

Basic Plant Nutrition

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We All Have Needs...

- Plants, just like humans require certain elements for normal growth. When any of these are left out the plant will develop definite symptoms related to its shortage.

Nutrient Classifications

- PRIMARY NUTRIENTS

- Nitrogen (N)

- Phosphorus (P)

- Potassium (K) a.k.a. “Potash”

- N P K (10-10-10) On Bag Of Fertilizer

Classifications...

- SECONDARY NUTRIENTS
 - Sulfur (S)
 - Calcium (Ca)
 - Iron (Fe)
 - Magnesium (Mg)

Classifications...

■ MICRONUTRIENTS

- Molybdenum (Mo)
- Boron (B)
- Copper (Cu)
- Manganese (Mn)
- Zinc (Zn)
- Chlorine (Cl)

Primary Nutrients

NITROGEN

- **Function:** Essential for plant growth. Part of every living cell. Responsible for increasing plant growth more than any element.
- **Deficiency:** Stunted growth, pale yellow color, burning of margins and tips of leaves starting at the bottom



Sources

- Most Common: Ammonium Nitrate (34-0-0)
Calcium Nitrate (16-0-0), Ammonium Sulfate (21-0-0), Urea (45-0-0)
- Organic: Blood Meal (13%), Fish Meal (10%), Manure (Variable)

PHOSPHORUS

- **Function:** Essential for plant growth, no other element can substitute for it. Plays a roll in every plant function including root development and photosynthesis. Not very mobile.
- **Deficiency:** Purple discoloration of leaves, dying tips of older leaves, poor root, fruit and seed development.



Sources

- Usually a part of mixed fertilizers.
- Most common sources: Super Phosphate (0-20-0), Concentrated Super Phosphate (0-46-0)
- Organic sources: Bone Meal (22%), Fish Meal (5%), Manure (Variable)

POTASSIUM



- Function: Important for plant metabolism and essential for plant growth, especially stalks, stems and roots.
- Deficiency: Scorched or fired leaf margins. Decreased photosynthesis.

Sources

- Usually part of mixed fertilizers.
- Muriate of Potash (60-62 %) Potassium Nitrate (44%), Potassium Sulfate (50%), Sulfate of Potash Magnesia (22%)
- Organic Sources: Manure (Variable)

Secondary Nutrients

CALCIUM

- Function: Stimulates root and leaf development, strengthens plant structure, part of cell walls.
- Deficiency: Blossom end rot, terminal bud loss, rotten roots, poor growth



Sources of Calcium

- Usually supplied with an application agricultural lime (calcium carbonate) if soil pH is acidic.
- Non acidic soil, use Calcium Sulfate (Gypsum)
 - Provide extra Calcium to prevent Blossom end rot in Tomatoes!

MAGNESIUM



- Function: Mineral constituent of Chlorophyll Molecule.
- Deficiency: Yellow to white leaf margins and interiors with green veins. Appears on lower older leaves first.

Sources of Magnesium

- Most common source is Dolomitic Limestone (Agricultural or pelletized lime)
- Other sources include Magnesium sulfate (Epsom Salts).

SULFUR

- Function: Aids in the formation of protein molecules, enzymes and vitamins .
- Deficiency: Pale green to yellow color of younger leaves. Leaves tend to shrivel as it progresses. Sandy soils problematic



Sources of Sulfur

- Contained in most common commercial fertilizers.
- Magnesium sulfate and Calcium sulfate are also sources.

MICRONUTRIENTS

Boron

- Function: Assimilation of Calcium, needed in very small amounts.
- Deficiency: Death of terminal bud causing excessive lateral growth, thickened, curled, chlorotic leaves.



Sources of Boron

- Generally a shortage of Boron is created by excessive pH (higher than 6.8). Proper maintenance of soil pH will generally make boron available.
- If additional Boron is needed Laundry Borax is a good source. Apply only according to soil test recommendations as too much is toxic to plants.

COPPER

- Function: Promotes formation of vitamin A, excess is very toxic.
- Deficiency: Stunted growth, die back of terminal shoots, poor pigmentation
- Generally readily available in soil.



MANGANESE

- Function: Serves in the growth processes. Helps assist iron in chlorophyll formation.
- Deficiency: Interveinal chlorosis, gray specks on leaves.
- Generally sufficient in soil.



ZINC

- Function: Important in cellular function and enzyme production.
- Deficiency: Decreased stem length and rosetting of terminal leaves.
- Deficiency generally related to high soil pH (>6.8)



Molybdenum



- Function: Required for Nitrogen utilization.
- Deficiency: Stunting, lack of vigor, very similar to N deficiency.
- Generally available in soil.

Chlorine



- Required in photosynthetic reactions in plants.
- Deficiency is generally not seen in the field due to its universal presence in nature.
- Bronzing and wilting in greenhouse or container plants

IRON



- Function: Essential for formation of chlorophyll, releases energy from sugars and starches.
- Deficiency: Leaves yellowish or white (chlorotic), generally young leaves first, affected leaves curl up.

QUESTIONS?