Soils Background for Lake Corpus Christi State Park

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Factors of Soil Formation?

CLORPT | 5 factors of soil formation

CL—Temperature and moisture influence the speed of chemical reactions, which in turn help control how fast rocks weather and dead organisms decompose. Soils develop fastest in warm, moist climates and slowest in cold or arid (dry) ones.

O—Plant roots spread, animals burrow, and bacteria eat. These and other soil organisms speed up the breakdown of large soil particles into smaller ones. Roots are a powerful soil-forming force, cracking rocks as they grow. And roots produce carbon dioxide that mixes with water, forming an acid that wears away rock.

R—The shape of the land and the direction it faces make a difference in how much sunlight a soil gets and how much water it holds. Deeper soils form at the bottom of a hill than at the top because gravity and water move soil particles down the slope.

P—Just like you inherited characteristics from your parents, every soil inherits traits from the materials in which it forms. Soils that formed from limestone bedrock, for example, are rich in calcium. Soils that formed from materials at the bottom of lakes are high in clay.

T—Older soils differ from younger soils because they have had longer to develop. In the northern US, soils tend to be young because glaciers covered the surface during the last Ice Age. In the southern US, there were no glaciers, so the soils have been exposed for a longer time, making them more weathered.

https://www.soils4teachers.org/posters

Taxonomy / Classification

- Biology and Soils – hierarchical systems
- Biology example:
  - ***Kingdom*** — ***Plantae***
  - ***Division**** — ***Magnoliophyta (flowering)***
  - ***Class*** — ***Magnoliopsida (dicots)***
  - ***Order*** — ***Violales***
  - ***Family*** — ***Passifloraceae***
  - ***Genus*** — ***Passiflora***
  - ***Species*** — ***incarnata***

* ***Phylum*** in the Animal kingdom

Taxonomy / Classification

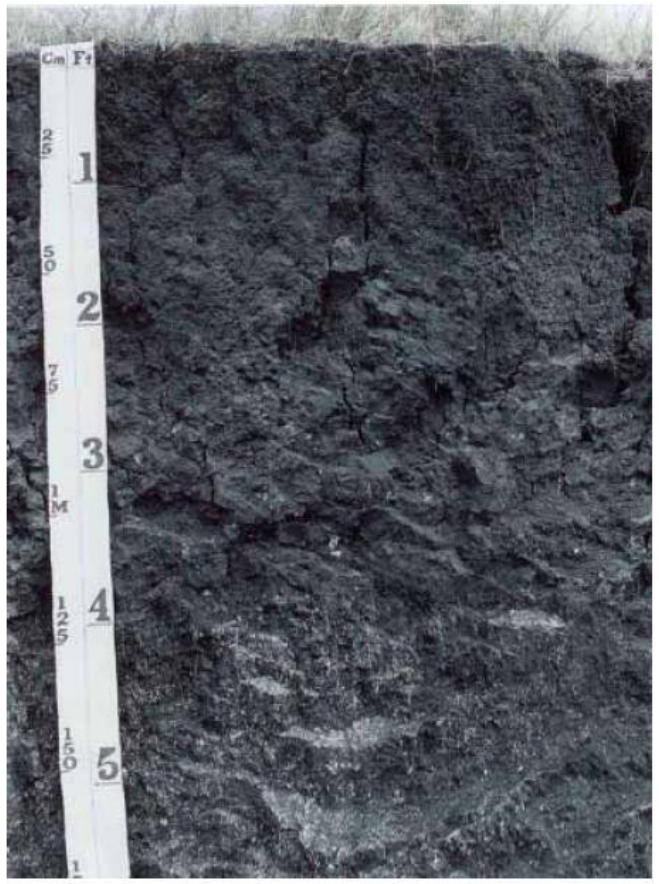
- Soils example
  - ***Order***
  - ***Suborder***
  - ***Great group***
  - ***Subgroup***
  - ***Family***
  - ***Series****

