

Plant Nutrient Deficiencies

If plants fail to thrive, despite adequate soil preparation, watering and mulching, it may be a sign of a nutrient deficiency. Fruit and vegetables are particularly vulnerable, as are containerized plants and those growing in very acid or alkaline, very dry or waterlogged soils. Some garden soils and potting composts suffer from a lack of nutrient content, leading to deficiency symptoms in the plants growing in them.

Mulching with organic matter (such as well rotted garden compost or aged manure) can address many nutrient deficiencies.

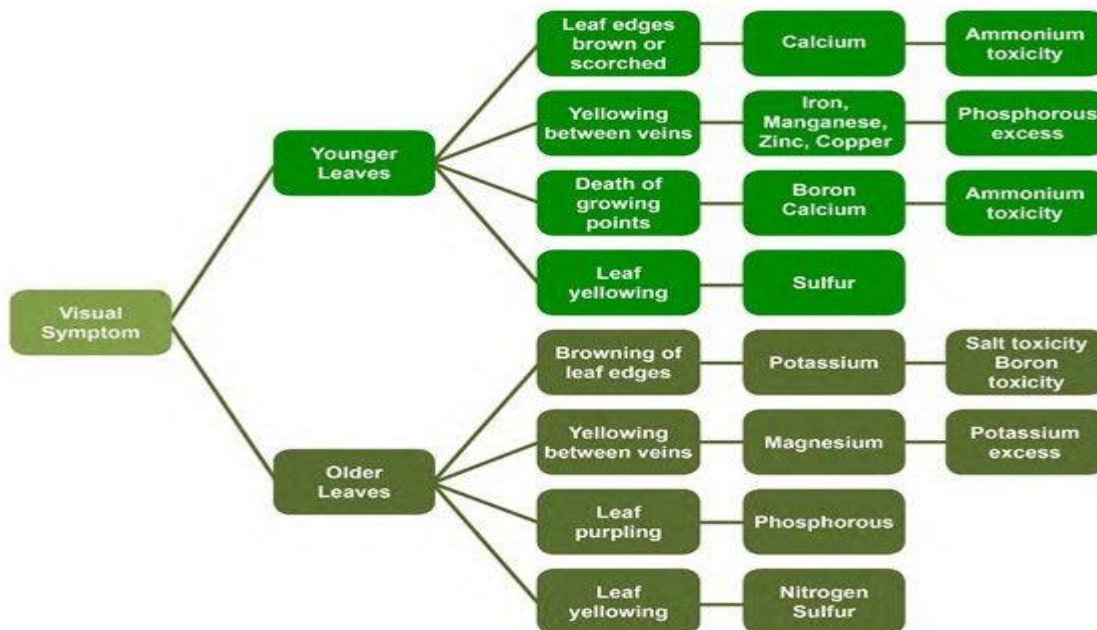
DIAGNOSIS:

First eliminate other obvious causes for sickly plants:

- Check first for signs of insects (signs of chewing, insect poop or the insect) or disease.
- Foliage discoloration and stunted plants can easily be caused by soil that is too wet and drains poorly or soil that is too compacted for good root growth.
- Extreme cold or heat will slow plant growth and affect flowering and fruit set.
- Too much fertilizer can result in salt injury. Plants may look scorched or they may wilt, even when the soil is wet.

Note: a laboratory Soil Test is the best way to find out what level of nutrients are in your soil. Several businesses on Vancouver Island offer soil testing services (Integrity, MB Laboratories).

PLANT NUTRIENT DEFICIENCY KEY



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NEW LEAVES: show Boron, Sulphur, Manganese, Calcium, Iron, Copper deficiency

OLD LEAVES: show Zinc, Magnesium, Phosphorus, Molybdenum, Potassium, Nitrogen deficiency

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DESCRIPTION OF THE NUTRIENTS AND ORGANIC REMEDIES FOR DEFICIENCIES

PRIMARY MACRONUTRIENTS:

When you see a bag of fertilizer, you'll notice three numbers listed, such as 10-5-5. This symbolizes the balance of nutrients in the bag for **nitrogen (N), phosphorous (P), and potassium (K), respectively**. These are the primary macronutrients. The 10-5-5 example would mean that the fertilizer contains 10% nitrogen, 5% phosphorous, and 5% potassium.

Nitrogen

Nitrogen helps plants become green and lush. It is the nutrient responsible for vegetative growth and utilizes chlorophyll produced during photosynthesis. Plants need a large amount of nitrogen because it plays a part in photosynthesis. Chlorophyll converts sunlight into sugars and energy. Nitrogen is very soluble so is easily washed out of the soil in winter rains, leaving the soil deficient in spring, just when plants are putting on new growth. Plants that don't have enough nitrogen can have yellow, or faded, wilted leaves because they're unable to produce enough chlorophyll.

