PCT		- - - ->				
0- 13	8.7	4.5	0.6	0.2	14.0	15.2	0.2	29.2	23.3	14.2	1	48	60				4.3	4.5	4.9
13- 38	1.5	2.2	0.3	0.1	4.1	13.3	1.1	17.4	9.9	5.2	21	24	41				3.7	4.1	4.8
38- 48	1.2	2.2	0.4	TR	3.8	4.8	1.6	8.6	6.7	5.4	30	44	57				3.5	4.1	5.0

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	THERMAL peak size	THERMAL Percent	DTA	TGA	SiO2	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	7C4a	EGME 7D2	INTER PRETA TION
94P6594	TCLY	KK 3	MI 2	VR 1												
94P6595	TCLY	KK 3	VR 2	MI 2	FD 1											
94P6596	TCLY	KK 3	MI 3	VR 3	FD 1											

SAND - SILT MINERALOGY (2.0-0.002mm)

SAMPLE NUMBER	FRACT ION	X-RAY 7A2i	THERMAL Peak Size	THERMAL Percent	DTA	TGA	TOT RE	OPTICAL GRAIN COUNT										INTE PRETA TION
94P6594	CSi							73	QZ71	PR17	FK 9	PO 2	CDtr	OPtr				
94P6594	CSi								SStr	OTtr	PNtr	HNtr	MStr	FEtr				
94P6594	CSi								GStr	TMtr								
94P6595	CSi							70	QZ68	FK16	PR12	CD 1	PO 1	MS 1				
94P6595	CSi								AR 1	RAtr	OTtr	HNtr	OPtr	BTtr				
94P6595	CSi								FEtr									
94P6596	CSi							66	QZ65	FK19	PR 9	MS 4	PO 1	BT 1				
94P6596	CSi								RAtr	CDtr	FEtr	CAtr	FPtr					

MINERAL INTERPRETATION:

KK	kaolinite	MI	mica	VR	vermiculite	QZ	quartz	PR	pyroxene	FK	potas feldsp
PO	plant opal	CD	chalcedony	OP	opaques	SS	spon spicule	OT	other	PN	pollen
HN	hornblende	MS	muscovite	FE	iron oxides	GS	glass	TM	tourmaline	FD	feldspar
AR	wthr aggrega	RA	resist-aggre	BT	biotite	CA	calcite	FP	plag-feldspa		

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

SAMPLE NO.	HZ NO	ACID OPT DEN 8J	OXALATE FE 6C9b	EXTRACTION SI 6V2b	AL 6G12b	PHOSPHOUS RET 6S4	CIT-ACID 6S5	KCL MN 6D3b	TOTAL C 6A2d	0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	WATER CONTENT CLAY <- - - 3A1c	SILT - - ->	SAND <- - -	CLAY SML	PIPETTE SILT - - ->	SAND	HYDROMETER CLAY - >	SILT	SAND	MIN SOIL CONT 8F1 <20mm	AGGRT STABL <5mm 4G1 <PCT>
		<- P C T o f < 2 m m ->				<- P P M ->		<- - - - - - - - - - - P E R C E N T o f < 2 m m - - - - - - - -																
94P6594	1	0.11	0.13	0.02	0.08	19		4.7	5.17															
94P6595	2	0.04	0.11	0.01	0.07	17		1.6	1.85															
94P6596	3	0.02	0.05	TR	0.04	13		1.0	0.35															

Narrative Pedon Description

Pedon: Victory

NSSL pedon number: 94P0842

Pedon ID: 94VI-020-002

Field classification: Fine-loamy, mixed, isohyperthermic, shallow Typic Ustropepts

Location: St. John Island, Virgin Islands; 0.5 km northwest of Bordeaux Mt. Peak; from utility pole #31403-026 follow "trail" 0.4 km down gut in southwest direction; from plot-boundary post and tree tags, site of 2266-2270 is on 10 degree compass bearing 13.7 meters north on stable landscape position. The area is protected from prevailing winds. Study site is rubbly colluvium over residuum. Colluvium starts accumulating at about the 243.8-m (800-ft) contour line.

Latitude: Unknown

Longitude: Unknown

Slope: 50 percent with an aspect of 190 degrees

Elevation: 247 meters

Drainage: Well drained

Vegetation: Undefined species of secondary, subtropical moist forest

Climate: Semiarid

Parent material: Residuum from volcaniclastic bedrock

Surface stoniness: Very stony

Moisture class: Moist

Root distribution: Common fine and medium from the surface to the C horizon

Described and sampled by: J. Davis on June 23, 1994

Notes: St. John Island, Virgin Islands

A—0 to 13 cm; dark brown (10YR 3/3) loam; weak fine and medium granular structure; very friable; 5 percent gravel; moderately acid; abrupt smooth boundary. 94P6594

BC—13 to 38 cm; brown (10YR 4/3) gravelly loam; 3 percent medium faint dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; very friable; 20 percent gravel; moderately acid; clear wavy boundary. 94P6595

C—38 to 48 cm; yellowish brown (10YR 5/4); 3 percent medium faint light yellowish brown (10YR 6/4) mottles; massive; very friable; moderately acid; clear wavy boundary. 94P6596

Cr—48 cm; light yellowish brown (10YR 6/4) weathered bedrock; 3 percent medium faint yellowish brown (10YR 5/4) mottles. Not sampled.

