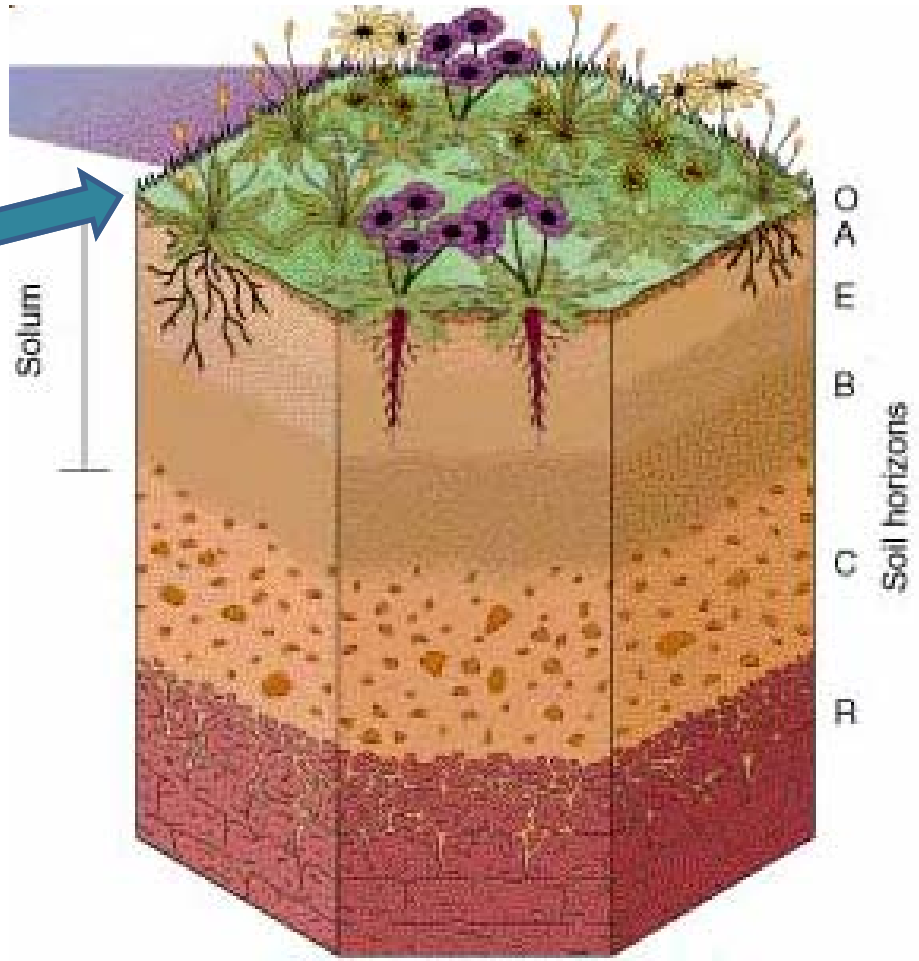
Soil Properties Indicate Physical and Chemical Characteristics

Soil Property 1
Horizons



O = Organic

- Litter
- Detritus
- Humus

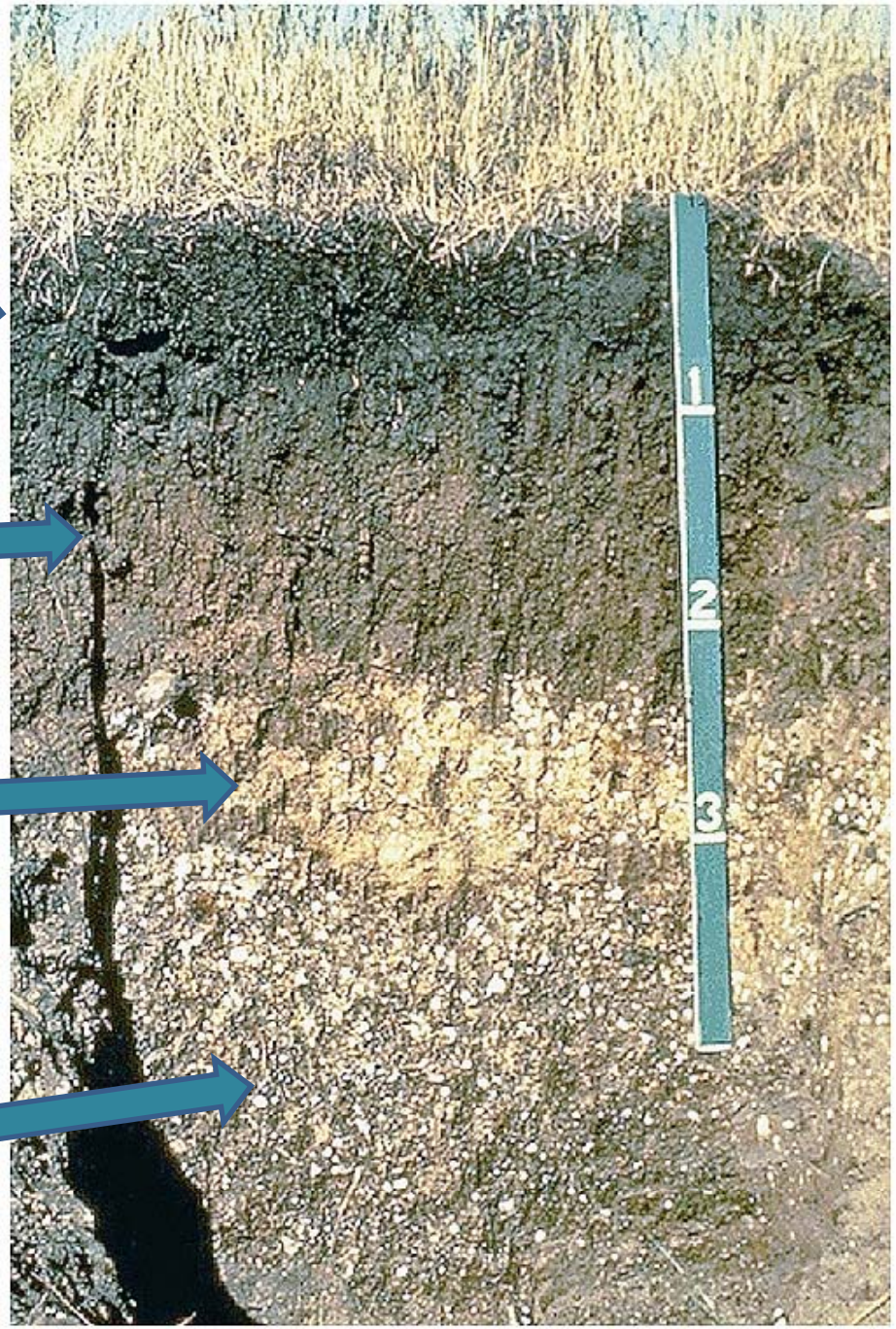
A Horizon = Top Soil

The darkest tone at the top is the A horizon (1).

