



Are there necrotic spots (dead, brown spots) on the leaves or stems of the young, rapidly growing parts of the plant? Are there brown dead spots on the fruit (especially on the blossom end)?

If so, you likely have a **Calcium deficiency**. If no, then you may have another nutrient deficiency, but it is not as likely as other variables, including problems with temperature, pests, or cultural methods.

HOW TO TREAT THESE DEFICIENCIES:





Iron:

Add chelated iron to your system- there are many types out there, but FeEDDHA and FeDTPA are the best types of chelated iron. (FeEDDHA will turn your water red though.) There is quite a bit of math involved in determining how much to add, because different chelated iron types have different purities. Basically, you want to add 2 mg of pure iron per liter of system volume every 4 weeks.



Nitrogen:

You should know that this is a possibility if you haven't been feeding much, have too much vegetation to fish, or have been measuring low nitrate levels in your system. Switch to a higher protein feed and feed more often to correct. If this doesn't correct, remove some plants and look for straw, wood or another high carbon substance in your system that could be consuming nitrogen in decomposition. Remove all wood, straw, etc. Low temperatures can also depress feeding and lead to nitrogen defiiency.



Potassium:

In systems with low pH, add potassium hydroxide (caustic lye) to raise pH and supplement potassium. In systems with neutral or high pH, add kelp meal concentrate (0-0-10) or potassium sulfate (0-0-50) in very low quantities.



Magnesium:

In systems with low pH, adding dolomitic lime can help, as well as hydrated lime. In all systems, Epsom salts (magnesium sulfate) can be added in small quantities to supplement magnesium.



Calcium:

Most systems have plenty of calcium because it's common in the water. However, if there's too much potassium in the system, your plants might show a calcium deficiency. To correct in low pH systems, reduce the amount of potassium you are supplementing and add hydrated lime to the system in small quantites. In neutral or high pH systems, the best way to supplement calcium is with small amounts of calcium chloride applied foliarly.

Remember that correcting deficiencies takes time - often 2-4 weeks, so add small amounts and wait to see the results. Adding too much of any of these substances can sometimes cause bigger problems than a nutrient deficiency! The amounts of these supplements that you add will vary based on system volume and the severity of the deficiency.

Check out these resources for more info on how to correct deficiencies in your system:



Vertical Food Blog: www.verticalfoodblog.com



Bright Agrotech YouTube Channel: Tube www.youtube.com/user/BrightAgrotechLLC

foliar applications as well or potassium chloride.