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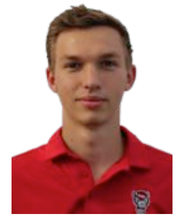

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Lower Leaf Interveinal Chlorosis of *Centaurea cineraria*

A group of perennial dusty miller (Centaurea cineraria) plants developed interveinal chlorosis on the older leaves. The initial assessment suggested that magnesium (Mg) deficiency was the cause because we don't have naturally occurring Mg in our irrigation water. Tissue analysis proved otherwise.

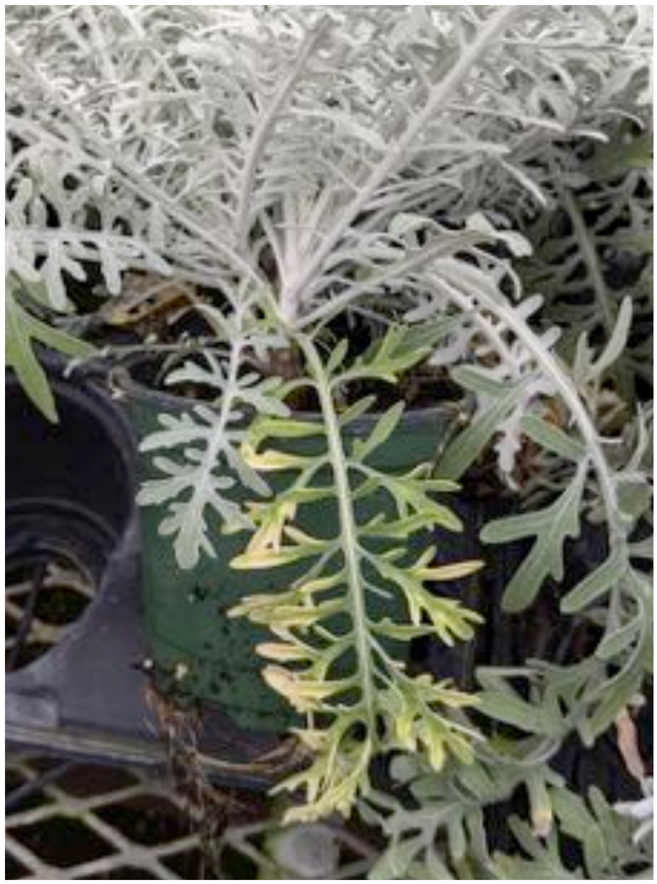

Figure 1. Perennial dusty miller plant with lower leaf interveinal chlorosis due to low potassium levels. (Photo: Brian Whipker)

Centaurea cineraria 'Colchester White' is a perennial dusty miller that adds a nice white textured leaf pattern to gardens. While visiting a greenhouse recently, the grower asked about their crop. Overall the plants looked good, but the lower leaves had developed interveinal chlorosis (Figs. 1-4).

Because our bedrock is granite and the surface water is the main irrigation source, it lacks a nutritional punch. If you want to provide calcium (Ca) or magnesium (Mg), you have to include it in your fertilization program. The need to add supplemental Mg results in frequent instances of Mg deficiency appearing late in the production season once the

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supply from the dolomitic limestone runs low. Therefore, it is a pretty safe bet when one observes lower leaf interveinal chlorosis, that it is a Mg deficiency.

Confirmation of Diagnosis

We ran a leaf tissue analysis at the NCDA&CS lab and to our surprise, we found Mg to be at 0.50%. This concentration was considered to be above the normal range according to the standards published in the Plant Analysis Handbook (normal range is 0.25 to 0.40%). Levels below 0.25% Mg are considered low and below 0.15% Mg are deficient.

Other common elements that develop symptoms on the lower leaves are iron toxicity (at 61.4 ppm is not problematic) and manganese (at 147 ppm is also not problematic). Boron (B) at 55.6 ppm was considered on the high end, but B toxicity generally begins as marginal leaf necrosis and has less interveinal chlorosis developing.

Nitrogen (N) was low at 1.17% and may have contributed to the overall yellowing, but would not have resulted in interveinal chlorosis. Phosphorus was also low at 0.5% and calcium (Ca) was high at 3.13%.

This leaves potassium (K) as a possibility. Levels were at 2.18%, which was reported to be low by NCDA&CS lab. Based on the lab analysis, this points to K being the problem. This is unusual because high levels of K are provided with the fertilization program. That is why one tends to think Mg first and discount it as being a K problem. Given that it is later in the season and less fertilization might be going on, it is hot, and excessive leaching during frequent irrigations may be occurring, and also coupled with higher concentrations of Ca in the plant, these factors might of all contributed to the development of symptoms.

Figure 2. Close-up of a leaf with potassium deficiency symptoms. (Photo: Brian Whipker)

Figure 3. Symptoms occurred on the lower leaves. (Photo: Brian Whipker)

Corrective Procedures

This is an easy fix with a heavy fertilization of 300 ppm N and K. This should restore the K levels in the plant and curtail further lower leaf symptoms. This will not reverse the lower leaf symptoms that have already occurred and those leaves would have to be removed.

Conclusion

Usually, it is safe to go with the typical diagnosis of a problem when one frequently observes it with numerous late season crops. Conducting a tissue test proved otherwise and illustrates the need to confirm your diagnosis even for people who regularly problem solve nutritional disorders.

Figure 4. Overview of a plant with lower leaf interveinal chlorosis caused by low potassium. (Photo: Brian Whipker)

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