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Late Season Magnesium Deficiencies

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The higher than normal temperatures this spring means that the irrigation demand of bedding plants has been increased. The more frequent irrigations can lead to a greater chance that any pre-plant nutrients getting flushed out. This leads me to the problem being highlighted in the e-GRO newsletter: late season magnesium (Mg) deficiencies.

In most of North Carolina and wide areas of the Southeast, along with other geographical areas not over limestone bedrock, we lack naturally occurring Mg in the irrigation water. Therefore, our primary source of Mg is from the pre-plant dolomitic limestone addition for pH control, any supplemental application of magnesium sulfate [$MgSO_4$ (Epsom salts)], or Cal-Mag fertilizers.

What I have observed over the past 10 years is that late spring Mg deficiencies start to appear, especially if it has been warmer than normal and growers have irrigated more often. My theory is that any available Mg from the limestone is either used up or washed out, thus leading to an increase in visual

Figure 1. Marguerite sweet potato vine with interveinal chlorosis of the lower leaves.

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Figure 2. Close up of Marguerite sweet potato vine with advanced bleaching of the interveinal region.

symptoms.

An excellent indicator plant is Marguerite sweet potato vine (ipomoea). With Marguerite, the lower leaves become a light yellow between the veins (interveinal chlorosis) (Figure 1). This can be difficult to see on a chartreuse-colored plant. Over time, the interveinal areas become bleached (white). Remember interveinal chlorosis of the lower leaves is a good indicator of Mg deficiency, while the same symptoms of the upper leaves suggests iron deficiency due to high substrate pH. Testing the substrate pH will help you diagnose the problem.

Symptoms of interveinal chlorosis were also observed in

Figure 3. Pot mum with lower to mid-level leaves exhibiting interveinal chlorosis induced by magnesium deficiency.

commercial greenhouses with pot mums (Figure 3) and nasturtiums (Figure 4). We also commonly observe a greater incidence of symptoms on poinsettias late in the crop cycle if it has been a warm fall.

Corrective and Preventative Measures.

First of all, have your water tested to determine your baseline Mg level being supplied by the irrigation water. Levels of 25 ppm Mg should be adequate.

If you do not have naturally occurring Mg in your irrigation water, then you need to make supplemental applications. There are two main options. The first one is to use a Cal-Mag fertilizer that provides Mg. Use the fertilization rate you would commonly use for your crop. Note, most Cal-Mag formulation are basic fertilizers which can lead to gradual increase in substrate pH levels over time, so monitor the substrate pH to ensure the plants are within the acceptable range. Also Cal-Mag formulations do not provide sulfur.

The second option is to apply Epsom salts. A preventative program commonly used in the Southeastern U.S. is to supply 1 pound of $MgSO_4$ per 100 gallons of water on a monthly basis. This application is made as a regular irrigation with 10% excessive flow through of water. This will also green up the plants nicely.

If Mg deficiency is observed, 2 pounds of $MgSO_4$ per 100 gallons of water is used. This needs to be done when symptoms are first observed. It is difficult to reverse advanced

leaf symptoms of interveinal chlorosis and impossible to correct the bleaching.

In summary, Mg deficiencies appear as an interveinal chlorosis on the lower leaves. Problems often appear late in the season. If you do not have naturally occurring Mg in your irrigation water, consider making supplemental applications to keep your plants looking healthy.

Figure 4. Lower leaves of nasturtiums with interveinal chlorosis induced by magnesium deficiency.