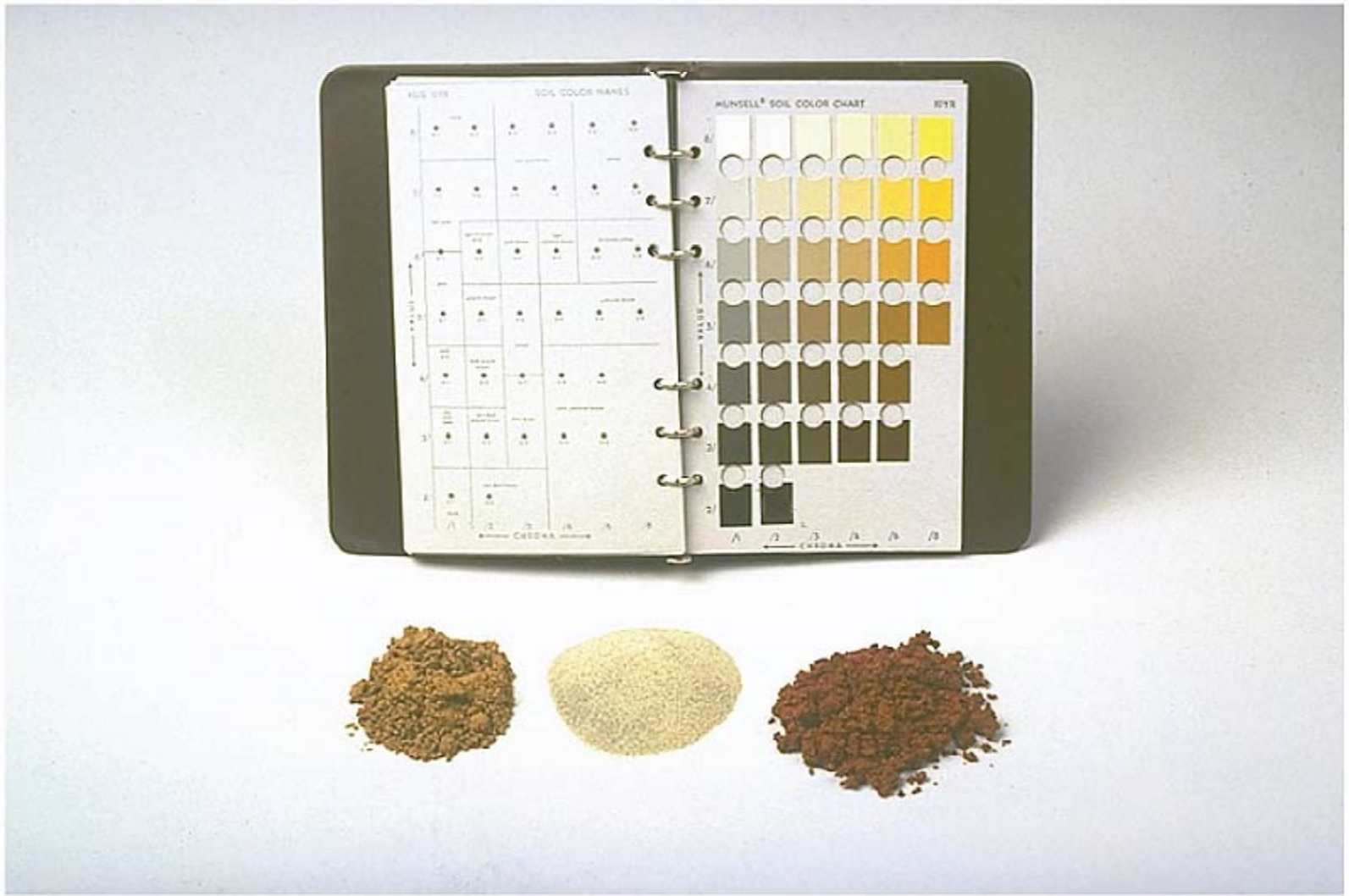
E Horizon = Zone of Eluviation (exit) (2)

B Horizon = Zone of Illuviation (into) (3). Often has higher clay content.

C Horizon = Weathered subsoil (below 3).



Color Chart Is Used to Match Soil to a Standardized Color



Soil Property 2 = Color

Certain colors indicate content of the soil.

Black = high organic (humus) content.

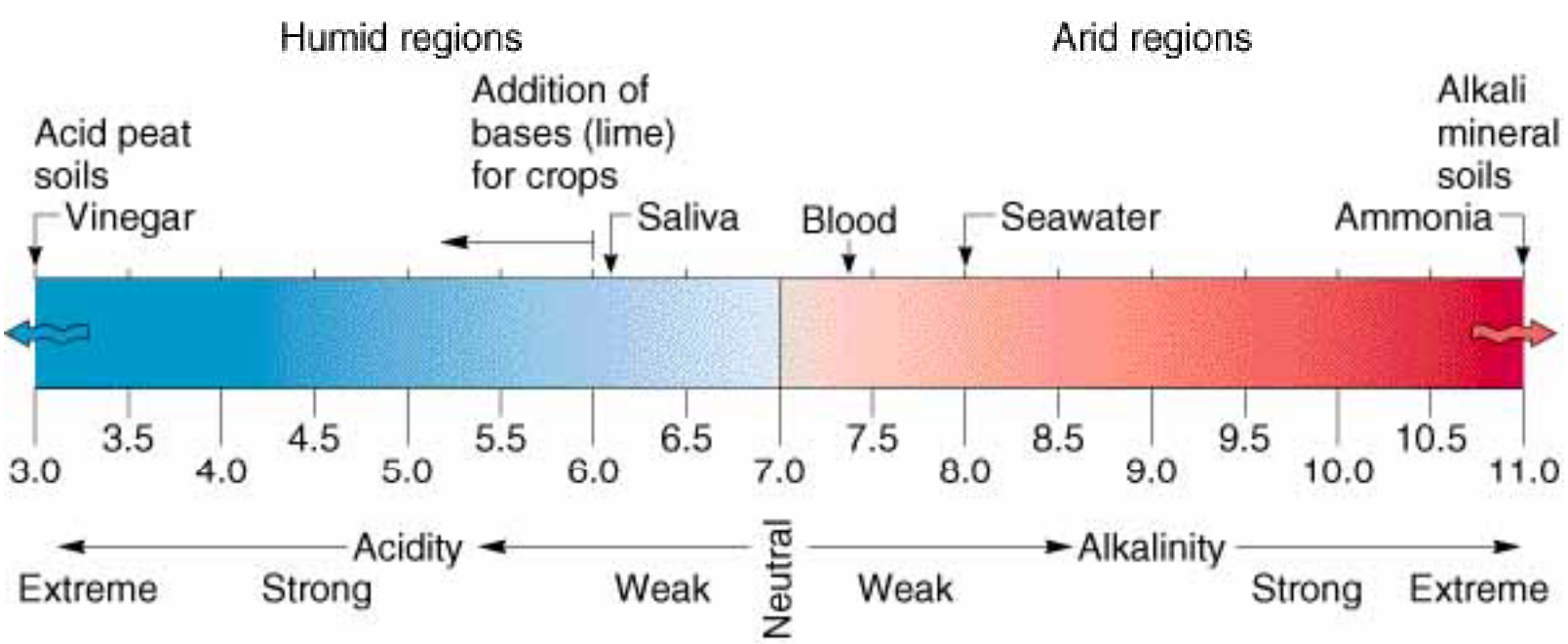
White = calcium deposits.