* More than 1,300 series in Texas

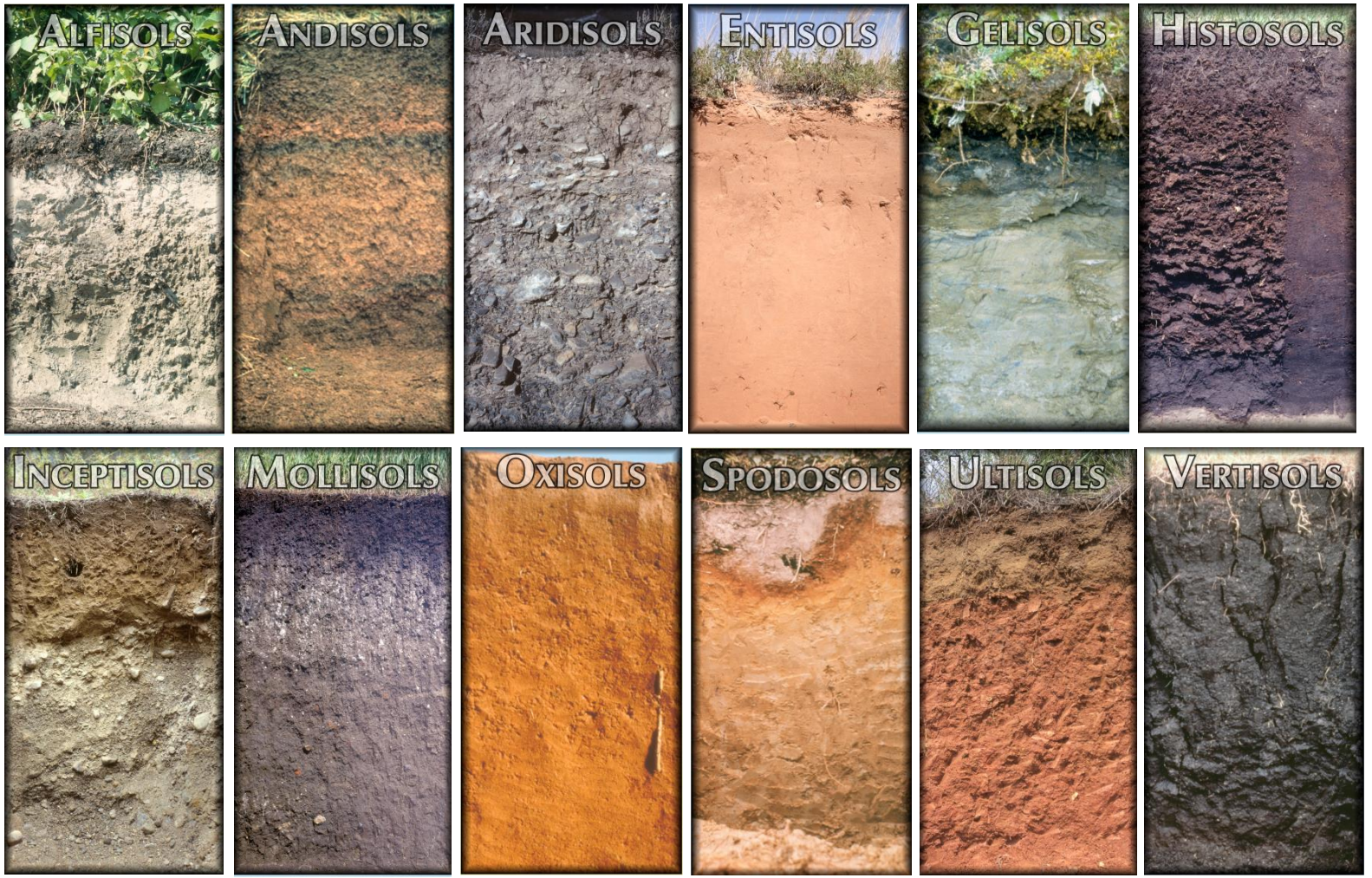
Soil Trivia!

Proposed State Soil

Houston Black



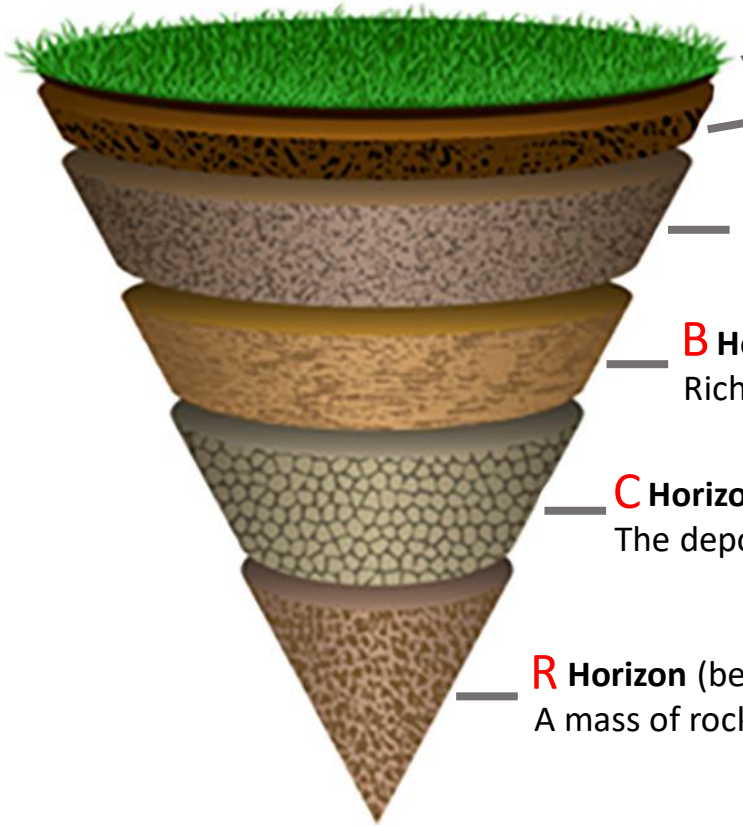
12 Orders of Soil Taxonomy



Mustang Island

Lake Corpus Christi State Park

Soil Profile



O **Horizon** (organic)
Organic matter such as decaying leaves

A **Horizon** ("topsoil")
Minerals from parent material with a little organic matter

E **Horizon** (eluviated horizon)
Light colored and leached of clay, minerals, and organic matter

B **Horizon** (subsoil)
Rich in minerals that moved down from A or E horizons

C **Horizon** (parent material)
The deposit at the earth's surface from which the soil developed

R **Horizon** (bedrock)
A mass of rock that weathers to form the parent material for some soils

