Soil Types and Their Characteristics

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Commentary

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DESCRIPTION

Agricultural soil science is a subset of soil science concerned with the study of edaphic conditions as they relate to food and fibre production. It is also a component of the field of agronomy in this sense, and is hence referred to as soil agronomy. Agricultural soil science follows the holistic method. Soil is investigated in relation to and as integral part of terrestrial ecosystems but is also recognized as a manageable natural resource. Agricultural soil science investigates the chemical, physical, biological, and mineralogical makeup of soils in relation to agriculture. Agricultural soil scientists explore ways for improving soil utilisation and increasing food and fibre crop output. The necessity of soil sustainability is being increasingly recognised. Erosion, compaction, reduced fertility, and pollution are all important problems with soil deterioration. Irrigation and drainage, tillage, soil classification, plant nutrition, soil fertility, and other fields are among the areas in which they perform study.

Although increasing plant (and consequently animal) output is a worthwhile aim, it may often come at a great cost, either immediately (e.g., widespread crop disease caused by monoculture) or over time (e.g., long-term consequences of monoculture) (e.g. impact of chemical fertilisers and pesticides on human health). An agricultural soil scientist may devise a strategy for maximising output while employing environmentally friendly methods and solutions, and in order to do so, they must research a variety of science subjects such as agricultural science, physics, chemistry, biology, meteorology, and geology.

Soil variables

Coming to soil variables like soil texture, also known as soil composition is made up of solid particles of varying sizes. Sand, silt, and clay are the particles in decreasing order. The relative percentages of sand, silt, and clay in each soil may be used to classify it.

Aeration and porosity: Atmospheric air includes oxygen, nitrogen, carbon, and other components. These components are necessary for life to exist on Earth. All cells (including root cells) require oxygen to operate, and they cannot respire or metabolise if the environment becomes anaerobic. The techniques by which air is provided to the soil are referred to as aeration in this context. Soil aeration in natural ecosystems is mostly performed by the biota's active activity. Tilling and ploughing are popular ways for humans to aerate the soil; however this technique can degrade it. The air-holding ability of the soil is referred to as porosity. See also soil pore space characterization.

Water provided by rain or irrigation may pool and stagnate on soils with poor drainage. As a result, anaerobic conditions dominate, and plant roots perish. Water moulds that damage plants thrive in stagnant water. Plants in excess drainage soils, on the other hand, do not get enough water to assimilate, and nutrients are washed out of the porous medium and end up in groundwater reserves.

Water content: Without soil moisture, plants do not transpire, grow, or wilt. Plant cells lose their pressure in a technical sense (see osmotic pressure and turgor pressure). Plants have a direct impact on soil moisture. For example, they form a leafy cover that reduces sun radiation's evaporative effects. Even when plants or portions of plants die, the decaying plant debris forms a thick organic cover over the soil, protecting it from evaporation, erosion, and compaction. See mulch for further information on this topic.

The tendency of water to move from one region of the soil to another is referred to as water potential. While water transported to the soil surface generally travels downhill owing to gravity, it encounters higher pressure at some point, causing it to flow back up. Water suction is the term for these phenomena.

Horizontation refers to the formation of soil layers with different properties and is most commonly encountered in advanced and mature soils. It has an impact on practically every soil variable.

Fertility refers to the amount of nutrients and organic matter in a soil. Much of the arable ground has been made unproductive by modern farming technologies. In such circumstances, soil is unable to support plants with high nutritional demands on its own, necessitating the use of an external supply of nutrients. However, in other circumstances, human action is regarded to be to blame for turning ordinary soils into super-fertile ones.

Organisms interact with the soil in a variety of ways, contributing to its quality in a variety of ways. Although the mechanism of interaction is often ambiguous, a rule is emerging: the volume and variety of the biota is "proportional" to the soil quality. Bacteria, fungi, nematodes, annelids, and arthropods are among the groups of interest.

Soil acidity, or pH, and action-exchange capacity: Root cells function as hydrogen pumps, and the concentration of hydrogen ions in the surrounding environment influences their ability to absorb nutrients. This concentration is measured by pH. Although each plant species thrives in a specific pH range, the great majority of edible plants may thrive in soil pH ranges of 5.0 to 7.5.