

Soil: A Natural Medium for Plant Growth

Dr. S. C. Tiwari

Introduction

- **Forest soil is a natural medium that produces nature's most magnificent crop i.e. the forest where an association of plants and animals exist since time immemorial.**

Definitions: According to-

- **Agronomists: A mixture of sand, silt, clay, lime and humus.**
- **Geologists: Product of weathering derived from minerals and decomposed remains of plants and animals.**
- **Soil Scientists: Soil is the weathered surface layer of earths which has been altered by the influence of water, air, organic matter, and living organisms.**
- **Nature /lover: Soil is a natural medium for the growth of diverse plants.**

All the concepts are well founded but not acceptable to silviculturists interested in soil as medium for plant growth. In many instances forest soil is a product of weathering composed of sand, silt and clay arranged in genetic horizons. Very often forest grow on barren rocks, piles of gravelly detritus, deposits of peat or permanently flooded areas, mangrove forests. These in general disregarded general definitions of soil, do not appear as rare exceptions but cover vast areas in different parts of the world and often support forest stands of high commercial value. Obviously the existence of such forest sites demands a broader concept of forest soils and somewhat a different approach to their studies and utilization.

Components of soil:

1. Organic matter (Obtained by decay plant residues, animal remains and microbial tissues).

2. Mineral matter (Obtained by decomposition of rocks),

3. Water (Obtained partly from atmosphere and and partly as a result of the reaction sand microbial activity taking place in the soil).

4. Air.

The fifth component of soil is **soil micro organisms** and **small animals** (Insects, worms, ants, termites, gastropods, arthropods, nematodes etc.) which are omnipresent. Air and water are present inside the soil pores and thus are increasing or decreasing by the increase and decrease of each other. During dry season air is more in the soil and during wet season water is more inside the soil.

Plant growth depends on the six factors namely:

Light

Mechanical support

Nutrient supply

Water supply

Oxygen supply

Heat

Plant growth depends on the soil for all except the first factor that is Light. Roots go deeper into the soil in search of nutrients, water and air.

Roots anchored in the soil enable growing plants to remain erect. Heat of the soil gives warmth to soil which helps in rapid decomposition of litter thus making the nutrient cycle rapid and faster release of nutrients.

Since soil provides all necessary things for the plant growth except light that is why soil is called natural medium of plant growth.

Functions of Soil

- 1. Various components such as Organic matter, mineral matter, air and water perform different functions for the soil.**

Soil extends the mechanical support for growing plants. Plants stand erect because of the hold exerted by the soil on plant roots. The roots are ramified and they are thus anchored in the soil mass.

2. Soil acts a reservoir of water and air.

The plant absorbs water through their roots from this reservoir and the roots breath in oxygen from the air stored in soil mass. The soil also stores the suns heat and supplies to the growing plants.

3. Soil acts a store house of plant nutrients.

Soil contains a large number of compounds o both organic and inorganic origin. The mineral matter derived from weathering of rocks and minerals constitute the organic compounds while decaying plant and animal remains furnishes the organic compound. Plants obtain nutrients from these compounds. The inorganic compounds supply nutrients like calcium, magnesium, sodium, potassium, iron, aluminum, sulphur, chlorine etc. while the organic compound mainly supplies nitrogen. Hydrogen is taken by the plants from water, oxygen partly from water and partly from air while carbon is taken mainly from carbon dioxide of the atmosphere of air.

4. Soil is the habitat of both macro and microorganisms.

The macro organisms are worms, rodents and insects. The microorganisms are fungi, bacteria, actinomycetes, algae and protozoa. Among the worms, nematodes and earthworms are important. Earthworms aerate the soil at the same time; they disintegrate and mix its constituents' by passing large quantities of soil through their bodies and ejecting the same on the surface as worm casts. The quantity of soil passed through the bodies of earthworms is enormous. It is estimated that earthworm transport about 10 tons of soil per acre per year. The ejected materials are in a more pulverized condition and possess better fertility than the original soil. This activity of earthworms leads to the transfer of soil from lower layers to the surface. The burrows made by the earthworms facilitate the entry of air and water into the lower layers thus, helping in aeration and drainage.