

Perspective Article

Role of major plant nutrient elements in soil

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ABOUT THE STUDY

Soil is an important source of nutrients for plant growth. Nitrogen, phosphorus, and potassium are the three major nutrients. They form the trio known as NPK. Calcium, magnesium, and sulphur are other essential nutrients. Plants also require trace elements like iron, manganese, zinc, copper, boron, and molybdenum, which are only needed in trace amounts. The role of these nutrients in plant growth is ambiguous.

Major plant nutrient elements

Nitrogen, phosphorus, and potassium are the most important nutrients. These three nutrients may be the most acquainted to you because they are required in greater quantities than other nutrients. The N-P-K label on commercial fertiliser sacks is based on these three elements. Sulphur, magnesium, and calcium are the approximate nutrients. Primary and intermediate nutrients are considered as macronutrients.

Nitrogen (N): Nitrogen is necessary for plant growth. It is found in all plant cells, plant proteins and hormones, and in chlorophyll. Soil nitrogen is derived from atmospheric nitrogen. Some plants, such as legumes, fix nitrogen from the atmosphere in their roots; otherwise, ammonium sulphate, ammonium nitrate, and urea are produced by using nitrogen from the air. When nitrogen is applied to soil, it is converted to the mineral form nitrate, which plants can accumulate. Soils rich in organic matter, such as chocolate soils, have higher nitrogen levels than volcanic soils. Heavy rain easily leaches nitrate from soil, resulting in soil acidification. Users must apply nitrogen in small amounts frequently so that plants can use it all, or in organic form.

Phosphorus (P): Potassium enhances plant vigour and disease resistance, aids in the formation and movement of starches, sugars, and oils, and can improve fruit quality.

Potassium levels are low or deficient in many of the North Coast's sandier soils. In addition, soils used for intensive grazing and intensive horticultural crops can experience significant potassium loss. The most common potassium sources are potash muriate and potash sulphate.

Calcium (Ca): Calcium is required for root health, the development of new roots and root hairs, and the growth of leaves. It is generally scarce in the acidic soils of the Northern Coast. Lime, gypsum, dolomite, and superphosphate all contain calcium. Lime is the most affordable and appropriate option for the North Coast; dolomite is useful for magnesium and calcium deficiencies, but if used for an extended period, it will unbalance the calcium/magnesium ratio. Superphosphate is useful in situations where calcium and phosphorus are required.

Magnesium (Mg): Magnesium is an essential component of chlorophyll, the green pigment found in plants, and is required for photosynthesis. Deficiencies occur primarily on sandy acid soils in humid regions, particularly when intensive horticulture or dairying is practised. Because bananas are high potassium users, heavy potassium fertiliser applications can result in magnesium deficiency, so banana growers must monitor magnesium levels. Dolomite, magnesite, and epsom salts can help with magnesium deficiency.

Sulphur (S): Sulphur is a component of amino acids in plant proteins and is involved in plant energy production processes. It is the source of many flavour and odour compounds in plants, including the aroma of onions and cabbage. In soils high in organic matter, sulphur deficiency is not a problem, but it leaches easily. Sea spray is a major source of sulphur in the atmosphere along the North Coast. The main fertiliser sources are superphosphate, gypsum, elemental sulphur, and ammonia sulphate.

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