

## GLOSSARY

**Aeration, soil** - The process by which air in the soil is replaced by air from the atmosphere. In a well-aerated soil, the soil air is very similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen than the atmosphere above the soil. The rate of aeration depends largely on the volume and continuity of pores within the soil.

**Available nutrient** - The quantity of nutrient element or compound in the soil that can be readily absorbed and assimilated by growing plants.

**Available water** - The portion of water in soil that can be readily absorbed by plant roots. Considered by most soil scientists to be that water held in the soil against pressure of up to approximately 15 bars.

**Buffering capacity** - The characteristic of a substance to resist sudden appreciable changes, used most often in relation to soil pH.

**Bulk density (soil)** - The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to a constant weight at 105°C.

**Carbon:nitrogen (C:N) ratio** - Ratio of carbon content to nitrogen content. The C:N in plant residues is often a convenient predictor of decomposition rates but is not the only determinant.

**Cellulose** - A structural polysaccharide of plant cell walls.

**Cation exchange capacity (CEC)** - The sum total of exchangeable cations that a soil can absorb. Expressed in milliequivalents per 100 grams of soil. Clay and organic matter are the parts of soil that have most, if not all, of the cation exchange sites.

**Chelate (Greek, claw)** - A chemical compound in which a metallic ion is firmly combined with a molecule by many chemical bonds.

**Compost** - Organic residues or a mixture of organic residues and soil, that have been piled, moistened, and allowed to undergo biological decomposition. Mineral fertilizers are sometimes added. Often called "artificial manure" or "synthetic manure" if produced primarily from plant residues.

**Crust** - A surface layer on soils, ranging in thickness from a few millimeters to perhaps as much as an inch, that is much more compact, hard, and brittle when dry than the material immediately beneath it. A nursery soil that can form a crust around a young seedling can girdle the seedling if the crust is uncovered and heated by the sun. The crust can also prevent seeds from germinating properly.

**Fertilizer requirement** - (1) The quantity of certain plant nutrients needed, in addition to the amount supplied by the soil, to increase plant growth to a designated optimum. (2) The quantity of fertilizer required to supply nutrient needs of both higher plants and microorganisms for maximum crop production.

**Fixation** - The process of conversion of an element in the soil essential to plants from a readily available to a less available form. Some clays can fix phosphorus and calcium, making it unavailable to plants.

**Green Manure** - Any plant material incorporated in the soil while green or soon after maturing for the purpose of improving the soil.

**Heat capacity** - The amount of heat a given soil can hold. This is dependent upon moisture content and organic matter composition.

**Heavy metals** - Metals that can be precipitated by hydrogen sulfide in an acid solution. Examples are Ag, Au, Bi, Hg, and Pb. When metals occur in soils and are taken up by the plants, they can reach levels toxic to animals and humans that consume the plants. Many of the metals mentioned are normally found in soils and plants but at minute levels. When they reach specific threshold levels, they are referred to collectively as "heavy metals".

**Humus** - The more or less stable fraction of the soil organic matter remaining after the major portion of added plant and animal residues have decomposed. Usually it is dark in color.

**Immobilization** - The conversion of an element from the inorganic to the organic form in microbial tissues or in plant tissues, thus rendering the element not readily available to other organisms or to plants.

**Infiltration** - The downward entry of water into the soil.

**Infiltration rate** - A soil characteristic determining or describing the maximum rate at which water can enter the soil under specified conditions, including the presence of an excess of water.

**Lignin** - Complex aromatic compounds in the cell walls of sclerenchyma, xylem vessels, and tracheids which make them rigid. Lignin is not easily broken down by microorganisms and has a high CEC.

**Macronutrient** - A chemical element necessary in large amounts (usually greater than 500 parts per million) for the growth of plants. ("Macro" refers to quantity used rather than how essential it is.)

**Micronutrient** - A chemical element necessary in only extremely small amounts (less than 50 ppm for the growth of plants. Examples are B, Cl, Cu, Fe, Mn, and Zn. ("Micro" refers to the amount used rather than to its essentiality.)

**Mineralization** - The conversion of an element from an organic form to an inorganic state as a result of microbial activity i.e. amino acid in a plant to nitrate nitrogen.

**Millequivalent (meq)** - One milligram of hydrogen or the amount of any other ion that will combine with it. Milliequivalents are units used in cation exchange capacity and fertility calculations. For example, 1 meq of a calcium ion ( $\text{Ca}^{++}$ ) is computed as its atomic weight in grams (40) divided by the valence (2), or 20mg.

**Mulch** - Any material such as straw, sawdust, leaves, plastic film, or loose soil that is spread on the surface of the soil to protect the soil and plant roots from the effects of raindrops, soil crusting, freezing, evaporation, etc.

**Mycorrhizae** - The biological association, usually symbiotic, between plant roots and particular fungi. (myco = fungus, rhiza = root)

**Nitrification** - The biological fixation of ammonium to nitrite and nitrate, or a biologically induced increase in the oxidation state of nitrogen.

**Nitrogen fixation** - The biological conversion of elemental nitrogen ( $N_2$ ) to organic combinations or to form readily utilizable nitrogen in biological processes.

**Organic matter** - Plant or animal residues at various states of decomposition.

**Ped** - A unit of soil structure, such as an aggregate, crumb, prism, block, or granule, formed by natural processes.

**pH, soil** - The degree of acidity (or alkalinity) of a soil as determined by means of a glass, quinhydrone, or other suitable electrode or indicator at a specified moisture content or soil water ratio, and expressed in terms of the pH scale.

**Phytotoxins** - Substances released by plants to the environment that inhibit germination or growth of other plants.

**Porosity** - The volume percentage of the total bulk not occupied by solid particles.

**Runoff** - The portion of the precipitation on an area discharged from the area through stream channels. What is lost without entering the soil is called surface runoff and what enters the soil before reaching the stream is called ground water runoff or seepage flow from ground water. (In soil science, runoff usually refers to the water lost by surface flow; in geology and hydraulics runoff usually includes both surface and subsurface flow.)

**Saprophyte** - Organisms, such as bacteria and fungi, that live on decaying organic matter.

**Soil structure** - The combination or arrangement of primary soil particles into secondary particles, units, or peds.

**Tilth** - The physical condition of soil as related to its ease of tillage, fitness as a seedbed, and its impedance to emergence of seedlings and penetration of roots.

**Trace element** - See micronutrient

**Trichoderma** - Beneficial fungi which are known to out-compete pathogenic fungi

**Water holding capacity, soil** - The amount of water a given soil can hold. This depends on particle size of the soil and is sometimes referred to as field capacity.

**Wilting point (or permanent wilting percentage)** - The moisture content of soil, on an oven dry basis, at which plants (specifically sunflower plants) wilt and fail to recover their turgidity.