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JIMMY CARTER
PLANT MATERIALS CENTER

SILVOPASTURE FIELDDAY JUNE 2006 IN EARLY CO GEORGIA
Landowners, NRCS ,GA.Soil &Water Con Com,GA Forestry Commission ,FVSU, Auburn University, GA Soil & Water Con Districts

A Technical Summary of Plant Materials Studies
At the Jimmy Carter Plant Materials Center
Americus, Georgia

NRCS Natural Resources Conservation Service

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STATE CONSERVATIONISTS ADVISORY COMMITTEE

Purpose: The purpose of the committee is to provide leadership in the coordination, communication, support, and integration of applied plant science technology within and between states, the Regional and National Plant Materials Advisory Committees and other partners.

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Walter W. Douglas	Columbia, SC
William Gary Kobylski	Auburn, AL
Mary K. Combs	Raleigh, NC

PLANT MATERIALS TECHNICAL COMMITTEE

The Plant Materials Technical Committee provides input to the PM Advisory process. The PM Technical Committee may be on a state, multi-state or other regional/local level for a single PMC or for multiple Plant Materials Centers. Responsibilities include:

- Provides overall technical leadership in the identification, integration, and prioritization of plant technology needs.
- Develops recommendations for addressing needs and submits information to the State Conservationist's Plant Materials Advisory Committee for review and approval.
- Promotes the transfer of developed applied science technology.

Technical Committee Members

NAME	LOCATION
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Robert Escheman, NPL-NRCS	Washington DC
Vacant, SRC NRCS	Athens, Ga
Eddie Jolley, NRCS	Auburn Ala
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Dr Richard Lowrance, Res, ARS	Tifton Ga
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Greg Mason, US F&W	Brunswick Ga
James Crozier, GA S&W Comm	Albany Ga
Jackie Fitts, GA Native Plant Soc	Atlanta Ga
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Tom Aiken, District Supervisor, Lamar Co GA	Barnesville Ga
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Ed Hackett, Wildlife Biologist, Wildlife Inst NRCS	Madison Miss
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George Coleman, HoneyHole Nursery	Glenwood Ga
Bill Hughes, SRC NRCS	Auburn, Alabama

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INTRODUCTION

The Jimmy Carter Plant Materials Center (PMC) is part of a national plant materials program operated by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), formerly recognized as the Soil Conservation Service (SCS). The purpose of the PMC is: to assemble, evaluate, and release new plant materials for conservation use; to determine techniques for their successful use; to provide for their commercial increase; and to promote the use of plant materials needed to meet the objectives of the National Conservation Program.

The Plant Materials Center serves NRCS field offices, public agencies, commercial seed and plant producers, and the general public in Georgia, Alabama, South Carolina, North Carolina, and parts of Florida and Tennessee. These states present a wide range of climatic and soil conditions and include a total of 13 major land resource areas (MLRAs) representing 120,377,913 acres across the Southeastern United States.

PMC activities are guided by a five-year program focusing on the development of the following high priority items for **Farm Bill Implementation**:

I. Evaluation of native grasses for grazing lands that support sustainable agriculture. (Conservation buffers, forage, erosion control, wildlife habitat improvement, urban landscapes, bio-fuels Farm Bill Implementation)

II. Evaluation of native plants for water quality (riparian forest areas, conservation buffers, filter strips, constructed wetlands, and streambank stabilization, Farm Bill Implementation).

III. Evaluation of plants for conservation tillage (green manure, organic gardening, carbon sequestration and winter cover)

LOCATION AND FACILITIES

The PMC is located on the northwest corner of Americus, Georgia approximately 40 miles north of Albany, Georgia. The facility consists of 327 acres of land with 19 buildings, including a new office building (conference room), greenhouse, seed cleaning /seed storage facilities, pesticide storage, and an underground irrigation system that covers approximately 85 acres. The center's land includes seven soil types, with Orangeburg predominating. Approximately two-thirds of the acreage is open for cultivation, and Muckalee Creek runs through the southwest corner.

HISTORY

The PMC was established in 1936 to produce planting material, mainly pine seedlings for use by the Civilian Conservation Corps (CCC) and for former SCS demonstration projects. The site was originally rented, but was purchased by the federal government in 1942. The center was operated on contract by the University of Georgia Experiment Station from 1954 to 1975, was SCS-operated from 1976 to 1994, and is currently NRCS-operated. Historically, the PMC's objective has been to find erosion-minimizing plants. Today the center seeks to solve problems confronting soil, water, air, plants, and animals.

PARTNERSHIPS

The PMC has conducted cooperative programs with the following organizations:

Alabama Agricultural Experiment Stations
Alabama Crop Improvement Association
Fort Valley State University
Georgia Crop Improvement Association
Alabama S&W Conservation Commission
Clemson University
Quail Unlimited
Alabama A&M University
Auburn University
Georgia Forestry Commission
Georgia Department of Transportation
RC & D Councils
North Carolina A&T University

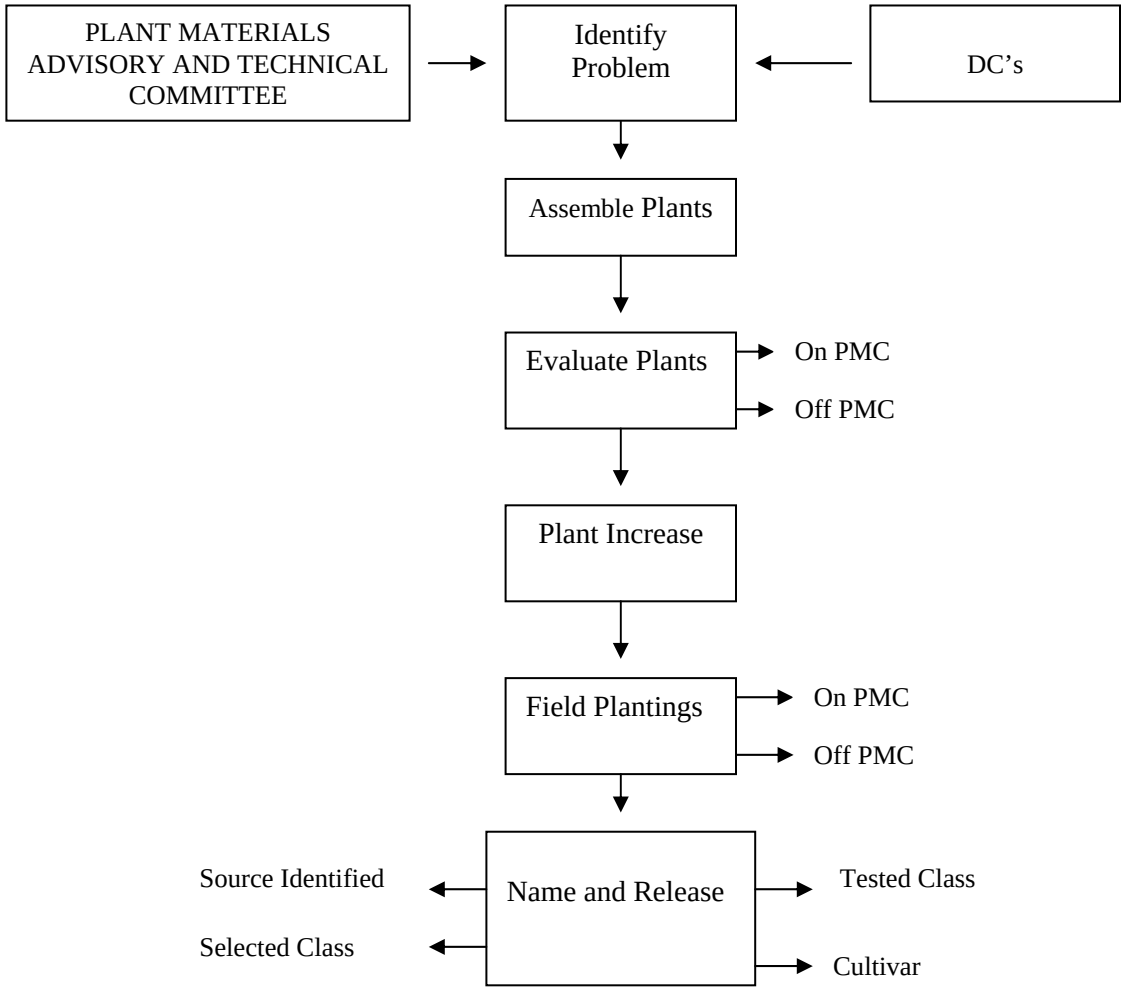
PARTNERSHIPS (CONTINUED)

Georgia Seed Development Commission
Wildlife Management Institute
The University of Georgia
Georgia Agricultural Experiment Stations
Georgia Department of Natural Resources
Tuskegee University

United States Environmental Protection Agency	United States Army Corps of Engineers
United States Department of Energy	United States Forest Service
United States Fish & Wildlife Service	Georgia Soil & Water Conservation Comm.
United States Department of Defense	Lamar Co. S&WCD
United States Department of Agriculture (ARS)	Flint River S&WCD
Lower Chattahoochee S&WCD	Alabama Forest Commission
Georgia Association of Conservation Districts	Alabama Association of Conservation Districts

PLANT MATERIALS PROGRAM

The Plant Materials Program has established a **systematic process to evaluate and release plants** to address the conservation problems outlined in the long-range program. The intensity and time of evaluation will vary according to the class of release. A cultivar will require many years of intense evaluation whereas a source identified plant can be released in 1-2 years with little evaluation. The following flow chart illustrates the steps involved in this process:



In addition to the release of new plants, the **PMC develops new technology to better utilize plant materials for our high priority concerns.**

DESCRIPTION OF THE SERVICE AREA

The Jimmy Carter PMC serves Alabama, Georgia, South Carolina, North Carolina, and parts of Tennessee and Florida. These states present a wide range of climatic and soil conditions.