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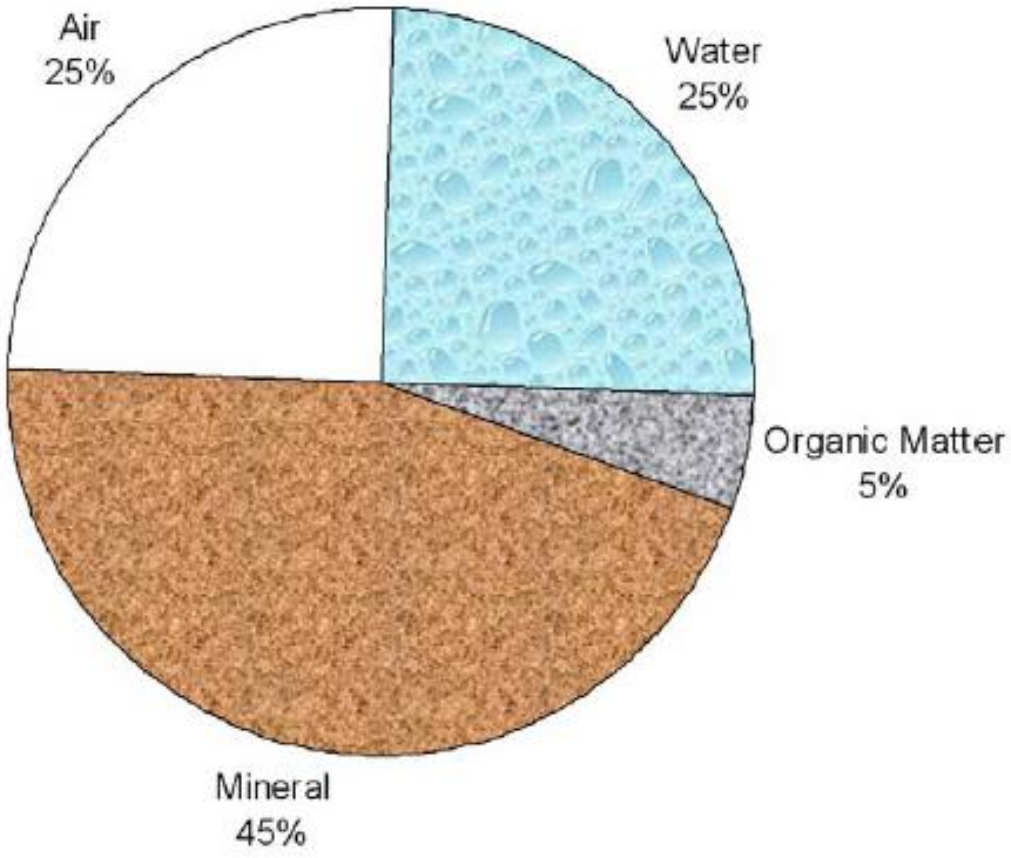
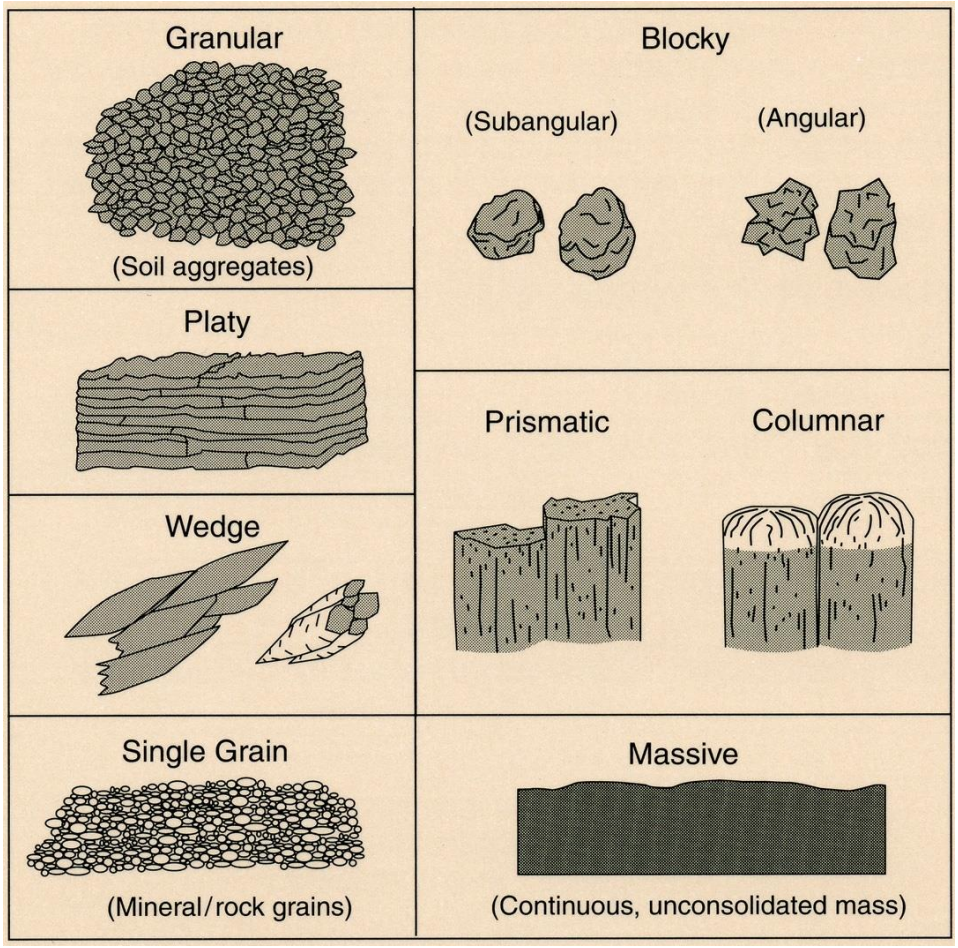
Soil Composition