Red-orange = iron oxides or rust.

Gray-blue = iron in reduced state, can indicate standing water.

Soil Property 3 = Ph

Soils Vary in their Ph, a chemical measure of acidity or alkalinity. Generally soils of arid and semi-arid environments are alkaline. Soils of humid environments are acid.



Soil Property 4 = Organic Content

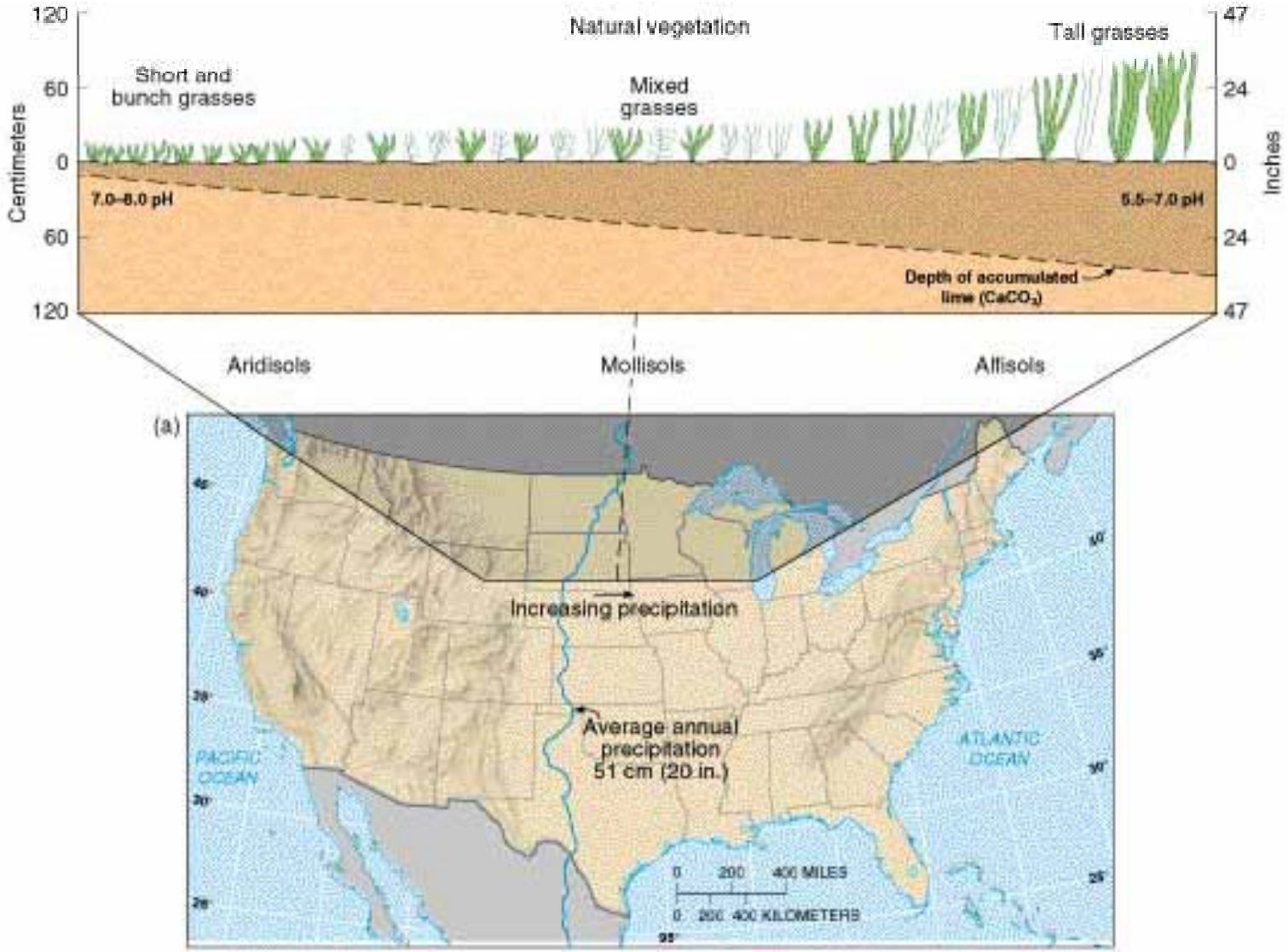
Desert soils have low organic content.

Grasslands have high organic content.

The exact type of vegetation is also important because it also affects Ph.
Pine needles add acid to the soil.
Grasses conserve calcium and magnesium (bases).

