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Lysimachia: Lower Leaf Purplish-Black Spotting

Low substrate pH induced micro-nutrient (iron/manganese) toxicity is discussed on Lysimachia 'Gold Globe' (Lysimachia procumbens). Low substrate induced iron toxicity has not been previously reported on this species.

Lysimachia 'Gold Globe' is a great mounding plant covered with round clusters of rich yellow flowers. It is commonly grown in both hanging baskets and five or six inch pots.

On a recent greenhouse visit, a group of plants were observed with purplish-black, lower leaves (Figs. 1-3). No fungal sporulation was observed and the root system was a mass of white roots.

A PourThru test was conducted and the electrical conductivity (EC) value was at 0.16 mS/cm. This EC value was on the lower end of the nutritional spectrum. The pH tested at 3.7, which was excessively low. There are no recommended pH ranges for Lysimachia 'Gold Globe' (*Lysimachia procumbens*), and one can only rely on recommended range of 5.8 to 6.2 for other *Lysimachia* species. In this case, the pH needs to be increased.

Based on testing other low pH sensitive crops over the years, it has been observed when the

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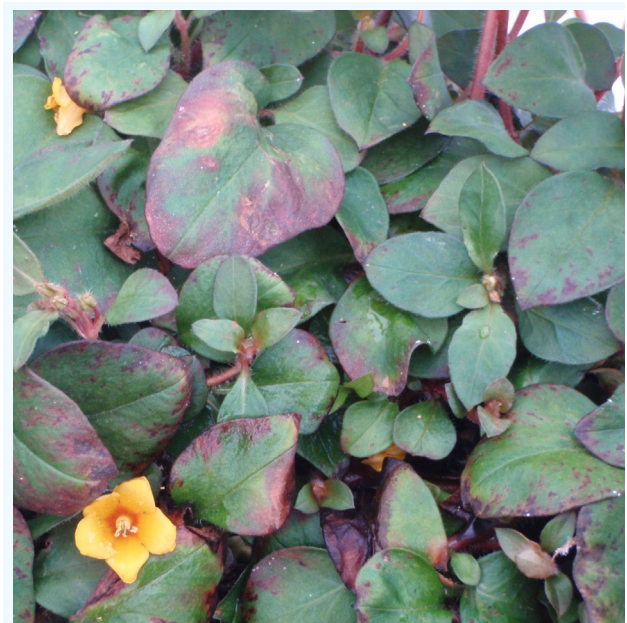


Figure 1. Lower leaf purplish-black discoloration denotes a low substrate pH induced iron toxicity.
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substrate pH drops below the 5.2 to 5.4 range, purplish-black spotting can occur. It is also usually linked with another stress event with the crop, which slows or stalls plant growth. In this case, the plants were being toned with low fertility to hold back excessive growth. The plants were also experiencing high levels of sunlight and because of the plant size, they were also drying down.

A tissue sample was submitted for nutrient analysis. As was the case with optimal pH ranges, there are no recommended nutrient ranges published for *Lysimachia* 'Gold Globe'. Table 1 contains the results of the tissue analysis test and a comparison against the general nutrient recommendation index provided by the North Carolina Department of Agricultural - Agronomic Division.

The recommended range for iron for most species is between 60-130 ppm and 30-260 ppm for manganese. Elevated levels of iron (1300 ppm, >10X higher than the upper limit of the recommended range) were found. Both the PourThru pH values and tissue analysis help to confirm that the problem was a low substrate pH induced iron toxicity.

