

Soil Microbiology:

Soil Microbiology: It is the branch of science / microbiology concerned with soil-inhabiting microorganisms, their functions and activities.

The Soil: a thin layer of material covering the earth's surface and most important natural resources.

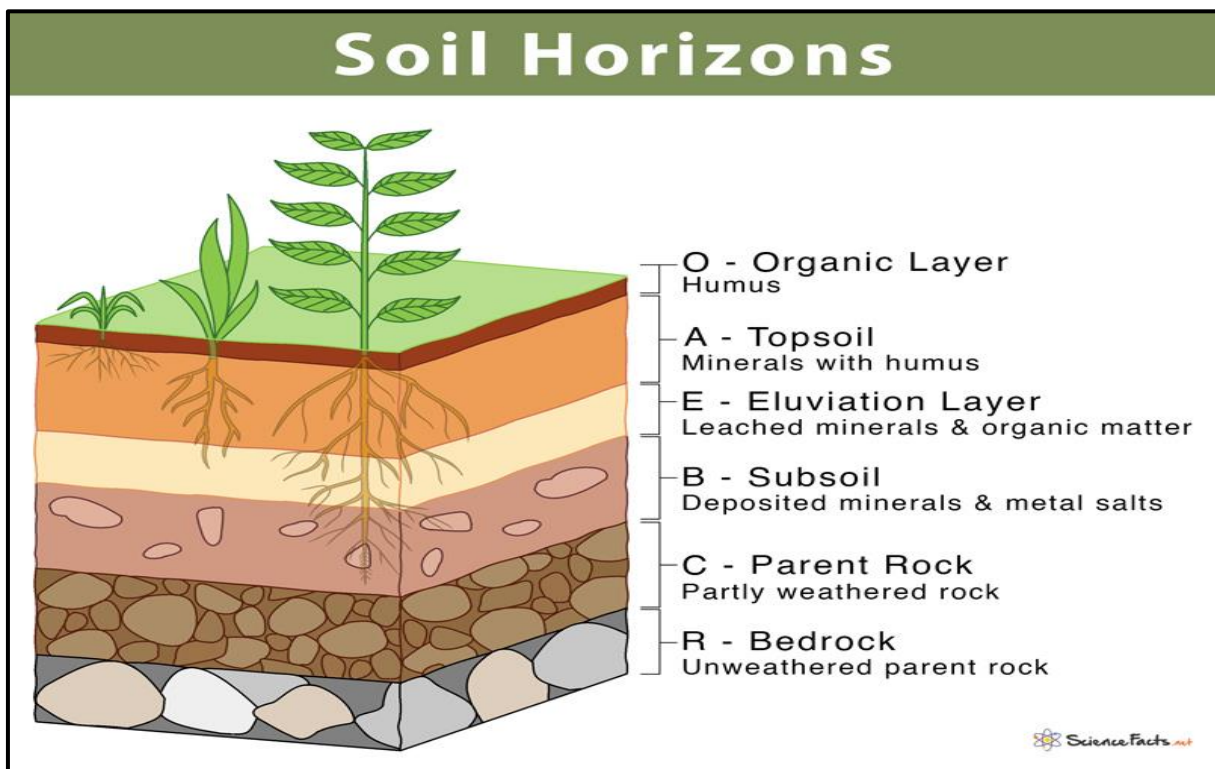
Together with air and water, it is the basis for life on planet earth.

The five factors interactions called soil forming factors includes:

1. Topography of the land.
2. The organisms present in the environment.
3. The climate.
4. The parent material.
5. The time.

Soil horizons:

Soil horizons: Is six different layers that make up a mature soil profile. These layers or horizons are represented by alphabets O, A, E, C, B, and R. Immature soils lack some of these layers. (Figure-1).



1) O Horizon – (Organic Layer)

The (O) is for organic. This layer is the uppermost layer of the soil rich in organic matter, such as the remains of plants and dead animals.

2) A Horizon – (Topsoil)

This called humus layer and contains the maximum organic matter. This layer of intense biological activity and has the most nutrients. Allowing it to hold air and moisture necessary for plants seed germination, Insects, earthworms, centipedes, bacteria, fungi, and other animals are found inside this layer.

3) E Horizon – (Eluviation Layer)

This layer consists of nutrients filtrated from O and A horizons and is thus called the eluviations layer. Filtrating of clay, minerals, and organic matter leaves this layer with a high concentration of sand, quartz and other resistant materials.

4) B Horizon – (Subsoil)

This layer has less organic content but is rich in minerals that are leached down from the topsoil. The subsoil is the region of deposition of certain minerals and salts of certain metals such as iron oxides, aluminum oxides, and calcium carbonate in large proportion.

