

## Soil

### Soil Development

Soil – comprised of humus and minerals

Humus – derived from organic material

Minerals – derived from mechanical and chemical break-down of rocks.

Soil is originally unstructured e.g., begins from bedrock, sediments, or glacial deposits

Over time, soil develops structure; soil [formation] is dynamic.

The process of soil formation results in a **soil profile** containing different **horizons**:

- O Primarily dead organic litter. Most soil organisms are found in this layer
- A Rich in humus, consisting of partly decomposed organic material mixed with mineral soil.
- E Region of extensive leaching of minerals from the soil. Because minerals are dissolved by water in this layer, plant roots are concentrated here.
- B Region of little organic material whose chemical composition resembles that of the underlying rock.
- C Primarily weakly weathered material, similar to parent rock.

The product of soil formation is dependent upon:

- parent material
- climate
- biota

Pedons (Peds) – basic units of soil structure; may be distinct in soils with "strong" structure.

Ped size and shape  $\xrightarrow{\text{influence}}$  size and shape of soil pores  $\xrightarrow{\text{influence}}$  root growth, water movement.

Soil can be classified by its texture, which is based on the percent of clay, sand, silt, and gravel. This influences its water retention capabilities.

Loam – a mix of both fine and small particles.

Coarse sand → fine sand → sandy loam → loam → clay loam → clay

### Soil Taxonomy

About 7,000 different types of soils are recognized in the United States.

Soil classification system used by the USDA is hierarchical:

*Order* – 11 broad classes exist; names end in -sol; e.g., Mollisol

*Suborder* – subdivision of order indicating a common property e.g., Aquolls (wet Mollisol);  
prefix to order name.

Other groupings based upon texture and physical and chemical properties:

*Great group, Subgroup, Family, Series*

### Soil chemistry

pH scale – a measure of the strength of acids and bases. 1 (strong acid) to 14 (strong base), 7 neutral. Rain should be around 5.6. Bogs can have a pH as low as 3.2 and fens a pH as high as 8.0.

The acidity or alkalinity of soil affects which minerals (and ions from plant roots) bind to soil particles; affects nutrient uptake.

Various types of minerals and their different forms (oxidized or reduced) affect soil color. Soil color charts are another way to describe soil characteristics.