Elevations range from sea level to over 6,000 feet. Low temperatures will vary from -20 degrees F at the higher elevations to 10 degrees F along the coast while summer high temperatures range from 70 F in the mountains to 110 F at lower elevations.

Frost-free days vary from 260 days near the coast to 130 days at the higher elevations.

Annual rainfall over the area ranges from 45 to 80 inches.

The states served by the center are represented by the eleven major land resource areas.

MAJOR LAND RESOURCE AREAS SERVED

123	Nashville Basin
128	Southern Appalachian Ridges and Valleys
129	Sand Mountain
130	Blue Ridge
133A	Southern Coastal Plain
134	Southern Mississippi Valley Silty Uplands
135	Alabama and Mississippi Blackland Prairies
136	Southern Piedmont
137	Carolina and Georgia Sandhill
152	Gulf Coast Flatwoods
153	Atlantic Coast Flatwoods

Soil Conditions vary widely -- deep droughty sand, heavy plastic clay subject to excessive intermittent wetness and drying, highly acid to alkaline extremes, and swamps and marshes - fresh and salt. Farming enterprises also vary widely. The area contains a number of heavily populated suburban areas surrounding centers of industry and commerce. The mountains, seashore, and other areas of natural beauty are being rapidly developed to meet the demand for recreation.
Such diversity of climate, soil, and enterprises requires many different types and kinds of vegetation to provide for protecting the land when it is properly treated for soil and water conservation.

Summary of Weather Conditions- Jimmy Carter PMC-2006

1929-2006

	TEMPERATURE (°F)		PRECIPITATION (Inches)			
Month	**2006 Max**	**2006 Min**	**Month Total 2006**	**77 Year Average**	**77 Year High Month**	**77 Year Low Month**
January	65	41	4.71	4.33	11.19	.64
February	59	36	5.71	4.58	12.28	.56
March	70	42	1.92	5.28	12.11	.28
April	80	54	2.84	3.78	12.26	.00
May	83	59	3.40	3.27	8.35	.14
June	91	64	1.49	4.34	11.69	.03
July	94	69	5.20	5.27	24.79	1.25
August	91	71	9.95	4.13	11.76	.99
Sept	86	63	2.40	3.52	14.00	.10
October	77	50	4.58	2.08	9.60	.00
Nov	67	41	2.91	3.02	10.63	.05
Dec	64	41	4.83	4.11	12.29	.42
Total	-	-	49.94	47.74		

PROJECT 13I128R - EVALUATION AND INCREASE OF BIG BLUESTEM (*ANDROPOGON GERARDI*)

INTRODUCTION:

Big bluestem (*Andropogon gerardi*) is a perennial, warm season grass. It is cross-pollinated and has several ploidy levels X = 20, 40, 60. Big bluestem is photoperiod sensitive. It is widely distributed in the United States. It occurs in tall grass

prairies of the Midwest as well as in forested areas of the southeast. It also has potential for other conservation concerns, such as, wildlife habitat improvement (WHIP), farm bill implementation, erosion control, and warm season native forages. It has been utilized for forage and hay production. This study attempts to evaluate big bluestem ecotypes for cultivar development for the Southeast.

MATERIALS AND METHODS:

In 1989-1990, the PMC assembled 750 vegetative ecotypes of southeastern big bluestems. These ecotypes were placed into an initial evaluation block. Each entry was planted to ten-foot rows with one foot between clones. All entries were separated by three-foot middles. Each entry was replicated twice.

RESULTS AND DISCUSSION:

In 1990 and 1991, the evaluation process began. The following were the evaluation criteria: 1) vigor, 2) stem color, 3) inflorescence color, 4) foliage amount, 5) foliage height (cm), 6) foliage color, 7) forage potential, 8) disease/insect resistance, 9) boot date, bloom date, maturing date, and percent germ, 10) seed amount, 11) uniformity, 12) leaves height on stem, 13) total height, 14) stem size, 15) tillering, 16) steminess, 17) basal foliage, 18) lodging, 19) late maturity.

In spring 1992, Dr. Edzard van Santen of Auburn University began a cooperative big bluestem study with the Jimmy Carter PMC. The following criteria were added to the existing evaluation process: 1) percent stand, 2) forage mass, 3) greening up date, 4) biomass at flowering (green weight and dry weight), 5) surface area of plot, 6) morphological data, and 7) % ADF of stem.

In June 1993, four pairs of cow/calf units were allowed to graze the big bluestem area. Cattle were removed and Dr. van Santen evaluated the cattle's preference for specific ecotypes. After regrowth, cattle were again allowed to graze the vegetation down to 8-inch stubble residues.

Dr. van Santen's data was processed and determined which ecotypes were selected for 'biomass type' crossing blocks in 1994. These blocks should produce germplasm for comparison testing against a standard big bluestem cultivar. The three blocks consist of early maturing ecotypes, late maturing ecotypes and median maturing ecotypes.
Early maturing crossing block
Lines - 23, 52, 54, 62, 71, 78, 81, 84, 94, 97, 140, 142, 161, 231, 260, 305, 322, 336, 351, 368, 481, 484, 542, 561, 578, 595, 624, 661, 676, 704,719
Median maturing crossing block
Lines - 1, 7, 10, 18, 20, 38, 44, 57, 61, 69, 75, 77, 85, 88, 89, 91, 93, 111, 116, 159, 200, 204, 223, 373, 432, 438, 452, 496, 497, 513, 532, 560, 580, 592, 598, 627, 689, 691, 709, 738
Late maturing crossing block
Lines - 4, 14, 32, 42, 46, 48, 50, 58, 59, 66, 73, 76, 98, 99, 106, 107, 122, 123, 124, 126, 127, 130, 131, 134, 143, 366, 399, 406, 692

Each line was represented by three replications per crossing block to ensure proper pollination.

In 1995, seed was collected from the three-biomass crossing blocks. All seed collected expressed high dormancy characteristics. Dr. van Santen worked to resolve this seed dormancy problem.

In March 1998, Dr. van Santen determined which ecotypes should constitute crossing blocks for production of big bluestem 'forage type' germplasm. The crossing blocks consist of early maturing ecotypes, median maturing ecotypes and late maturing ecotypes. Each line was replicated three times per crossing block to ensure proper pollination.

Early maturing crossing block
Lines - 15, 84, 105, 110, 135, 136, 140, 154, 166, 179, 198, 215, 216, 218, 245, 247, 260, 290, 297, 361, 364, 385, 389, 397, 436, 439, 455, 484, 488, 500, 548, 561, 568, 641, 661, 693, 707, 743.

Median maturing crossing block
Lines - 7, 17, 18, 26, 77, 114, 155, 181, 200, 214, 228, 234, 252, 266, 296, 328, 334, 377, 414, 420, 446, 447, 472, 482, 505, 510, 520, 524, 537, 559, 569, 584, 649, 651, 689, 700, 717, 725.

Late maturing crossing block
Lines - 3, 4, 14, 42, 46, 49, 59, 60, 66, 90, 98, 122, 124, 126, 131, 144, 170, 206, 219, 249, 254, 261, 298, 312, 325, 333, 341, 362, 366, 406, 426, 540, 575, 635, 658, 678, 679, 747.

In 2001 wildlife biologists with NRCS selected big bluestem lines to constitute a wildlife type big bluestem seed production block.