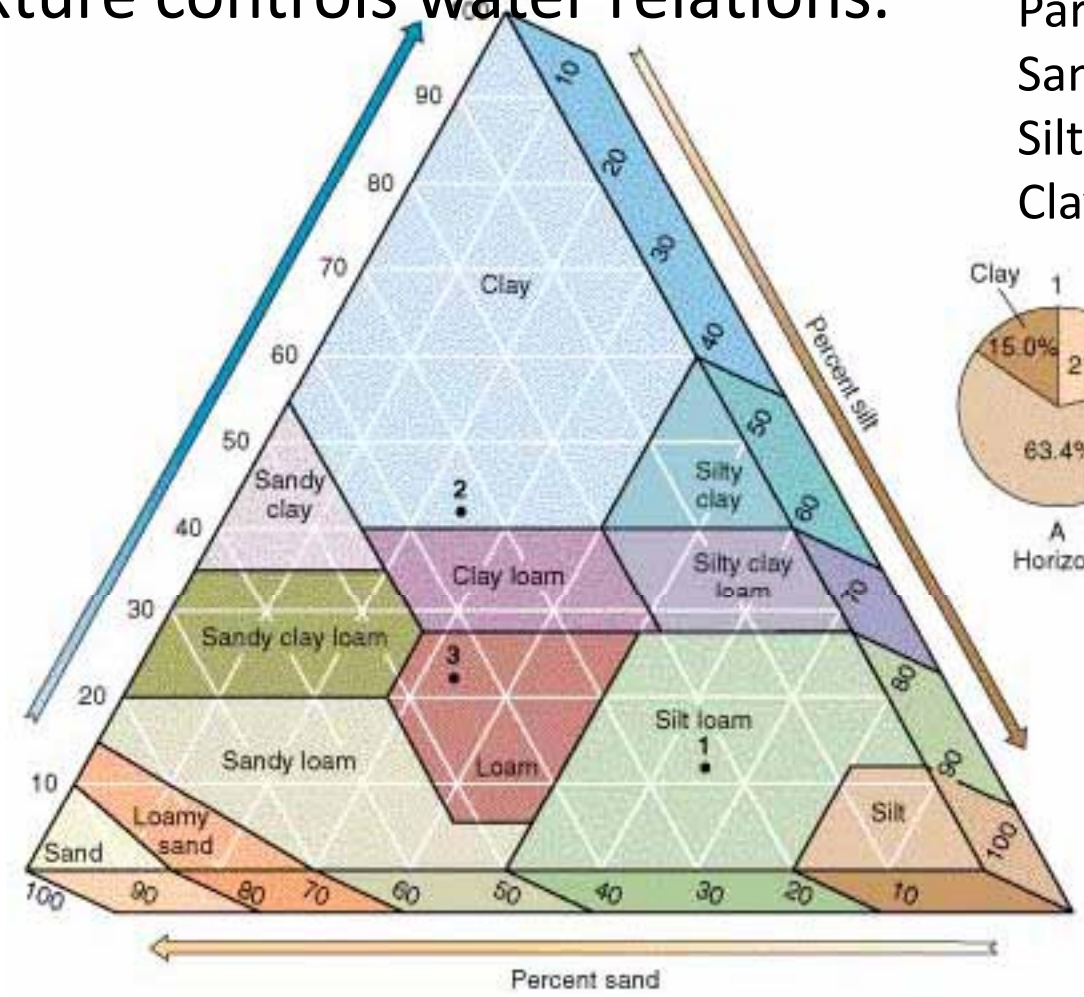
Most crops like a neutral Ph.

In the Precipitation Gradient From the Great Plains to the Midwest, Wetter Conditions Cause Denser Vegetation and More Organic Content in Soils

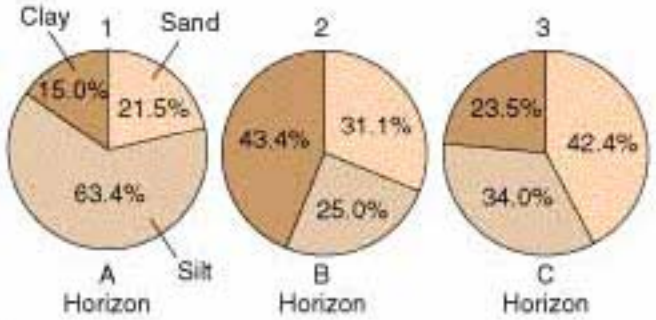


Soil Property 5 = Texture

Texture is the mix of particles in the soil. Sandy is coarse texture, clay is fine texture. Loams have a mix of sand, silt and clay and are the best for most agriculture. Texture controls water relations.