Chapter 9
Soils of St. Thomas Island, Virgin Islands

This chapter presents data and descriptions for five soils on St. Thomas Island. Most of the soils on St. Thomas are Mollisols, which are under-represented in historical sampling. All of the soils have an isohyperthermic temperature regime. Soil moisture regimes range from aquic in wet areas along the coastline to ustic in upland areas. Stones and boulders cover most of the upland areas of the island. St. Thomas is the most heavily urbanized of the Virgin Islands, making the study of the soils difficult (fig. 6).

Soils orders sampled on St. Thomas Island include Alfisols (2 pedons), Inceptisols (2 pedons), and Mollisols (1 pedon).

Figure 6.—Charlotte Amalie and other urban landscapes on St. Thomas Island.

Dorothea: S64VI-030-001

Primary Characterization Data

St. Thomas Island, Virgin Islands

Sampled as: Dorothea; fine, mixed, isohyperthermic Udic Haplustalfs

SSL—Project: 40A 1, (NL40) SSIR Samples

—Pedon: 40A 568, Samples 40A 4158–4162

—General methods: 1B1A, 2A1, 2B

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20
			(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - - -SAND- - - - - -)					(-COARSE FRACTIONS(MM)-)				(>2MM)
			CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT - - - -				WT
SAMPLE	DEPTH	HORIZON	LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	% OF
NO.	(CM)		.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				SOIL
40A4158S	0- 15	A	38.0	32.3	29.7			20.6	11.7	9.8	9.9	3.9	3.8	2.3	TRC	2C	--	22	2
40A4159S	15- 28	B21t	39.3	30.9	29.8			19.9	11.0	9.1	9.6	4.2	4.5	2.4	TRC	2C	--	22	2
40A4160S	28- 48	B22t	46.9	26.1	27.0			16.3	9.8	8.3	9.3	3.8	3.6	2.0	TRC	1C	--	20	1
40A4161S	48- 76	B3			--	--	--		-										
40A4162S	76- 0	C			--	--	--		-										

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1c	6B3a	6S3	6R3b	6C2b	6G7a	6D2a	8D1	8D1	4F1	4F	4A3a	4A1d	4A1h	4D1	4B4	4B1c	4B1c	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 15	3.68	0.312			4.1			0.77	0.50										19.0	
15- 28	1.70	0.155			4.1			0.77	0.46										17.9	
28- 48	0.77	0.077			5.0			0.66	0.42										19.6	
48- 76																				
76- 0																				

	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE SAT-		CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS	KCL	CACL2	H2O
DEPTH					BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM	IN	.01M	
(CM)	6N2e	6O2d	6P2b	6Q2b		6H5a	6G9b	5A3a	5A8b	5A3b	5G1	5C3	5C1	6E1g	8E1		8I	8C1g	8C1f	8C1f
	<- - - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - ->											<- - - - -PCT - - - ->							1:2	1:1
0- 15	17.4	12.2	0.7	0.5	30.8	11.7		42.5	29.1			72	100					4.9		6.1
15- 28	15.9	13.2	0.8	0.2	30.1	10.1		40.2	30.1			75	100					4.5		6.1
28- 48	17.8	16.6	1.1	0.3	35.8	9.1		44.9	31.0			80	100	--				4.4		6.1
48- 76																				
76- 0																				

Narrative Pedon Description

Pedon: Dorothea
NSSL pedon number: 40A0568
Pedon ID: S64VI-030-001
SSIR #12 pedon ID: S64VI-18-8
Field classification: Fine, mixed, isohyperthermic Udic Haplustalfs
Revised classification as of January 01, 1995: Dorothea; fine, vermiculitic, isohyperthermic Typic Haplustalfs
Location: St. Thomas Island, Virgin Islands; about 305 meters west Liliendal Junction and 22.9 meters south of the highway
Latitude: Unknown
Longitude: Unknown
Slope: 45 percent; convex; northwest facing
Geomorphic position: Steeply dissected uplands
Elevation: 122 to 152 meters
Average annual precipitation: 1,143 to 1,270 mm
Drainage, runoff, and permeability: Well drained, rapid runoff, and moderately slow permeability
Parent material: Residuum over local colluvium from basic volcanic rock
Vegetation and use: Idle land covered by native brush
Described and sampled by: W.E. McKinzie and R.B. Grossman on September 24, 1964
Notes: Mineralogy was mixed. The expandable clay appeared to be a micaceous mineral with montmorillonite components.

