



March 6, 1991

NATIONAL SOIL TAXONOMY HANDBOOK
430-VI
ISSUE NO. 14

Purpose. To distribute current amendments to Soil Taxonomy, Agriculture Handbook 436.

Effective Date. These amendments and revisions are effective when received.

Filing instructions. File this copy of the changes in the 3-ring binder with Issues Nos. 1 through 13. It is suggested that you keep this binder with the Soil Taxonomy volume for easy reference.

Replace 615 "Contents" dated July 1989 with the enclosed "Contents" dated January 1991. Replace page v of "Index to pages of Soil Taxonomy" dated July 1989 with the enclosed page v of the index. File pages 615-389 to 615-405 following page 615-388.

Supplementation. States and NTC's may not supplement the handbook.

ROBERT R. SHAW
Deputy Chief for Technology

Enclosures

DIST: NSTH



CONTENTS

Section

- 615.00 General
- 615.00-1 Purpose of amendments
- 615.00-2 Changes at the series level
- 615.00-3 Amendments to Soil Taxonomy above the series level
- 615.01 Addition of particle-size classes
- 615.02 Deletion of temperature requirements of Vertisols
- 615.03 Redefinition of Arenic Albaqualfs
- 615.04 Establishment of great group Fragixeralfs
- 615.05 Changes in key to Mollisols and Inceptisols
- 615.06 Change in definition of Arenic Ochraqualfs
- 615.07 Mollic Natraqualfs and Typic Natralbolls
- 615.08 Changes in definitions of diagnostic horizons
- 615.09 Changes in identification key
- 615.10 Changes in order of Alfisols
- 615.11 Changes in order of Aridisols
- 615.12 Changes in order of Entisols
- 615.13 Changes in order of Histosols
- 615.14 Changes in order of Inceptisols
- 615.15 Changes in order of Mollisols
- 615.16 Changes in order of Oxisols
- 615.17 Changes in order of Spodosols
- 615.18 Changes in order of Ultisols
- 615.19 Changes in definitions of family and series
- 615.20 Changes in classification of pedons in Appendix IX
- 615.21 Changes in definitions of family and series
- 615.22 Torriorthents and Fluvaquents
- 615.23 Haploborolls and Hapludolls
- 615.24 Ochraqualts
- 615.25 Lithic vertic and paralithic vertic subgroups
- 615.26 Durustolls
- 615.27 Lithic vertic and paralithic vertic subgroups
- 615.28 Plate 8C
- 615.29 Hapludolls
- 615.30 Changes in horizon designations
- 615.31 Add implied subgroup of Alfic Cryorthents
- 615.32 Change the determinant fraction for Quartzipsamments
- 615.33 Add implied subgroup of Lithic Petrocalcic Calciustolls
- 615.34 Changes in subgroups of Haplaquods
- 615.35 Restrict fragic and fragiaquic subgroups of Paleudults
- 615.36 Correction in ochric epipedon and spodic horizon definitions
- 615.37 Corrections in horizon designations
- 615.38 Low Activity Clay amendment
- 615.39 Aquic and Typic Fragiudults
- 615.40 Add implied subgroup of Ustic Quartzipsamments
- 615.41 Paleudalfts
- 615.42 Correction in previous issue

Section

- 615.43 Ustalfs, Ustochrepts, and Ustolls
- 615.44 Additions and changes
- 615.45 Oxisol amendment
- 615.46 Eutroboralfs
- 615.47 Fraglossudalfs
- 615.48 Additions and corrections
- 615.49 Grossarenic Ochraqualfs
- 615.50 Umbraqualfs
- 615.51 Natrustalfs
- 615.52 Durixeralfs
- 615.53 Haploxeralfs
- 615.54 Arenets
- 615.55 Vertic Ustifluvents
- 615.56 Palehumults and Haplohumults
- 615.57 Lithic Haploxerults
- 615.58 Addition of ashy over sandy or sandy-skeletal
particle size class
- 615.59 Corrections
- 615.60 Andisol amendment
- 615.61 Andic and vitrandic subgroups
- 615.62 New format for the keys to subgroups
- 615.63 Additions and corrections
- 615.64 Frigid Ultisols
- 615.65 Glossic horizon amendment
- 615.66 Additions and corrections

