

Soil Elements and Amendments

Primary Elements

Element/ Symbol	Function	Signs of Deficiency	Signs of Excess	Sources
Nitrogen N	Gives dark green color to plant. Increases growth of leaf & stem. Influences crispness of leaf crops. Stimulates early, rapid growth.	Light green to yellow leaves, stunted growth.	Deep green, excessive growth, retarded maturity, loss of buds or fruit.	Cottonseed meal, blood meal, manure, Grass clippings Urea Ammonia Nitrates
Phosphorus P	Stimulates early formation & growth of roots. Gives plants a rapid & vigorous start. Is important in formation of seed. Gives hardiness to fall seeded grasses & grains.	Red or purple leaves.	Possible tie up of other essential elements. Difficult to directly diagnose.	Bonemeal, apple & citrus waste, blood meal, wood ashes, fish & fish waste Super phosphate Rock Phosphate
Potassium K	Increases vigor of plants and resistance to disease. Stimulates production of strong, stiff stalks. Promotes production of sugar, starches, oils. Increases plumpness of grains and seed. Improves quality of crop yield.	Reduced vigor. Susceptibility to diseases. Thin skin and small fruit.	Coarse, poor colored fruit. Reduced absorption of magnesium & calcium.	Greensand, granite dust, wood ashes, hay & leaves Muriate Sulfate of Potash
	Common organic amendments & their values of N-P-K	Blood Meal 13-0-0 Bone Meal 3-15-0 Rock Phosphate 0-3-0	Super Phosphate 0-45-0 Cottonseed Meal 6-2-1 Greensand 0-0-3	Kelp Meal 1-0.1-2 Alfalfa Meal 2-0.5-2

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Secondary Elements

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Magnesium Mg	Overall health.	Loss of yield. Chlorosis of old leaves.	Reduced absorption of calcium & potassium	Magnesium sulfate Epson salts Dolomite is 1/3 magnesium.
Manganese Mn	Overall health	Mottled chlorosis of the leaves. Stunted growth.	Small dead areas in the leaves with yellow borders around them.	Manganese sulfate
Copper Cu	Overall health	Multiple budding.	Prevents the uptake of iron. Causes stunting of roots.	Copper sulfate Neutral copper
Zinc Zn	Overall health	Small, thin, yellow leaves. Low yields.	None known	Zinc sulfate
Iron Fe	Iron deficiency is the most common secondary element problem.	Yellowing of leaves, the veins remaining green.	None known	Iron sulfate Chelated iron
Sulfur S	Overall health	Looks like nitrogen deficiency	Sulfur burn from too low pH	Sulfur Super phosphate
Calcium Ca	Overall health	Stops growing point of plants	Reduces intake of potassium & magnesium	Lime Basic slag Gypsum
Molybdenum Mo	Overall health	Symptoms vary greatly from plant to plant	Poisonous to livestock	Sodium Molybdate
Boron B	Overall health	Small leaves. Heart rot & corkiness. Multiple buds.	Leaves turn yellowish red.	Borax

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