Soil Taxonomy

A system developed to identify and attempt to understand the relationships between different soils and the formation factors that shape individual soil characteristics. The system provides flexibility, so as new information is acquired, there is a framework that will accomodate changes.

There are thousands of soils (approximately 1200 to 1300 in Texas); however there are only 12 general classes or Orders of soils (based on the Soil Taxonomy system in the United States). It is a heirarchical system similar to that used in biology.

Biology	Soils	Examples:	Based on:
Phylum	Order	Alfisol	Morphology – soil genesis
Class	Suborder	Udalf	Homogeneity: wetness, environment, etc.
Subclass	Great Group	Hapludalf	Diagnostic horizons
Order	Subgroup	Typic Hapludalf	Typic – central concept of that class
Family	Family	Fine loamy, mixed, mesic	Texture, mineralogy, temperature regime
Genus	Series	Miami	Location where first identified, etc.
Species ~~Phase~~	Phase	Miami, eroded phase	Interpretation of soil characteristics, etc.

12 Soil Orders:

Alfisols - soils with a subsurface zone of silicate clay accumulation and >35% base saturation
Andisols - soils formed in volcanic ash
Aridisols - $CaCO_3$-containing soils of arid environments with moderate to strong development
Entisols - soils with little or no morphological development
Gelisols - soils with permafrost within 2 m of the surface
Histosols - organic soils
Inceptisols - soils with weakly developed subsurface horizons
Mollisols - grassland soils with high base status
Oxisols - intensely weathered soils of tropical and subtropical environments
Spodosols - acid soils with a subsurface accumulation of metal-humus complexes
Ultisols - soils with a subsurface zone of silicate clay accumulation and <35% base saturation
Vertisols - clayey soils with high shrink/swell capacity

Formative elements in names of soil orders (from USDA-NRCS, 1999, *Soil Taxonomy*, 2nd ed.)

Name of order	Formative element in name of order	Derivation of formative element	Pronunciation of formative element
Alfisol	Alf	Meaningless syllable	Pedalfer
Andisol	And	Modified from ando	Ando
Aridisol	Id	Latin, *aridus* – dry	Arid
Entisol	Ent	Meaningless syllable	Recent
Gelisol	Gel	Latin, *gelare* – to freeze	Jell
Histosol	Ist	Greek, *histos* – tissue	Histology
Inceptisol	Ept	Latin, inceptum – beginning	Inception
Mollisol	Oll	Latin, *mollis* – soft	Mollify
Oxisol	Ox	French, *oxide* – oxide	Oxide
Spodosol	Od	Greek, *spodos* – wood ash	Odd
Ultisol	Ult	Latin, *ultimus* – last	Ultimate
Vertisol	Ert	Latin, *verto* – turn	Invert

Examples: Ust**ert** – a vertisol in an ustic moisture regime (from Latin, *ustus* – burnt, implying dryness.

The proposed state soil of Texas is the **Houston Black** (Fine, smectitic, thermic Udic Haplustert). Texas has more Vertisols (self-mixing, cracking soils) than any other state. These soils shrink when dry and swell when wet. Texas has about 15 million acres of Vertisols. Almost 2 million acres, or 13 percent, consists of Houston Black soils – they are very important agricultural soils (for growing grain sorghum, cotton, corn, small grains, and forage grasses).

Reference: Buol, S.W. et al. 1989. Soil genesis and classification, 3rd ed. Iowa State University Press. Ames, IA.