Part 615 - Amendments to Soil Taxonomy

<u>Section</u>	<u>Page</u>
615.62 (cont.)	213-226, 238-246, 248-256, 258-263, 265-268, 274, 276-283, 285-286, 288-289, 291-304, 306, 308-317, 319-321, (NSTH pages 615-125 to 127, 615-129, 615-131, 615-133, 615-136 to 138, 615-141, 615-142, 615-144, 615-146, 615-147, 615-150, 615-152, 615-154, 615-156), 335-339, 341-346, 352 (NSTH page 615-78), 353-357 (NSTH pages 615-82 to 84), 358 (NSTH pages 615-171 to 172), 362-363, 364 (NSTH pages 615-87 to 90), 367, 370-371 (NSTH pages 615-93 to 97), 372-373
615.63	27 (NSTH page 615-52), 36, 258, 260, 262, 323, 385
615.64	75, 92, 95, 96, 206, 207, 337 (NSTH 615-357-358), 339 (NSTH 615-358), 344 (NSTH 615-363), 346 (NSTH 615-364), 347, 349, 350, 360, 362, 372
615.65	33, 44, 78, 92, 95, 96, 109, 110, 112, 113, 114 (NSTH page 615-212), 115, 118, 119, 120, 120 (NSTH page 615-216), 121, 121 (NSTH page 615-217), 122, 123, 123 (NSTH 615-219), 124, 125, 126, 127, 128, 128 (NSTH 615-161), 127 (NSTH pages 615-220, 221), 129, 129 (NSTH 615-221), 130, 131, 133, 133 (NSTH pages 615-62, 63, 226), 150, 164, 165, 283 (NSTH page 615-319), 284, 291, 291 (NSTH pages 615-325, 326), 306 (NSTH page 615-341), 307, 345, 349, 350
615.66	No page number (NSTH page 615-1), 237 (NSTH page 615-204), No page number (NSTH page 615-219), 127 (NSTH page 615-220), 130 (NSTH page 615-223), 141 (NSTH page 615-231), No page number (NSTH page 615-238), 296 (NSTH page 615-328), 339 (NSTH page 615-359), 344 (NSTH page 615-363), No page number (NSTH page 615-376), 258 (NSTH page 615-388)

615.64 Frigid Ultisols

This amendment allows Ultisols and Ultic intergrades to have any temperature regime.

Page 75, column 1, Ultisols, line 7. Change the comma following the word "horizons" to a period and delete "and a mean annual soil temperature higher than 8° C (47° F)."

Page 92, column 2, item F., lines 1 & 2. Delete "have a mesic, isomesic, or warmer temperature regime,."

Page 95, column 1, Definition, item (1). Delete "(1) A frigid, isofrigid or colder temperature regime;" and renumber items (2) and (3) as (1) and (2).

Page 95, column 2, item b., lines 3 & 4. Delete "have a frigid or colder temperature regime or".

Page 96, column 2, item 7.b. Delete "b. A frigid, isofrigid or colder temperature regime;" and renumber item "c." as item "b."

Page 206, column 2, line 11. Delete " or have a frigid temperature regime".

Page 206, column 2, line 23. Delete ", and have a mesic or warmer temperature regime".

Page 206, column 2, Description of subgroups, Alfic Udipsamments, lines 5 & 6. Delete "Either the temperature regime is frigid or " and capitalize the "t" in "the".

Page 207, column 1, Ultic Udipsamments, lines 5 to 7. Delete "The soil temperature regime is mesic to hyperthermic, and " and capitalize the "b" in "base".

NSTH 615.62, pages 615-357 and 358, item CAFE (*Soil Taxonomy* page 337). Delete " either" and " or have a mean annual soil temperature lower than 8° C".

NSTH 615.62, page 615-358, item CAFK (*Soil Taxonomy* page 337). Delete " either" and " or have a mean annual soil temperature lower than 8° C".

NSTH 615.62, page 615-359, item CAGB (*Soil Taxonomy* page 339). Delete " or they have a mean annual soil temperature lower than 8° C".

NSTH 615.62, page 615-363, item CDBE (*Soil Taxonomy* page 344). Delete " or have a mean annual soil temperature lower than 8 degrees C".

Page 346, column 2, Description of subgroups, Typic Haplorthods, lines 8 & 9. Delete " and temperature"

NSTH 615.62, page 615-364, item CDEE (*Soil Taxonomy* page 346). Delete " either" and " or has a mean annual soil temperature lower than 8° C".

NSTH 615.62, page 615-364, item CDEH (*Soil Taxonomy* page 346). Delete " either" and " or

has a mean annual soil temperature lower than 8° C".

Page 347, column 1, Alfic Haplorthods, line 3. Delete "either" and substitute "a".

Page 347, column 1, Alfic Haplorthods, line 4. Delete " or a frigid temperature regime".