In 2004 late maturing seed was collected and tested for germination and seedling vigor. Results indicate very little seed fill and germination. Therefore in 2005 the PMC altered the cultural techniques used on the big bluestem fields. Fields were burned during growing season instead of dormant season to stimulate inflorescence production and sprayed in summer with insecticide to prevent possible insect (midges) infestation of the seed heads. Seed was harvested in October 25,2005. This seed showed very little germ % in seed laboratory results. In **2006** seed production fields were **not burned** or **sprayed** for insects. Seed laboratory results for late maturing **forage and biomass** big bluestem were pure seed 13.91% **germination 37%**. **Wildlife selection** pure seed was 14.75 % and **germination 54%**. Due to these improved seed germination results**, Dr van Santen of Auburn University** will try to increase the big bluestem seed amount and the quality of big bluestem seed by planting increases involving seed viability tests with the **2006 seed**.

Subsequent seed harvest will be used for increase and comparative replicated biomass and forage testing .

Big Bluestem Crossing Block Burn May 26,2005. Field *Not Burned* in 2006

PROJECT 13A140S - EVALUATION AND SELECTION OF PLANT MATERIALS FOR FOREST BUFFERS IN THE SOUTHEASTERN UNITED STATES

INTRODUCTION:

This test consists of the following species: ogeche lime, red maple, blackgum, green ash, cherry bark oak, loblolly pine, yellow poplar, bald cypress, water oak, sweetgum, white oak, and sycamore. The goal of the project is to determine which tree buffer produces optimal growth and uptakes the most applied fertilizers.

MATERIALS AND METHODS:

Plantings were established by use of dibbles in the winter of 1993/1994. One 54 foot x 100 foot block per species was planted on 6 foot spacings. Each block runs perpendicular to the slope, and was planted with 160 trees.

RESULTS AND DISCUSSION:

Information contained in Tables 1-2 provides vegetative data to accompany future chemical analysis. All growth means represent means of surviving material. Through 2001 sweetgum, green ash and cherrybark oak produced the most height growth. Through 2004 ogeche lime has the greatest trunk diameter growth. However, it also has a low percent survival reading. Through 2004 the highest survival means were recorded by green ash and cherrybark oak. Due to a shortage in PMC personnel this project was not evaluated in 2005 or 2006..

In June 1998 and June 1999, the PMC staff in cooperation with Dr. Richard Lowrance of ARS (Tifton, Ga.) took soil, stem, leaf, and fruit samples from selected specimens in the tree blocks. These were analyzed for N & P content. PMC staff fertilized the blocks in May 1999 (158 lbs N/Ac and 30 lbs P/Ac). Dr. Lowrance is evaluating and analyzing the N & P data for future reports. If funds become available further analysis and cooperation with the USDA-ARS should determine which block of trees has the highest capacity for fertilizer uptake.

TABLE 1 MEAN % SURVIVAL OF FOREST BUFFER TREES

Tree Species	Aug 1995	Aug 1996	Sep 1997	Jul 1998	Aug 1999	Oct 2000	Aug 2001	Aug 2002	Sep 2003	Sep 2004
Loblolly Pine *	16	13	13	13	13	12	12	12	12	12
Yellow Poplar *	14	8	8	8	8	7	7	7	7	7
Sycamore *	27	20	20	20	20	20	20	20	18	16
Blackgum	68	66	63	63	62	62	62	62	62	62
Cherrybark Oak	89	89	89	88	87	87	87	87	87	87
Sweetgum	77	73	74	74	74	74	71	70	70	70
White Oak	49	46	44	44	43	43	43	43	43	43
Bald Cypress	71	70	68	68	68	66	66	66	66	66
Green Ash	81	82	82	82	82	81	81	81	81	81
Red Maple	76	71	72	71	71	71	68	67	67	67
Ogeche Lime	35	35	34	35	35	35	34	34	33	33
Water Oak	73	70	70	70	70	70	70	70	70	70

* Low survival trees were not included in further data tables

Forest Buffer Evaluation Area at Jimmy Carter PMC

White Oak (Above)

TABLE 2 TRUNK DIAMETER OF FOREST BUFFER TREES

Mean Diameter Main Trunk Ground Level (mm)

Tree Species	Aug 1994	Aug 1995	Jul 1996	Sep 19 97	Jul 19 98	Aug 1999	Oct 2000	Aug 2001	Aug 2002	Sep 2003	Sep 2004
Blackgum	7.232	14.4	26.6	35.2	54.4	84.5	88.9	109.3	112.5	127.5	138.1
Cherrybark Oak	5.61	12.1	28.0	46.0	63.6	96.5	122.4	151.1	152.5	170.6	174.4
Sweetgum	10.54	24.5	42.3	65.5	88.9	116.1	134.6	172.8	186.7	225.8	229.2
White Oak	6.73	11.0	19.4	24.5	35.6	52.1	63.6	95.6	109.4	138.8	145.2
Bald Cypress	8.06	18.0	31.0	43.7	63.2	76.5	105.0	114.6	127.8	151.3	156.9
Green Ash	25.49	46.4	69.7	82.7	107.8	1l5.9	119.0	122.2	135.6	160.6	162.5
Red Maple	8.19	20.7	43.0	56.0	76.9	90.6	110.1	125.9	151.4	178.8	185.5
Ogeche Lime	16.57	35.6	64.3	110.5	126.6	149.7	162.2	210.5	258.1	289.6	292.3
Water Oak	9.23	21.7	30.9	49.9	66.2	86.9	96.8	118.2	143.5	158.8	164.4

PROJECT 13A142R - GRAZING MANAGEMENT OF EASTERN GAMAGRASS

INTRODUCTION:

Eastern gamagrass, *Tripsacum dactyloides*, is a warm-season, native, perennial grass suited to most of the Eastern United States. One of its potential uses is forage for livestock. The Jimmy Carter Plant Materials Center in Americus, Georgia is demonstrating intensive grazing management of this plant. The Lamar County Soil and Water Conservation District is cooperating by providing cattle for the demonstration. The uses of eastern gamagrass are grazing land, wildlife habitat improvement, critical area stabilization, biofuels, alternative fuels, streambank stabilization, nutrient reclamation/uptake, filter strip, conservation buffers, and urban conservation.

MATERIALS AND METHODS:

In the spring of 1993, a 4.5 acre field of Eastern gamagrass, (variety 'Pete'), was planted in 36 inch rows using a corn planter. This 4.5-acre pasture was allowed to establish through 1994 and into 1995.

This demonstration is located on the northwest side of the town of Americus, Georgia, where mean annual precipitation is 125 cm (about 49"), and the mean annual temperature is 18.5 degrees Celsius (about 65.3 degrees Fahrenheit).

The demonstration site is divided into ten paddocks, approximately 0.2 hectares (about 0.45 acre) each, using a single strand of electric fence wire about 90 cm high. Water is provided to each paddock using one inch black plastic pipe and 60 gallon portable water trough. The water source is Muckalee Creek.

In April 2004 the Lamar County Soil and Water Conservation District provided ten heifers. Each heifer weighed about 658 pounds prior to grazing.

The heifers were weighed, vaccinated, wormed, dusted, and ear tagged.

May 17, 2004 the heifers were moved into the first eastern gamagrass paddock to begin a 2.5-3.5 day grazing period in each paddock.

In the spring, 600 pounds per acre of 10-10-10 fertilizer was applied to the pasture, then approximately 150 pounds of ammonium nitrate was applied to each paddock after each grazing event.

In previous years manure samples were taken on a periodic basis to determine crude protein and digestible organic matter of the eastern gamagrass consumed by the animals. The Grazing Animal Nutrition Laboratory at Texas A&M University was utilized to determine these readings. The NUTBAL Nutritional Balancer software was used to predict animal nutritional needs.

RESULTS AND DISCUSSION:

Cattle were rotated successively through the ten paddocks with 2.5-3.5 days grazing period in each paddock for four cycles. Eight to ten inches of plant stubble was left after each grazing event. The cattle were rotated through the entire ten paddocks until October 6, 2004.

The results from typical manure samples taken from the heifers are as follows:
Crude Protein ranged from 11.8 to 14.14%. Digestible organic matter ranged from 63.68 to 66.49 %.

AVERAGE WEIGHTS 2004

	DATE	WEIGHT	TOTAL GAIN	AVG. DAILY GAIN
Beginning	May 17	658 lbs	-	-
Ending	OCT 06	732 lbs	74 lbs	0.44 lbs

In **2001-2003 heifers** have shown an average daily weight gain (**ADG) of approximately 1.0** after grazing the eastern gamagrass at the Jimmy Carter Plant Materials Center in Americus, Georgia. In **2004 heifers** were less inclined to consume forage compared to previous herds and only produced an ADG of .44lbs. similar procedures with **steers in 1999 and 2000** produced an average daily gain of **1.75 and 1.5 respectively**. Due to increased workload on other projects the eastern gamagrass pasture was rested for regeneration in 2005. Due to reduced personnel cattle did not graze test in 2006.