- Solids
- Pore space

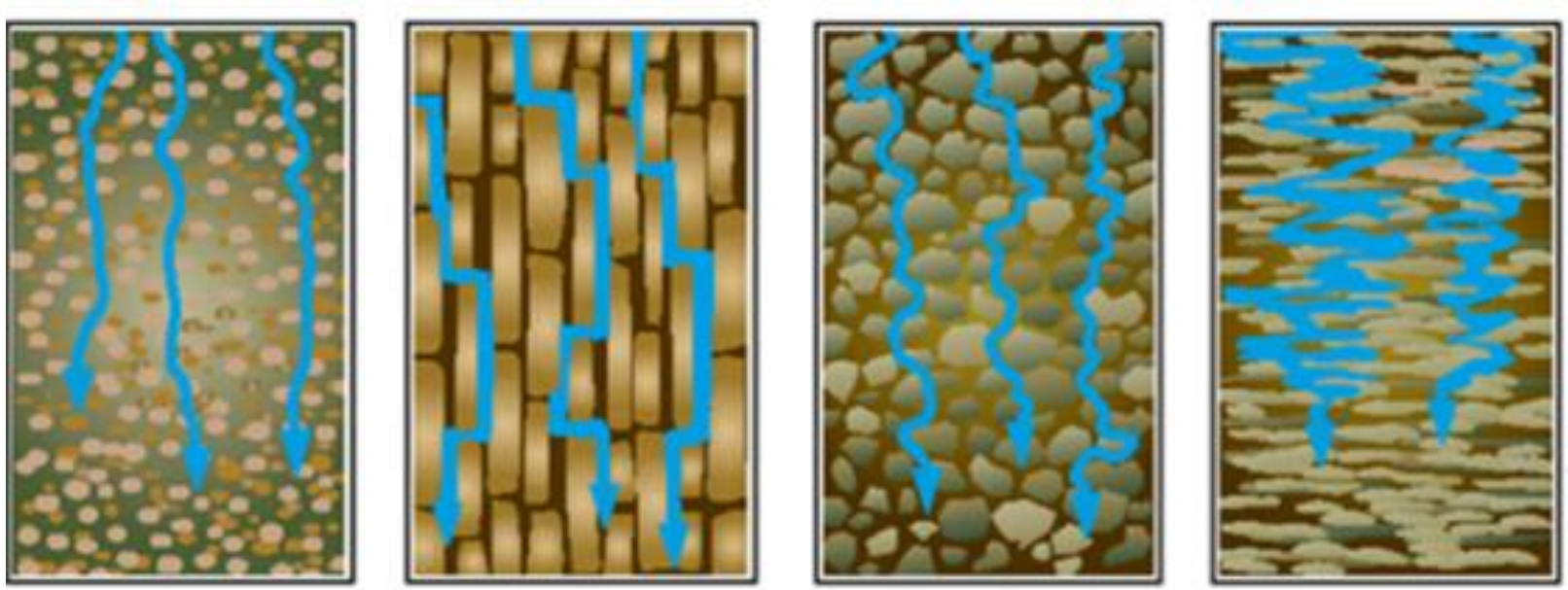


Soil Structure



Effects of Soil Characteristics

- Water flow through different soil structures
- Which of these soil structures will allow water to move fastest through the soil?



