USDA

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Alternate Subgroup Key Style

13th Edition Keys to Soil Taxonomy

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Procedure for Soil Taxonomy

This proposal supports the idea of the combination of keys and benefits of the new key style, but proposes formatting that is more congruous with existing Keys.

Excerpt Chapter 4 (*Identification of the Taxonomic Class of a Soil*)

> All of the keys in this taxonomy are designed in such a way that the user can determine the correct classification of a soil by going through the keys systematically. *The user must start at the beginning of the "Key to Soil Orders" and eliminate, one by one, all classes that include criteria that do not fit the soil in question.* The soil belongs to the first class listed for which it meets all the required criteria.
>
> In classifying a specific soil, the user of soil taxonomy begins by checking through the "Key to Soil Orders" to determine the name of the first order that, according to the criteria listed, includes the soil in question. [...] going through the "Key to Subgroups" of that great group, the user selects as the correct subgroup name the name of the first taxon for which the soil meets all of the required criteria.

Syntax of Soil Taxonomy

A. Soils that have:

1. Permafrost within 100 cm of the soil surface; or

2. Gelic materials within 100 cm of the soil surface and permafrost within 200 cm of the soil surface.

Gelisols, p. 157

DEFINED by Keys / Handbook INTERVAL in Profile QUANTITY to Measure CONDITIONS to Evaluate

A. Soils that **have**:

1. **Permafrost** **within** **100 cm** of the **soil surface**; **or**

2. **Gelic materials** **within** **100 cm** of the **soil surface** *and* **permafrost** **within** **200 cm** of the **soil surface**.

Gelisols, p. 157

Syntax of Soil Taxonomy (continued)

DEFINED by Keys / Handbook | INTERVAL in Profile | QUANTITY to Measure | CONDITIONS to Evaluate

A. Soils that **have**:

1. Permafrost within 100 cm of the soil surface; **or**
2. Gelic materials within 100 cm of the soil surface *and* permafrost within 200 cm of the soil surface.

Gelisols, p. 157

B. Other soils that:

1. ***Do not have*** andic soil properties in 60 percent or more of the thickness between the soil surface *and either* a depth of 60 cm *or* a densic, lithic, or paralithic contact *or* duripan if shallower; **and**
2. **Have** organic soil materials that meet ***one or more*** of the following:

   a. **Overlie** cindery, fragmental, or pumiceous materials and/or **fill their interstices** * *and* **directly below these materials, have** a densic, lithic, or paralithic contact; **or**

   b. **When added with the underlying** cindery, fragmental, or pumiceous materials, **total** 40 cm or more between the soil surface and a depth of 50 cm; **or**

   c. Constitute two-thirds or more of the **total thickness of the soil** to a densic, lithic, or paralithic contact *and* have no mineral horizons *or* have mineral horizons with a total thickness of 10 cm or less; **or**

   d. Are saturated with water for 30 days or more per year in normal years (or are artificially drained), *have* an upper boundary within 40 cm of the soil surface, *and have* a **total thickness** of ***either***:

      (1) 60 cm or more if three-fourths or more of their volume consists of moss fibers or if their bulk

Albaqualfs (PROPOSED IN 13th Edition)

Key to Subgroups

JAHA. Albaqualfs that have a texture class (fine-earth fraction) of coarse sand, sand, fine sand, loamy coarse sand, loamy sand, or loamy fine sand throughout a layer extending from the mineral soil surface to the top of an argillic horizon at a depth of 50 cm or more below the mineral soil surface.

Arenic Albaqualfs

JAHB. Other Albaqualfs that meet items 1 *and* 2 below:

Aeric Vertic Albaqualfs

JAHC. Other Albaqualfs that meet items 1 *and* 3 below:

Chromic Vertic Albaqualfs

JAHD. Other Albaqualfs that meet item 1 below:

Vertic Albaqualfs

1. *One or both*:

   a. Have cracks within 125 cm of the mineral soil surface that are 5 mm or more wide through a thickness of 30 cm or more for some time in normal years and slickensides or wedge-shaped peds in a layer 15 cm or more thick that has its upper boundary within 125 cm of the mineral soil surface; *or*

   b. Have a linear extensibility of 6.0 cm or more between the mineral soil surface and either a depth of 100 cm or a densic, lithic, or paralithic contact, whichever is shallower;

2. Have chroma of 3 or more in 40 percent or more of the matrix between the lower boundary of the A or Ap horizon and a depth of 75 cm from the mineral soil surface.