Page 347, column 1, Aqualfic Haplorthods, lines 2 & 3. Delete "either" and substitute "a".

Page 347, column 1, Aqualfic Haplorthods, lines 3 & 4. Delete " or a frigid temperature regime,."

Page 347, column 2, Ultic Haplorthods, lines 3 & 4. Delete " both" and " and a mesic or warmer temperature regime".

Page 349, column 1, line 31. Delete " warmer than frigid or isofrigid".

Page 349, column 2, item 2. Delete "2. Have a mesic, isomesic, or warmer temperature regime;" and renumber item "3." as item "2."

Page 350, column 1, line 7. Delete "a. Have a mesic, isomesic, or warmer temperature regime;" and renumber "b." and "c" as "a" and "b".

Page 350, column 1, item 2., lines 2 & 3. Delete ", must have a mesic, isomesic, or warmer soil temperature regime,."

Page 360, column 2, line 6. Add " frigid," following "temperature regime is".

Page 362, column 2, line 20. Add " or frigid" following "regime is mesic".

NSTH 615.62, page 615-380, item GDBE 2.a., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,."

NSTH 615.62, page 615-380, item GDBH 1., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,."

NSTH 615.62, page 615-380, item GDBI 1., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,."

NSTH 615.62, page 615-381, Definition of Typic Kandiusults, item 6.a., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,."

NSTH 615.62 page 615-382, item GDCE 2.a., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,."

NSTH 615.62 page 615-382, item GDCl 1., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,."

615.64

NSTH 615.62 page 615-382, item GDCJ 1., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,".

NSTH 615.62 page 615-383, column 1, item 9.a., (*Soil Taxonomy* page 371). Delete "mesic or thermic," and replace with "thermic, mesic, or colder,".

Page 372, column 2, Xerults, line 10. Delete "or mesic" and substitute ", mesic, or frigid".

615.65 Glossic Horizon Amendment

Page 33, column 2, line 44. Following "an albic horizon," add "a glossic horizon," and delete "tonguing or".

Page 44, column 2, Albic horizon. Delete description of the "albic horizon" and substitute the following descriptions:

"Albic horizon"

The albic (*L. albus*, white) horizon is an eluvial horizon 1.0 cm or more thick containing more than 85 percent by volume albic materials (defined later). It usually occurs below an A horizon but may be at the mineral soil surface. Under the albic horizon there is usually an argillic, cambic, kandic, natric, or spodic horizon or a fragipan. The albic horizon may lie between a spodic horizon and either a fragipan or an argillic horizon; or it may lie between an argillic or kandic horizon and a fragipan. It may lie between a mollic epipedon and an argillic or natric horizon, or between a cambic horizon and an argillic, kandic, or natric horizon or a fragipan. The albic horizon may separate horizons which, if together, would meet the requirements for a mollic epipedon. It may separate lamellae that together meet the requirements for an argillic horizon; these lamellae are not considered to be part of the albic horizon.

In some soils the horizon underlying the albic horizon is too sandy or too weakly developed to have the levels of accumulation required for a spodic, argillic, kandic, or natric horizon. In some soils the albic horizon is underlain by a lithic or paralithic contact, or another relatively impervious layer that produces a perched water table with stagnant or moving water.

Pedon 11 has an albic horizon that extends from a depth of 10 cm to 36 cm below the surface. Plate 6D illustrates the appearance of an albic horizon overlying a glossic (defined below) and an argillic horizon. Plate 4C shows a soil with an albic horizon overlying a spodic horizon. Plate 11D illustrates a soil in which an albic horizon overlies an argillic horizon and separates horizons that together would meet the requirements for a mollic epipedon.

Glossic horizon

The glossic (*Gr. glossa*, tongue) horizon is a soil layer 5 cm or more thick which shows evidence of the degradation of an argillic, kandic, or natric

horizon. It consists of specific (15 to 85 percent) volumes of both albic materials (described later) and of remnants of an argillic, kandic, or natric horizon. Degradation proceeds with clay and free iron oxides being removed, first from the exterior of peds and then progressing toward the interior. This process leaves albic materials and remnants of the argillic, kandic or natric horizon in the glossic horizon. In early stages of that development, the peds of the remnant argillic, kandic, or natric horizon still form structural units that extend through the glossic horizon. In later stages, some of these structural units no longer extend all the way through the horizon. In the most advanced stages remnant peds are completely surrounded by albic materials. The boundary between the illuvial and eluvial parts of the glossic horizon is either abrupt or clear, and either irregular or broken.

