



UNIVERSITY of NEW HAMPSHIRE COOPERATIVE EXTENSION

Scouting and managing nutrient problems of greenhouse crops

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The key to managing nutrient problems of greenhouse is to make sure that you look at your plants at least weekly. Make sure to check the color and vigor of the foliage and also the health of the roots. Even though the foliage is showing nutrient deficiency symptoms, the problem may be pest/disease and water management problems 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, growing in water logged or 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 the smaller media volumes are more susceptible to changes than bigger volumes. For flats and 4 inch pots test once a week, and for containers 6 inch or larger every 2 weeks.

There are 2 methods of testing that are easy to do in the greenhouse:

1. PourThru: irrigate the crop 1 hour before testing. After 1 hour select 5 pots and place plastic saucers under the containers. Pour distilled water on the surface of the media. The amount of distilled water depends on the size of the pot: Cell packs and 4 inch pots pour 50 ml (1.7 oz), 6 inch pots 75 ml (2.5 oz), 6¹/₂ - 8 inch pots pour 100 ml (3.3oz). Collect leachate and test pH and EC as soon as possible. For plugs place container under the plugs, press on top of plug media to collect leachate.
2. 1:2 method: collect a small amount of root media from 2/3 bottom of the pot (from 5 randomly selected pots). Mix thoroughly and remove any slow release fertilizer capsules to avoid inaccurate EC values. Add distilled water 2 times volume of soil. Mix thoroughly and allow to sit for 30 minutes before testing EC and pH of the slurry.

Select one method and stick to it. Establish a target range depending on your crop.

For iron inefficient crops (also referred to as petunia group) which include: petunia, calibrachoa, pansy, nemesia, bacopa, dianthus, snapdragon, verbena, vinca; the acceptable pH range is 5.4 – 6.2.

For iron efficient crops (geranium group) which include seed and zonal geranium, marigolds, new guinea impatiens and lisianthus; the acceptable pH range is 6.0 – 6.6

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

The acceptable EC ranges depend on the testing method:

EC (mS/cm)	Pour thru 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

Trouble shooting nutritional problems in the greenhouse

It is important to note that symptoms may be caused by other problems like root rot diseases, 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 that is causing deficiency or toxicity symptoms.

Symptom	Possible problem	Solution
1. Color of entire plant is Light green to yellow	Sulfur deficiency	Use MgSO ₄ (Epson salt) at 0.25-0.5 lbs/100 gallons of water in the water soluble fertilizer. (Do not mix in the same tank with fertilizers containing CaNO ₄ .)
2. 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 gallons water or Solubor at 12.2 g/100 gallons of water. Or a regular drench with borax at 0.85 g/100 gallons water or Solubor at .48 g/100 gallons water.
3. 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 gallons of water weekly.

Symptom	Possible problem	Solution
4. 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).
5. 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 within a week pH has not risen drench with potassium bicarbonate at 2 lbs./100 gallons or flowable (liquid) lime at 2-4 qts/100 gallons water.
6. 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.
7. 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.
8. 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 gallons will solve problem. Include dolomitic lime in the media.
9. 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.