e-GRO Alert
Volume 3, Number 54 September 2014

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Poinsettia Fertilization:
Getting Phosphorus Right

Growing poinsettias with a low phosphorus fertilization regime helps control excessive stretch. If phosphorus levels are too low, phosphorus deficiency can occur.

Click to view YouTube summary: ***Poinsettia Phosphorus***

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We are at the beginning stages of the fall poinsettia crop. While some production issues always pop up that keep you on your toes, for the most part, poinsettia fertilization is pretty straight forward. It is important to review some of the basics of essential elements to help avoid future problems.

During the past few seasons, I have observed poinsettia crops in about mid-October with lower leaves developing yellow spotting along the mid-rib (Fig. 1). Later the yellow leaf spots

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Figure 1. The first symptoms of phosphorus deficiency during warm growing conditions is yellowing along the midrib of the older leaves.

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appear randomly over the leaf (Fig. 2). This is followed within a few weeks by necrotic spotting (Fig. 3). Over time the symptoms move up the plant and leaves can be yellow and have greasy, dark olive colored spotting (Fig. 4). In these cases, the poinsettias were grown without phosphorus. These are all symptoms of phosphorus deficiency that occur during warm growing conditions. In contrast, during wet or cold growing conditions, the lower leaves usually turn purple (Fig. 5).

Background

Phosphorus is an essential element. While we can manipulate it by providing only small amounts to control plant growth on short-term plug crops, phosphorus is still needed by the plant. Soilless substrates have very limited holding capacity for phosphorus, so little is held in reserve. With a long-term crop such as poinsettias, they simply ran out of P!

When one considers all the elements that can be modified for controlling plant growth, phosphorus is still one of the easiest to manipulate. By far, the window between producing smaller plants and leaf necrosis or lower leaf purpling is fairly wide, so limiting phosphorus is a safe production practice. But there is a point, as we found out with poinsettias, that lower leaf damage will occur. One just needs to remember that there is a line, and to avoid going over it.

Management

Periodic applications of phosphorus are still needed. It can be accomplished by utilizing low P fertilizers such as 13-2-13 Cal-Mag (what we primarily use in my research at NC State). Another method is by adding periodic phosphorous applications (such as potassium phosphate if you mix your own fertilizer). Finally, monthly applications of 20-10-20 (which when applied at 200 ppm N, provides 44 ppm P) can be made. The target amount of phosphorus in a SME substrate test should be between 5 and 10 ppm. Higher substrate values will only encourage elongated growth. Excess levels also readily leach and

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Figure 2. As symptoms progress, yellowing can appear anywhere on the leaf. Also denote the olive colored spotting.

Figure 3. Yellow areas develop necrotic spots over time.

Figure 4. With advanced symptoms, the entire leaf can yellow and have the olive colored spots. Leaf drop can also occur. [The interveinal chlorosis was the result of another element (magnesium) being limited to these plants.]

Figure 5. Lower leaf purple discoloration is typically associate with phosphorus deficiency. Purpling readily occurs with colder growing temperatures.

can lead to environmental contamination.

There is no doubt that limiting the amount of phosphorus applied to poinsettias is a sound production practice. A little goes a long way, but we must also provide a small amount of phosphorus during the production cycle to still grow high quality poinsettias.

Original Phosphorus Research by Dr. Paul Nelson

One of the most significant research projects influencing greenhouse fertilization in the 1990's was Dr. Paul Nelson, Chen-Young Song and Jin-Sheng Huang's work at North Carolina State University on the growth control effects of limiting phosphorus to plugs (see GPN, January 2002; *http://www.gpnmag.com/what-really-causes-stretch*).

Up to that point, plant growth and stretch was primarily attributed to only ammoniacal-nitrogen. Their research proved that phosphorus was the element that had the greatest impact on stem stretch and ammoniacal-nitrogen had a far greater influence on leaf expansion. Most fertilizers high in ammoniacal-nitrogen are also high in phosphorus, and it took the Dr. Nelson's team of researchers' work to decouple these two effects.