The glossic horizon usually occurs between an albic horizon and an underlying argillic, kandic, or natric horizon or a fragipan. It can occur between an argillic, cambic, or kandic horizon and a fragipan. In the early stages of the degradation process a glossic horizon can be within an argillic, kandic, or natric horizon, or within a fragipan if that fragipan shows evidence of the degradation of an argillic horizon. An albic horizon may be below, or between subhorizons of, the glossic horizon.

Argillic horizons consisting of lamellae and intervening albic materials are not within the concept of the glossic horizon.

In summary, a glossic horizon:

1. Is 5 cm or more thick;
2. Consists of 15 to 85 percent (by volume) albic materials throughout; *and*
3. Has 15 to 85 percent (by volume) remnants of an argillic, kandic, or natric horizon throughout."

Page 47, column 2, line 13. Delete "may be tonguing or interfingering of albic material, which are" and replace with "a glossic horizon or interfingering of albic material, which is".

Page 64, column 1, **Tonguing and interfingering.** Delete the section on "Tonguing and Interfingering" and replace with the following:

"Albic materials and interfingering of albic materials"

Albic materials

Albic (*L. albus*, white) materials are soil materials with a color that is largely determined by the color of the primary sand and silt particles, rather than by the color of their coatings. The definition implies that clay and/or free iron oxides have been removed from the materials, or the oxides have been segregated to such an extent that the color of the materials is largely determined by the color of the primary particles.

615-390

The color value, dry, of albic materials is 5 or more and the value, moist, is 3 or more; however, if the value, dry, is 5, then the value, moist, has to be 4 or more. If the value, dry, is 7 or more, or the value, moist, is 6 or more, the chroma is 3 or less either dry or moist. If the value, dry, is 5 or 6, or the value, moist, is 5 or less, the chroma is 2 or less either dry or moist; however, a chroma of 3 is permitted if the parent materials have a hue of 5YR or redder and if the chroma is due to the color of uncoated silt or sand grains.

Relatively unaltered layers of light-colored sand, volcanic ash, or other materials deposited by wind or water are not considered to be albic materials although they may have the same color and apparent morphology. These deposits are parent materials which have not had clay and/or free iron removed and do not overlie an illuvial horizon or other soil horizon except a buried soil. Light-colored krotovina or filled root channels should only be considered as albic materials if they have no fine stratifications or lamellae, if any sealing along krotovina walls has been destroyed, and if these intrusions have been leached of free iron oxides and/or clay after deposition.

Interfingering of albic materials

Interfingering of albic materials consists of penetrations of albic materials 5 cm or more down into an underlying argillic or natric horizon along vertical and, to a lesser degree, horizontal faces of peds. There need not be a continuous overlying albic horizon. The albic materials make up less than 15 percent of the layer which they penetrate, but they form continuous skeletans (ped coatings of clean silt or sand defined by Brewer, 1964) 1 mm or more thick on the vertical ped faces, which means a total width of 2 mm or more between abutting peds. Because quartz is such a common constituent of silt and sand, these skeletans are usually nearly white when dry and light gray when moist, but their color is determined in large part by the color of the sand or silt fraction.

For interfingering of albic materials to be recognized, all the following requirements must be met:

1. Penetrations of albic materials extend 5 cm or more into an underlying argillic or natric horizon;
2. Albic materials are 2 mm or more thick between vertical faces of abutting peds; *and*
3. Albic materials make up less than 15 percent (by volume) of the layer which they penetrate.

Plate 6D shows interfingering of albic materials into an argillic horizon that has moderately fine texture."

Page 78, column 2, lines 14 & 15. Delete "deep tongues of an eluvial horizon penetrating them." and substitute "developed a glossic horizon."

Page 92, column 2, item F., lines 2 & 3. Delete "tongues of albic material in the argillic horizon that have" and replace with "a glossic horizon that has".

Page 95, column 1, last line. Delete "tongues of albic material in the argillic horizon that have" and replace with "a glossic horizon that has".

Page 95, column 2, lines 30 & 31. Delete "or have tongues of albic material in the argillic horizon that have" and replace with "or have a glossic horizon that has".

Page 96, column 2, lines 6 & 7. Delete "Tongues of albic material in the argillic horizon that have" and replace with "A glossic horizon that has".

Page 109, column 2, Key to great groups, item IAF. Delete "an albic horizon tonguing into an argillic horizon" and replace with "a glossic horizon".

Page 110, column 1, Definition, item 2. Delete "tonguing of albic materials in the argillic horizon" and replace with "glossic horizon".

