SL43

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Key to Soil Orders in Florida [1]

M.E. Collins[2]

This fact sheet is intended for anyone who has some understanding of Soil Taxonomy but who needs a simplified key to help distinguish one soil order from another. There are 12 soil orders: Andisols, Gelosols, Entisols, Inceptisols, Alfisols, Ultisols, Spodosols, Histosols, Mollisols, Aridisols, Vertisols, and Oxisols. Only seven of these soil orders are present in Florida. The soil orders not recognized in Florida are the Aridisols, Vertisols, Andisols, Gelosols, and Oxisols. The distribution of dominant soil orders in Florida is shown in Figure 1. Alfisols, Inceptisols, and Mollisols are not shown because: Alfisols are widely interspersed throughout the state; and the aerial extent of Inceptisols and Mollisols is too small to be shown at this scale of map (source: Carlisle and Brown, 1982).

To determine the order to which a soil belongs, you must follow the "Keys to Soil Taxonomy" (Soil Survey Staff, 1996). But before you can use the key, you must know which diagnostic horizon(s) is present in the soil that you are classifying. These diagnostic horizons are particular kinds of horizons in the soil that indicate the degree and kind of dominant sets of soil-forming processes that have occurred. Therefore, you must know the epipedon (diagnostic surface horizon) and what, if any, diagnostic subsurface horizons exist.

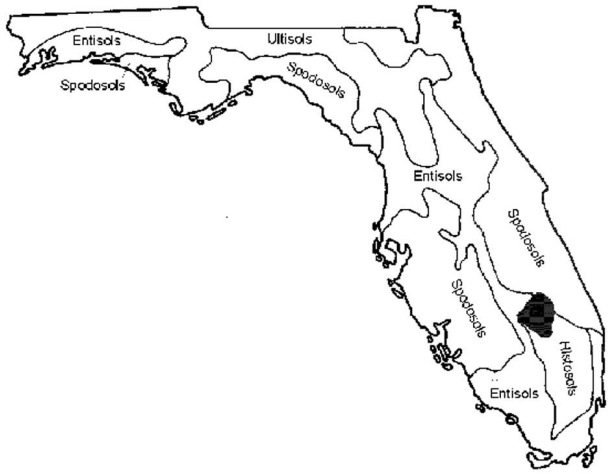

Figure 1. Distribution of soil orders in Florida.

The soil order is the highest category in Soil Taxonomy. At this hierarchical level, soils are distinguished in relation to the five soil-forming factors: (1) climate and (2) living organisms acting on (3) parent materials over (4) time as conditioned by (5) relief.

The seven soil orders recognized in Florida and the major properties that differentiate them are discussed next. Complete definitions for the soil orders and diagnostic horizons are available in "Keys to Soil Taxonomy" (Soil Survey Staff, 1996).

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2. M.E. Collins, professor, Soil and Water Science Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

ALFISOLS

Soils in the Alfisol order are characterized by having undergone processes that translocate silicate clays to form an argillic horizon. Clay translocation in Alfisols takes place without the depletion of bases. The unique properties of Alfisols in Florida are a combination of an argillic horizon, a medium to high amount of bases in the soil, water generally available to plants during the growing season, and an ochric epipedon. In general, these soils are intensively cropped. An example of a generalized profile description of an Alfisol is shown in Figure 2. Presently, Alfisols have been mapped on approximately 4.6 million acres in Florida.

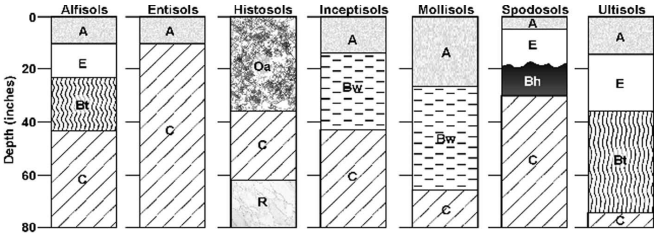

Figure 2. Profile descriptions of soil orders in Florida.

ENTISOLS

A soil that does not reflect any major set of soil-forming processes belongs to the Entisol order. Entisols are able to support any vegetation and occur in any climate. Commonly, they form in inert parent materials such as quartz sand (Central Ridge of Florida) or slowly soluble rock such as limestone (South Florida). There also may have been insufficient time, as in recent alluvial deposits, for diagnostic horizons to have formed. Entisols could occur on steep slopes, where the rate of erosion exceeds the rate of formation of pedogenic horizons. The properties unique to Florida Entisols are a dominance of mineral soil and an absence of distinct pedogenic horizons except for an ochric epipedon, an albic horizon, and a spodic or argillic diagnostic subsurface horizon that is below 80 inches.

An example of a generalized profile description of an Entisol is shown in Figure 2. Presently, Entisols have been mapped on approximately 7.5 million acres in Florida.