A—0 to 15 cm; brown to dark brown (10YR 4/3) clay loam; weak fine and medium subangular blocky structure parting to moderate medium granular; friable, nonsticky, slightly plastic; many roots; clear smooth boundary. 40A4158

B21t—15 to 28 cm; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; very firm, slightly sticky, plastic; common roots; discontinuous faint coats on vertical and horizontal faces of peds and few discontinuous faint pressure faces; few wormcasts; clear smooth boundary. 40A4159

B22t—28 to 48 cm; yellowish brown (10YR 5/6) clay; moderate medium and coarse subangular blocky structure; very firm, slightly sticky, plastic; few roots; discontinuous faint coats and few discontinuous faint pressure faces; few wormcasts; clear smooth boundary. 40A4160

B3—48 to 76 cm; strong brown (7.5YR 5/6) moist clay loam; weak medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; patchy faint clay films; few black nodules, 25 to 30 percent saprolite; gradual smooth boundary. 40A4161

C—76 cm; (saprolite) highly weathered volcanic rock with a few large unweathered volcanic boulders (breccia) mixed throughout the weathered material. 40A4162

Cramer: S88VI-030-001

Primary Characterization Data

St. Thomas Island, Virgin Islands

Sampled as: Cramer; clayey-skeletal, mixed, isohyperthermic Typic Haplustalfs

SSL—Project: 88P 76, (CP88VI115) Virgin Islands 1988

—Pedon: 88P 390, Samples 88P 1996–1999

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05	SAND -2	FINE .0002	(- -CLAY- -) CO3 .002	(- -SILT- -) FINE -.02	COARSE -.05	VF -.10	(- - - - -SAND- - - - - -) F -.25	M -.50	C -1	VC -2	(-COARSE FRACTIONS(MM)-) (>2MM) - - - - WEIGHT - - - - -5	5 -20	20 -75	.1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P1996S	0- 7	A	39.7	29.9	30.4	19.6		17.6	12.3	6.5	7.8	7.8	5.7	2.6	7	5	--	33	12
88P1997S	7- 35	Bt	39.8	28.0	32.2	19.3		16.1	11.9	6.9	7.8	7.8	6.2	3.5	2	7	38V	60	51
88P1998S	35-106	R&Bt	33.2	17.8	49.0	12.9		10.6	7.2	4.5	6.1	7.3	12.4	18.7	1	4	94V	99	99
88P1999S	35-106	ROCKS			--	--	--		-										

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	CEC 8D1	15 BAR 8D1	(RATIO/CLAY)	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d - - ->	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 7	2.99	0.318	1		2.9	0.2	0.1	1.01	0.44				1.27	1.57		--			27.3	17.4	0.12
7- 35	1.89	0.215	1		2.8	0.2	0.1	0.97	0.41		49	23	1.30	1.57		--			23.8	16.5	0.06
35-106	0.86	0.111	1		2.5	0.1	0.1	1.14	0.45											15.0	
35-106				2.68																	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 7	28.1	11.0	0.4	1.1	40.6	6.7		47.3	40.1			86	100				5.7	6.5	6.9
7- 35	31.5	13.6	0.4	0.6	46.1	6.5		52.6	38.5			88	100				5.3	6.3	6.9
35-106	23.7	13.5	0.6	0.3	38.1	4.9		43.0	38.0			89	100				5.3	6.4	7.1
35-106																			

| SAMPLE NUMBER | < - - - - - - - - - - - - -

Narrative Pedon Description

Pedon: Cramer
NSSL pedon number: 88P0390
Pedon ID: S88VI-030-001
Field classification: Clayey-skeletal, mixed, isohyperthermic Typic Haplustalfs
Revised classification as of January 01, 1995: Maho Boy; clayey-skeletal, mixed, superactive, isohyperthermic, shallow Typic Ustropepts
Location: St. Thomas Island, Virgin Islands; 2 km southeast of Pearson Gardens; Central St. Thomas USGS quadsheet (1:24,000); atlas sheet 12
Latitude: 18°19’25" north
Longitude: 64°54’05" west
Physiography: Middle third of backslope in hillside or mountainside in hills
Slope: 25 percent; convex; southwest facing
Elevation: 60 meters
Average annual precipitation: 1,140 mm; ustic moisture regime
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Permeability: Moderately slow
Drainage: Somewhat excessively drained
Land use: Forestland, not grazed
Surface stoniness: Class 5
Erosion or deposition: Slight
Runoff: Rapid
Particle-size control section: 7 to 35 cm
Parent material: Residuum from igneous-granite material
Diagnostic features: Ochric epipedon at 0 to 7 cm; argillic horizon at 7 to 106 cm
Described and sampled by: D. Williams and R. Rollings during February 1988
Notes: Colors are for moist interiors of peds. Fifty percent cover of stones, 75 percent of which are larger than 25 cm. Soil and stones derived from volcanic sandstone.