Page 112, column 2, Glossaqualfs, lines 1 & 2. Delete "an albic horizon tonguing into an argillic horizon. The tonguing" and add "a glossic horizon. The glossic horizon".

Page 112, column 2, Glossaqualfs, lines 7 & 8. Delete "tongues" and replace with "albic materials" and delete "tonguing" and replace with "a glossic horizon".

Page 113, column 1, Figure 35, caption. Delete "the tonguing of the albic horizon into the argillic" and replace with "a glossic".

Page 113, column 1, item 1., lines 2 & 3. Delete "an albic horizon tonguing into an argillic" and replace with "a glossic".

Page 113, column 2, line 21. Delete "tongues" and replace with "albic materials".

NSTH 615.62, page 615-212, item IABA (*Soil Taxonomy* page 114). Delete "tonguing" and replace with "a glossic horizon" and delete "more than 2.5 cm".

NSTH 615.62, page 615-212, item IABC (*Soil Taxonomy* page 114). Delete "tonguing" and replace with "a glossic horizon" and delete "more than 2.5 cm".

NSTH 615.62, page 615-212, Definition of Typic Natraqualfs, item 1 (*Soil Taxonomy* page 114). Delete "tonguing" and replace with "a glossic horizon".

Page 115, column 1, Albic Glossic Natraqualfs, lines 1 & 2. Delete "tonguing or" and add after "soils have" "a glossic horizon or".

Page 115, column 1, Glossic Natraqualfs, line 1. Delete "tonguing" and replace with "a glossic horizon".

615.65

- Page 115, column 1, Ochraqualfs, Definition, item 2. Delete "tonguing of albic materials in the argillic" and replace with "a glossic".
- Page 118, column 2, line 8. Delete "albic materials tonguing in the argillic" and replace with "a glossic".
- Page 119, column 2, item IBA, lines 4 & 5. Following the words "that have" add "a glossic horizon or" and delete "tonguing or".
- Page 119, column 2, line 27. Delete "tonguing" and replace with "glossic horizon".
- Page 119, column 2, line 30. Delete "tonguing of albic materials in the upper part of the argillic" and replace with "a glossic".
- Page 120, column 1, line 2. Delete "tonguing" and replace with "glossic horizon".
- NSTH 615.62, page 615-216, item IBDH (*Soil Taxonomy* page 120). Delete "albic materials tonguing in an argillic" and replace with "a glossic".
- NSTH 615.62, page 615-216, column 2, line 6 (*Soil Taxonomy* page 120). Delete "albic materials tonguing in an argillic" and replace with "a glossic".
- Page 120, column 1, Description of subgroups, Typic Cryoboralfs, lines 4 & 5. Delete "deep tongues of albic materials in the argillic" and replace with "a glossic".
- Page 120, column 2, lines 8 to 10. Delete "Tongues of albic materials in the argillic horizon are considered abnormal. They are" and replace with "A glossic horizon is considered abnormal. It is".
- Page 120, column 2, line 27. Delete "Andeptic" and replace with "Andic".
- Page 120, column 2, line 30. Delete "amorphous clays, and they are permitted but not required to have albic materials tonguing into the argillic" and replace with "some andic soil properties. They are permitted but not required to have a glossic".
- Page 120, column 2, line 45. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 120, column 2, line 55. Delete "tongues of albic materials extend down into it." and replace with "they have a glossic horizon."
- Page 120, column 2, line 62. Delete "Albic materials are permitted to tongue into the argillic horizon." and replace with "A glossic horizon is permitted."
- Page 121, column 1, line 6. Delete "The albic horizon in soils of this subgroup is permitted to tongue into the argillic horizon." and replace with "Soils of this subgroup are permitted to have a glossic horizon."
- Page 121, column 1, line 14. Delete "Tongues of albic materials are permitted in the argillic horizon." and replace with "A glossic horizon is permitted."
- Page 121, column 1, line 27. Delete "albic materials that tongue into the argillic" and replace with "a glossic".
- Page 121, column 1, line 39. Delete "are no" and replace with "is no glossic horizon nor" and delete "tongue or".
- NSTH 615.62, page 615-217, item IBEE. (*Soil Taxonomy* page 121). Delete "tongues of albic materials in the argillic horizon (interfingering is permitted)." and replace with "a glossic horizon."
- NSTH 615.62, page 615-217 Item IBEJ. (*Soil Taxonomy* page 121). Delete "tongues of albic materials in the argillic horizon (interfingering is permitted)." and replace with "a glossic horizon."
- NSTH 615.62, page 615-217, column 2, Definition of Typic Eutroboralfs, item 3. (*Soil Taxonomy* page 121). Delete "tongues of albic materials in the argillic horizon (interfingering is permitted)." and replace with "a glossic horizon."
- Page 121, column 2, line 8. Delete "are no albic materials that tongue or" and replace with "is no glossic horizon nor albic materials that".
- Page 121, column 2, line 52. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 122, column 1, lines 3 & 4. Delete "Tongues of albic materials in the argillic horizon are" and replace with "A glossic horizon is". In line 4 delete "are" and replace with "is".
- NSTH 615.46, page 615-160, lines 21 & 22 (*Soil Taxonomy* page 122). Delete "albic materials tonguing into the argillic" and replace with "a glossic".
- NSTH 615.46, page 615-160, line 30 & 31 (*Soil Taxonomy* page 122). Delete "albic materials tonguing into the argillic" and replace with "a glossic".
- Page 122, column 1, line 37. Delete "Tongues of albic materials are" and replace with "A glossic horizon is".
- Page 122, column 1, line 48. Delete "albic materials that tongue into the argillic" and replace with "a glossic horizon".
- Page 122, column 2, line 19. Delete "are no albic materials that tongue or" and replace with "is no glossic horizon nor albic materials that".
- Page 122, column 2, line 41. Delete "are no albic materials that tongue or" and replace with "is no glossic horizon nor albic materials that".
- Page 123, column 1, line 5. Delete "characteristic tonguing of albic materials" and replace with

