Identification of Nutrient Deficiencies

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Nutrient Deficiency ID

- Where
- Color
- Pattern
- Soil
- Environment
Old Growth

- Means the Nutrient is **mobile** in the Plant
- Nitrogen
- Phosphorus
- Potassium
- Magnesium
Nitrogen Deficiency

Nitrogen is **mobile** in the Plant: Lower/Older Leaves
Yellow from the tip toward the mid rib
Phosphorus Deficiency

Phosphorus is **mobile** in the plant: Lower/Older Leaves
Purpling of the leaf margins or base of stems.
Symptoms similar too...
Acidic soils
Potassium Deficiency

Potassium is **mobile** in the plant: Lower/Older Leaves
Yellow starting at the tip advancing along the leaf margins
Brown Scorching along outer margins
Magnesium Deficiency

Magnesium is mobile in the plant: Lower/Older Leaves
Yellowing between the veins
Reddish Purple from leaf edge moving inward, cotton soybean canola
Figure 6. Magnesium deficiency.
New Growth

• Means the Nutrient is **immobile** in the Plant
  – Iron
  – Zinc
  – Manganese
  – Calcium
  – Boron
  – Sulfur
  – Copper
  – Chlorine
  – Molybdenum
Iron Deficiency

Iron is immobile in the plant: Upper/Newer leaves
Intervienal chlorosis, stripes narrower than zinc and extend full length of leaf
Calcareous Soils pH >8
Zinc Deficiency

Zinc relatively *immobile* in plant: Upper/Newer leaves
Purple margins, inward purple blotching,
bleached bands on either side of midrib near base, intervienal chlorosis
Acidic, Sandy soils, Calcareous pH>8
Manganese Deficiency

Manganese is relatively **immobile** in plant, but can move in xylem sap. Interverinal chlorosis, very similar to Fe, Mg, N. Severe deficiencies have brown specs and bronzing. Limited at high pH, Calcareous soils.
Boron Deficiency

Boron is **immobile** in the plant: Upper/Newer leaves
Wide range of symptoms; necrosis of young leaves and terminal buds,
reddening in some legumes and canola
Well drained sandy soils
Sulfur Deficiency

Sulfur is **Immobile** in the plant: Upper/Newer leaves. Similar to nitrogen, yellowing more uniform over leaf. Intervienal Chlorosis.
Figure 8. Sulfur-deficient plants (left) and normal plants (right).
Sulfur is becoming more of a limiting nutrient in crop production than in the past, for several reasons: higher crop yields require more S; increased use of high analysis fertilizers containing little of no S; reduced amounts of atmospheric S fallout from the sky; and reduced soil S reserves from organic matter losses due to mineralization and erosion. Most S in the soil is tied up in organic matter and cannot be used by the plant until it is converted to the sulfate (SO$_4$) form by soil bacteria. That process is known as mineralization. Sulfur can be applied as broadcast or banded fertilizer material or applied through irrigation systems (furrow and sprinkler). Sulfur is also an important nutrient for proper nutrition of forage crops that will be consumed by livestock.
Copper Deficiency

Copper is **Immobile** in the plant:
Upper/Newer leaves
Stunted growth, terminal dieback, necrosis of meristem, delayed flowering
New leaves uniformly pale
Chlorine Deficiency

Chlorine is **mobile** in the plant: Lower/Older leaves
Reduced growth, necrotic and chlorotic spots, bronzing in extreme.
Upper leaves will wilt.
Sandy soils
Molybdenum Deficiency

Molybdenum is readily translocated; **whole plant**
Related to N metabolism, yellowing, stunting, interveinal mottling
Cupping of upper leaves
Soil with low pH and high Fe and Al.
Nutrient Deficiency Contest

- Send in photos/story/details.
- At the end of the year awards go to the best.
- IPNI Photo contest
  www.ipni.net/photocontest
- IPNI has a thumbdrive of photos.
- IPNI has a App.

  Crop Nutrient Deficiency Images