Observations and results of NIRS analysis of fecal samples for crude protein suggest that forage quality is adequate for typical livestock operations in this region.

After each grazing period cattle were moved to a new paddock

EASTERN GAMAGRASS ROTATIONAL GRAZING STUDY

Lamar Co S&WCD cattle grazing paddocks

PROJECT 13A144R - GRAZING MANAGEMENT OF YELLOW INDIANGRASS (*SORGHASTRUM NUTANS*)

INTRODUCTION:

Yellow indiangrass (*Sorghastrum nutans*) is a native perennial warm season grass. It can be utilized for forage and hay production. This test attempts to demonstrate the use of a PMC selection known as PI-514673. Emphasis will be placed upon establishment and management techniques for forage production for the Southeast.

MATERIALS AND METHODS:

In the fall of 1993, a three-acre bahia grass pasture was sprayed with Roundup. In February 1994, the pasture was disked. In March 1994, 450#/Ac of 0-14-14 fertilizer was applied. On May 5, 1994 the pasture area was disked and cultipacked to firm the seedbed. Indiangrass seed was applied with a Solo fertilizer spreader set on No. 24 for a 12-14 foot swath. The rate of seeding was 25 #/Ac or 10# pls/Ac. The area was then cultipacked perpendicular to original cultipacking for proper seed covering. In June 1994, broadleaf weeds were sprayed with 2-4-D at a rate of 1 qt/Ac. A good stand of indiangrass was observed during the summers of 1995 - 1996.

In May 1997, 10-10-10 fertilizer was applied at the rate of 600 #/Ac. The first week of June, 150 #/Ac of ammonium nitrate were spread on the area. On May 27, 2, 4-D herbicide was sprayed at 1 qt/Ac to control broadleaf weeds. Similar cultural practices were followed thereafter.

RESULTS AND DISCUSSION:

In 2000, 12 steers from Lamar Co. S&WCD strip grazed the indiangrass field from late June until early July. Cattle quickly adapted to the new source of forage. Fecal samples from this grazing episode indicated plant crude protein of 7.64 - 10.03 % and digestible organic matter of 64.14 - 67.60

In October 2005 and 2006, Americus Indiangrass seed was harvested from the indiangrass field to support **Cultivar Release.** Additional rotational grazing of the indiangrass is planned for future years when needed to supplement other grazing studies such as the silvopasture study.

'Americus' Indiangrass – Before Prescribed Burn Demonstration Field Day with Georgia Forestry Commission March 2006

Americus **Indiangrass Field during Prescribed Burn Training March 2006 (Trained NRCS, Georgia Forestry Commission, Georgia Soil & Water Conservation Commission and Private Landowners)**

PROJECT 13A150R - QUANTITATIVE AND QUALITATIVE RESPONSE OF NATIVE GRASSES VERSUS INTRODUCED WARM SEASON PASTURE PLANTS AS INFLUENCED BY DIFFERENT BURN REGIMES

INTRODUCTION:

Very little comparative testing between native and introduced warm season forage plants has been documented in the Southeastern United States. This test attempts to establish, evaluate, and analyze different warm season pasture plants and mixtures subjected to different burn regimes. Data should provide qualitative and quantitative information relative to native and introduced pasture species performance in different burn management regimes. Response variables include species composition, and species frequency. This is a cooperative effort between the NRCS and Dr. Mary S. Goodman of Auburn University.

MATERIALS AND METHODS:

On May 6, 1997, the following experimental split plot design was established:
Split plot (cultivars) with main plots (burn regime) in RBD with three (3) reps. Main plots (50' x 300') are burn #1 and burn #2. Split plots (50' x 50') are six cultivar and cultivar mixes. (1) pure 'Cave-In-Rock' switchgrass (2) pure 'Earl' big bluestem , (3) pure 'coastal' bermudagrass, (4) pure 'Pensacola' bahiagrass, (5) a mixture of 30% "Oklahoma Select" little bluestem, 25% "Earl" big bluestem, 20% 'Americus' indiangrass, and 25% "Cave in Rock" switchgrass, (6) a mixture of 50% little bluestem and 50% 'Serala' lespedeza. Grass seeds were planted at a rate of 10 # PLS/Acre and coastal bermuda was planted at a rate of .15 Bu/120 sq. ft. Serala lespedeza was seeded at 20 #/Acre.

RESULTS AND DISCUSSION:

PHASE I

In 1998 all plots were burned. Since 1999, burn #1 plots were burned every year and burn #2 plots burned every two years during dormant season. In 1998 - 2002, percent species composition was recorded for each plot. In 1999- 2002, species frequency was recorded for each plot. Dr. Mary S.Goodman conducted analysis of percent species composition and species frequency. **The following is an abstract from a poster based on this study presented by Dr Goodman and the PMC at the Second National Conference on Grazing Lands held in Nashville Tennessee December 7-10 2003.**
Accumulation of desirable canopy cover is necessary during pasture establishment to protect pasture soil and provide optimum forage quantity and quality. The objective of this study was to evaluate long-term responses of desirable and invasive cover components of forage swards to burn frequency during pasture establishment in a humid, southeastern environment. Forages were sown or sprigged spring 1997 at Americus Ga. in 6 blocks of six 50 by 50 foot plots that included (a) little bluestem +big bluestem +switchgrass +indiangrass (b) little bluestem +serecia lespedeza (c) bahiagrass (d) bermudagrass (e) big bluestem (f) switchgrass. All blocks were burned spring 1998; thereafter, one-half of the blocks were burned every, and one-half every-other year. Percent canopy cover was estimated each fall (1998-2002) and analyzed as a split plot design with year after establishment the main plots; burn frequency the subplots. Percentages of 70-yr average rainfall (48in) for 1997 to 2002 were 117, 92,60, 77, 100, 98, respectively. Burn frequency had significant and varying impacts on cover of specific desirable and invasive species and these impacts often occurred in interaction with impacts of year after establishment and mixture. For example, little bluestem cover in first mix was not different in year 1 (13%) versus year 5 (17%) after establishment if the mix was burned every year. However, when burned every other year, little bluestem cover in first mix was higher (P=. 016) in year 5 (38%) versus year 1 (16%). In second mix little bluestem cover was higher (P=.010) after year 5 when burned every year (32%) versus every other year (16%). Also bahia as an invasive was reduced after year 5 compared to year 1 in some cases. During pasture establishment, desirable and invasive cover components responded positively and negatively to burn frequency over time and these responses varied within a species when sown in different mixtures.

PHASE II

The **burning regime** for the study was changed in 2004 from a **cool season burn** to a **growing season burn.** Also **burning frequency** was changed from burn every year and burn every other year to **burn every year and burn every third year**. May 25, 2004 all plots were burned. On May 26,2005 the main plots which burn every year were burned while the main plots that burn every three years were not burned. Due to lack of personnel and safety issues the plots were not burned in 2006 until August . Percent species composition was recorded from all plots. This data was analyzed in an ANOVA for 2004-2006.Data was analyzed utilizing year as main plot and burn frequency as sub –plot. All data was analyzed using LSD comparison at $p<0.05$. Data in Table 1 and Table 3 was transformed to smooth distribution points.

Data in **Table 1** indicate that “Earl” Big bluestem in a four-way mixture of big bluestem, “Americus” indiangrass, “Cave in Rock” switchgrass, and “Oklahoma select” little bluestem shows no differences in % composition for years or burn frequency. This could imply big bluestem requires one or more complete cycles of the burn regime to show % composition differences possibly due to the large vegetative habit of the taxa.

Data in **Table 2** indicate that “Americus” indiangrass in a four –way mixture has no differences in burn regime but produced higher % composition in 2005 and 2006 compared to 2004. This could be because the indiangrass took two years to acclimate to growing season burns possibly due to the biannual nature of the indiangrass culms.

Data in **Table 3** indicate that across all three years of 2004-2006 the burn regime of every third year produced higher % composition of “Cave in Rock” switchgrass in the four-way mixture. Cave in Rock % composition is adversely affected by burning every year in the four - way mixture.

Growing season burn conducted August 2, 2006

Graph 1 shows simple effects on % composition of "Oklahoma Select" little bluestem in four way mixture. This data indicates a difference in burn regimes during 2006. The burn every year plot was burned late (August) the burn every third year plot was not burned. The late burn with increased fire intensity probably lead to the lower % little bluestem composition in 2006.

Table 4 indicates that the % composition of "Earl" big bluestem in a monoculture was reduced in 2006. Without the buffering effect of the four way mixture the big bluestem monoculture % composition was adversely affected by the late (August) burn of 2006.