- "glossic horizon that commonly has tongue-like projections of albic materials".
- Page 123, column 1, line 34. Delete "are no albic materials that tongue or" and replace with "is no glossic horizon nor albic materials that".
- NSTH 615.62, page 615-219, item IBFF (*Soil Taxonomy* page 123). Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- NSTH 615.62, page 615-219, Definition of Typic Glossoboralfs, item 2. (*Soil Taxonomy* page 123). Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 123, column 2, line 42. Delete "an argillic horizon that has tongues of albic materials" and replace with "a glossic horizon".
- Page 124, column 1, line 2. Delete "tongues or fingers" and replace with "a glossic horizon, interfingering".
- Page 124, column 1, line 5. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 124, column 1, line 15. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 124, column 1, line 23. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 124, column 1, line 31. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 124, column 1, line 45. Delete "In most of them, the albic horizon tongues into the argillic" and replace with "Most of them have a glossic".
- Page 124, column 2, line 3. Delete "tongues or fingers" and replace with "a glossic horizon or interfingering".
- Page 125, column 2, line 22. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 125, column 2, line 24. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- Page 126, column 2, line 24. Delete "an albic or other eluvial horizon tonguing into the argillic horizon from the top" and replace with "a glossic horizon".
- Page 127, column 1, line 62. Delete "tongue or" and add following "horizon, and" "there is a glossic horizon or".
- Page 127, column 2, line 61. Delete "tongue or" and add following "and the fragipan," "a glossic horizon or".
- Page 128, column 1, line 40. Delete "deep wide tongues of albic materials" and replace with "a glossic horizon".
- Page 128, column 1, line 51. Delete "deep wide tongues of albic materials" and replace with "a glossic horizon".
- Page 128, column 1, line 58. Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- NSTH 615.46, page 615-161, line 1 (*Soil Taxonomy* page 128). Delete "tongues of albic materials in the argillic" and replace with "a glossic".
- NSTH 615.46, page 615-161, line 27 (*Soil Taxonomy* page 128). Delete "deep wide tongues of albic materials that at least extend through the upper 15 cm and may extend through the horizon. Tongues constitute 15 percent or more of the matrix in that part." and replace with "a glossic horizon that is 15 cm or more thick and may extend through the horizon."
- NSTH 615.62, page 615-220, IEFA, item 2. (*Soil Taxonomy* page 127). Change item 2. to read as follows:
- "2. Have, immediately above the fragipan, a layer 5 cm or more thick that:
- a. Has skeletons of clean silt and sand on faces of primary peds that constitute 1 percent or more (by volume) of the layer;
or
 - b. Is an eluvial horizon (E) and has 3 or more percent (absolute) less clay than both the overlying and underlying horizons;
and"
- NSTH 615.62, page 615-220, IEFC, item 1. (*Soil Taxonomy* page 127). Change item 1. read as follows:
- "1. Other Fragiudalfs that have, immediately above the fragipan, a layer 5 cm or more thick that:
- a. Has skeletons of clean silt and sand on faces of primary peds that constitute 1 percent or more (by volume) of the layer;
or
 - b. Is an eluvial horizon (E) and has 3 or more percent (absolute) less clay than both the overlying and underlying horizons;
and"
- NSTH 615.62, page 615-221, item IIEFG (*Soil Taxonomy* page 127). Change item IIEFG to read as follows:
- IIEFG. Other Fragiudalfs that have, immediately above the fragipan, a layer 5 cm or more thick that:
1. Has skeletons of clean silt and sand on faces of primary peds that constitute 1 percent or more (by volume) of the layer;
or

615.65

2. Is an eluvial horizon (E) and has 3 or more percent (absolute) less clay than both the overlying and underlying horizons.

