MARYLAND COOPERATIVE EXTENSION
UNIVERSITY OF MARYLAND
COLLEGE PARK•EASTERN SHORE

Fact Sheet

Fact Sheet 869

NUTRIENT TESTING

INTRODUCTION

- Important way to determine what strength and what type of fertilizer to apply
- Three basic tests:
  - Visual analysis
  - Soil test
  - Foliar analysis

VISUAL ANALYSIS

- Measures what damage has already occurred
- Observing the leaves of plants will show if any nutrient deficiencies/ toxicities are present
- See chart for symptoms and deficiencies

SOIL TESTING

- Shows pH, soluble salt, and nutrient levels
- Samples should be taken on a regular basis, monthly minimum
- Tests can be completed at a laboratory or with inexpensive personal meters

FOLIAR ANALYSIS

- Take samples every 4-6 weeks for general observation
- Take samples immediately when symptoms/deficiencies are suspected
- Tests are generally done in a lab
- Sample selection:
  - If only the terminal (young, mature foliage) section is affected, take sample from that location
  - If entire plant is affected, take a sample from the top, middle, and bottom sections
  - Take an unaffected plant sample to be used as a standard with all infected samples

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IDENTIFYING NUTRIENT DISORDERS		
DEFICIENCY/TOXICITY	**SYMPTOMS**	**SOLUTION**
Excessive soluble salt levels	Slowed growth, plants wilt on bright days, root tips die, shows many other nutrient deficiency symptoms	Apply clear irrigation water to leach from media
Ammonium toxicity	Margins of older leaves curl upward or downward depending on species, older leaves develop a highly variable chlorosis, followed by necrosis and/or root tip burn	Change N source to a fertilizer containing less N in the ammonium or urea form
Calcium deficiency	Young leaves develop chlorosis and distortion (crinkling, dwarfing)	If irrigation water has less than 6.0 pH, add dolomitic limestone to media. If normal pH, apply fertilizers high in calcium (20-0-20, 21-0-20, 15-0-15, or 13-2-13) or N in the form of calcium nitrate (13-2-13)
Iron deficiency	Interveinal chlorosis of young leaves	Apply iron chelate as a drench at a rate of 1 oz. per 50 sq. ft.
Sulfur deficiency	Leaves develop chlorosis and may turn slightly beige	Apply one application of magnesium sulfate or use a complete fertilizer that contains sulfur (20-18-18, 20-18-20, or 20-9-20)
Nitrogen deficiency	Lower, older leaves become chlorotic and eventually necrotic, slower growth rate, stems become hard and woody, and lower leaves may drop off	Apply fertilizers high in nitrogen or apply calcium nitrate (15-0-0) or ammonium nitrate (34-0-0)
Nitrogen toxicity	Poor growth due to high soluble salts	Leach with clear water, lower application of ppm N
Phosphorus deficiency	Leaves become a deeper green, plant becomes stunted, and older leaves may develop a purple color	Add superphosphate 0-20-0 into media at 5 lbs. per cubic yard
Magnesium deficiency	Interveinal chlorosis on older leaves, in severe cases older leaves may turn brown	Apply one application of magnesium sulfate to media at 2-4 lbs. per cubic yard, apply 1-3 lbs. magnesium sulfate per 100 gal. irrigation water monthly, use dolomitic limestone as a component in media mix, or use a complete fertilizer containing Mg (13-2-13, 14-0-14, 15-15-15, or 17-0-17)
Potassium deficiency	Margins of older leaves become chlorotic, then necrotic and old leaf blades develop necrotic spots with more occurring near the margins	Switch to a fertilizer high in K (20-5-30, 17-5-24, 15-11-29, or 15-10-30) or switch to potassium nitrate (13-0-44)
Boron deficiency	Young leaves become thick, leathery and crinkled, terminal buds die, young stems, petioles, and flower stalks develop rust-colored cracks	Apply Borax (0.5 oz. per 100 gal.) or Solubor (0.25 oz. per 100 gal.)

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