5) C Horizon – (Parent Rock)

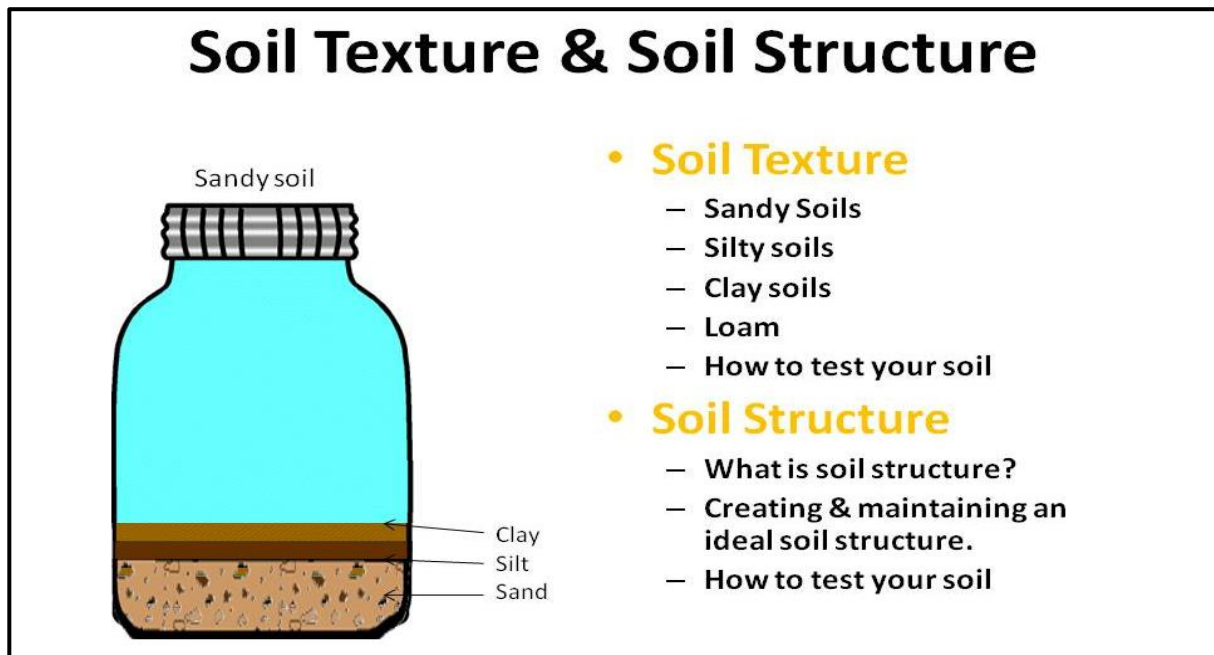
It is called the parent rock because all the upper layers developed from this layer. C horizon is devoid of any organic matter and is made of broken-up bedrocks, making it hard.

6) R Horizon – (Bedrock)

Found beneath all the layers, it consists of un-weathered igneous, sedimentary, and metamorphic rocks. It is highly compact. Granite, basalt, quartzite, sandstone, and limestone make up the bedrock.

Soil Texture and Soil Structure:

Soil texture and soil structure: are both unique properties of the soil that will have a profound effect on the behavior of soils, such as water holding capacity, nutrient retention, supply, drainage and leaching.



Soil Texture:

Soil is comprised of different sizes of mineral particles. The relative amounts of each of these different sized particles constitute a **soils texture**.

There are 3 main soil textures; sandy, silty or clayey and there are pluses and minuses to each one.

- 1. Sandy soils:** Their larger particle size serves to create larger spaces between particles, and easy root penetration and helps to keep plants relatively free from soil borne diseases. They do not hold water and nutrients. This easy to work and faster drainage.
- 2. Silty soils:** Have a silky feel and hold nutrients and water better than sand. These are easy to work.
- 3. Clay soils:** These soils compact very easy and are excellent at holding in water and nutrients. These very slow to drain and difficult to work.
- 4. Loam:** Is the technical term used to describe the ideal soil texture. It consists of a mixture of 30-40% sand.....30-40% silt.....and 8-28% clay. This excellent drainage and easy to work and will hold nutrients.
- 5.** To quickly identify a sandy, silty or clayey soil, squeeze a handful of moist dirt in your hand. If it makes a ball then you are not sandy, but if that ball does not easily crumble apart then you likely have a clay soil.

Soil Structure:

Deals with how a soil hangs together and structure. Soils with good structure are able to absorb more rainwater, drain freely and roots and soil organisms are able to move through the soil with greater ease.

A synergistic partnership between organic matter and soil organisms is the main agent behind good soil structure. As organic matter is broken down by earth worms and soil microorganisms, small air pockets are created in the soil.

Soil Composition:

Soil composition is an important aspect of nutrient management. While soil minerals and organic matter hold and store nutrients, soil water is what readily provides nutrients for plant uptake. Soil air, too, plays an integral role since many of the microorganisms that live in the soil need air to undergo the biological processes that release additional nutrients into the soil.

The basic components of soil are minerals, organic matter, water and air. The typical soil consists of approximately 45% mineral, 5% organic matter, 20-30% water, and 20-30% air. These percentages are only generalizations at best. In reality, the soil is very complex and dynamic. The composition of the soil can change on a daily basis, depending on numerous factors such as water supply, cultivation practices, and/or soil type.