A—0 to 7 cm; dark reddish brown (5YR 3/3) clay loam; moderate fine subangular blocky structure parting to moderate fine granular; hard, friable, sticky, plastic; common medium and common fine roots throughout; neutral; clear smooth boundary. 88P1996

Bt—7 to 35 cm; dusky red (10R 3/4) very gravelly clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky, plastic; common medium and common fine roots throughout; common fine tubular pores; many continuous distinct clay films on vertical and horizontal faces of peds; neutral; 10 percent gravel; 25 percent cobbles; 5 percent stones; clear wavy boundary. 88P1997

R&Bt—35 to 106 cm; dusky red (10R 3/4) interior clay loam; common fine roots matted around stones; neutral; highly fractured hard bedrock, fractures 1 to 10 cm apart with clay loam between fractures, most fractures are 3 to 5 cm; bedrock tilted 50 to 70 degrees; Bt portion occupies 2 to 3 percent of the horizon and is dark brown (10R 3/4) clay loam. 88P1998 & 88P1999

R—106 to 175 cm; hard fractured bedrock, fractures 10 to 40 cm apart; few roots between fractures. Not sampled.

Pozo Blanco: S88VI-030-002

Primary Characterization Data

St. Thomas Island, Virgin Islands

Sampled as: Pozo Blanco; fine, mixed, isohyperthermic Typic Haplustalfs

SSL—Project: 88P 76, (CP88VI115) Virgin Islands 1988

—Pedon: 88P 391, Samples 88P 2000–2005

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACTIONS WEIGHT 2 -5	-14- WEIGHT 5 -20	-15- WEIGHT 20 -75	-16- WEIGHT .1- 75	-17- (>2MM) WT % OF WHOLE SOIL
			<- - PCT OF <2MM (3A1)											- ->	<- PCT OF <75MM(3B1)			->	
88P2000S	0- 9	A	40.6	28.5	30.9	19.5		16.9	11.6	6.4	8.1	7.2	6.0	3.2	3	2	--	28	5
88P2001S	9- 29	Bt1	42.0	28.8	29.2	20.9		17.3	11.5	5.9	7.8	8.1	5.5	1.9	4	3	9V	36	20
88P2002S	29- 45	Bt2	25.1	34.0	40.9	9.6		18.3	15.7	8.6	8.8	7.9	9.4	6.2	6	34	20V	73	60
88P2003S	45- 65	2Bw1&Bw2	15.5	41.4	43.1	3.8		22.7	18.7	12.7	8.3	5.2	7.1	9.8	11	20	22V	67	55
88P2004S	65- 92	2C	13.7	50.7	35.6	2.8	5.1	29.6	21.1	13.7	8.9	4.5	4.2	4.3	8	5	--	32	13
88P2005G	92-175	2R&C							P										

DEPTH (CM)	ORGN C 6A1c	TOTAL N 6B3a	EXTR P 6S3	TOTAL S 6R3a	DITH-CIT EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3a	1/3 BAR 4A1d	OVEN DRY 4A1h	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1c	1/3 BAR 4B1c	15 BAR 4B2a	WRD WHOLE SOIL 4C1
	PCT	<2MM	PPM	<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 9	3.13		1		2.8	0.2	0.1	0.99	0.43										17.3	
9- 29	1.87		1		2.9	0.1	0.1	0.94	0.40										16.7	
29- 45	0.64		1		1.8	0.1	0.1	1.33	0.46										11.5	
45- 65	0.47		2		1.1	0.1	TR	1.68	0.58										9.0	
65- 92	0.63		TR		0.3	TR	TR	0.86	0.53										7.3	
92-175									2.5											

DEPTH (CM)	NH4OAC EXTRACTABLE BASES CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID-ITY 6H5a	EXTR AL 6G9b	CEC SUM CATS 5A3a	CEC NH4-OAC 5A8b	CEC BASES + AL 5A3b	AL SAT 5G1	BASE SAT SUM 5C3	BASE SAT NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	PH KCL IN 8C1g	PH CACL2 .01M 8C1f	PH H2O 8C1f
	<- - - - -MEQ / 100 G									- ->	<- - -PCT			- ->				1:2	1:1
0- 9	28.4	10.9	0.3	1.1	40.7	6.1		46.8	40.1			87	100				5.7	6.6	7.0
9- 29	25.1	12.7	0.3	0.4	38.5	6.4		44.9	39.3			86	98				5.1	6.1	6.9
29- 45	22.0	11.0	0.4	0.2	33.6	3.5		37.1	33.5			91	100				5.0	6.3	7.2
45- 65		8.2	0.4	0.2					26.0			100	100	1			6.7	7.5	8.0
65- 92		3.7	0.2	0.1					11.8			100	100	43			7.4	7.8	8.5
92-175				11					8.0	8.7									

