

PermaCycle Organics – Healthy Soils, Nutritious Foods

SOIL NUTRIENT GUIDE - ORGANIC PRODUCTION

Nutrient and Function	Deficiency Symptoms	Sources
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N - Nitrogen

<ul style="list-style-type: none"> • Vital building block for amino acids, protein and plant protoplasm • Critical for flower differentiation, rapid shoot growth, bud vigor and fruit set • Acts as a catalyst for other nutrients • Increases size and quality of fruit 	<ul style="list-style-type: none"> • Smaller fruit size, lower yields • Reduced vegetative growth • Older foliage shows yellowing first, then the rest turns a yellowish-green • High levels result in lower quality, delayed coloring, soft fruit, poor storage life and low juice content 	<ul style="list-style-type: none"> • Blended organic fertilizers, other fish based protein products • Blood meal, feather meal, other animal protein meals • Alfalfa meal, cottonseed meal, canola meal, other vegetable meals • Chicken manure, steer manure, other manure composts
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P - Phosphorus

<ul style="list-style-type: none"> • Promotes root, flower and seed development • Transfers and stores energy • Formation of nucleic acids and RNA and DNA • Hastens maturity 	<ul style="list-style-type: none"> • Delayed maturity • Leaf dieback • Poor seed development, possible fruit quality problems • Purple coloration in older leaves, stems and veins 	<ul style="list-style-type: none"> • Blended organic fertilizers containing phosphate • Bone meal/ hard rock phosphate/ soft rock phosphate • Chicken manure composts, other manure composts rich in phosphate
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K - Potassium

<ul style="list-style-type: none"> • Necessary for the formation of sugars, proteins and cell division • Essential for oil formation • Enzyme activator • Improves cold hardiness • Improves fruit color 	<ul style="list-style-type: none"> • Marginal leaf scorch on older foliage, distorted, curled and premature drop • Irregular blotching pattern in late season • Poorly developed root system • Distorting and curling of leaves 	<ul style="list-style-type: none"> • Blended organic fertilizers containing potassium • Potassium fertilizers • Chicken Manure composts, other manure composts rich in potash • Wood chips, sawdust, composts
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S - Sulfur

<ul style="list-style-type: none"> • A component of amino acids and proteins • Promotes growth and maturity • A flavor component • Necessary for protein and plant oil synthesis 	<ul style="list-style-type: none"> • New leaves are pale green to yellow • Plants are small and stunted • Delayed maturity 	<ul style="list-style-type: none"> • Blended organic fertilizers containing sulfate • Sulfur (elemental) • Sulfate compounds (Gypsum, potassium sulfate, K-Mag, Epsom Salts MgSO₄)
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Ca - Calcium

<ul style="list-style-type: none"> • Helps regulate nutrient uptake by roots and movement through the plant • Aids in cell wall formation and structure • Important for cell membrane integrity • Necessary for the development of firm fruit 	<ul style="list-style-type: none"> • Deformed terminal leaves and fruit; • Dead terminal buds • External and internal disorders of fruits and vegetables • Premature shedding of buds and blossoms • Poor root development. 	<ul style="list-style-type: none"> • Blended organic fertilizers containing calcium • Bone meal • Gypsum, lime, dolomite • Rock phosphate
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Mg - Magnesium

<ul style="list-style-type: none"> • Essential for chlorophyll synthesis and nitrogen metabolism • Enzyme activator • Helps formation of amino acids, vitamins, sugars, oils and fats 	<ul style="list-style-type: none"> • Chlorotic leaves with brilliant colors appearing in older leaves first • Drooping leaves • Overall yellowing with green veins • Necrotic spots on leaves • Excessive premature fruit drop 	<ul style="list-style-type: none"> • K-Mag • Epsom Salts - MgSO₄ (Kieserite) • Dolomite lime
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Fe - Iron

<ul style="list-style-type: none"> • Aids in energy transfer • Required for chlorophyll formation • Activator for enzymes that control respiration • Important chloroplast and enzyme component 	<ul style="list-style-type: none"> • Availability decreases as pH increases • High phosphorus will induce iron deficiency • Young leaves develop chlorotic symptoms first with interveinal chlorosis • Severe deficiency results in stunted growth • A moderate deficiency results in poor quality and yield • Early and later season paling in leaf color • Chlorosis unevenly distributed in trees 	<ul style="list-style-type: none"> • Iron sulfate • Blood meal • Iron chelate
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Cu - Copper

<ul style="list-style-type: none"> • Critical in the role of photosynthesis • Necessary for seed and chlorophyll formation • Component of several enzymes • Contributes to color and flavor development in fruits and vegetables 	<ul style="list-style-type: none"> • Availability decreases as pH increases but more closely associated with organic matter content • Leaf margin yellowing (chlorosis) • Shoot dieback • Dead spots and burn areas on terminal leaves • Stunted growth, undersized fruit • Severe deficiency results in tip necrosis • Moderate deficiency, reduced growth and yield 	<ul style="list-style-type: none"> • Copper sulfate; • Copper hydroxide • Copper chelate
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Zn - Zinc

<ul style="list-style-type: none"> • Needed for the synthesis of growth hormones and protein • Essential for uniform maturity and seed formation • Aids in chloroplast formation and internodal and cell elongation 	<ul style="list-style-type: none"> • Availability decreases as pH increases • Stunted growth • Small malformed leaves with yellow or mottled color • Striping in grasses • Twig dieback • Chlorotic interveinal mottling in new growth 	<ul style="list-style-type: none"> • Zinc sulfate; • Zinc chelate
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B - Boron

<ul style="list-style-type: none"> • Essential for reproduction • Aids in formation of hormones • Maintains balance between sugar and starch 	<ul style="list-style-type: none"> • Availability decreases on fine-textured, heavy clay soils • Death of terminal growth • Leaves are thickened, curled and brittle • Poor fruit and seed set, reduced flowering • Tubers, fruits and roots may become discolored, cracked and have brown spots 	<ul style="list-style-type: none"> • Fertilizer borate • Liquid boron • Boric Acid
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Mn - Manganese

<ul style="list-style-type: none"> • Aids in nitrogen utilization and assimilation • Assimilates CO₂ in photosynthesis • Essential for phosphorus and magnesium uptake • Important in oxidation-reduction reactions • Aids in chlorophyll synthesis 	<ul style="list-style-type: none"> • Availability decreases as pH increases, at 6.3 and above Mn becomes insoluble • Chlorosis appears first on old leaves, then on new growth; • Rust spots or mottled pattern on many plants • Some crop stunting 	<ul style="list-style-type: none"> • Manganese sulfate • Manganese chelate
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Mo - Molybdenum

<ul style="list-style-type: none">• Essential for nitrogen fixation by legumes• Vital in protein synthesis• Vital for the reduction of nitrates.	<ul style="list-style-type: none">• Availability increases as pH increases.	<ul style="list-style-type: none">• Molybdenum sulfate• Liming the soil may cause the release of more in acidic soils.
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For more information, contact:

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