GROWERTALKS

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Growing With Griffin: Nutrient Deficiency Review

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Deciphering nutrient deficiency symptoms can be compared to real estate: It's all about location, location, location. Location comes into play because plants express nutritional problems in a very predictable manner. Many factors can influence why a deficiency arises, but the location and pattern of symptoms will indicate the deficient nutrient.

The most important locational pattern to assess for deficiencies is old versus new growth. Deficiency symptoms appearing on older leaves point to mobile nutrients: nitrogen, phosphorus, potassium and magnesium. Under conditions of inadequate fertility, the plant will pull these nutrients from older leaves to support new growth. Specific patterns on the leaf will indicate which nutrient is most likely to be deficient.

Pictured: Magnesium deficiency in gerbera.

Magnesium deficiencies manifest as interveinal yellowing on expanded leaves. Phosphorus deficiency often brings a purple cast to the lower leaves, though it can also cause interveinal chlorosis in the center of the leaf. Still, on the older leaves, potassium deficiency can cause a reddish, bronze discoloration. Nitrogen will show a general yellowing, often over a significant portion of the plant since new, rapidly growing and expanding tissue has such a high demand for nitrogen.

Identifying the underlying cause of the deficiency will guide the correction. For macronutrients, inadequate nutrition is often tied to injector use and fertilizer rates simply being too low. Inspect injectors for proper operation, using an electrical conductivity (EC) meter to confirm the rate at the end of the hose and review stock recipes for accuracy. To reduce errors, create a protocol for preparing stock solutions that avoids the need for on-the-spot calculations or decision-making.

If injector and stock-solution problems have been ruled out, and the crop hasn't been subjected to leaching, take a look at the roots. Plants showing general chlorosis, consistent with nitrogen deficiency, should be

checked for signs of damage or root disease. Remember that phosphorus deficiencies can be induced by cold media reducing root function, even though the roots may appear healthy.

In the absence of disease or other root damage, increase the rate of feed to correct the problem. For ongoing, rain-leached crops, apply liquid feed. The fertilizer will displace water and boost nutrition. Magnesium deficiencies are quickly remedied with Epsom salts. Confirm your diagnosis with a media test. Many labs offer this service for a reasonable fee and with very quick turnaround times.

Some deficiency symptoms appear exclusively on younger leaves. Deficiency symptoms in this location are tied to immobile nutrients, including the micronutrients and calcium. The plant cannot pull these nutrients from older tissue, so the new tissue becomes deficient. Most often, deficiencies of these nutrients are caused by inadequate nutrition, improper pH and/or reduced transpiration (e.g., calcium and boron).

For cases of low nutrition, apply micronutrient supplements. These products are especially important when using component fertilizers or for crops with higher demand, such as petunias. Also, keep in mind that when feeding with a complete formulation of a water-soluble fertilizer, 150 to 200 ppm nitrogen is often required to provide adequate micronutrients. A complete trace-element mix is preferred for most crops.

Classic examples of high pH-inducing deficiencies are interveinal yellowing of young leaves in petunias, calibrachoa, pansy and vinca. For these and other crops, media pH above 5.8 ties up iron in a form unavailable to the plant. Sulfuric acid can be used to quickly lower media pH. High-acid fertilizers can also be used to correct slightly elevated pH, but the process will be a little slower. Additionally, iron chelate may be applied to further boost iron levels and/or quickly improve leaf color.

Calcium and boron both require transpiration for uptake. Therefore, conditions that limit uptake (waterlogged soil, high humidity, reduced airflow) can lead to deficiencies. Tip and edge burn of young leaves indicate low calcium. Weakened cell walls due to low calcium may also cause cupping or other distortion. Boron deficiency shows as distortion of the young tissue, thick/leathery growth and tightly stacked nodes. Boron deficiency is also encouraged by pH above 6.2 and/or high levels of calcium. To correct these deficiencies, increase airflow, correct pH and apply supplements: calcium chloride dihydrate sprays for lettuce, ornamental kale and poinsettia; boron drenches for pansy, petunia and viola. Once again, confirm your diagnosis with either a media or tissue test (sample only the symptomatic tissue).

Of course, there are always exceptions to general rules and some of them are more surprising than others. Molybdenum is an immobile micronutrient that shows its deficiency symptoms on recently expanded leaves as a strong marginal chlorosis with interveinal puckering in poinsettias. In another example, Dr. Brian Whipker from North Carolina State University recently described phosphorus deficiency causing pale leaves progressing to severe yellowing and scorching in garden mums on leaves just below the flower buds. In this case, these mature leaves were robbed of phosphorus to support the developing flowers.

Consult with your fertilizer supplier regarding application methods and rates for products to correct nutritional deficiencies. Your supplier should also be able to assist with questions about diagnosing and understanding deficiency symptoms. **GT**

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