CLAY MINERALOGY (<.002mm)

SAMPLE NUMBER	FRACTION	X-RAY 7A2i (peak size)	THERMAL DTA 7A6 (Percent)	THERMAL TGA 7A4b (Percent)	ELEMENTAL SiO2 7C3 (Percent)	AL2O3	Fe2O3	MgO	CaO	K2O	Na2O	EGME RETN 7D2	INTERPRETATION
88P2001	TCLY	VR 3 KK 2 VR 2 MI 1 HE 1				15.0	13.3			0.9			
88P2001	TCLY	GE 1											
88P2002	TCLY	VC 4 KK 3 VR 2 MT 2 MT 2				15.0	12.3			0.7			
88P2002	TCLY	MI 1											
88P2003	TCLY	MT 3 VC 3 KK 3				10.0	9.3			0.3			
88P2004	TCLY	MT 3 KK 3 CA 3 VC 2				3.5	5.0			0.2			
88P2005	TCLY	KK 2 VC 1 MT 1				0.2	4.0			0.3			

FRACTION INTERPRETATION: TCLY Total Clay, <0.002mm

MINERAL INTERPRETATION:

VR vermiculite KK kaolinite MI mica HE hematite GE goethite VC verm-chlorit

MT montmorillon CA calcite

RELATIVE PEAK SIZE: 5 Very Large 4 Large 3 Medium 2 Small 1 Very Small 6 No Peaks

Narrative Pedon Description

Pedon: Pozo Blanco
NSSL pedon number: 88P0391
Pedon ID: S88VI-030-002
Field classification: Fine, mixed, isohyperthermic Typic Haplustalfs
Revised classification as of January 01, 1995: Victory; fine, mixed, superactive, isohyperthermic Typic Ustropepts
Location: St. Thomas Island, Virgin Islands; 2 km southeast of Pearson Gardens; central St. Thomas USGS quadsheet (1:24,000); atlas sheet 12
Latitude: 18°19’25" north
Longitude: 64°54’05" west
Geomorphic position: Middle third of a backslope of a side slope on a hillside in a river valley
Slope: 25 percent; convex; southwest facing
Elevation: 60 meters
Average annual precipitation: 965 mm; ustic moisture regime
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Permeability: Moderately slow
Drainage: Somewhat excessively drained
Land use: Forestland, not grazed
Surface stoniness: Class 5
Erosion or deposition: Slight
Runoff: Rapid
Particle-size control section: 9 to 45 cm
Parent material: Local colluvium from igneous-granite material over residuum from igneous-granite material
Diagnostic features: Mollic epipedon at 0 to 9 cm; argillic horizon at 9 to 45 cm; cambic horizon at 45 to 65 cm
Described and sampled by: D. Williams and R. Rollings during February 1988
Notes: Soils are for moist interior peds. Fifty percent cover of stones, 75 percent of which are larger than 25 cm. Soil and stones derived from volcanic sandstone.

A—0 to 9 cm; dark reddish brown (5YR 3/3) clay loam; moderate fine subangular blocky structure parting to moderate fine granular; hard, friable, sticky, plastic; common medium and common fine roots throughout; clear smooth boundary. 88P2000

Bt1—9 to 29 cm; dusky red (10R 3/4) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky, plastic; common medium and common fine roots throughout; 5 percent gravel; 3 percent cobbles; clear smooth boundary. 88P2001

Bt2—29 to 45 cm; dark brown (7.5YR 3/4) very gravelly clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky, plastic; common fine roots throughout; 15 percent gravel; clear smooth boundary. 88P2002

2Bw1—45 to 54 cm; dark brown (7.5YR 3/4) very gravelly clay loam; moderate fine subangular blocky structure; hard, friable, sticky, plastic; 15 percent gravel; clear smooth boundary. 88P2003

2Bw2—54 to 65 cm; brown to dark brown (10YR 4/3) interior clay loam; moderate fine subangular blocky structure; hard, friable, sticky, plastic; 3 percent gravel; clear smooth boundary. 88P2003

2C—65 to 92 cm; light brownish gray (2.5Y 6/2) interior loam; massive; slightly hard, very friable, slightly sticky, slightly plastic; strongly effervescent; clear wavy boundary. 88P2004

