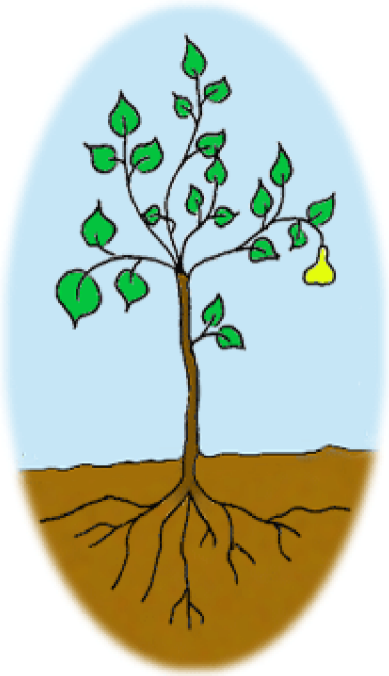
Plant Nutrients



Plants need water, air, light, suitable temperature, and sixteen nutrients to grow. Plants get carbon, hydrogen and oxygen from air and water. The other thirteen nutrients come from the soil. Soil nutrients are divided into two groups according to the amounts needed by plants. The Macronutrients are nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur. The Micronutrients, which are needed in only trace amounts, are iron, manganese, boron, zinc, copper, molybdenum and chlorine.

These nutrients are essential for plant growth. The lack of nutrients effect the growth and appearance of plants. If the nutrients are deficient, or too abundant, then plants will be discolored or deformed. The deficiency symptoms will indicate which nutrient or nutrients are needed. However, it is much better to supply additional nutrients before deficiency symptoms appear. A soil test will tell which nutrients are low before growth is affected.

MACRONUTRIENTS

Nitrogen, N, stimulates leaf and stem growth. Nitrogen deficiency causes reduced growth and pale yellowish green leaves. The older leaves turn yellowish first since the nitrogen is readily moved from the old leaves to the new growth. If the soil is cold and wet, nitrogen in the soil is not as available to the plants. Excess nitrogen may cause potassium deficiency. Nitrogen is usually provided as potassium nitrate and ammonium nitrate. Nitrogen availability is further complicated by soil temperature. Under cool soil temperatures ammonium forms of nitrogen (urea is an example) are not available to the plants. Ammonium nitrates must be broken down by soil bacteria into a form of nitrogen which can be used by the plant. Soil temperatures above 65 degrees allow this. Ammonium based nitrogen sources are also harmful to some plants such as pansies and primroses, and may cause impatiens to fail to bloom. On the other hand, plants such as chrysanthemums and petunias require more ammonium sources of nitrogen. Plants that require cool weather feeds usually use calcium nitrate as a source. Urea as a nitrogen source should be avoided unless you are growing plants for lush and green foliage., such as grass.

Phosphorus, P, is important in the germination and growth of seeds, the production of flowers and fruit, and the growth of roots. Phosphorus deficiency causes reduced growth and small leaves that drop early, starting with the oldest leaves. Leaf color is a dull, bluish green that becomes purplish or bronzy. Leaf edges often turn scorched brown.

Excess phosphorus may cause potassium deficiency. Some plants, particularly those of Australian origin such as Scaevola, bract, and brachychomes will be damaged from excessive phosphorus amounts

Potassium, K, promotes general vigor, disease resistance and sturdy growth. Potassium deficiency causes stunted growth with leaves close together. Starting with the older leaves, the leaf tips and edges turn scorched brown and leaf edges roll. Excess potassium may cause calcium and magnesium deficiencies.

Calcium, Ca, is a major ingredient in cell walls and is important for root growth, especially root tips. Calcium deficiency causes poorly developed roots with weak tips. Leaves are distorted with hooked tips and curled margins.

Magnesium, Mg, is vital to chlorophyll production and is important in most enzyme reactions. Magnesium deficiency causes different symptoms in different plants, but commonly includes leaf yellowing with brilliant tints. Leaves may suddenly drop off without withering. Symptoms show first on older leaves. Excess magnesium may cause calcium deficiency.

Sulfur, S, is an ingredient in proteins and is necessary for chlorophyll formation. Sulfur deficiency causes slow growth with small round leaves that roll upward and are stiff and brittle. Leaves drop off and tip buds die.

MICRONUTRIENTS

Iron, Fe, is necessary for chlorophyll formation and for oxygen transfer. Iron deficiency causes leaf yellowing while leaf veins stay green. Younger leaves are affected first. The availability of iron is controlled by the PHG of the soil. Alkaline soils (PH above 7 make iron unavailable to plants, while lowering the PH will make it available. Excess lime may cause iron deficiency.

Manganese, Mn, is a catalyst for many enzymes and is important for chlorophyll formation. Manganese deficiency causes different symptoms in different plants, but commonly causes leaves to turn yellow while veins stay green. White or gray specks may appear on leaves. Older leaves are affected first. Excess manganese may cause iron deficiency and may cause symptoms similar to manganese deficiency. .

Zinc, Zn, is necessary for the production of proteins and affects plant size and maturity. Zinc deficiency causes leaf yellowing between the veins, usually with purple or dead spots starting with the older leaves. Leaves are close together, small and deformed. Fruiting is reduced. Excess zinc may cause iron deficiency.

Copper, Cu, is necessary for the production of proteins and is important for reproduction. Copper deficiencies cause bluish green leaves which may wither or fail to unfold. Younger leaf tips may be yellow at the edge. Growing tips may form rosettes. Excess copper may cause iron deficiency.

FERTILIZING

Most plants in most soils will grow better if additional nutrients are provided by fertilizing. A soil test will give a complete and accurate measure of the nutrients in the soil. A general recommendation is that all soils need more nitrogen. Shallow rooted plants, such as grass and flowers, need more phosphorus and potassium. Acid loving plants, such as rhododendrons, azaleas, camellias, junipers and pin oaks, often need more iron. Sometimes sandy soils need micronutrients, but rarely clay soils. Certain micronutrients may be deficient in certain parts of the country. Here in southwest Ohio higher PH causes iron deficiency among the more acid loving plants.

Many fertilizers are available to supply additional nutrients. Some fertilizers only supply one nutrient. Many supply N, P and K only. A few fertilizers include all of the macronutrients and micronutrients. The label on the package will tell which nutrients are included as well as the sources of the nutrients. The nutrients are identical whether they come from organic or synthetic sources, but the source will affect how fast the nutrients are available to plants. Ammonia sulfate and water soluble fertilizers release most of their nitrogen in a few days and may burn plants if too much is applied at one time. Organic fertilizers and specially treated synthetic fertilizers release slowly so they last longer and won't burn. Deeper rooting trees and shrubs can be fertilized once a year, but shallow rooted plants, such as grass and flowers, will need regular fertilizing throughout the growing season.

Water can move nitrogen several inches in the soil. Nitrogen that is applied in the fall may be carried too deep into the soil by winter rains. February or March is the best time to feed trees and shrubs. Phosphorus and potassium hardly move in the soil. To get them down to tree roots, either punch a hole in the soil with a bar or use a root feeder and inject them 12" deep every two feet in rings from the trunk to twice the length of the branches. The feeder roots are found throughout the area under and around a tree, not just at the drip line.