Table 5 Although the data indicates no difference in % composition of "Cave in Rock" switchgrass in a monoculture due to burn regime as is indicated in the four way mixture(Table 3) comparison at $p<0.1$ does reveal a similar difference between the burn regimes.

Table 1 Percent Composition of 'Earl' Big Bluestem in Four–Way Mixture Burned Every Year and Every Third Year ,USDA-NRCS Jimmy Carter Plant Materials Center, Americus, Ga. 2004-2006

Burn Regime [1/]	2004	2005	2006	Mean
	----------	----------	----------	----------
	%-			
Year 1	**16.467**	**14.067**	**8.833**	**13.122a**
Year 3	**12.50**	**8.0667**	**9.133**	**9.900a**
Mean	**14.483 a[2/]**	**11.067a**	**8.983a**	

1- burn regime—Year 1=burn every year in growing season; Year 3 = burn every third year in growing season 2- means in rows and columns followed by the same letters are not statistically significant at P<0.05

Table 2 Percent Composition of 'Americus' Indiangrass in Four-Way Mixture Burned Every Year and Every Third Year, USDA-NRCS Jimmy Carter Plant Materials Center, Americus, GA, 2004-2006.

Burn Regime[1/]	2004	2005	2006	Mean
	----------%----------			
Year 1	**14.333**	**30.433**	**23.00**	**22.589a**
Year 3	**7.300**	**23.967**	**19.367**	**16.878a**
Mean	**10.817b[2/]**	**27.2a**	**21.183a**	

1 – burn regime – Year 1 = burn every year in growing season; Year 3 = burn every third year in growing season 2 – means in rows or column followed by the same letters are not statistically significant at P<0.05.

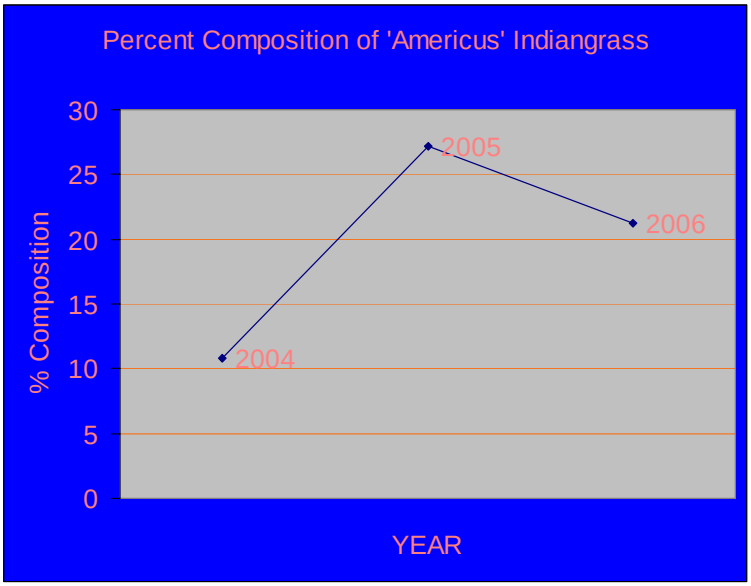


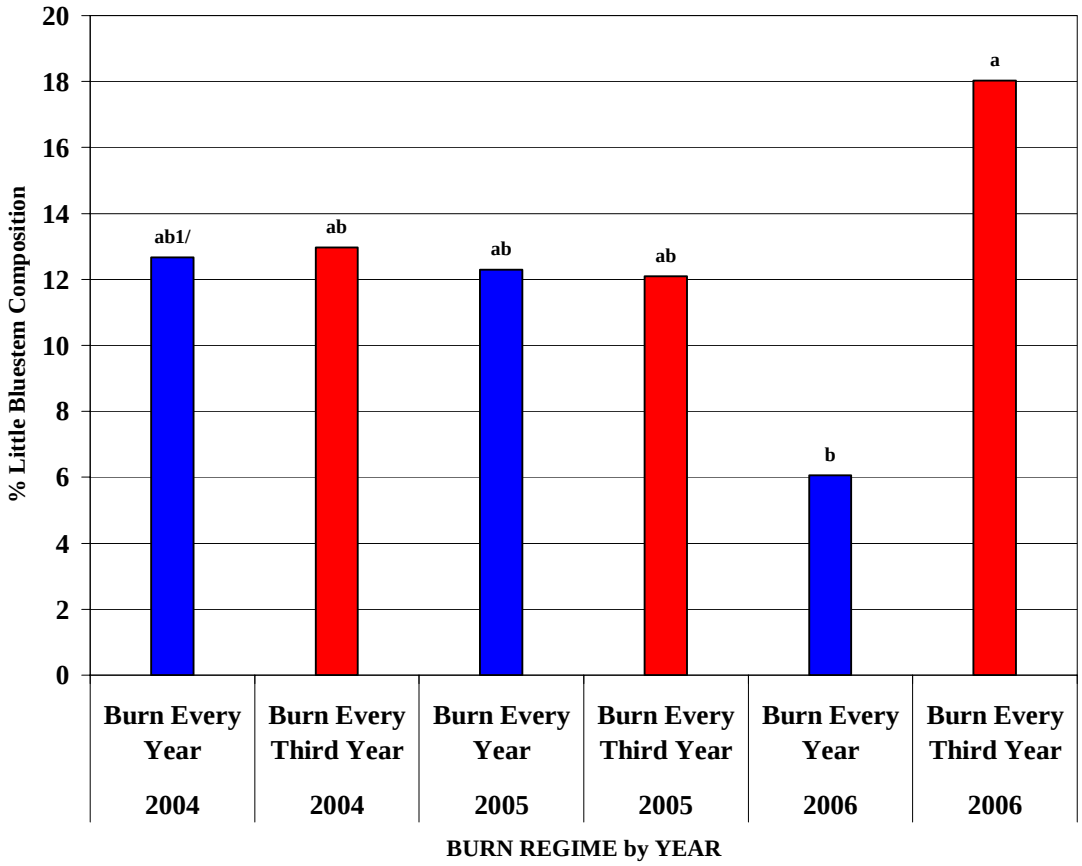
Table 3 Percent Composition of 'Cave in Rock' Switchgrass in Four-Way Mixture Burned Every Year and Every Third Year, USDA-NRCS Jimmy Carter Plant Materials Center, Americus, GA, 2004-2006.

Burn Regime[1/]	2004	2005	2006	Mean
	----------%----------			
Year 1	6.733	6.367	3.700	5.60 b
Year 3	18.10	10.667	9.300	12.69a
Mean	12.42a[2/]	8.52a	6.50a	

1 – burn regime – Year 1 = burn every year in growing season; Year 3 = burn every third year in growing season 2 – means in rows or column followed by the same letters are not statistically significant at P<0.05.

Graph 1

Percent Composition of 'Oklahoma Select" Little Bluestem in Four-Way Mixture Burned Every Year and Every Third Year During Growing Season, USDA-NRCS Jimmy Carter Plant Materials Center, Americus, Ga. 2004-2006



1- Values with same letters are not statistically significant at P<0.05

Table 4 Percent Composition of 'Earl' Big Bluestem Monoculture Burned Every Year and Every Third Year, USDA-NRCS Jimmy Carter Plant Materials Center, Americus, GA, 2004-2006.

Burn Regime[1/]	2004	2005	2006	Mean
	----------%----------			
Year 1	71.43	75.93	51.00	66.12 a
Year 3	67.73	71.23	67.57	68.84 a
Mean	69.58 a[2/]	73.58 a	59.28 b	

1 – burn regime – Year 1 =Burn every year in growing season; Year 3 = Burn every third year in growing season 2 – means in rows and columns followed by the same letters are not statistically significant at P<0.05.