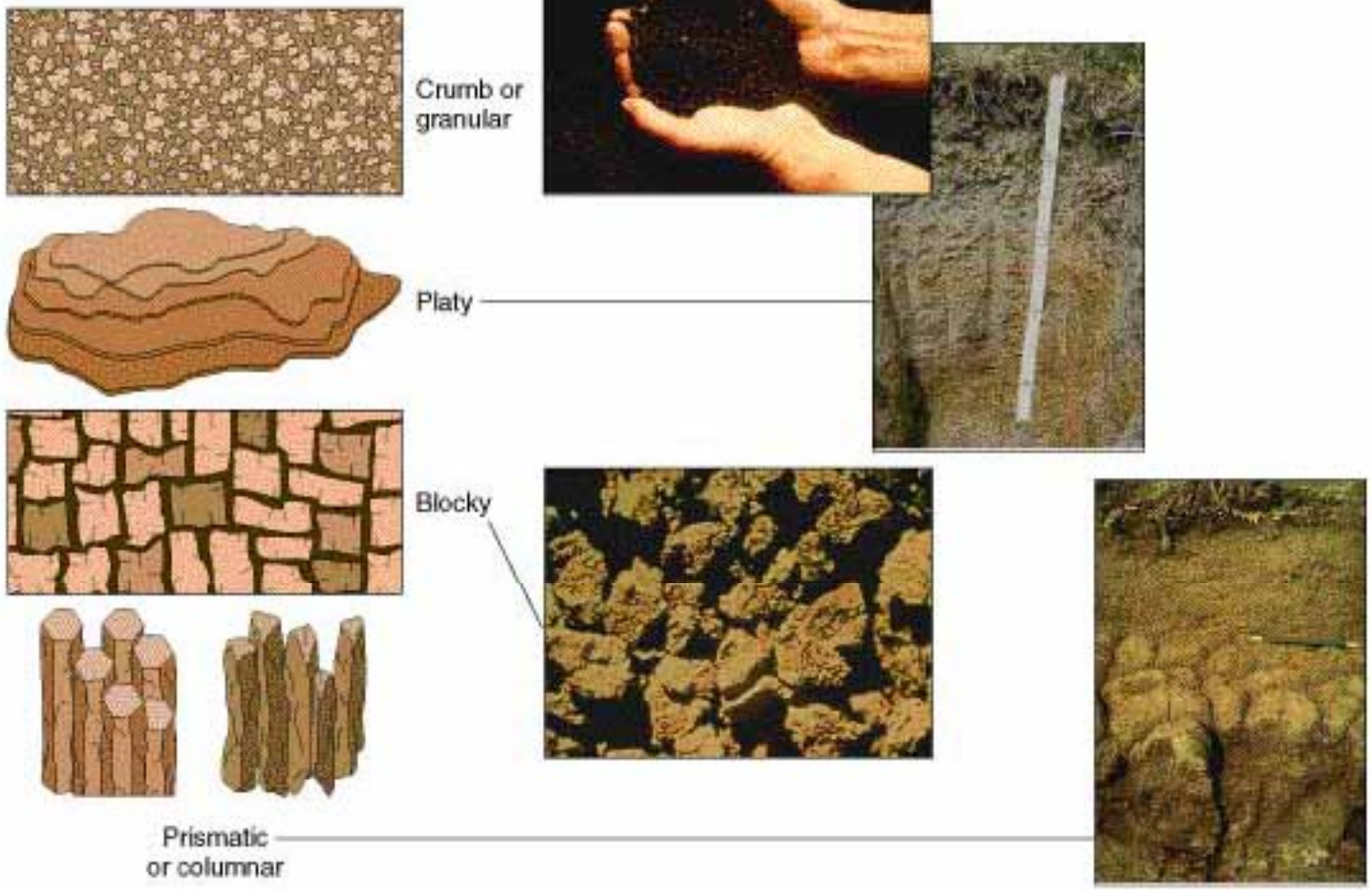


Particle Size
Sand > .05 mm
Silt = .002 mm - .05mm
Clay < .002 mm

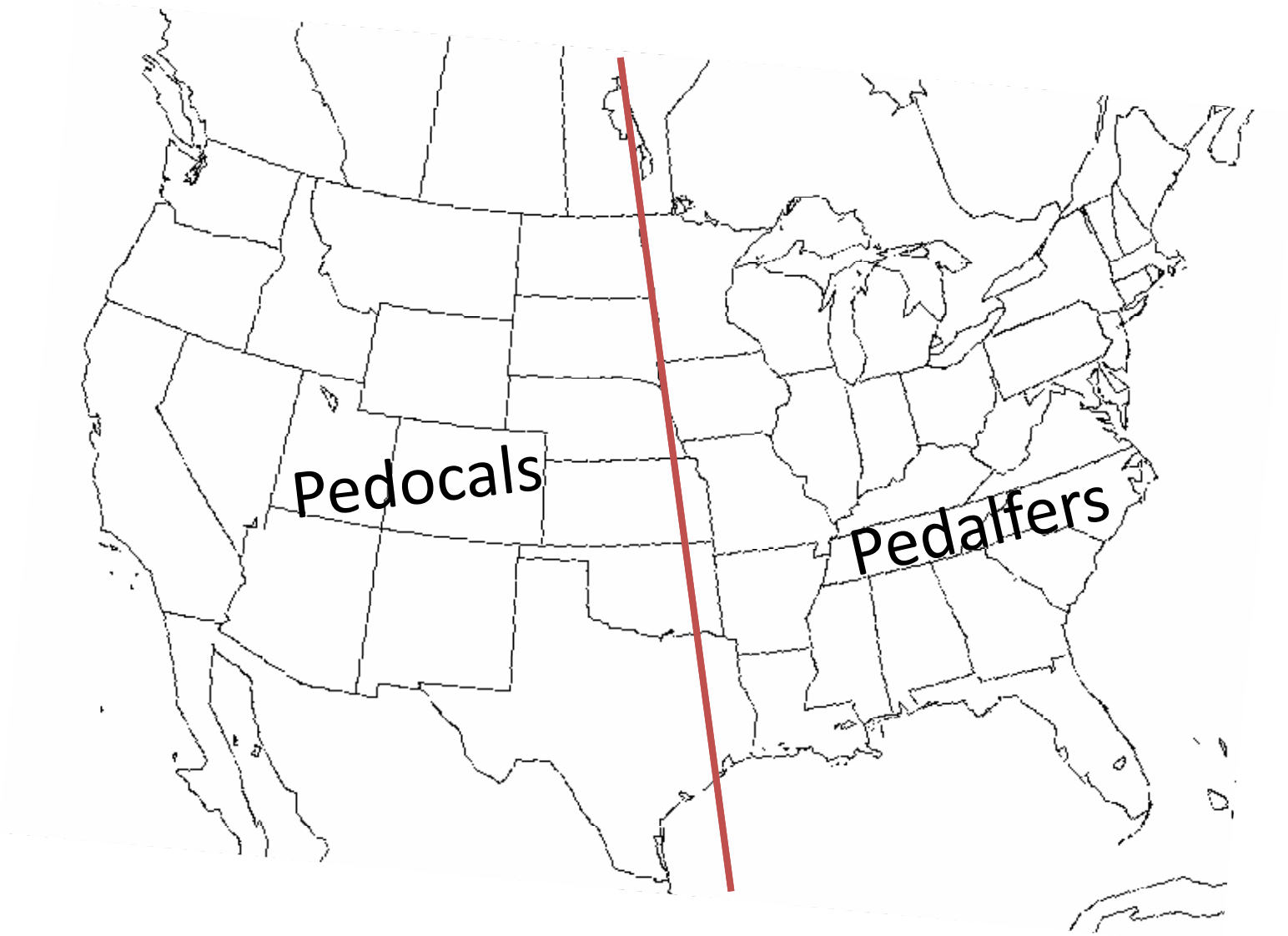


Soil Property 6 = Structure

Structure refers to the way the soil particles clump together into a characteristic shape. Granular structure indicates earthworms.



The Soils of the U.S. Fall in Two Major Classes.
Pedocals Form in Dry Envs & Have Calcium.
Pedalfers Form in Humid Envs & Have Iron and Aluminum



Soil Orders are the Major Types of Soils

Oxisols Are Old Soils of Tropics

Mollisols Are Grassland Soils

Vertisol, TX

Spodosols, New Eng.

Aridisols of S.W. U.S.

