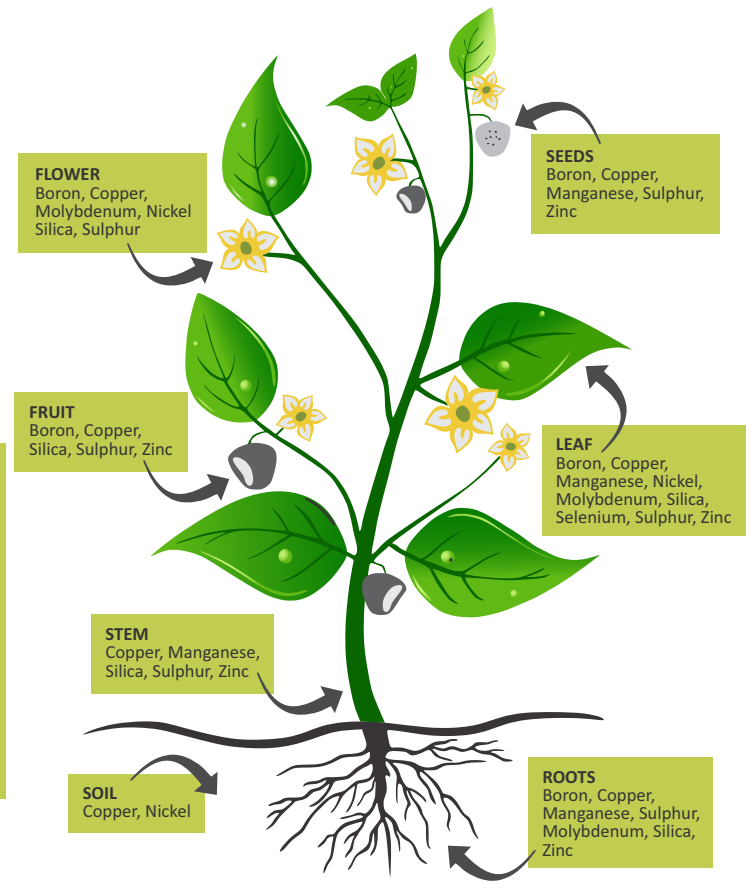
WHY MICRONUTRIENTS

Micronutrients play an important role in both plant and soil health as they are equally as important as macronutrients. Plants grown in micronutrient deficient soils exhibit similar reductions in productivity as those grown in macronutrient deficient soils. Unfortunately over the past 70 years, levels of micronutrients, in almost every kind of food, has decreased severely, resulting in a need for increased consumption to gain the nutrition needed

BORON (B)
- Important for plant cell wall structural integrity.
- Important role in reproductive growth and assists with pollination, as well as fruit and seed development.
- Plays an essential role in photosynthesis.
- Plays a role in transpiration and sugar transport
- Important in normal root nodule development in legumes.

COBALT (Co)
- Essential for the growth of symbiotic microorganisms such as Rhizobia, free-living N_2 - fixing bacteria and blue-green algae.
- Assists with N_2 fixation.
- Important for the synthesis of Vitamin B12 coenzyme.

MICRONUTRIENTS IN THE PLANT



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OASIS™

GRANULATED MICRO NUTRIENT PRESCRIPTION BLEND

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COPPER (Cu)
- Plays an important role in nitrogen utilization.
- Ensures successful protein synthesis.
- Activates enzymes and catalyzes reactions in numerous plant growth processes such as chlorophyll production for photosynthesis, sugar synthesis and root metabolism.
- Activates enzymes important in lignin synthesis.
- Lignin is important for strength and rigidity of the plant (erect stature).
- Linked to protection from fungal disease and increases stalk strength and elasticity.

MANGANESE (Mn)
Accelerates seed germination and early maturation of crops.
Functions as an activator of enzymes required for metabolism of nitrogen, carbon and carbohydrates.
Activates enzymes that synthesize several amino acids and phenols for lignin production. These compounds are also used to synthesize phenolic acids and alcohols that provide resistance to infections by pathogens.
Important role in photosynthesis and chlorophyll production.
Important role in O_2 production via photolysis (the use of sunlight to separate molecules) of water.

MOLYBDENUM (Mo)
Important role in the conversion of nitrates into amino acids in the plant, and is required by symbiotic nitrogen fixing bacteria in legumes to fix atmospheric nitrogen.
Antagonist of copper.
Essential for (NO^{3-} reductase) an enzyme in chloroplasts which catalyzes the conversion of NO^{3-} to NO^{2-}.
Component in nitrogenase, an enzyme essential to N_2 fixation by root-nodule bacteria of leguminous crops, some algae and actinomycetes (bacteria), and by free-living N_2 fixing organisms.
Essential role in Fe absorption and translocation in plants.

NICKEL (Ni)
- Required for proper seed germination.
- An important component of urease enzymes (convert urea into ammonia and CO_2)
- Essential for plants supplied with urea and for those in which ureides are important in nitrogen metabolism. Beneficial to nitrogen metabolism in legumes.
- A positive effect of nickel application on disease tolerance has been clearly documented. It is thought that nickel may either exert a direct phytosanitary (plant health) effect on pathogens themselves, or that nickel may stimulate plant disease resistance mechanisms.

SELENIUM (Se)
- More important for animal consumption than for plant benefit.
- Some plants (Astragalus) utilize large amounts of selenium in an amino acid specific to the species
- Cruciferae (cabbages and mustards) and onions require intermediate amounts.
- Grasses and grain crops absorb low to moderate amount

SULPHUR (S)
- Essential plant growth, as it is essential for protein production.
- Essential for the development of legume nodules and aids the translocation of sugars and starches to the roots.
- Vital in metabolism of nitrates, assimilation of N_2 by root nodule bacteria, and free-living nitrogen fixing soil bacteria.
- Helps develop enzymes and vitamins.
- Involved in oxidation and synthesis of fatty acids, synthesis of amino acids and oxidation of intermediates of the citric acid cycle.
- Involved in the synthesis of chlorophyll.

SILICA (Si)
- Silica has both a physical and biochemical defense role in the plant.
- Helps to overcome metal toxicity (Al, Cd, As, Mn, Zn, and Fe) via increase enzyme and non-enzymatic anti-oxidant production.
- In Saline conditions it enhances enzymes to prevent membrane oxidative damage.
- During drought it assists in decreasing water loss through transpiration, improves root resistance to dry soils, increases photosynthetic rates, and decreases lodging rates.
- Under temperature stresses, silicified structures decrease leaf heat-load, Improves resistance to water stress.
- Help overcome nutritional imbalances (Excess of N, deficiency of P).
- Prevents compaction
- Impregnates the walls of epidermal and vascular cells, where it strengthens tissues (stalks, helps maintain leaf erectness) assisting in plant disease resistance (fungal and pests) and reduced damage at points of insect feeding and animal grazing (protein function)
- Improves photosynthesis through light interception increasing quality and yields.
- Increases available phosphorus.
- Protects the plant from UV damage.

ZINC (Zn)
- Required for normal metabolism of the plant hormones, auxins and gibberellins. Essential for plant development.
- Key constituent of many enzymes and proteins in plants.
Necessary for chlorophyll synthesis and activity.
- Important role in plant defense against UV light damage.
- Essential as a catalyst in plant cell oxidation and vital for metabolism of carbohydrates.
- Essential for phosphorus uptake.
Involved in cell membrane integrity.