Granular | Prismatic | Subangular Blocky | Platy

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Image Credit: USDA-NRCS

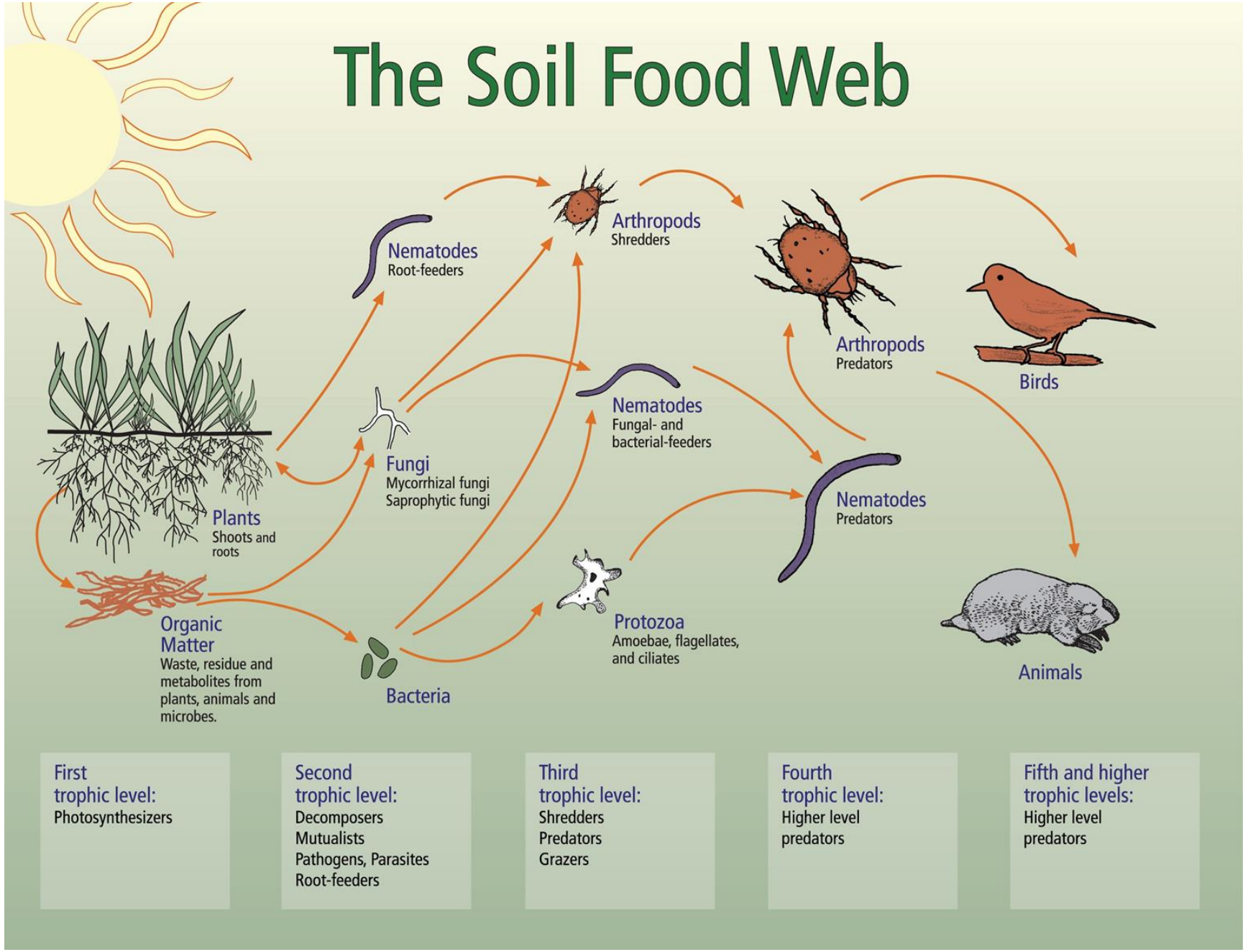

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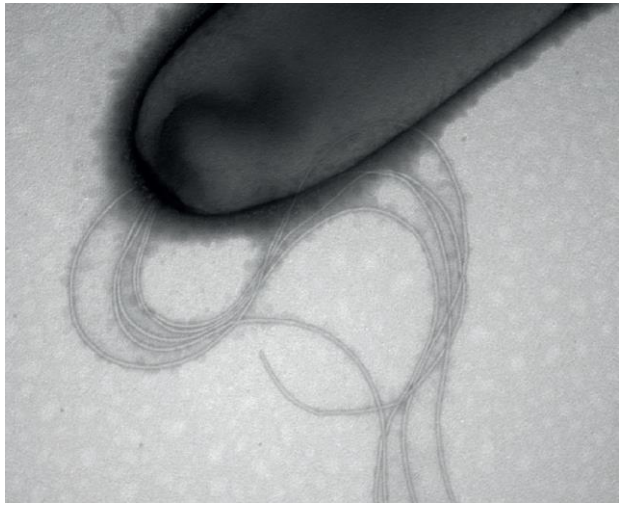
Image Credit: NRCS

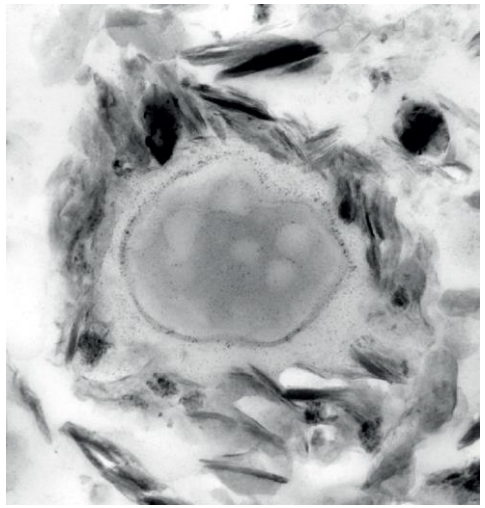
Bacteria and Archaea



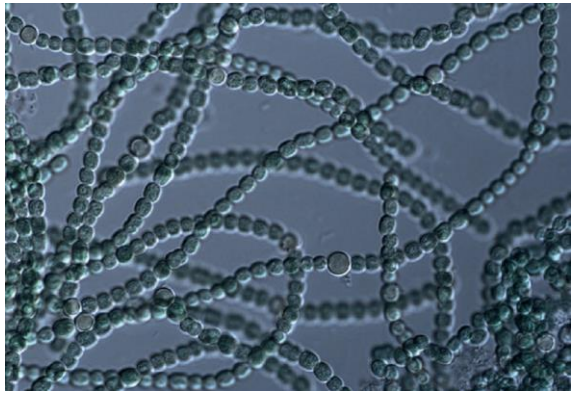
Pseudomonas aeruginosa, a common soil bacterium

Root nodules on legume plant roots filled with nitrogen-fixing bacteria

A variety of Actinobacteria growing on plates



Soil bacterium (circle) producing polysaccharide "glue" sticking clay particles (black)