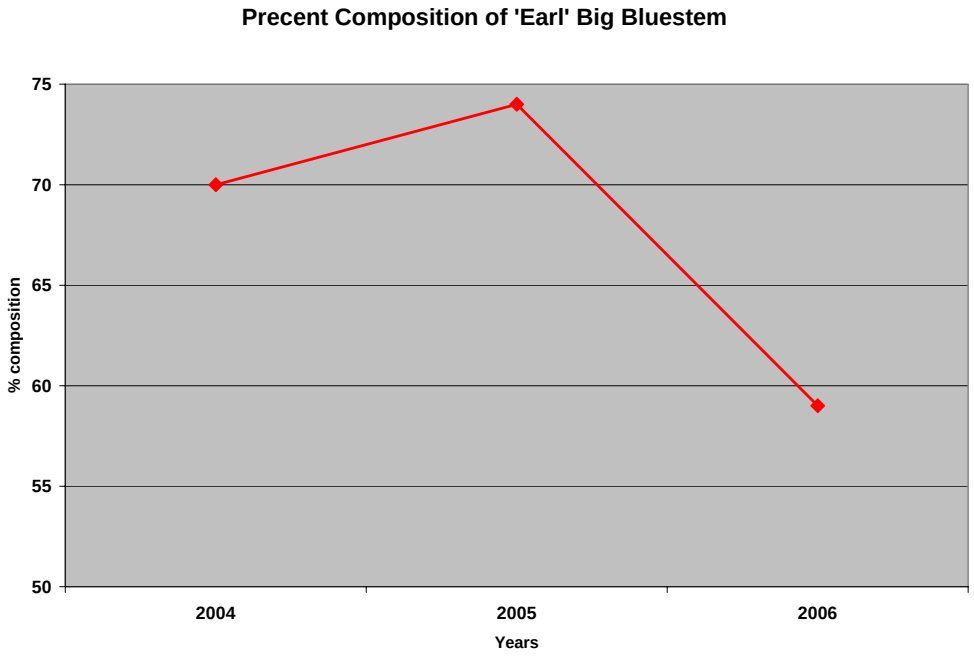
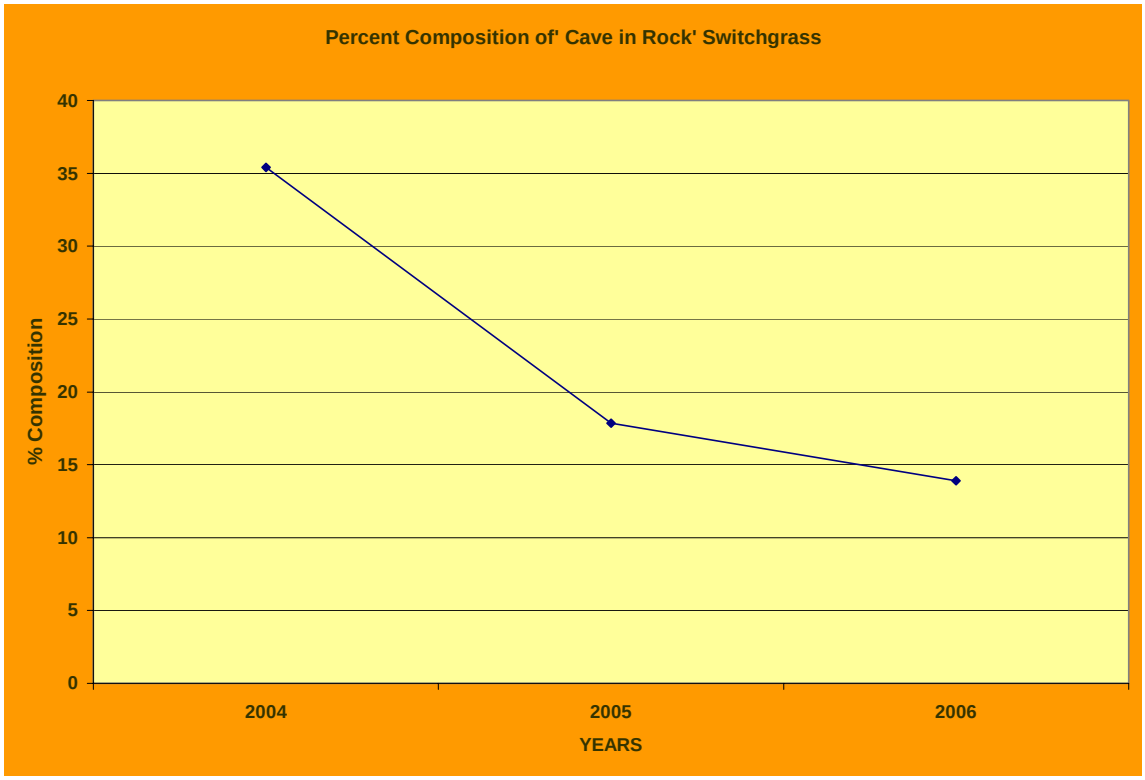


Table 5 Percent Composition of 'Cave in Rock' Switchgrass Monoculture Burned Every Year and Every Third Year, USDA-NRCS Jimmy Carter Plant Materials Center, Americus, GA, 2004-2006.

Burn Regime[1/]	2004	2005	2006	Mean
	----------%----------			
Year 1	36.80	4.20	3.22	14.739 a
Year 3	34.00	31.53	24.567	30.033 a
Mean	35.40 a[2/]	17.867 b	13.892 b	

1 – burn regime – Year 1 =Burn every year in growing season; Year 3 = Burn every third year in growing season 2 – means in rows and columns followed by the same letters are not statistically significant at P<0.05.



PROJECT 13A151B - SILVOPASTURE DEMONSTRATION PROJECT

INTRODUCTION:

In past years, silvopasture studies were conducted by various research institutions in the southeast. They found that tree production and cattle production could be accomplished in one management regime. However, there is a lack of silvopasture demonstration at the present time. This study was established to demonstrate the establishment, management and maintenance of a system designed to produce several valuable products (cattle, pasture, and trees) over the long-term.

MATERIALS AND METHODS:

In 2000, longleaf pine trees were planted on the PMC. Containerized trees were planted on 6 foot spacing within a row with 10 feet between double rows and 40 feet between outside rows. Tree density was about 290 trees/Ac. Trees were planted into existing 'coastal bermudagrass' and 'pensacola' bahiagrass mixed pasture. Pasture was sprayed to reduce grass competition. Spraying was continued in 2002. **Dr. Goodman of Auburn University** is working with the PMC to produce maximum data and knowledge from this study concerning forage production, forage composition, and soil characteristics.

RESULTS AND DISCUSSION:

The overall objective of this project is to identify sustainable management approaches for maintenance of perennial pasture productivity and soil quality during (a) conversion to silvopasture and (b) establishment of rotational stocking within silvopasture. A successful stand of 'Dixie' crimson clover (*Trifolium incarnatum*) was obtained from the Fall 2004 planting. Pastures were sampled in January 2005 for fertilization requirements. Fertilizer was applied according to soil test recommendations in May; no fertilizer N was added to the clover treatment plots. The following information was gathered in **2005.** In May, species composition measurements determined that canopy cover of crimson clover was approximately 15% in both bahiagrass (*Paspalum notatum*) silvopasture and open-pastures. Soil samples were collected at full clover bloom in May and again in early August at two points on 5 separate transects positioned perpendicular to the tree strips in each silvopasture and in a similar configuration in the open-pasture paddocks. On each transect, one sample site was located 1 m from the center of the tree base and the other at the midpoint between adjacent sets of tree strips. In May, the samples were analyzed to characterize percent water-stable aggregates (aggregate stability); soil compaction was measured *in situ* at 5-cm increments to 20 cm in July. In August, 15-cm soil cores were collected to characterize root biomass. Shoot biomass above 5 am was clipped from 10 0.25-m^2 quadrats in each paddock along transects at points used for soil sampling in May, July and August. No treatment or spatial differences were found in percent water-stable aggregates (%WSA) however, there was a significant temporal difference as %WSA increased overall by 23% in August versus June. Soil strength (J/m^2) increased with depth however, sample sites closest to the tree base showed a 50, 56 and 43% reduction in soil strength at 5, 10 and 15 cm, respectively. There were no shoot biomass yield differences as a result of spatial comparisons in May however, clover-treatments had a significantly higher biomass yield by 28% in clover- versus comparable N-fertilizer treatment paddocks. No differences in shoot biomass yield were detected in July however, in the silvopastures in August, there was a significant 10% reduction in biomass yield at sampling points closest to the tree line. Weather stations were located in silvopasture (5-yr old *Pinus palustrus*) and open pasture at Americus and Chipley FL (20-yr old *Pinus taeda*). Silvopasture , open pasture,clover and N-fertilizer treatment plots were again evaluated **in *2006*** by **Dr Mary Goodman** and her staff from Auburn University. Extensive data was collected and will be **reported by her in 2007**. In addition ,a native warm season grass silvopasture demonstration established in Early Co. Georgia was showcased in a **silvopasture field day** at Mr Mack Evans farm **June 2006**.Planting and establishment techniques were demonstrated to area farmers using switchgrass, indiangrass, big bluestem, little bluestem, and eastern gamagrass.

Crimson Clover Plots in Silvopasture Study at PMC in May

Early Co Georgia SilvopastureField Day June 2006 Demonstration with Native Warm Season Grasses

PROJECT 13A152R- ROTATIONAL GRAZING MANAGEMENT OF A MIXED NATIVE GRASS PASTURE

INTRODUCTION:

Native grass pasture systems are used commonly in the Midwestern U.S. However, these systems are rarely utilized in the Southeastern United States. This study attempts to establish a mixture of native warm season grasses and to demonstrate their use in a managed rotational grazing system.

