Nutrient Deficiency Guide

About Perennia
Perennia is a not-for-profit corporation with the mission to help farmers, fishermen and food processors be prosperous and profitable. We have three major service areas: field services, quality and food safety and product development and commercialization.

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Zinc (Zn)
- Initial symptoms occur in MIDDLE leaves
- Short stalks (stunted growth)
- Small, thick leaves

Iron (Fe)
- Veins remain sharply green in contrast with chlorotic leaf
- Yellowing, cupping, and/or spotting of leaves

Sulfur (S)
- Light green foliage, similar to N deficiency except found in new growth

Boron (B)
- Wilted young leaves
- Leaf tips appear withered
- Weak stem tip

Calcium (Ca)
- Hooked young leaves, then die back at tips/margins
- Leaf cupping

Copper (Cu)
- Wilted young leaves
- Leaf tips appear withered
- Weak stem tip

Magnesium (Mg)
- Interveinal chlorosis
- Yellowing starting at leaf base

Potassium (K)
- Chlorotic areas with scorched along leaf margin
- Leaf cupping
- Slender stalks

Phosphorus (P)
- Dark green foliage, with red/purple colour
- Plants stunted

Molybdenum (Mo)
- Light green foliage
- Leaves may look scorched, cupped, rolled

Manganese (Mn)
- Veins remain green
- Small necrotic spots
- Yellowing, cupping, and/or spotting of leaves

Calcium (Ca)
- Hooked young leaves, then die back at tips/margins
- Leaf cupping

Terminal buds ALIVE, but wilted
Terminal buds are DEAD/DYING, young leaves are distorted

Mostly GENERALIZED over entire plant. Lower leaves dry up, die

Mostly LOCALIZED. Mottling or chlorosis. Leaf margins cupped or tucked

Younger leaves (immobile nutrients)

Glossary
- Chlorotic = yellowing
- Mottling = blotches
- Necrotic = dead
- Interveinal = between the veins

Young leaves chlorotic, NOT WILTED

Are there NECROTIC SPOTS?

NO

YES

Terminal buds are DEAD/DYING, young leaves are distorted

Plants light green or yellow

Deficiency Symptoms
1. **Boron (B)**
   - Growth reduction/death at growing tip
   - Small, crinkled, deformed leaves
   - Short internodes
   - Poor seed set or fruit set, hollow stem in Cole crops, internal browning of root crops, cracked stem in celery, cleft in strawberries

2. **Calcium (Ca)**
   - Terminal buds turn brown, die back
   - Irregular leaf margins, cupping
   - Young leaves distorted, reduced in size
   - Tip burn in lettuce and cabbage, blackheart in celery, forked roots in beets, cavity spot in carrots, blossom end rot in tomatoes, peppers, and watermelon

3. **Sulfur (S)**
   - Light green leaves
   - Looks like N deficiency except found on new growth
   - Plants are spindly and small, with thin stems
   - Common on sandy, low organic matter soils

4. **Iron (Fe)**
   - Veins very green, rest of leaf is chlorotic or white
   - Stunted growth, usually no necrosis
   - Often occurs when soil pH is high
   - Highbush blueberry may get fruit that are small and not fully ripe

5. **Zinc (Zn)**
   - Initial symptoms in middle leaves
   - Small leaves, necrotic, short internodes
   - Pig tailing in onions; leaf roll in potatoes; small, narrow leaves with black spots in yellow areas in tomatoes, zebra-stripping in corn

6. **Molybdenum (Mo)**
   - Plants light green
   - Pale leaves sometimes scorched, cupped, or rolled
   - Thick, brittle leaves
   - Whiptail in Cole crops

7. **Copper (Cu)**
   - Chlorotic young leaves, withered tips
   - Stunting
   - Tip dieback in onions (on mineral soils), undersized onions

8. **Manganese (Mn)**
   - Plant becomes yellow to olive green with stunted growth
   - Yellowing, cupping, and/or spotting of leaves, some mottling in interveinal areas
   - Most common if soil pH > 6.8
   - Marsh spot in peas and beans

9. **Potassium (K)**
   - Tip and marginal leaf scorch, margins become brown and cup downward
   - Chlorosis throughout leaf, premature leaf and fruit drop
   - Slowed plant growth
   - Reduced fruit size, shrunken seed, small tubers

10. **Magnesium (Mg)**
    - Interveinal chlorosis on lower leaves
    - Low Mg will contribute to P deficiency
    - Stiff, brittle leaves, upward leaf curl along margin
    - Poor flavour and colour in carrots

11. **Phosphorus (P)**
    - Slow growth, stunted plants, delayed maturity
    - Dark green or blue-green leaves with purplish color on older leaves
    - Can happen early in the season with cool weather
    - Poor fruit and seed development

12. **Nitrogen (N)**
    - Slow growth, stunted, spindly plants
    - Yellowing on older leaves
    - Turning up of tips and margins of leaves
    - Red calyx on strawberries

It is important to note that just because a plant is showing symptoms of deficiency, it does not necessarily indicate that your soil is lacking in that nutrient. pH plays a role in nutrient availability, for example, and excess of one nutrient can cause a deficiency in another nutrient. Talk to your agronomist.