2R&C—92 to 175 cm; hard lightly fractured rock; fractures 4 to 40 cm apart; C material is light brownish gray (2.5Y 6/2) loam. 88P2005

Cramer: S88VI-030-003

Primary Characterization Data

St. Thomas Island, Virgin Islands

Sampled as: Cramer; fine, mixed, isohyperthermic Typic Argiustolls

SSL—Project: 88P 76, (CP88VI115) Virgin Islands 1988

—Pedon: 88P 392, Samples 88P 2006–2010

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .002	CO3 LT .002	(- -CLAY- -) FINE .002 -.02	COARSE .02 -.05	(- -SILT- -) VF .05 -.10	F .10 -.25	(- - - - - -SAND- - - - - -) M .25 -.50	C .5 -1	VC 1 -2	(-COARSE FRACTIONS(MM)-) 2 -5	5 -20	20 -75	(>2MM) .1- 75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM						(3A1) - - - - - - - - - - - - - - - ->						<- PCT OF <75MM(3B1)->				
88P2006S	0- 8	A1	43.6	31.0	25.4	25.7		18.9	12.1	8.7	8.9	4.3	2.3	1.2	6	2	2V	25	10
88P2007S	8- 22	A2	45.2	29.7	25.1	26.8		18.3	11.4	9.1	9.3	4.2	1.7	0.8	1	2	2V	20	5
88P2008S	22- 45	Bt	46.4	25.5	28.1	30.7		15.7	9.8	9.7	10.5	4.7	2.0	1.2	4	1	--	22	5
88P2009S	45- 70	BC	14.8	25.1	60.1	7.3		11.5	13.6	11.5	18.9	16.8	12.9	--	2	TR	--	50	2
88P2010G	70-120	Cr	4.8	13.2	82.0	1.6		6.8	6.4	10.2	18.2	19.6	20.6	13.4					P

DEPTH (CM)	ORGN C 6A1c PCT	TOTAL N 6B3a <2MM	EXTR P 6S3 PPM	TOTAL S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a	MN 6D2a OF <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - - ->	COLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF <2MM	1/10 BAR 4B1c	1/3 BAR 4B1c - - ->	15 BAR 4B2a CM/CM	WRD WHOLE SOIL 4C1
0- 8	3.42	0.388	1		4.2	0.3	0.2	0.96	0.47				1.24	1.55	--			28.6	20.7	0.09
8- 22	2.05	0.220	1		4.5	0.3	0.2	0.92	0.44				1.29	1.59	--			27.4	19.8	0.10
22- 45	0.80	0.126	TR		5.3	0.3	0.1	1.04	0.46	56	29		1.29	1.82	--			36.5	21.5	0.19
45- 70	0.17		TR		3.5	0.2	0.1	3.14	0.95				1.49	1.62	--			20.0	14.1	0.09
70-120	0.04		1		2.5	0.1	0.1	7.75	1.65		NP								7.9	

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS CACO3 <2MM 6E1g	RES. OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->							1:2	1:1
0- 8	26.8	10.0	0.5	0.6	37.9	10.7		48.6	41.8			78	91				4.9	5.7	6.2
8- 22	25.6	10.2	0.6	0.4	36.8	9.5		46.3	41.4			79	89				4.7	5.8	6.3
22- 45	30.0	13.2	1.4	0.4	45.0	9.1		54.1	48.4			83	93				4.0	5.4	6.3
45- 70	31.3	12.6	1.1	0.2	45.2	7.0		52.2	46.5			87	97				3.7	5.5	6.6
70-120	23.3	11.3	1.0	0.1	35.7	4.4		40.1	37.2			89	96				3.9	6.0	7.0

| SAMPLE NUMBER | FRACT ION | < - - - - - - - - - - - - - - -

Narrative Pedon Description
Pedon: Cramer
NSSL pedon number: 88P0392
*Pedon ID:*S88VI-030-003
Field classification: Fine, mixed, isohyperthermic Typic Argiustolls
Revised classification as of January 01, 1995: Susannaberg; fine, vermiculitic, isohyperthermic Typic Haplustolls
Location: St. Thomas Island, Virgin Islands; Western St. Thomas USGS quadsheet (1:24,000); 200 meters south of Bordeaux Hill; atlas sheet 4
Latitude: 18°21'17" north
Longitude: 65°01'34" west
Slope: 20 percent; convex; west facing
Elevation: 135 meters
Average annual precipitation: 1,140 mm; ustic moisture regime
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Permeability: Moderately slow
Drainage: Well drained
Land use: Forestland, not grazed
Surface stoniness: Class 4
Erosion or deposition: Slight
Runoff: Rapid
Particle-size control section: 22 to 45 cm
Parent material: Residuum from igneous-granite material
Diagnostic features: Mollic epipedon at 0 to 22 cm; argillic horizon at 22 to 45 cm
Described and sampled by: D. Williams and R. Rollings during February 1988
Notes: Colors are for interior peds. Soil developed from volcanic sandstone. Prevailing wind is from the northeast from October to April.