HISTOSOLS

Soils that belong to the Histosol order have a very high content of organic carbon (more than half of the soil's thickness is organic) in the upper 32 inches of the soil. These soils are considered to be organic rather than mineral soils. The amount of organic carbon required for Histosols depends on the amount of clay. Most Florida Histosols formed from partially decomposed plant remains that accumulated in water. More common names for Histosols are peats or mucks.

An example of a generalized profile description of a Histosol is shown in Figure 2. Presently, Histosols have been mapped on approximately 4.0 million acres in Florida.

INCEPTISOLS

Soils of the Inceptisol order have a unique combination of properties that include water available to plants during the growing season, one or more pedogenic horizons of alteration or concentration with little accumulation of translocated materials, some unweathered minerals, a moderate to high cation exchange capacity in the clay fraction, and usually textures finer than loamy sand. Even though most Inceptisols in Florida have loamy sand or coarser (more sandy) textures, these soils are classified as Inceptisols because of a dark, thick, and low base saturation (<35%) surface horizon (umbric epipedon). Inceptisols in Florida are of minor extent.

An example of a generalized profile description of an Inceptisol is shown in Figure 2. Presently, Inceptisols have been mapped on approximately 1.0 million acres in Florida.

MOLLISOLS

Soils that belong to the Mollisol order have a very dark brown to black surface horizon (mollic epipedon), a high amount of calcium versus other extractable cations present in the soil, and clay minerals of moderate or high cation-exchange capacity. The mollic epipedon forms mainly from the decomposition of organic matter in a soil that has a considerable amount of divalent cations, especially calcium. Soil properties associated with a mollic

epipedon are a reasonable reserve of plant nutrients (Ca, Mg, K, and sometimes N), soil structure that allows movement of air and water when the soil is not saturated, and good permeability. The vast majority of Mollisols presently recognized in Florida are poorly to very poorly drained.

An example of a generalized profile description of a Mollisol is shown in Figure 2. Presently, Mollisols have been mapped on approximately 1.0 million acres in Florida.

SPODOSOLS

Spodosols are characterized by having undergone soil processes that translocate organic matter and aluminum, or organic matter, aluminum, and iron, as amorphous materials. The most striking property Spodosols have is a horizon that has resulted from accumulation of black or reddish amorphous materials having a high cation-exchange capacity. This horizon is called a spodic horizon. In some Spodosols a leached horizon, which can range from white to gray, overlies the spodic horizon. Many Spodosols in Florida are poorly to very poorly drained, and all Spodosols in Florida have developed in sandy, acid parent materials.

An example of a generalized profile description of a Spodosol is shown in Figure 2. Approximately 8.4 million acres in Florida have been mapped as Spodosols.

ULTISOLS

Ultisols are like Alfisols in that they have a horizon in which clay has accumulated to a significant extent (argillic horizon). Ultisols, however, are more developed and more leached than Alfisols. The soil properties associated with Ultisols are an argillic horizon, enough moisture for crops in most years, and a low supply of bases. They exist in relatively warm and moist climates, like northwest Florida, and therefore can be highly productive if managed properly.

An example of a gene profile description of an Ultisol is shown in Figure 2. There are approximately 6.9 million known acres of Ultisols in Florida.

KEY TO SOIL ORDERS IN FLORIDA

In this gene key the soil orders are listed in the same sequence as in Soil Taxonomy. This key is an abbreviated guide.

A. Soils that are organic in more than half the thickness of the upper 32 inches.

Histosols

B. Other soils that are mineral with an illuvial horizon of amorphous aluminum and organic matter with or without iron (a spodic horizon) within 80 inches of the surface.

Spodosols

C. Other mineral soils with an illuvial horizon of clay (an argillic horizon), relatively low base saturation (< 35 %), and enough moisture for crops in most years.

Ultisols

D. Other mineral soils that have a thick, dark surface horizon which is relatively rich in organic matter (a mollic epipedon), have a high base saturation (> 50 %) throughout the soil, and do not have deep, wide cracks.

Mollisols

E. Other mineral soils with an illuvial horizon of clay (an argillic horizon), relatively high base saturation (> 35 %), and enough moisture for crops in most years.

Alfisols

F. Other mineral soils that have no horizon of illuvial clays, relatively little organic matter or base saturation or both, some diagnostic horizons and weatherable minerals, and enough moisture for a crop in most years.

Inceptisols

G. Mineral soils with weak or no diagnostic horizons.

Entisols

LITERATURE CITED

Carlisle, V. W. and Brown, R. B. (eds.). 1982. *Florida Soil Identification Handbook* . IFAS Publication.

Soil Survey Staff. 1996. *Keys to Soil Taxonomy*. U.S. Government Printing Office, Washington, D.C.