Cyanobacteria get their energy via photosynthesis

Branching filaments of *Streptomyces*

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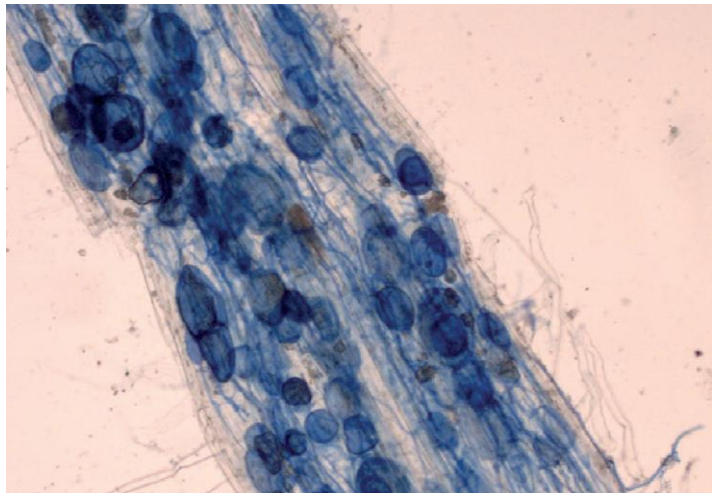
Image Credit: Orgiazzi A., et al, Global Soil Biodiversity Atlas, 2016 European Commission, Publications Office of the European Union, Luxembourg.

Fungi

Fungal hyphae have a branching structure that looks like plant roots



Stained roots colonized by arbuscular mycorrhizal fungi

Roots of a beech tree colonized by a white ectomycorrhizal fungus

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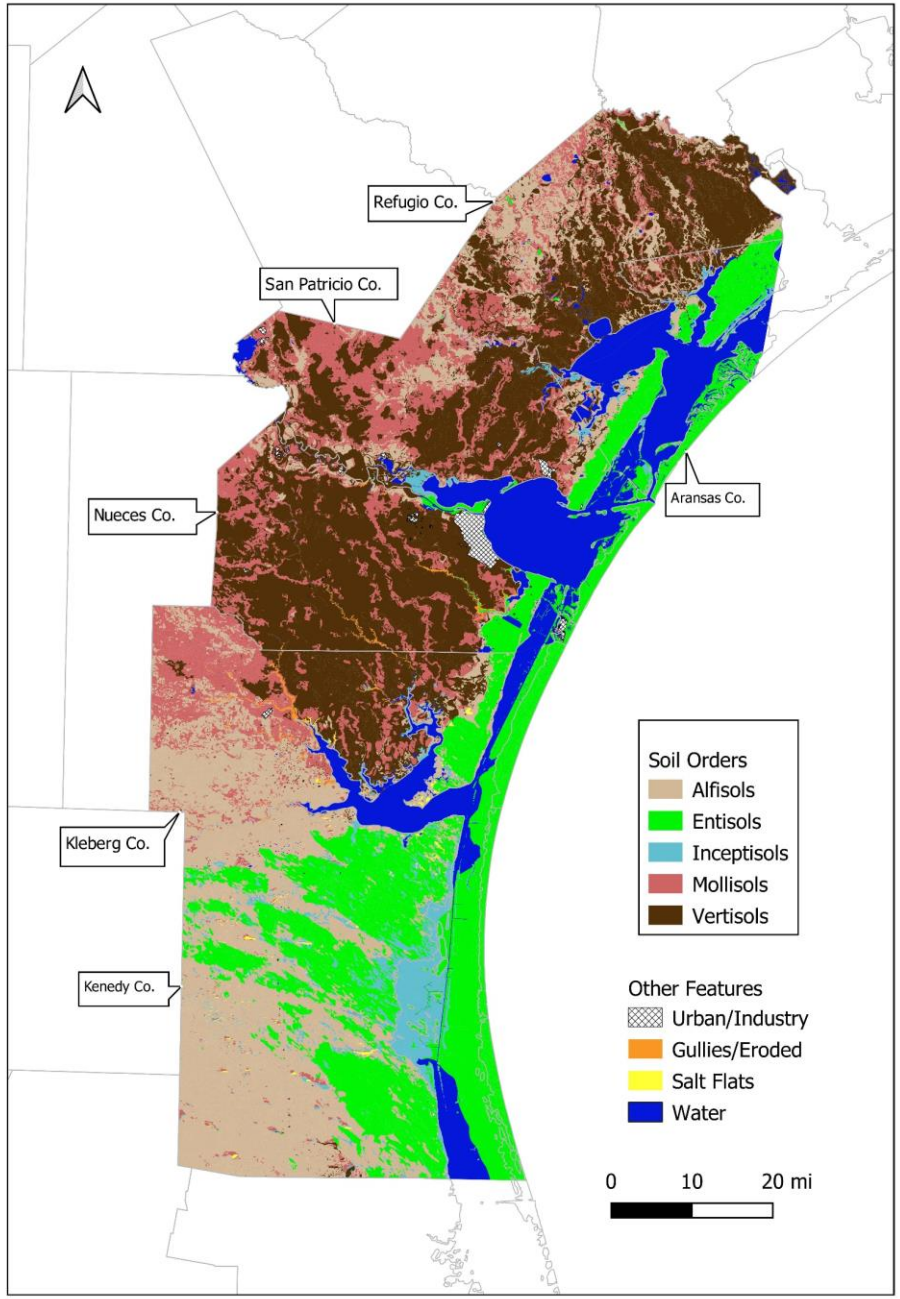
Image Credit: Orgiazzi A., et al, Global Soil Biodiversity Atlas, 2016 European Commission, Publications Office of the European Union, Luxembourg.