A1—0 to 8 cm; dark reddish brown (5YR 3/3) clay loam, dark reddish brown (5YR 3/3) dry; moderate fine subangular blocky structure parting to moderate fine granular; hard, friable, sticky, plastic; many medium and many fine roots throughout; neutral; 1 percent gravel; clear smooth boundary. 88P2006

A2—8 to 22 cm; dark reddish brown (5YR 3/3) clay loam, dark reddish brown (5YR 3/3) dry; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable, sticky, plastic; common medium and common fine roots throughout; common fine tubular pores; few wormcasts; neutral; 1 percent gravel; clear smooth boundary. 88P2007

Bt—22 to 45 cm; red (2.5YR 4/6) clay, red (2.5YR 4/6) dry; moderate medium subangular blocky structure; very hard, firm, very sticky, very plastic; few fine roots throughout; few fine tubular pores; common continuous distinct clay films on vertical and horizontal faces of peds; neutral; clear wavy boundary. 88P2008

BC—45 to 70 cm; yellowish red (5YR 4/8) clay loam, yellowish red (5YR 4/8) dry; weak medium subangular blocky structure; hard, friable, sticky, plastic; few fine roots throughout; common fine tubular pores; neutral; abrupt wavy boundary. 88P2009

Cr—70 to 120 cm; highly fractured volcanic sandstone, 4 to 10 cm between fractures; roots tend to turn but a few are between fracture planes; fracture planes coated with manganese. 88P2010

Magens: S88VI-030-004

Primary Characterization Data

St. Thomas Island, Virgin Islands

Sampled as: Magens; fine, mixed, isohyperthermic Typic Hapludalfs

SSL—Project: 88P 76, (CP88VI115) Virgin Islands 1988

—Pedon: 88P 393, Samples 88P 2011–2016

—General methods: 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	(- - -TOTAL - - -) CLAY LT .002	SILT .05-.002	SAND .05-2	FINE .0002	(- -CLAY- -) CO3 LT .002	(- -SILT- -) FINE .02-.002	COARSE .05-.02	(- - - - - -SAND- - - - - -) VF .10-.05	F .25-.10	M .50-.25	C 1-.50	VC 2-1	(-COARSE FRACTIONS(MM)-) 5-2	20-5	75-20	(>2MM) .1-75	WT % OF WHOLE SOIL
			<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P2011S	0- 18	A	53.9	26.7	19.4	20.2		18.2	8.5	3.8	4.5	3.6	4.2	3.3	2	2	3	22	7
88P2012S	18- 40	Bt1	56.3	30.3	13.4	26.1		23.5	6.8	3.1	3.3	2.2	2.2	2.6	5	1	--	16	6
88P2013S	40- 71	Bt2	53.9	35.7	10.4	21.5		28.8	6.9	2.8	3.3	1.9	1.7	0.7	2	1	--	10	3
88P2014S	71-103	Bt3	37.2	35.3	27.5	14.2		24.2	11.1	9.2	10.4	5.4	2.3	0.2	TR	--	--	18	-
88P2015S	103-187	Bw	29.0	37.5	33.5	8.3		25.0	12.5	11.7	11.9	6.9	2.8	0.2	--	--	--	22	-
88P2016S	187-250	C	24.7	33.6	41.7	5.7		24.5	9.1	11.1	12.3	9.3	6.6	2.4	1	TR	--	31	1

DEPTH (CM)	ORGN TOTAL C 6A1c PCT	N 6B3a <2MM	EXTR TOTAL P 6S3 PPM	S 6R3a <- PERCENT	(- - DITH-CIT - -) EXTRACTABLE FE 6C2b	AL 6G7a OF	MN 6D2a <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3a <- - G/CC	1/3 BAR 4A1d	OVEN DRY 4A1h - ->	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT	1/10 BAR 4B1c OF	1/3 BAR 4B1c <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 18	2.79	0.311	TR	8.9	0.6	0.4	0.19	0.42				1.09	1.31	--			32.8	22.8	0.11
18- 40	1.11	0.113	--	8.6	0.5	0.1	0.33	0.44				1.29	1.48	--			29.6	24.6	0.06
40- 71	0.51	0.053	TR	8.5	0.4	0.1	0.35	0.46		59	27	1.31	1.50	--			30.0	24.7	0.07
71-103	0.26	0.025	1	9.6	0.4	0.1	0.48	0.65				1.10	1.24	--			37.8	24.0	0.15
103-187	0.12		1	8.7	0.4	0.1	0.62	0.78				1.09	1.17	--			44.8	22.7	0.24
187-250	0.06		1	7.9	0.4	0.1	0.60	0.80				1.10	1.18	--			42.6	19.8	0.25

