



Scouting & Managing Greenhouse Nutrient Problems

Checking your plants weekly is the key to managing greenhouse nutrient problems. Check the color and vigor of the foliage, as well as the health of the roots. Even though the foliage is showing nutrient deficiency symptoms, the root problem may be pest, disease, or water-management related, rather than fertilizer type or concentration. Checking the roots is important because the plant may have a compromised root system due to *Pythium*, fungus gnat infestation, or water-logged and poorly drained media.

Conducting regular testing of media pH and EC is vital. pH affects the availability of nutrients and EC gives you the overall concentration of fertilizer salts in the media. For plugs, test 2-3 times per week, because their smaller media volumes are more susceptible to changes compared to bigger volumes. For flats and 4-inch pots, test once a week, and for containers 6-inches or larger, every 2 weeks.

These 2 testing methods are easy to do in the greenhouse:

- **Pour-through:** Irrigate the crop 1 hour before testing. Select 5 pots and place plastic saucers under them. Pour distilled water on the surface of the media. The amount of distilled water depends on the size of the pot: For cell packs and 4-inch pots, pour 50 ml (1.7 oz), for 6-inch pots, 75 ml (2.5 oz), and for 6 1/2 - 8 inch pots, pour 100 ml (3.3oz). Collect the leachate and test pH and EC as soon as possible. For plugs, place containers under the plugs, then press on top of the plugs' media to collect leachate.
- **1:2 Method:** Randomly select 5 pots and collect a small amount of root media from the lower 2/3 of the pot. Mix thoroughly and remove any slow-release fertilizer capsules to avoid inaccurate EC values. Add distilled water twice the volume of soil. Mix thoroughly and allow to sit for 30 minutes before testing EC and pH of the slurry.

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Nutrient problems can show up in your crop very quickly. Perform regular soil tests so that you can identify problems early and take corrective action. Train your staff to recognize nutritional disorders so that they can scout while working in the crop.

Select one method and stick to it. Establish a target range depending on your crop. For iron-inefficient crops, also known as the petunia group (petunia, calibrachoa, pansy, nemesia, bacopa, dianthus, snapdragon, verbenas, and vinca), the acceptable pH range is 5.4 – 6.2.

For iron-efficient crops, or the geranium group, (seed and zonal geranium, marigolds, New Guinea impatiens and lisianthus), the acceptable pH range is 6.0 – 6.6.

For other crops such as impatiens, ivy geraniums, poinsettia, and chrysanthemums, the acceptable pH range is 6.0 – 6.4. Therefore, a range of 6.0 – 6.2 would be acceptable for most crops.

The acceptable EC ranges depend on the testing method:

EC (mS/cm)	Pour-through method	1: 2 method
Acceptable range	1.0 – 6.0	0.30 – 1.50
Low	1.0 – 2.5	0.25 – 0.75
Normal	2.6 – 4.5	0.76 – 1.25
High fertility range	4.6 – 6.5	1.26 – 1.75
Can cause root damage	> 8.0	>2.5

Troubleshooting Nutritional Problems in the Greenhouse

Symptoms may be caused by other problems such as root rot disease, insects or poor drainage in the root media. To confirm that the symptoms are nutritional you have to rule out all other causes. You also need a soil test to confirm the nutrient element causing deficiency or toxicity symptoms.

Symptom	Possible problem	Solution
Color of entire plant is light green to yellow.	Sulfur deficiency	Use MgSO ₄ (Epson salt) at 0.25-0.5 lb/100 gal of water in the water-soluble fertilizer. (Don't mix in the same tank with fertilizers containing CaNO ₄ .)
Growing tip is lost, many growing tips develop, young leaves elongate and are brittle.	Boron deficiency	Lower humidity levels in the greenhouse to increase boron uptake. Use a one-time drench with borax at 21.3 g/100 gal water, or Solubor at 12.2 g/100 gallons of water. Or use a regular drench with borax at 0.85 g/100 gal water or Solubor at .48 g/100 gal water.
Growing tip alive, but young leaves are distorted. Leaf edges may become necrotic.	Calcium deficiency	Lower humidity levels in the greenhouse to improve calcium uptake. If this doesn't work use foliar sprays with calcium chloride at 1 lb/100 gal of water weekly.
Youngest leaves start to show interveinal chlorosis progressing to yellow to white.	Iron deficiency	Check media pH, adjust pH by adding acid fertilizer (NH ₄). Use supplemental iron chelate drenches (sprint 330 or sprint 139 at 5oz/100 gallons of water).
Older leaves show bronzing coloration with necrotic spots (especially in iron efficient crops like geranium or marigolds).	Iron/Manganese toxicity	Check media pH. Switch to nitrate-based fertilizers (e.g. 13-2-13 or 15-0-15. If pH has not risen within a week, drench with potassium bicarbonate at 2 lbs./100 gal or flowable (liquid) lime at 2-4 qts/100 gal water.

Symptom	Possible problem	Solution
Older leaves become chlorotic over the entire leaf.	Nitrogen deficiency	Check EC of fertilizer solution. Check to see if your injector is working properly. Reduce leaching.
Older leaves turn purple, top of the plant may be dark green.	Phosphorus deficiency	Check if P was incorporated in root media before planting. Check P levels in your fertilizer. Drench with fertilizer containing P at 50-100 ppm.
Older leaves have interveinal chlorosis or gray –green coloration.	Magnesium deficiency	Check for Mg levels in root media. Single drench with MgSO ₄ at 0.5lb./100 gal will solve problem. Include dolomitic lime in the media.
Older leaves show edge burn which may progress towards the center.	Potassium deficiency	Check K levels in fertilizer. Check if injector is working properly. Increase K levels in fertilizer by adding KNO ₃ . Reduce leaching.

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