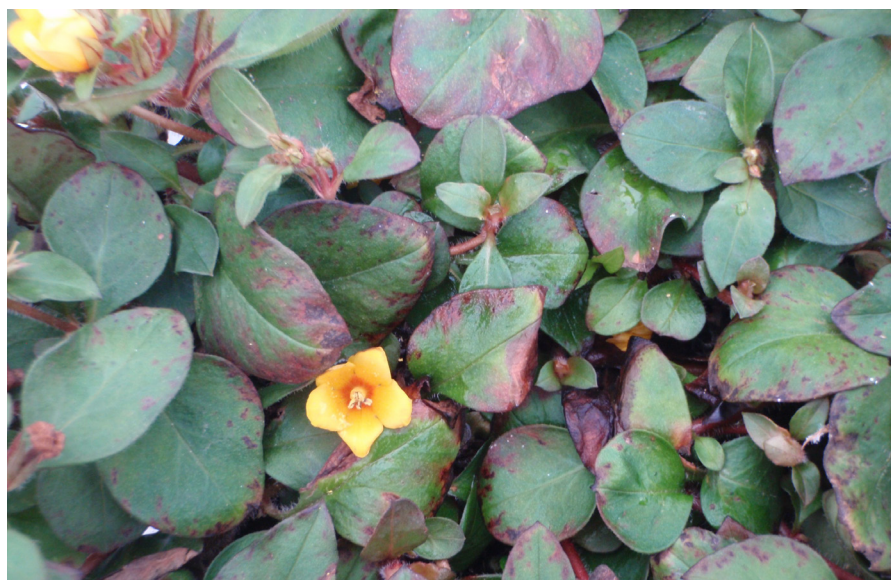


Figure 2. Close up of the lower leaves with purplish-black leaf spots. Photo copyright by Brian Whipker

Management

Monitor *Lysimachia* 'Gold Globe' (*Lysimachia procumbens*) to make sure that the substrate pH is within the recommended range of 5.8 to 6.2. Limiting or reducing sources of plant stress will also help to prevent these symptoms.

Corrective Procedures

Corrective procedures for low pH are listed below. Switching to a basic fertilizer when the substrate pH is nearing the lower limit will help stabilize the pH. If the pH is below the recommended range, then corrective procedures will need to be implemented. Flowable lime is one option. Typically a rate of 2 quarts per 100 gallons of water will increase the substrate pH by roughly a 0.5 pH unit. The flowable lime may be applied using a fertilizer injector. Additional



Figure 3. Close up of the purplish-black discoloration on the lower leaves. Photo copyright by Brian Whipker

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applications can be made if needed.

Potassium bicarbonate can also be applied. The rate of 2 pounds per 100 gallons of water will increase the substrate pH by roughly a

0.8 pH unit. This treatment will also provide excessive amounts of potassium and cause a spike in the substrate electrical conductivity (EC). The day following a potassium bicarbonate application, a leaching irrigation with clear water

is required to restore the nutrient balance (the ratio of K:Ca:Mg) and lower the EC level. As always, remember to recheck your substrate pH to determine if reapplications are needed.

Flowable Lime

Use 1 to 2 quarts per 100 gallons of water.

Rinse foliage.

Avoid damage to your injector by using rates of 2 qts per 100 gal of water, or less

Can split applications

Hydrated Lime

Mix 1# in 3 to 5 gal of WARM water. Mix twice. Let settle. Decant liquid and apply thru injector at 1:15.

Caustic (rinse foliage ASAP and avoid skin contact)

Potassium Bicarbonate (KHCO_3)

Use 2 # per 100 gal of water

Rinse foliage ASAP

Provides 933 ppm K

Leach heavily the following day with a complete fertilizer to reduce EC levels and restore nutrient balance.

Rates greater than 2 # per 100 gal of water can cause phytotoxicity!

Table 1. Lysimachia 'Gold Globe' (<i>Lysimachia procumbens</i>) tissue nutrient levels.			
Element	Unit	Sampled Plant Tested Values	Reported Index Values¹
N	%	3.35	46 - Low
P	%	0.30	57 - Sufficient
K	%	4.54	76 - High
Ca	%	0.78	64 - Sufficient
Mg	%	0.26	59 - Sufficient
S	%	0.25	53 - Sufficient
Fe	ppm	1300	124 - Excessive
Mn	ppm	65	65 - Sufficient
B	ppm	57.8	80 - High
Cu	ppm	8.19	58 - Sufficient
Zn	ppm	28.8	54 - Sufficient
Mo	ppm	Not reported	---

¹ Index values reported by the North Carolina Department of Agriculture – Agronomic Division. Samples are classified with the index for the desired nutrient and to determine if the status of that nutrient is: deficient, low, sufficient, high or excess. The sufficient range index values are between 50 and 75.