Organic and natural sources: compost, blood meal, fish emulsion or alfalfa meal

Phosphorous

Phosphorous is needed for root growth, flower growth, and photosynthesis. Phosphorus is especially important when plants are developing roots, so it's good to add some when plants are just starting out or when transplanting them. When plants are deficient in phosphorus it can produce stunted growth, spindly stems, underdeveloped flowers, or no flowers at all. Leaves can also have dark veins while the rest of the leaf turns dark. *Soil shortages of phosphorus are rare but may occur in areas with high rainfall and heavy clay soil.*

Organic and natural sources: compost, bone meal, rock phosphate or manure

Potassium

Potassium improves the overall health of the plant. It helps the plants grow faster, make carbohydrates, fight off disease and pests, and make better use of water. Potassium also regulates and activates plant enzymes. A deficiency of potassium can cause weak or deformed plants and stems and early loss of fruit. Older leaves may wilt or look scorched.

Organic and natural sources: compost, potash, wood ash or composted banana peels

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SECONDARY MACRONUTRIENTS:

Secondary macronutrients are just as important as primary macronutrients but are needed in smaller quantities. The secondary macronutrients are calcium, magnesium, and sulfur.

Calcium

Calcium aids in the development of cell walls, which helps to strengthen stems and new shoots. Well-developed cell walls can help resist disease. It also helps with root ends and prevents blossom-end rot (where fruit becomes dark and eventually rots). Without calcium, garden plants can experience yellowing and curling of the leaves, blackened shoots, tips dying and stunted growth. Eventually leaf production will stop altogether.

Organic and natural sources: bone meal, limestone or crushed eggshells

Magnesium

Magnesium assists plants in the production of chlorophyll. Magnesium essentially gives leaves their green color. Magnesium is also used by plants for the metabolism of carbohydrates. Older leaves turn yellow at edge leaving a green triangle shape in the center of the leaf. Magnesium deficiency is common in tomatoes, apples, grape vines, raspberries, roses and rhododendrons. Soil shortages of magnesium are more common on light, sandy soils. Over-use of high-potassium fertilisers (such as tomato feed) can cause magnesium deficiency, as plants take up potassium in preference to magnesium.

Organic and natural sources: dolomite, Azomite, or Epsom salts

Sulfur

Sulfur helps form amino acids, proteins, enzymes, and vitamins. It also helps plants resist disease and plays a role in giving flavor to mustard, onions, and garlic. Younger leaves will turn yellow first and sometimes followed by older leaves turning yellow as well.

Organic and natural sources: gypsum or manure

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MICRONUTRIENTS

Micronutrients are needed in small amounts for your garden to thrive. There are multiple ways that you can go about adding these micronutrients, but most can be added by using a single amendment. **Compost, kelp meal, glacial rock dust, Azomite, and liquid kelp can help to add these plant nutrients back into your soil.**

Iron: is required for the production of chlorophyll in plants. A deficiency in iron can cause yellowing between the veins of young leaves.

Manganese: assists iron in chlorophyll formation. It also serves as an activator for enzymes in the growth process and breaking down carbohydrates. A deficiency in manganese can cause slow growth and yellowing between the veins of young leaves, along with curled leaves.

Zinc: helps change carbohydrates into sugars. A deficiency in zinc can cause yellowing between the veins of the new leaves.

Copper: helps plants reproduce and boosts metabolism in roots. A deficiency in copper can cause leaves to be limp and dark green and plants to be stunted.

Boron: regulates the metabolism of carbohydrates in plants. It's critical for new growth, seeds, and fruit. A deficiency in boron can cause poor root growth and discoloration of leaf buds and the dropping of buds.

Molybdenum: is needed by plants for utilization of nitrogen. Without molybdenum, plants can't transform nitrogen into amino acids. A deficiency in molybdenum can cause yellowing of older leaves, and the rest of the plant might be pale.

Chlorine: aids in plant growth and health. Chlorine helps the chemical reaction that allows for the opening and closing of tiny pores, called stomata, that allow gas water to be exchanged. Without this, photosynthesis can't occur. A deficiency in chlorine can cause wilting and leaf molting.

References:

Royal Horticultural Society on *Nutrient Deficiencies* <https://www.rhs.org.uk/advice/profile?pid=456>

West Virginia University Extension, *Nutrient Deficiencies in Plants* <https://extension.wvu.edu/lawn-gardening-pests/plant-disease/nutrient-deficiencies-in-plants>