MATERIALS AND METHODS:

In April 2001 the PMC planted a 5-acre native mixed grass pasture using a Truax no-till drill. Since the planting area is sandy soil, a cover of oats was grown to stabilize the soil. Before planting the warm season grasses, the oats were sprayed with herbicide. The oat field was not mowed before planting because the mowed debris can interfere with the planting mechanisms of the planter. The oats were not completely killed before planting. Drill was set to plant switchgrass ('Cave in Rock' and 'Alamo' combined) at 4 # pls/Ac, 'Americus' indiangrass at 2.5 # pls/Ac, Oklahoma selection of little bluestem at 4.1 # pls/Ac, and 'Earl' big bluestem at 2.5 # pls/Ac. Each year the entire pasture is burned.

RESULTS AND DISCUSSION:

In 2002-2006 transects of the field were conducted to determine the percent species composition of the mixture after establishment. The results were as follows:

% Species Composition of Native Mixture from 2002-2006

PLANT SPECIES	2002	2003	2004	2005	2006
ALAMO	25	40	40	48.8	45
CAVE in ROCK	7	12	14.5	8.8	9.1
AMERICUS	4	2	11	5	8.5
EARL	5	14	16.5	16.3	11.9
Oklahoma Select	12	8	11	5	6.5
WEED/OPEN	47	24	7	16.1	19

Through **2006" Alamo " switchgrass** continues to dominate the stand. "Earl" big bluestem is the only other entry to show some competition with the dominate "Alamo". Also in **March 2006** the Georgia Forestry Commission and the staff of the Jimmy Carter PMC utilized the mixed native grass pasture for a **prescribed burning demonstration**. This demonstration provided training for personnel from NRCS, Georgia Forestry Commission, Flint River S&WCD, Georgia Soil & Water Conservation Commission and area landowners.

Georgia Forestry Commission review prescribed burn and safety techniques

In addition to burn and safety techniques smoke management was also demonstrated

PROJECT GAPMC-T-0154-CP ALTERNATIVE CROPS FOR SMALL FARMER'S DEMO AT THE JIMMY CARTER PMC (PHARMACEUTICAL PLANTS)

INTRODUCTION:

Humans have utilized plants for thousands of years. For example therapeutic agents for treating many aliments are derived from various herbs. Several plants produce economically important organic compounds such as **phytochemicals** and pesticides. The USDA-ARS is looking at many legumes for pharmaceutical purposes such as Velvetbean (contains **L-DOPA**, which is used to treat **Parkinson's disease**). Dr. Morris with ARS (Griffin Georgia) states many obscure legumes can provide valuable multiple resources in addition to medicines such as human food, animal feed, cover crops, green manure and erosion control. This study will attempt to assemble, grow, increase and demonstrate new and different crops for small farmers. These farmers will subsequently produce valuable plant material for many uses including medicine, food, and conservation.

MATERIALS AND METHODS:

In 2006 the PMC grew several species of important pharmaceutical plants that do not produce seed at Griffin Georgia.

RESULTS AND DISCUSSION:

In **2006 the PMC grew the following plant taxa** for potential work by **Dr Brad Morris** and the pharmaceutical industry. Seed for future increase and study was delivered to Dr Morris in Feburary 2007.

PI Number	Taxa	Country of Origin
297254	*Canavalia gladiata*	India
436884	*Desmanthus illinoensis*	US
311155	*Lablab purpureus*	Guatemala
275091	*Macrotyloma uniflorum*	India
167238	*Ricinus communis*	Turkey
387941	*Stylosanthes fruticosa*	Australia
180026	*Hibiscus sabdariffa*	India
413201	*Psophocarpus tetragonolobus*	New Guinea
316186	*Chamaecrista mimosoides*	Australia
574536	*Tephrosia vogelii*	Puerto Rico
365057	*Teramnus labialis*	South Africa

Sword Bean (Canavalia gladiata) Pods before harvest

INTRODUCTION:

Concerns over global warming have increased interest in carbon and carbon sequestration. Scientists estimate agriculture is responsible for about 7 % of the total U. S. contribution of greenhouse gases. Plants remove carbon dioxide from the atmosphere and store it in plant parts as carbon. When plants die and decompose some carbon is released back to the atmosphere while some is sequestered as soil carbon, especially under conservation tillage systems. This amounts to a natural giant carbon storage sink. This study will compare perennial crops ability to sequester carbon. This will be determined by soil organic matter testing of several entries in a long-term study.

MATERIALS AND METHODS:

A randomized complete block design with four replications was planted to 'Earl' big bluestem, 'Iuka' eastern gamagrass and 'Alamo' switchgrass in May 2001 with a check of naturalized weed species. Soil organic matter content measured at 0-2 and 2-6 inch depth for each ground cover over time will be the main measured variable. Percent soil organic matter content of ground covers taken from 2-6 inch depth in 2006 were not normally distributed as determined by Shapiro-Wilk Test. Therefore the data was transformed using an arithmetic log. As a result of the logarithmic function the transformed data expressed a normal distribution pattern.

RESULTS AND DISCUSSION:

Data from **Table 1 and 2** indicate **no significant differences** in **% soil organic matter** content of the ground covers or control. This is probably due to lack of time for the ground covers to sequester enough soil organic matter to show a statistical difference. Continued evaluation could show differences in the future.

Table 1 Percent Soil Organic Matter Content of Ground Covers Taken from 0-2 Inch Depth of Carbon Sequestration Study at Jimmy Carter PMC-2006

GROUND COVER	% Soil Organic Matter
Alamo Switchgrass	2.035a*
Earl Big bluestem	2.250a
Iuka Eastern Gamagrass	2.090a
Control (Natural Weed Cover)	2.045a
Mean	2.105

*** Means followed by the same letters are not significantly different as determined by LSD at P<0.05**

Table 2 Percent Soil Organic Matter Content of Ground Covers Taken from 2-6 Inch Depth of Carbon Sequestration Study at Jimmy Carter PMC-2006

GROUND COVER	% Soil Organic Matter
Alamo Switchgrass	1.9050a*
Earl Big Bluestem	1.7150a
Iuka Eastern Gamagrass	1.6250a
Control (Natural Weed Cover)	1.8050a
Mean	1.7625

*** Means followed by the same letters are not significantly different as determined by LSD at P<0.05**

Iuka Eastern Gamagrass shows Potential as Carbon Sequester

PROJECT GAPMC-P-0456-WL LONGLEAF PINE NATIVE UNDER STORY PLANT COLLECTION AND INCREASE STUDY

INTRODUCTION:

The longleaf pine ecosystem of the Southeast is one of the most threatened in the United States. The loss of longleaf pine forests and related plant communities not only jeopardizes the extant plant species but also the native fauna that depend on the resources and structure provided by the vegetation. The objectives of this study are to locate, collect, and grow various native grasses, legumes and forbs which make up the understory vegetation of longleaf pine forest of the southeast United States. Later, seed will be increased for field planting and distribution to growers Any seed produced by small farmers from these native seeds will be marketed for planting on **CRP longleaf pine sites**. Also seed grown by small farmers will be used to "restore" natural areas to longleaf pine and its native understory plant species.

MATERIALS AND METHODS:

Old growth longleaf pine sites have been identified in Southwest Georgia for seed collection. The PMC staff will collect longleaf pine understory seed from locations in Worth, Irwin, and Decatur Counties Georgia. The longleaf pine understory vegetation will be grown on upland soil at the JCPMC. The soil series is orangeburg sandy loam. New Material will be added as needed. Plant Material will be in rod rows, 20 feet long and 6 foot spacing and 10 foot alleys. Basic phenological notes will be taken on the accessions. Seed will then be placed into increase blocks at the PMC for seed production and future use. Since this study is primarily a collection and increase of native understory vegetation for longleaf pine no statistical design will be employed**.**

RESULTS AND DISCUSSION:

The following is a list of **taxa collected in 2004**: Pineywoods Dropseed *Sporobolus junceus, Helianthus radula,* Little Bluestem *Schizachyrium scoparium, Lespedeza angustifolia, Lespedeza hirta ,Lespedeza virginica,* Wiregrass *Aristida stricta,* Grass Leaved Golden Aster *Pityopsis adenolepis,* Blue Sage *Salvia* azurea, Sweet Goldenrod *Solidago odora, Crotalaria purshii,* Pencil Flower *Stylosanthes biflora,* Scurf Pea *Psoralea canescens,* Sensitive Brier *Schrankia microphylla,* Goat's Rue *Tephrosia virginiana,* Dollar Plant *Rhynchosia reniformis,* Wild Indigo *Baptisia lanceolata,* Black-Eyed Susan *Rudbeckia hirta, Andropogon gyrans.* In **2005** Queens delight *Stillingia sylvatica* , Split beard bluestem *Andropogon ternarius* , Dusty clover *Lespedeza capitata* , Rattle-box *Crotalaria rotundifolia,* Purple Elephants- foot *Elephantopus nudatus* was added to the seed collection. In **2006** Hairy small- leaf ticktrefoil *Desmodium ciliare* Velvetleaf ticktrefoil *Desmodium viridiflorum,* Pinebarren ticktrefoil *Desmodium strictum,* White– topped aster,*Aster tortifolius* **,** Rattlesnake Master, *Eryngium yuccifolium,* Blazing star *Liatris gracilis,Liatris elegans,Liatris tenuifolia,* Beaked panicum,*Panicum anceps* ,Thoroughwort, *Eupatorium semiserratum, Eupatorium hyssopifolium,* Lopsided indiangrass**,** *Sorghastrum secundum,* Slender bluestem, *Schizachyrium tenerum,* Deers tongue, *Carphephorus odoratissimus,* Black senna, *Seymeria cassioides,* Summer farewell, *Dalea pinnata,* Narrow plumegrass, *Erianthus strictus* and Golden aster, *Chrysopsis gossypina,* was added to the seed collection. PMC staff will attempt to collect more seed from the same areas in 2007 for later planting at PMC.

Seed Collection in Worth Co Georgia

PROJECT GAPMC-T-0457-WL ASSEMBLY OF PLANTS FOR BOBWHITE QUAIL HABITAT IMPROVEMENT

INTRODUCTION:

There is renewed interest in plant material for use in wildlife habitat improvement. The Georgia Department of Natural Resources and the Georgia NRCS is involved in improving wildlife habitat on landowners property throughout the state. The bobwhite quail initiative designed to improve bobwhite quail habitat has received much national and local attention. This new special planting was installed to demonstrate to landowners and other cooperators the potential of plant materials for use in wildlife habitat improvement.

MATERIALS AND METHODS:

All material was selected to demonstrate use of plants for wildlife cover, nesting and food. This demonstration especially emphasizes wildlife habitat improvement for bobwhite quail in the Southeastern U.S. Plant cultivars, and accessions displayed included 20 big bluestem collected from the Southeastern U.S. and selected by NRCS biologists for bob white quail habitat improvement, Oklahoma Select little bluestem, Cave-in-Rock switchgrass, Wabasso switchgrass, Stuart switchgrass , Martin eastern gamagrass, St. Lucie eastern gamagrass, Arkansas selection of big bluestem, Citrus maidencane, Illinois bundleflower, ragweed , Florida Paspalum, and partridge pea.

RESULTS AND DISCUSSION:

September **2006** landowners and cooperators observed the Bob white Quail habitat improvement study during the Jimmy Carter Plant Materials Center **Wildlife Field Day and Tour**. Participants included the following: Flint River Soil and Water Conservation District, Lower Chattahoochee River Soil & Water Conservation District, Georgia Soil and Water Conservation Commission, Georgia DNR, Fort Valley State University, NRCS, bobwhite quail enthusiasts, Quail Unlimited Company, Georgia Forestry Commission, USF&WS, wildlife plant nurserymen, Tuskegee University, and local landowners. Similar events are planned for the future.

Bobwhite Quail Habitat Improvement Study

PROJECT GAPMC-T-0758-WL RESTORATION STUDY FOR ENHANCEMENT OF BOBWHITE HABITAT

INTRODUCTION:

Native warm season grasses and forbs constitute a major source of food, shelter and structure for bobwhite quail populations. However modern farming practices in the Southeastern U.S. have eliminated much of this habitat. Efforts such as this project at Jimmy Carter PMC and also at private sites in the entire region will demonstrate modification of conventional farming systems to enhance wildlife and upland bird habitat.

MATERIALS AND METHODS:

The site at the JCPMC for this restoration project and demonstration is on bahia-bermudagrass pasture and hayland. The soil series is orangeburg sandy loam. The first phase of the restoration will be the elimination of competitive vegetation by use of herbicides and disking. Later, native warm season grasses and forbs will be planted to the site. Motts may also be added at a later date. Once a stand of desirable vegetation has been established data will be collected on species composition and growth. This data will be analyzed by wildlife biologists to determine the level of habitat restoration and improvement. Data collection and analysis will be shared by DNR, NRCS and WMI biologists.

RESULTS AND DISCUSSION:

In October **2006** PMC personnel applied chopper ,plateau ,and BASF 693 to the restoration site The site will be sprayed again and disked in **2007** to eliminate competitive vegetation.. This area will be evaluated and planted to native warm season grasses and forbs in **2008.**

RELEASES FROM JIMMY CARTER PMC

Common Name (Year of Release)	Scientific Name	Primary Use
'Pensacola' Bahiagrass ('44)	*Paspalum notatum*	Forage Production
'Amclo' Arrowleaf Clover ('63)	*Trifolium vesiculosum*	Forage Production
'Ambro' Virgata Lespedeza ('71)	*Lespedeza virgata*	Roadbank stabilization
'Dove' Proso Millet ('72)	*Panicum miliaceum*	Wildlife Food
'Ellagood' Autumn Olive ('86)	*Elaeagnus umbellata*	Wildlife Food
'Amquail' Thunberg Lespedeza ('87)	*Lespedeza thunbergii*	Wildlife Food and Cover
'Flageo' Marshhay Cordgrass* ('90)	*Spartina patens*	Beach Stabilization
(The 'Flageo' Marshhay Cordgrass release involved a cooperative effort with Fort Valley State Univ.)		
'GA-5' Tall Fescue ('92)	*Festuca arundinacea*	Forage Production
(The 'GA-5' Tall Fescue release involved a cooperative effort with the University of Georgia)		
'Big O' Crabapple* ('92)	*Malus coronaria*	Wildlife Food
'Sumter Orange' Daylily ('93)	*Hemerocallis fulva*	Landscape Beautification
'Doncorae' Brunswickgrass ('93)	*Paspalum nicorae*	Waterways Stabilization
'Wetlander' Giant Cutgrass* ('93)	*Zizaniopsis miliacea*	Constructed Wetlands
'Restorer' Giant Bulrush* ('93)	*Scirpus californicus*	Constructed Wetlands
'Americus' Hairy Vetch ('93)	*Vicia villosa*	Winter Cover Crop and Conservation Tillage
(The 'Americus' Hairy Vetch release involved a cooperative effort with the University of Georgia)		
'AU Early Cover' Hairy Vetch ('94)	*Vicia villosa*	Winter Cover Crop and Conservation Tillage
('The 'AU Early Cover' Hairy Vetch release involved a cooperative effort with Auburn University)		
'AU Ground Cover' Caley Pea ('94)	*Lathyrus hirsutus*	Winter Cover Crop and Conservation Tillage
(The 'AU Ground Cover' Caley Pea release involved a cooperative effort with Auburn University)		
'Sharp' Marshhay Cordgrass* ('94)	*Spartina patens*	Beach Stabilization
(The 'Sharp' Marshhay Cordgrass release involved a cooperative effort with NRCS PMC in Brooksville, Florida)		
'AU Sunrise' Crimson Clover ('97)	*Trifolium incarnatum*	Winter Cover Crop and Conservation Tillage
(The 'AU Sunrise' Crimson Clover release involved a cooperative effort with Auburn University)		
'Americus' Indiangrass * (2002)	*Sorghastrum nutans*	Forage, landscape, restoration
(The 'Americus' Indiangrass release involved a cooperative effort with Alabama Crop Improvement)		
'Highlander' Eastern Gamagrass * (2003)	*Tripsacum dactyloides*	Forage, buffer, conservation
(The 'Highlander' release involved Coffeeville Miss PMC as primary with MAEP)		
' Kinchafoonee' Virginia Wildrye* (2004)	*Elymus virginicus*	Conservation, log roads, restoration
' Newberry' Indiangrass* (2005)	*Sorghastrum nutans*	Conservation buffers,wildlife habitat,urban landscape, restoration and critical areas

'Union' Purpletop* (2005)	*Tridens flavus*	Conservation buffers,wildlife habitat, urban landscape,restoration and critical areas
(Newberry and Union release involved cooperative effort with USDA-USFS and SC Native Plant Society)		
'Durham' Switchgrass* (2005)	*Panicum virgatum*	Conservation buffers, wildlife habitat,urban landscapes, restoration and critical areas

***Native plants**

For more information concerning the plant materials center and its conservation efforts, contact the center's manager at 295 Morris Drive, Americus, Georgia 31709. Phone: (229) 924-4499 or 924-7003.