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Licorice Plant (*Helichrysum*): Lower Leaf Black Spots

*The first report of low substrate pH induced micronutrient toxicity is discussed on the licorice plant (*Helichrysum petiolare*).*



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We grew the licorice plant as part of an experiment at NC State University. During that time, we noted upon maturity that the lower foliage developed black spotting on plants grown with a 250 ppm N fertilization rate. In an effort to diagnose the cause of these symptoms, the substrate was tested for pH and EC. Tests indicated that pH was 5.4 and EC was 2.9 mS/cm (SME method). Proven Winners suggests growing *Helichry-*



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Black leaf spotting on the lower foliage of *Helichrysum*.

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e-GRO Alert

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sum at a pH of 6.0 to 6.5 and fertilizing with 150 to 200 ppm N. When using a 1:2 extraction method for analysis, the recommended EC range is 0.6 to 0.9 mS/cm (that converts to 1.3 to 2.0 mS/cm for the SME method used here. (based on top irrigation). The results from the affected plants indicated that pH was lower than recommended and the EC was higher than recommended. As a side note, another set of *Helichrysum* plants that were fertilized with 150 ppm N and had a corresponding pH of 6.0 had no lower leaf black spotting symptoms.

In addition to substrate analysis, two tissue samples were taken from the affected plants and analyzed for nutrient levels (Table 1). One sample was taken from the most recently matured leaves (MRML) that were located near the upper part of the plant. The second sample was collected from the lower foliage (LL) that exhibited the black spotting. Results from the MRML sample fell within acceptable ranges for mature plants and did not provide

a clear explanation of the problem. In contrast, analysis of the LL sample detected an iron (Fe) concentration that was four times higher compared to the MRML sample. Elevated iron [and manganese (Mn)] levels can result in lower leaf black spotting in many other species such as gerbera, pansy, fuchsia, and zinnia. These results, (elevated tissue Fe and low substrate pH) helped confirm that the black spotting was related to low pH induced micronutrient toxicity. This is the first report that confirms *Helichrysum* is sensitive to low substrate pH (<5.4).

The recommendation from Proven Winners to maintain the pH range from 6.0 to 6.5 for *Helichrysum* was corroborated. Substrate pH should be monitored during production of this species to detect and correct undesirable pH drops. Corrective procedures for low pH include the application of hydrated lime, flowable lime or potassium bicarbonate. **Application details are provided in e-GRO Alert 3.05.**

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A second take home message is that two samples, one of the most recently mature foliage and another collected from the symptomatic foliage may be very helpful in diagnosing the problem.

Thanks is expressed to the Dümmer Group for supplying cuttings, the North Carolina Department of Agriculture and Consumer Services Agronomic Division for donating the tissue analysis tests, and the Fred C. Gloeckner Foundation for support of plant nutrition research at North Carolina State University.

Additional *Helichrysum* Production Information

Proven Winners

<http://www.provenwinners.com/plant/43572/culture>

<http://www.provenwinners.com/plant/43573/culture>

Ball Seed Company

http://www.ballseed.com/Growers/plant_info.aspx?phid=032001124002920

Table 1. Leaf tissue nutrient analysis results for the licorice plant (*Helichrysum*).

Element	Most Recently Matured Leaves (MRML)	Lower Leaves (LL) with Black Spotting Symptoms
Nitrogen (%)	3.81	2.07
Phosphorus (%)	0.27	0.36
Potassium (%)	1.73	2.08
Calcium (%)	0.67	0.76
Magnesium (%)	0.36	0.25
Sulfur (%)	0.18	0.21
Sodium (%)	0.29	0.5
Iron (ppm)	256	1190
Manganese (ppm)	286	266
Zinc (ppm)	42.3	74.4
Copper (ppm)	7.61	13.3
Boron (ppm)	43.6	65.1



Over time, the black leaf spotting on the lower foliage expands to cover most of the leaf.



With advanced symptoms, the entire leaf turns yellow.