3. Have an Ap horizon or materials between the mineral soil surface and a depth of 18 cm that, after mixing, have *one or more* of the following:

   a. A color value, moist, of 4 or more; *or*

   b. A color value, dry, of 6 or more; *or*

   c. Chroma of 4 or more.

Basic objections to "current" format

> "eliminate one by one all classes that include criteria that do not fit the soil in question"

- If you read several taxa worth of conditions (meets X below; meets X, Z below; meets Y, Z below…) before the criteria themselves, then you are juggling several classes worth of criteria evaluations.
    - May violate concept of "eliminat[ing] one by one."
- Keys should be logically structured as if the user reads through from beginning to end.
    - Hopefully actually doing that is now less onerous after the work done by Craig Deitzler to combine logic for these subgroups with identical criteria.

Albaqualfs (ALTERNATE – 2020/03/24; AGB)

Key to Subgroups

JAHA. Albaqualfs that have a texture class (fine-earth fraction) of coarse sand, sand, fine sand, loamy coarse sand, loamy sand, or loamy fine sand throughout a layer extending from the mineral soil surface to the top of an argillic horizon at a depth of 50 cm or more below the mineral soil surface.

Arenic Albaqualfs

JAH[B – D]. Other Albaqualfs that:

1. *One or both*:

   a. Have cracks within 125 cm of the mineral soil surface that are 5 mm or more wide through a thickness of 30 cm or more for some time in normal years and slickensides or wedge-shaped peds in a layer 15 cm or more thick that has its upper boundary within 125 cm of the mineral soil surface; *or*

   b. Have a linear extensibility of 6.0 cm or more between the mineral soil surface and either a depth of 100 cm or a densic, lithic, or paralithic contact, whichever is shallower.

2. Have chroma of 3 or more in 40 percent or more of the matrix between the lower boundary of the A or Ap horizon and a depth of 75 cm from the mineral soil surface.

3. Have an Ap horizon or materials between the mineral soil surface and a depth of 18 cm that, after mixing, have *one or more* of the following:

   a. A color value, moist, of 4 or more; *or*

   b. A color value, dry, of 6 or more; *or*

   c. Chroma of 4 or more.

JAHB. Meet items 1 *and* 2 above.

Aeric Vertic Albaqualfs

JAHC. Meet items 1 *and* 3 above.

Chromic Vertic Albaqualfs

JAHD. Meet item 1 above.

Key Proposal Elements

1. Criteria come before the *conditions* to evaluate a specific taxon.
2. Clear notation for when and where several criteria are shared between subgroups.

For example `JAH[B-D]. Other Albaqualfs that:`

- followed by a numbered list of common *criteria* used for subgroups `JAHB`, `JAHC`, and `JAHD`
- followed by the *conditions* for each subgroup `JAHB`, `JAHC`, and `JAHD`

Impacts of New Key Style

- For alternate:
  - Add one line: `ABC[A-Z]. Other [Great Group ABC]s that:`
    - `[A-Z]` shows range of subgroup codes within a sub-key
  - Move criteria up from after `ABCZ` to *before* `ABCA`
  - Change `"Other [Great Group]s that meet items X,Y below:"` to `"Meet items X,Y above."` for each subgroup in the sub-key.
- 644 subgroups in 131 subgroup-level keys use "meet items X,Y,Z" style
  - 52 subgroup level keys have more than one sub-key
- Top 10 Affected Great Groups (number of separate sub-keys):
  - *Haploxerolls*, *Haplustolls* (n = 5)
  - *Paleudults*, *Argixerolls*, *Argiustolls*, *Dystrudepts* (n = 4)
  - *Haplorthods*, *Hapludands*, *Haplustox*, *Haploperox* (n = 3)

Thank you!

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