Glossic Fragiudalfs"

NSTH 615.62, page 615-221, Definition of Typic Fragiudalfs, item 2. (*Soil Taxonomy* page 129). Change item 2. to read as follows:

"2. Do *not* have, immediately above the fragipan, a layer 5 cm or more thick that:

a. Has skeletons of clean silt and sand on faces of primary pedis that constitute 1 percent or more (by volume) of the layer;
or

b. Is an eluvial horizon (E) and has 3 or more percent (absolute) less clay than both the overlying and underlying horizons;"

NSTH 615.62, page 615-221, item IEDD (*Soil Taxonomy* page 129). Delete "tongues of albic materials that extend through at least the upper 50 cm of the argillic horizon." and replace with "a glossic horizon that is 50 cm or more thick".

NSTH 615.62, page 615-221, Definition of Typic Glossudalfs, item 2. (*Soil Taxonomy* page 129). Delete "tongues of albic materials that extend through at least the upper 50 cm of the argillic horizon." and replace with "a glossic horizon that is 50 cm or more thick".

Page 129, column 1, line 29. Delete "tongues of albic materials that extend 50 cm or more into the argillic horizon and constitute 15 percent or more of the matrix in that part." and replace with "a glossic horizon that is at least 50 cm thick."

Page 129, column 1, line 39. Delete "tongues of albic materials that do not everywhere extend to the top of the argillic horizon but are within it." and replace with "a glossic horizon that does not everywhere extend to the top of the argillic horizon."

Page 129, column 1, line 60. Delete "tongues do not penetrate deeply into the argillic horizon." and replace with "the glossic horizon is less than 50 cm thick."

Page 129, column 2, line 6. Delete "albic materials tonguing in the argillic" and replace with "a glossic".

Page 129, column 2, line 30. Delete "tongues of albic materials in the argillic horizon that constitute as much as 15 percent of the volume in any subhorizon;" and replace with "a glossic horizon;"

Page 130, column 2, line 40. Delete "tonguing" and replace with "a glossic horizon".

Page 131, column 1, line 8. Delete "are some tongues" and replace with "is some interfingering".

NSTH 615.38(a), page 615-62, line 33 (*Soil Taxonomy* page 133). Delete "tongues of albic materials in the argillic" and replace with "a glossic".

NSTH 615.38(a), page 615-63, line 45 (*Soil Taxonomy* page 133). Delete "tongues of albic materials in the argillic" and replace with "a glossic".

NSTH 615.62, page 615-226, item IEBB. (*Soil Taxonomy* page 133). Delete "tonguing", replace with "a glossic horizon", and delete "more than 2.5 cm".

NSTH 615.62, page 615-226, Definition of Typic Natrustalfs, item 4. (*Soil Taxonomy* page 133). Delete "tonguing", replace with "a glossic horizon", and delete "more than 2.5 cm into the natric horizon".

Page 133, column 2, line 30. Delete "tonguing" and replace with "a glossic horizon".

Page 133, column 2, line 32. Delete "tonguing" and replace with "glossic horizon".

Page 133, column 2, line 39. Delete "that tongue or", and following "These soils have" add "a glossic horizon or".

Page 150, column 1, Natric Haploxeralfs. Change to read as follows:

"Natric Haploxeralfs.—These soils are like Typic Haploxeralfs except they have 15 percent or more saturation with sodium in some part of the argillic horizon. The argillic horizon of these soils would be a natric horizon if it had prismatic or columnar structure or if it had blocky structure and albic materials extending more than 2.5 cm into the horizon."

Page 164, column 2, line 52. Delete "Tongues" and replace with "Tongue-like projections".

Page 165, column 1, line 19. Delete "tongues" and replace with "tongue-like projections".

NSTH 615.62, page 615-319, item HEDN (*Soil Taxonomy* page 283). Delete "tonguing" and replace with "a glossic horizon".

