Vegetation Management Section

Materials

Plant Nutrient Deficiencies

Nutrient	Function	Deficiency Signs	Toxicity Signs
Macronutrients			
Nitrogen	Root absorbed, converted to ammonium and combines with carbohydrates to form proteins. This produces healthy leaves, stems and root systems. Most notable effect is vibrant green color that is produced in plant.	Stunting of shoot growth, decreased leaf size, pale green to yellow in color, copper color in leaf tips if problem continues	Deep blue green leaves, soft texture, delayed maturity, possible scorching of leaves
Phosphorus	Root absorbed, plays a role in cell division, helps develop growing point of plant (meristematic tissue), involved in sugar development, found in photosynthesis, involved in flower and seed development.	Slow growth, delayed maturity, older leaves begin to show dark green discoloring turning to dull blue green, dwarf growth habits but not to degree of nitrogen deficiency	Toxicity is rare
Potassium	Root absorbed, helps regulate osmotic pressure and turgidity of plant, considered a catalyst because it influences cell division, enzyme activity, & translocation of sugars	Weak stalks, small fruit or seed, drooping leaves, chlorosis of the leaves, younger leaves will show signs of starvation	Toxicity is rare
Secondary Nutrients			
Calcium	Root absorbed, aids in regulating osmotic pressure similar to that of phosphorus	Death of growing points, abnormal dark green appearance, weakened stems, fruit disorders	Toxicity is rare
Sulfur	Involved in protein development similar to that of nitrogen	Paling of older leaves similar to nitrogen, scorching effect along edges of leaves until it withers up	Toxicity is rare
Magnesium	Root absorbed and aids in movement of phosphorus throughout plant, it is found in the chlorophyll molecule	Interveinal chlorosis in older leaves, curling of leaves upward, marginal yellowing along mid-rib of leaf	Toxicity is rare
Micronutrients			
Zinc	Essential to enzyme systems, acts as growth regulator	Stunting growth, thinning, shriveling, & drying up of leaves	Toxicity is rare

Iron	Required for chlorophyll production, activator for respiration, photosynthesis & nitrogen fixation	Young actively growing leaves show yellowing, and eventually blades become white or ivory	Brown leaf spotting at low point of plant
Manganese	Activator for enzymes in growth processes, assist in chlorophyll production	Similar to iron deficiency, leaves droop but remain green, localized tissue death	Yellowing, upward cupping of leaves
Copper	Bluish discoloration of young leaf tips, death of leaf tips and progression toward stem		Very rare, chlorosis
Molybdenum	Helps to transform nitrates into amino acids	Older, lower leaves begin paling, stunting will develop, localized tissue death along with withering	Root depression, yellowing, browning of leaves
Boron	Involved in meristematic cells as a differentiator	Delayed symptoms, shoots are discolored, stubby leaf appearance, growth point stunting	Localized spotty death in veins
Chlorine	Involved in photosynthesis	Not often noticed	Burning of leaf tips. premature yellowing