Aridisols are Desert Soils

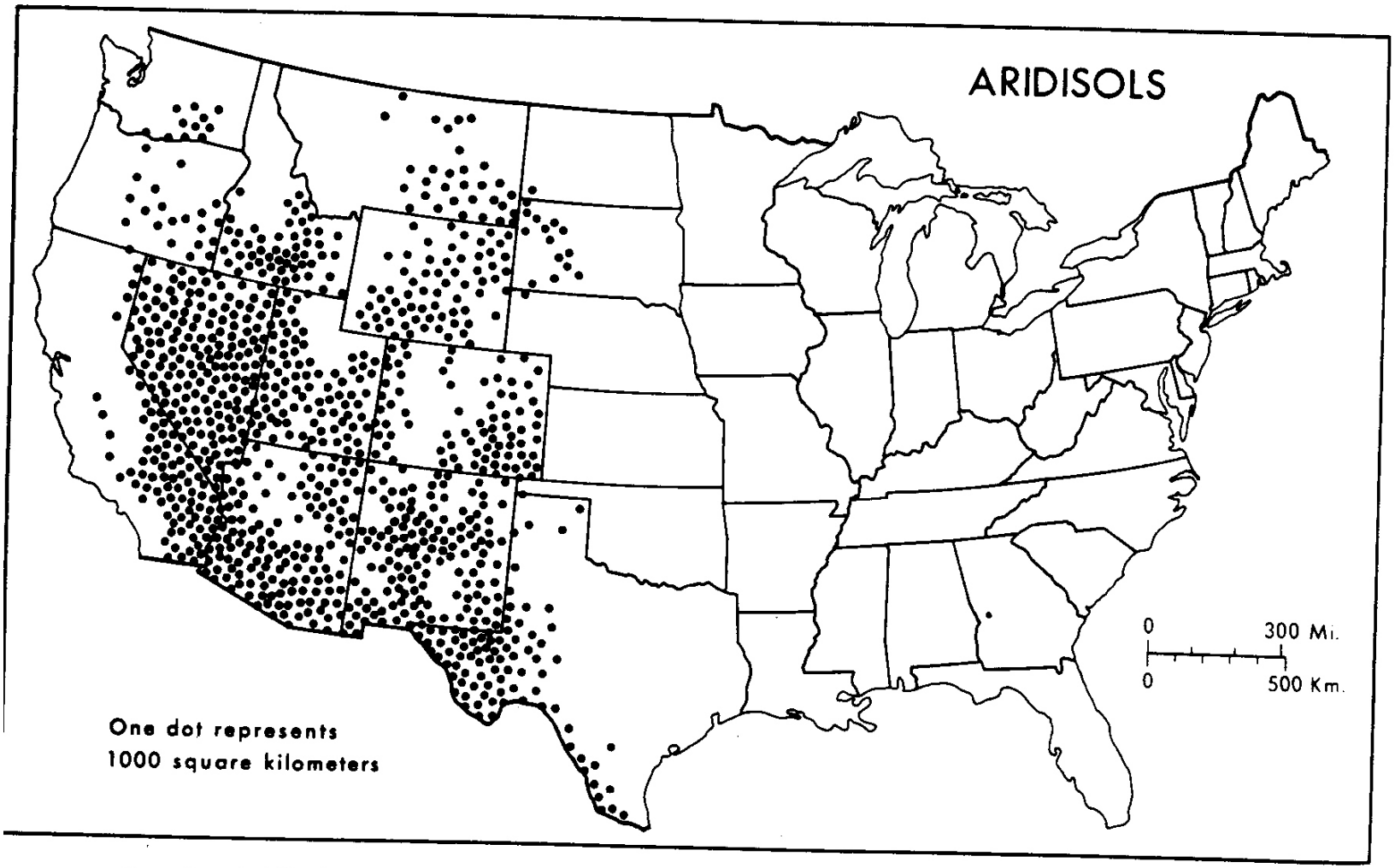


FIG. 4. Aridisols, soils with a layer of accumulated salt or clay but without organic matter and available water.