NSTH 615.62, page 615-319, item HEDO (*Soil Taxonomy* page 283). Delete "tonguing" and replace with "a glossic horizon".

NSTH 615.62, page 615-319, Definition of Typic Argiborolls, item 2.a. (*Soil Taxonomy* page 133). Delete "Tonguing" and replace with "A glossic horizon".

Page 284, column 1, line 1. Delete "an albic horizon that tongues or interfingers" and replace with "a glossic horizon or albic materials that interfinger".

NSTH 615.62, page 615-325, item HECC (*Soil Taxonomy* page 291). Delete "tonguing" and replace with "a glossic horizon".

NSTH 615.62, page 615-325, item HECE (*Soil Taxonomy* page 291). Delete "tonguing" and replace with "a glossic horizon".

615-394

- NSTH 615.62, page 615-326, column 1, line 2 (*Soil Taxonomy* page 291). Delete "tonguing" and replace with "a glossic horizon".
- Page 291, column 2, line 1. Delete "tongue or", and following "do not have" add "a glossic horizon or".
- Page 291, column 2, line 57. Delete "or tongues", and following "in the form of" add "a glossic horizon or".
- NSTH 615.62, page 615-341, item HFBE (*Soil Taxonomy* page 306). Delete "tonguing" and replace with "a glossic horizon".
- NSTH 615.62, page 615-341, Definition of Natrustolls, item 3. (*Soil Taxonomy* page 306). Delete "tonguing" and replace with "a glossic horizon".
- Page 307, column 1, line 4. Delete "Thick clean skeletans in the upper part of the natric horizon or tongues of an albic horizon" and replace with "A glossic horizon, interfingering of albic materials, or thick clean skeletans in the upper part of the natric horizon".
- Page 345, column 1, line 9. Delete "Tongues of an albic" and replace with "A glossic".
- Page 349, column 1, line 38. Delete "tongues of albic materials in the argillic horizon that have" and replace with "a glossic horizon that has".
- Page 350, column 1, line 38. Delete "tongues of albic materials in the argillic horizon that have" and replace with "a glossic horizon that has".
- 615.66 Additions and Corrections.
- 615.00, Page 615-1, line 9. Change "603.1(d)" to "602.00-1(d)".
- 615.60, Page 615-204, column 2, line 5 (*Soil Taxonomy* page 237). Change "'JAI" to "JAG"' to read "'JAI" to "JAH"'.
- 615.62, Page 615-219, column 2, line 50. Delete ".pno 124"
- 615.62, Page 615-220, column 2, item IEFA. (*Soil Taxonomy* page 127). Delete "." at the end of item "3.", replace with "; and", and add item 4 as follows:
- "4. Have base saturation (by NH_4OAc) of less than 50 percent in some part of the epipedon."
- 615.62, Page 615-223, item IEKN.2., line 2 (*Soil Taxonomy* page 130). Change "of 3 or less or" to "of 3 or less and".
- 615.62, Page 615-231, column 2, lines 26 and 29 (*Soil Taxonomy* page 141). Delete "Kandiustalfs" and replace with "Kanhaplustalfs" in both lines.
- 615.62, Page 615-238, column 2, line 41. Delete ".pno 124".
- 615.62, Page 615-328, item HGBF, line 1 (*Soil Taxonomy* page 296). Change "40 cm" to "50 cm".
- 615.62, Page 615-359, CAEG, item 2 (*Soil Taxonomy* page 339). Change item 2. to read as follows:
- "2. In more than 50 percent of each pedon, a spodic horizon in which all subhorizons have a ratio of free iron (by dithionite-citrate) to carbon (both elemental) of 0.2 or more."
- 615.62, Page 615-363, column 1, line 38 (*Soil Taxonomy* page 344). Change item "CDBH" to "CDBI" and add new item CDBH to read as follows:
- "CDBH. Other Fragiorthods in which the spodic horizon has an intermittent black upper subhorizon with a ratio of free iron (elemental) to carbon that is less than 0.2; or in which, if plowed and the Ap horizon rests directly on the spodic horizon, there are tongues of such a subhorizon.
- Humic Fragiorthods"**
- 615.62, Page 615-363, Definition of Typic Fragiorthods, item 6. (*Soil Taxonomy* page 344). Delete " at the end of item 6.
- 615.62, Page 615-376, column 2, line 35. Delete "Page 384" and "385", and replace with "Page 364" and "365", respectively.
- 615.62, Page 615-388, column 1, line 15 (*Soil Taxonomy* page 258). Delete "JDC" and replace with "JCC".