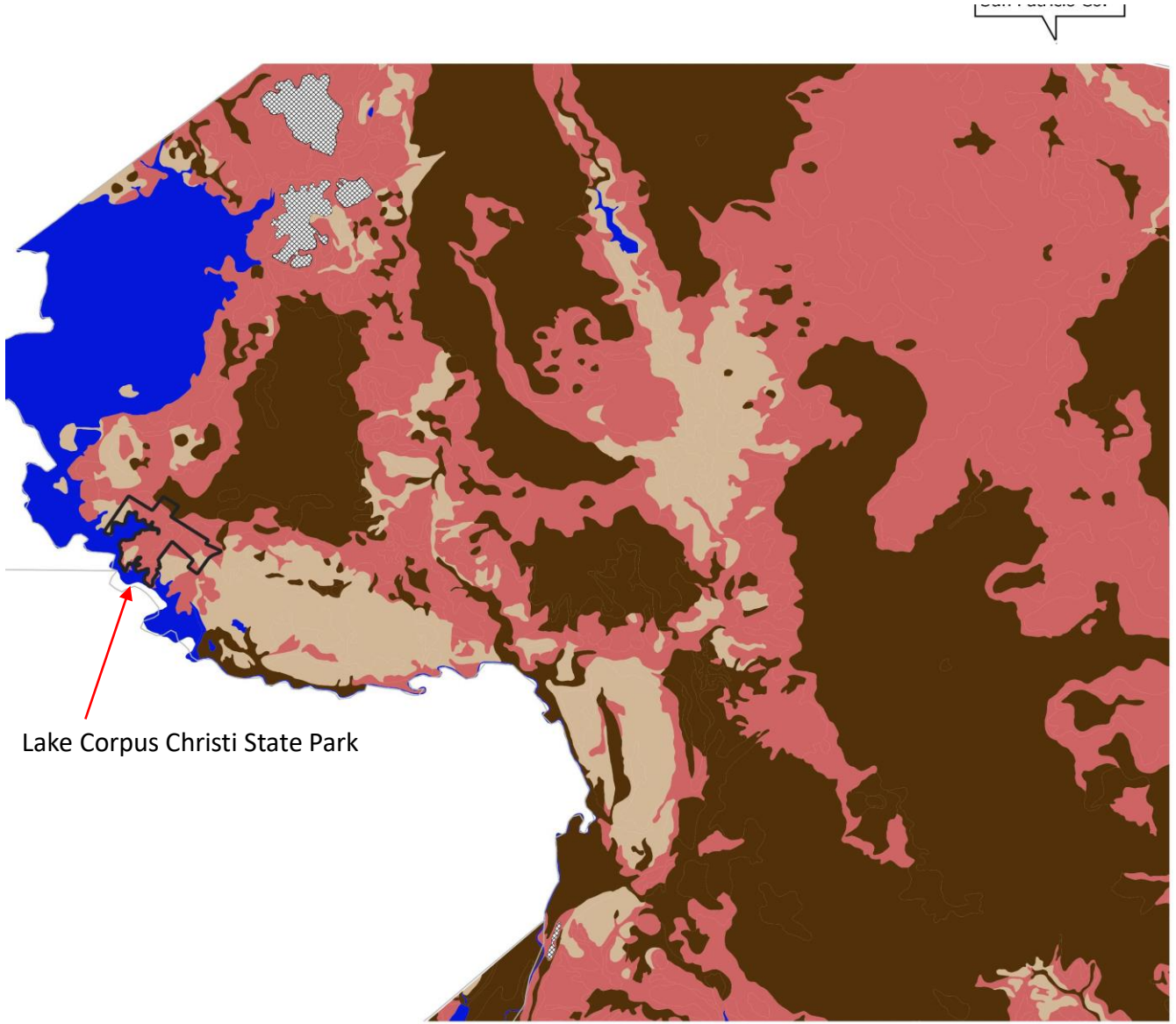

Northbound I-37, north of Odem


TX-359, southwest of Mathis
Wavy pavement in parts

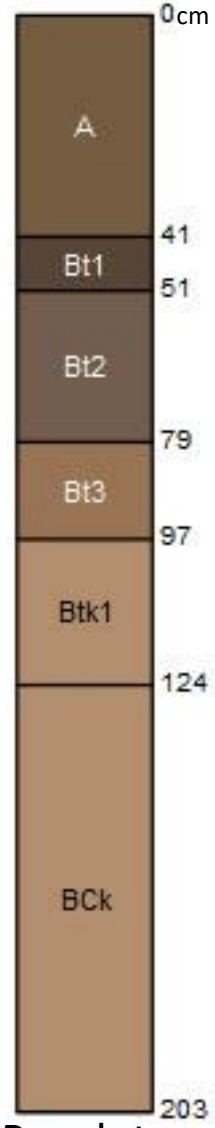
Field of Victoria Clay (a Vertisol)