Mollisols are Grassland Soils

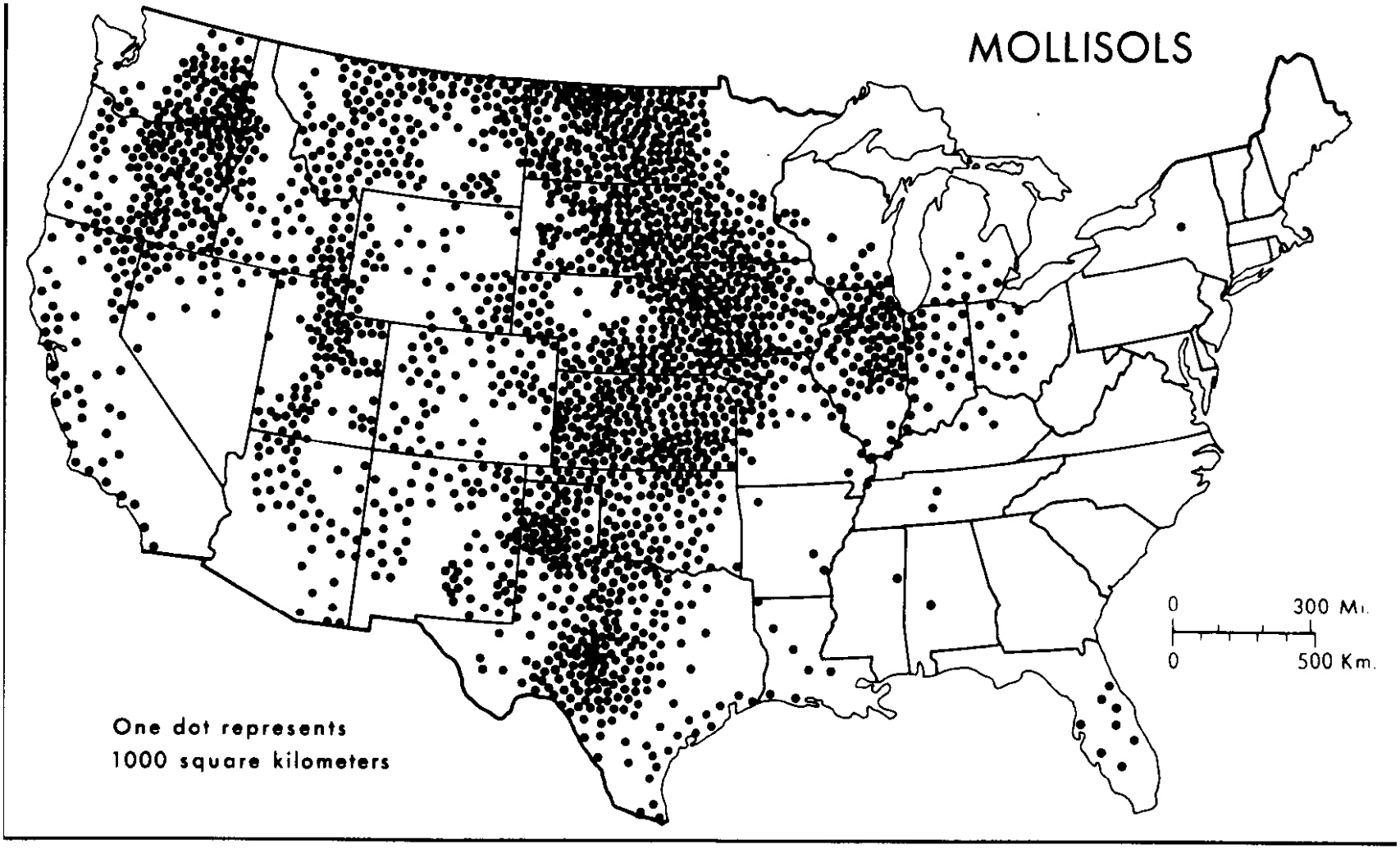


FIG. 5. Mollisols, soils with a dark surface layer that is fertile and well structured.

Spodosols Are Soils of Needle Leaf Forests

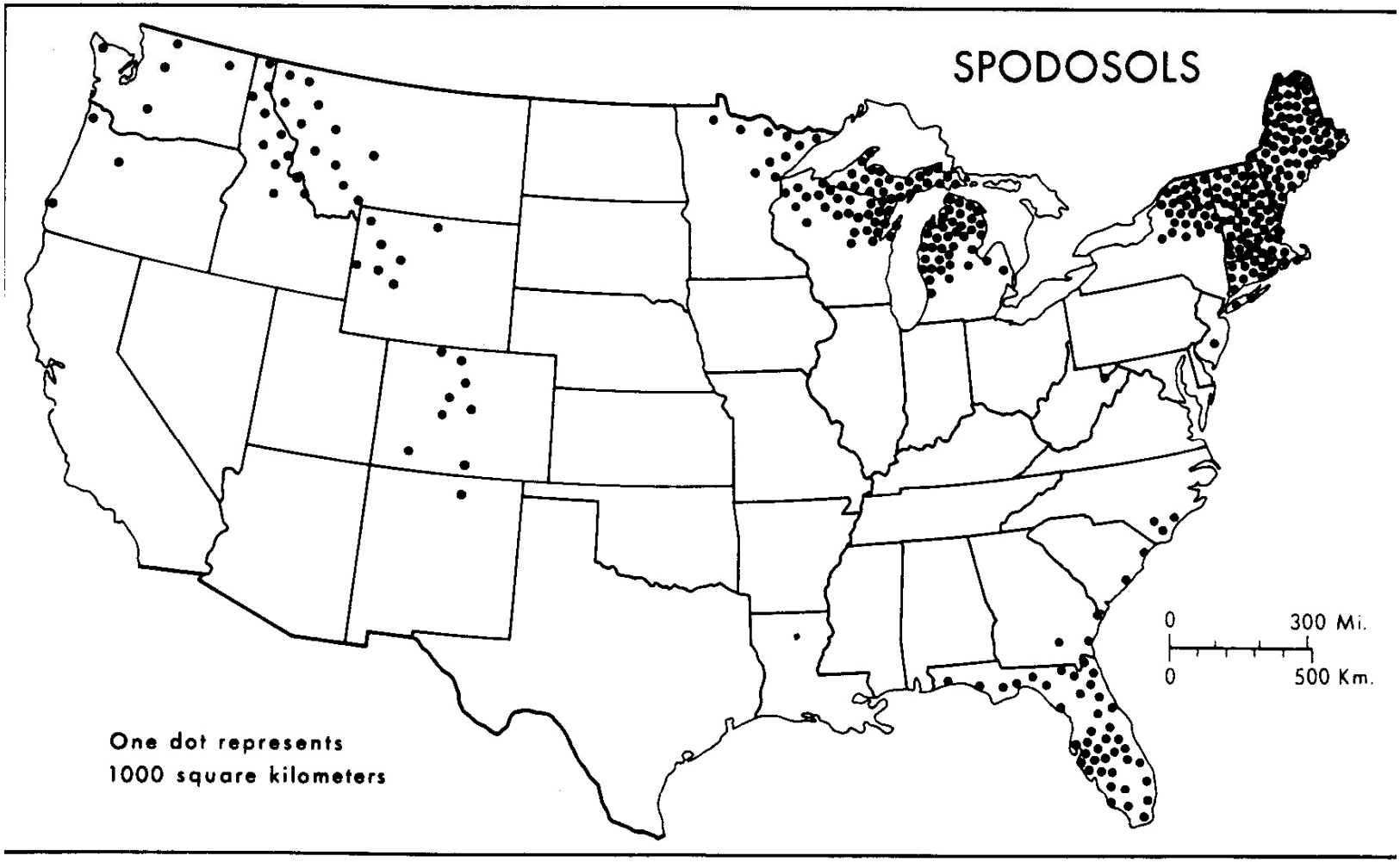


FIG. 6. Spodosols, soils with a subsurface layer of accumulated aluminum and organic matter.

Texas Has Many Vertisols that Shrink and Swell Causing Building Foundations to Move

