e-GRO Nutritional Monitoring

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Nutritional Monitoring Series: Element Edition

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Nitrogen (N)

Function: Essential for the production of proteins, nucleic acids, and chlorophyll. Helps plants with rapid growth, increasing seed and fruit production, and improving leaf quality.

Deficiency: Plants exhibit slow growth, stunting, lower leaf chlorosis (yellowing) and leaf abscission (Figs. 1-4).

Figure 1. Lower foliage chlorosis (yellowing) is the typical symptom of a nitrogen deficiency. Photo by: Brian Whipker.

Nitrogen

Elemental Parameters

Mobile Element:
Deficiency symptoms appear on older growth

Function:
Protein production, nucleic acids and chlorophyll

Target Fertilizer Range:
100 to 250 ppm N

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Figure 2. Streptocarpus with an overall light green coloration due to insufficient nitrogen. Photo by: Brian Whipker.

Nitrogen (N) is a mobile element within the plant; therefore, deficiency symptoms will first appear on the lower, older leaves.

Excess: Excess levels of N will result in reduced plant growth and delayed flowering. It can also reduce uptake of potassium (K).

Misdiagnosis With:

a. Insufficient light levels can lead to lower leaf yellowing and abscission. Determine if the plant spacing is too dense.

b. Drought stress can lead to lower leaf yellowing and abscission. Review cultural/ irrigation records and inspect irrigation equipment and programs to determine if this is the situation.

c. Sulfur (S) deficiency also results in overall chlorotic coloration, but symptoms are more pronounced at the top of the plant. Conduct leaf tissue analysis to determine S and N concentrations.

Confirm your actual N levels by conducting a routine root substrate (medium) test (including both nitrate-nitrogen [NO_3-N] and ammonium-nitrogen [NH_4-N] analysis) and/or a leaf tissue analysis.

Monitoring and Management Strategy for Nitrogen
Fertilization Rate: Provide 100 to 250 ppm N. Use lower rates to control growth and higher rates to encourage growth.

Ratio: Plants are susceptible to ammoniacal-nitrogen (NH_4-N) toxicity. Limit use or avoid ammoniacal-nitrogen when growing bedding plants under reduced air temperature.

Symptoms in poinsettia appear as an interveinal V-shaped chlorosis with green veins, and downward cupping of the younger leaves. Ammoniacal-nitrogen toxicity can be avoided by supply >75% of N in the nitrate (NO_3-) form. (Categorize urea-nitrogen with ammoniacal-nitrogen when calculating the ratio.) Ammoniacal-nitrogen promotes vegetative growth and is beneficial during the first half of the growing season. After November 1st, discontinue the application of ammoniacal-nitrogen due to the promotion of growth (stretch). Furthermore, high levels of ammoniacal-nitrogen have been linked to increased incidents of bract edge burn and a shorter post-harvest life of poinsettia plants.

Tissue Concentration: The normal N range is between 1.0 to 6.0% but varies by species. In general, for many floriculture species, N levels less than 2.0% are considered deficient when plant growth is being promoted while N levels greater than 6.0% typically would be classified as excessive. Leaf tissue concentrations of N are higher in young plants and decline over time due to the dilution effect of nutrient distribution in larger plants.

Figure 3. Overall pale greenish-yellow coloration on ornamental peppers occurs when nitrogen is limited. Photo by: Brian Whipker.

Options:

Preplant: Incorporation of calcium nitrate [$Ca(NO_3)_2$] or potassium nitrate (KNO_3) in the root substrate (medium) for a starter charge.

Continual Fertilization:

1. Use a fertilizer that provides N. Examples include calcium nitrate [$Ca(NO_3)_2$] with potassium nitrate (KNO_3), 20-10-20, 15-5-25, 13-2-13 Cal-Mag, 15-5-15 Cal-Mag, and others.
2. If using calcium nitrate [$Ca(NO_3)_2$] with potassium nitrate (KNO_3), remember to supply P, Mg, and micro-nutrients to the plants.
3. If using 20-10-20 or 20-20-20, remember to supply Ca and Mg to the plants.

Corrective Fertilization:

1. Applications include calcium nitrate [$Ca(NO_3)_2$], potassium nitrate (KNO_3) 13-2-13 Cal-Mag, or 15-5-15 Cal-Mag at the rate of 300 to 400 ppm N. A corrective N fertilization will return the lower leaves to the normal green color within 1 to 2 weeks. Do not overapply. It is important to correct N deficiency when symptoms first appear because lower leaf drop may occur under severe conditions.

Figure 4. Advanced symptoms of nitrogen deficiency on dill with lower leaf chlorosis. Photo by: Brian Whipker.

e-GRO Alert

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