State Park Road 25

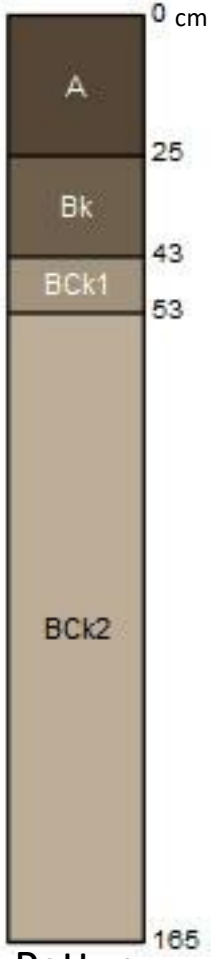

Refugio Co.
San Patricio Co.
Aransas Co.
Nueces Co.
Kleberg Co.
Kenedy Co.
Soil Orders
Alfisols
Entisols
Inceptisols
Mollisols
Vertisols
Other Features
Urban/Industry
Gullies/Eroded
Salt Flats
Water
0
10
20 mi


Lake Corpus Christi State Park

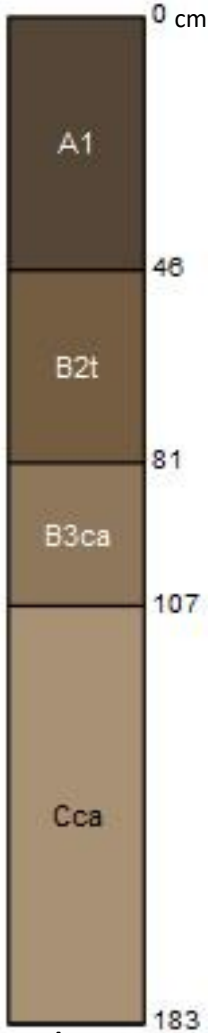
Examples of Soil Series Profiles In/Around Lake Corpus Christi S.P.



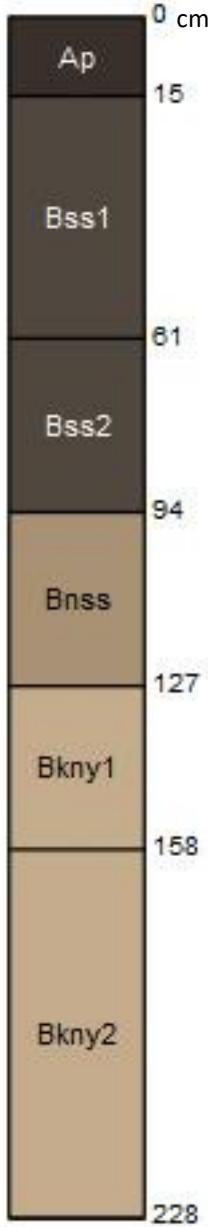
Papalote
(Alfisol)



Pettus
(Mollisol)



Pharr
(Mollisol)



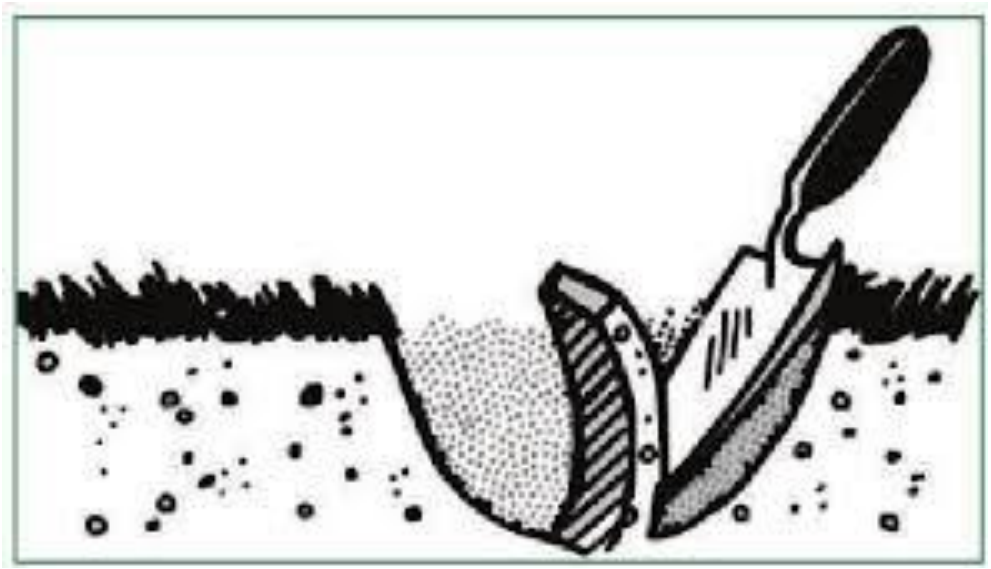
Victoria *(Vertisol)*

Class Objectives:

- Short walk with observations
- Soil Health Evaluation
- Soil texture – hands on, how-to
- Examine soils samples brought by trainees

Taking a Soil Sample for This Class

- Area of interest to you
- Need approximately 1 cup of soil
- Ziploc bag or plastic container
- Observations to report:
  - Easy to dig hole?
  - Earthworms present?
  - What kind of soil structure?



From Univ. of Georgia


METRIC 1
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METRIC 1
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Microbiotic crusts are predominantly composed of cyanobacteria (formerly bluegreen algae), green and brown algae, mosses, and lichens