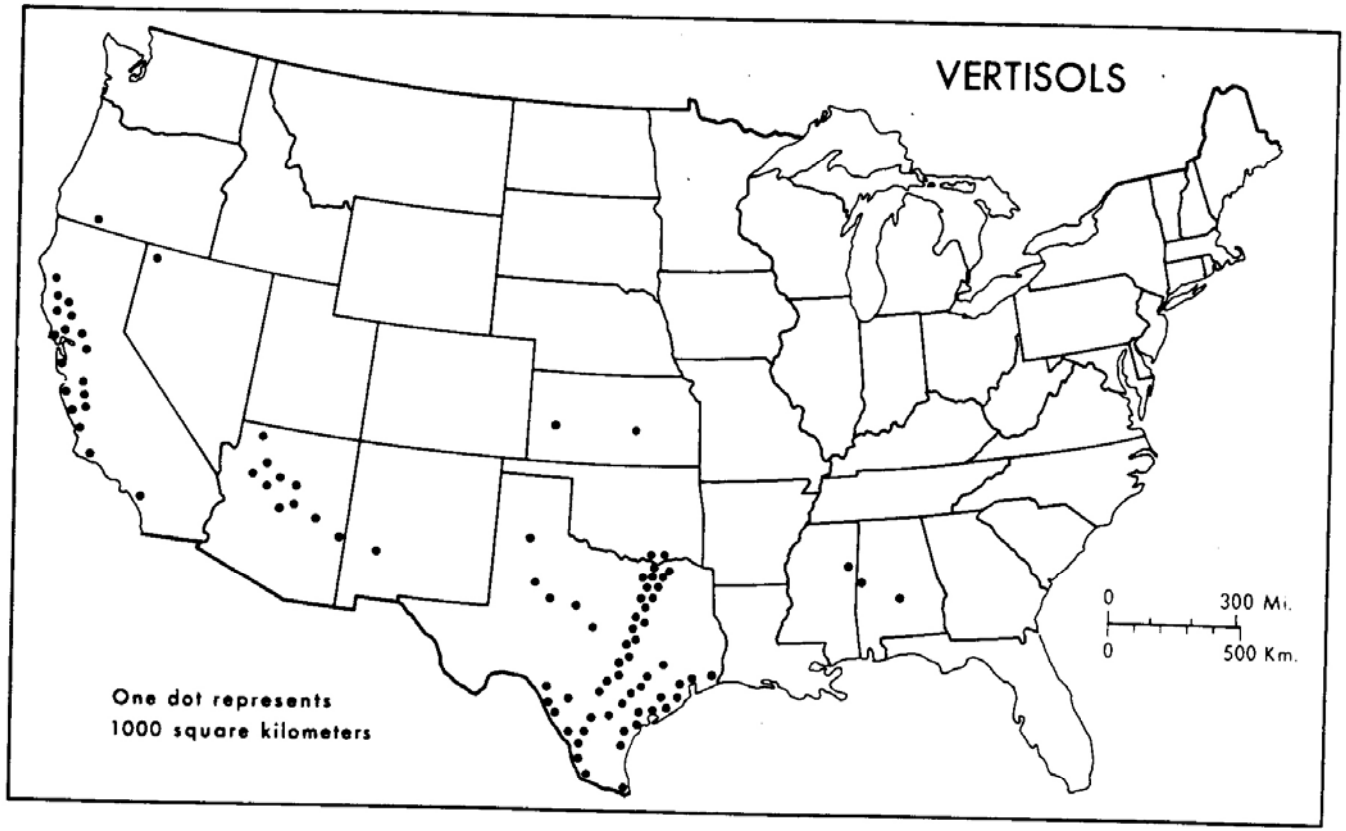
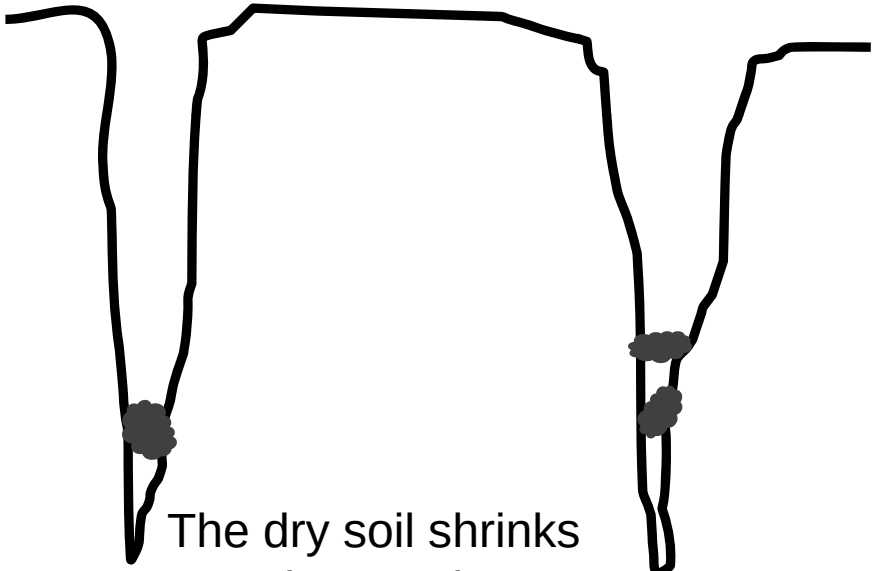


FIG. 3. Vertisols, soils with abundant clay that expands when moist and cracks deeply during the dry season.

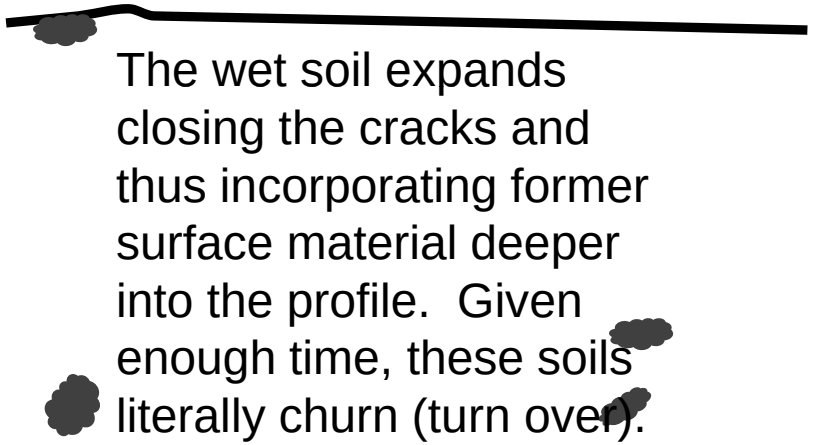
Vertisols Shrink and Swell Moving Building Foundations

Dry



The dry soil shrinks Opening cracks. Some soil from surface falls into the cracks

Wet



The wet soil expands closing the cracks and thus incorporating former surface material deeper into the profile. Given enough time, these soils literally churn (turn over).

Pedogenic Processes = Soil Formation

Additions = Soil Enrichment

Loess, ash, alluvium, organic matter

Removals = Erosion, leaching, decalcification

Translocation = Movement within profile

organic material moves down.

clay is eluviated from E horizon and illuviated to B horizon.

Transformation = Detritus decomposition

Development of hardpan

Edwards AFB Where Space Shuttle Lands

Runway at Edwards AFB Extends Across Hardpan of Lake Bed