DEPTH (CM)	(- NH4OAC EXTRACTABLE BASES -) CA 5B5a 6N2e	MG 5B5a 6O2d	NA 5B5a 6P2b	K 5B5a 6Q2b	SUM BASES	ACID- EXTR ITY 6H5a	AL 6G9b	(- - - -CEC - - -) SUM CATS 5A3a	NH4- OAC 5A8b	BASES + AL 5A3b	AL SAT 5G1	-BASE SAT- SUM 5C3	NH4 OAC 5C1	CO3 AS RES. CACO3 <2MM 6E1g	OHMS /CM 8E1	COND. MMHOS /CM 8I	(- - - -PH - - -) KCL IN 8C1g	CACL2 .01M 8C1f	H2O 8C1f
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - - - - ->											<- - - - -PCT - - - ->						1:2	1:1
0- 18	13.1	5.8	1.3	0.2	20.4	12.2		32.6	10.3			63	100	TR			4.9	5.3	5.6
18- 40	8.0	5.6	1.2	0.1	14.9	10.0		24.9	18.8			60	79				4.5	5.0	5.6
40- 71	8.4	6.9	1.1	0.1	16.5	9.2	0.2	25.7	19.0	16.7	1	64	87				4.4	5.0	5.5
71-103	6.6	8.3	1.1	0.1	16.1	7.9	0.4	24.0	18.0	16.5	2	67	89				4.6	5.0	5.5
103-187	2.9	12.5	1.0	0.1	16.5	7.2	0.2	23.7	18.0	16.7	1	70	92				4.8	5.2	5.3
187-250	1.8	9.9	1.8	0.1	13.6	6.8	0.2	20.4	14.8	13.8	1	67	92				4.4	4.8	4.8

| SAMPLE NUMBER | < - - - - - - - - - - - - - - -

Narrative Pedon Description

Pedon: Magens
NSSL pedon number: 88P0393
Pedon ID: S88VI-030-004
Field classification: Fine, mixed, isohyperthermic Humic Haplustalfs
Revised classification as of January 01, 1995: Dorothea; fine, mixed, semiactive, isohyperthermic Kanhaplic Haplustalfs
Location: St. Thomas Island, Virgin Islands
Latitude: 18°21’30" north
Longitude: 64°15’07" west
Physiography: Hillside or mountainside in hills on lower third of component
Slope: 25 percent; convex
Elevation: 415 meters
Average annual precipitation: 1,500 mm
Major Land Resource Area: 271—Semiarid Mountains and Valleys
Permeability: Moderate
Drainage: Well drained
Land use: Forestland, not grazed
Erosion or deposition: Slight
Runoff: Rapid
Particle-size control section: 18 to 68 cm
Parent material: Local colluvium from igneous-granite material
Diagnostic features: Ochric epipedon at 0 to 18 cm; argillic horizon at 18 to 103 cm
Described and sampled by: D. Williams and W. Lynn during February 1988
Notes: Matrix colors are for interior peds.

A—0 to 18 cm; dark reddish brown (5YR 3/4) clay; moderate fine granular structure; hard, friable, sticky, plastic; many fine and many medium roots throughout; neutral; clear smooth boundary. 88P2011

Bt1—18 to 40 cm; red (2.5YR 4/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; very hard, firm, sticky, plastic; common fine and common medium roots throughout; few fine tubular pores; neutral; clear smooth boundary. 88P2012

Bt2—40 to 71 cm; red (2.5YR 4/8) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; very hard, firm, sticky, plastic; common fine roots throughout; few fine tubular pores; neutral; clear smooth boundary. 88P2013

Bt3—71 to 103 cm; red (2.5YR 5/8) clay; weak medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots throughout; few fine tubular pores; few fine platelike nonmagnetic shot; neutral; clear wavy boundary. 88P2014

Bw—103 to 187 cm; strong brown (7.5YR 5/8) loam; common medium distinct mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots between peds; common fine tubular pores; few

fine platelike nonmagnetic shot; few rounded rocks and boulders (volcanic sandstone) 50 cm to 1 m in diameter; neutral; gradual wavy boundary. 88P2015

C—187 to 250 cm; strong brown (7.5YR 5/8) saprolite that crushes to loam; massive; friable, slightly sticky, slightly plastic; few fine roots between peds; 2 to 20 cm fracture planes coated with manganese; few rounded boulders (volcanic sandstone) 50 cm to 3 m in diameter. 88P2016