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Begonia Leaf Necrosis: A Common End-of-Season Problem

Lower leaf necrotic spotting can be problematic on Dragon Wing and large leaf begonias.



Figure 1. A Dragon Wing begonia with lower leaf necrotic spotting due to a low substrate pH induced iron toxicity. (© Brian Whipker)


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Dragon Wing and Whopper begonias are commonly grown due to their large size, which appeals to both homeowners and gardeners. During a grower visit, we discovered some late-season, full-grown plants with necrotic spots on the lower and midsections of the plant (Fig. 1). After further inspection, plants were pot-bound, and in severe cases, leaf margin necrosis of the lower foliage was observed. The PourThru procedure was utilized to determine the substrate pH and electrical conductivity (EC). Additionally, symptomatic leaves of both cultivars were collected and submitted for foliar tissue analysis to determine the nutrient status (Fig. 2).

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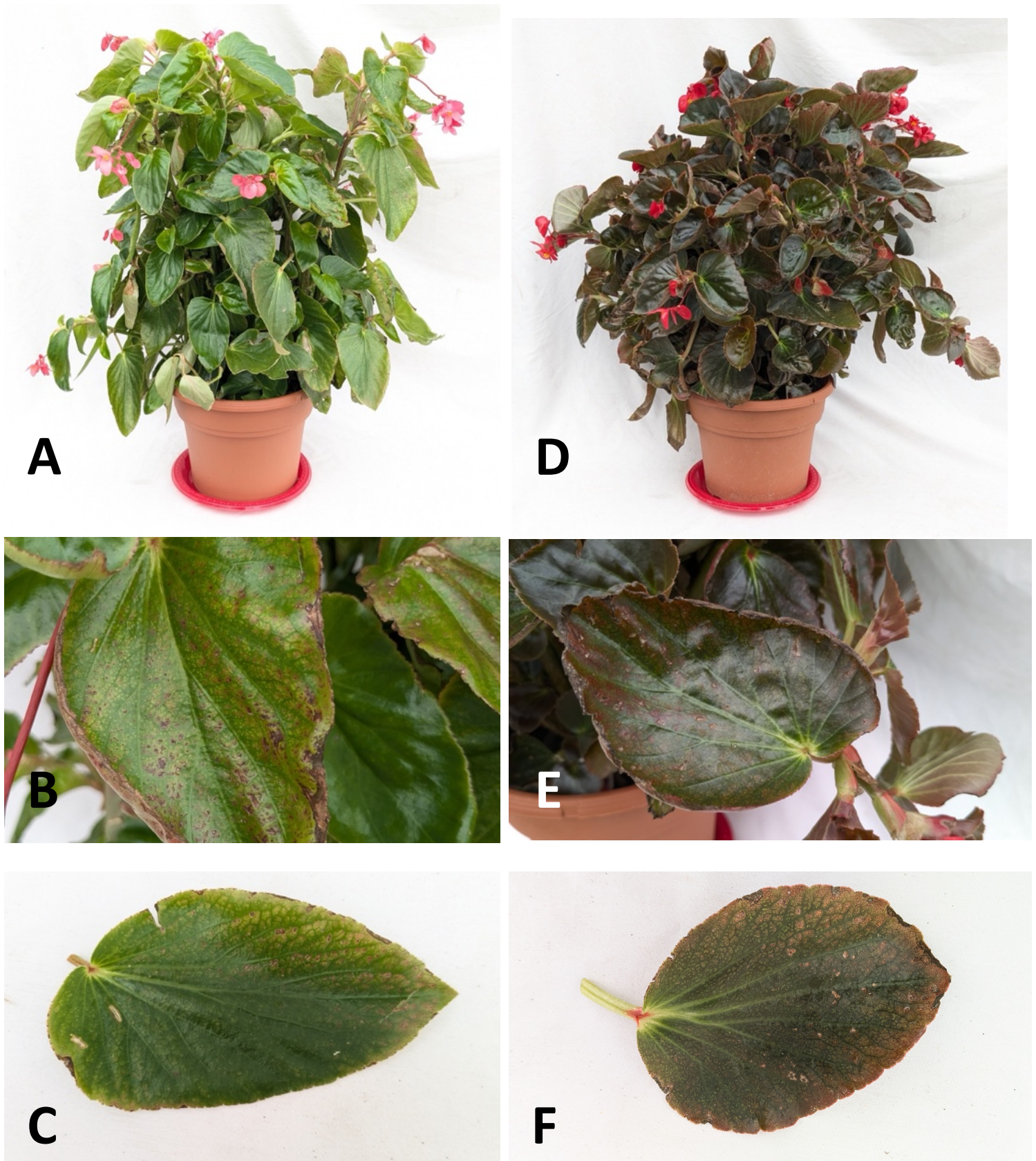


Figure 2. Discoloration varies depending on the cultivar. The Dragon Wing begonia exhibited small necrotic spots on the leaf edges and interior, which highlight well against the bright green leaves (Fig. 2A to 2C). Whopper begonia visual symptoms are more challenging to diagnose due to the necrotic spots blending in with the red leaf pigmentation (Fig. 2D to 2F). (© Brian Whipker)

Test Results

A PourThru was conducted to determine the pH and EC values of both plants. The pH value was 4.5 for the Whopper Red with Bronze Leaf, with an EC of 1.16 mS/cm. The pH was 4.7 for the Dragon Wing Pink begonia with an EC of 1.19 mS/cm.

The PourThru EC values (1.16 and 1.19 mS/cm) were lower than the recommended range listed by PanAmerican Seed company of 1.5 mS/cm (converting the 1.0 mS/cm for a 1:2 test into PourThru values). The EC values were also lower than the range of 1.3-2.0 mS/cm for top irrigated plants recommended by Fertdirtandsquirt.

Recommended pH values range from 5.4-6.0 (PanAmerican) to a slightly higher zone of 5.5-6.2 (Fertdirtandsquirt). The values found on the problematic plants were lower at pH levels of 4.5 and 4.7, indicating that low pH is likely the cause for the lower leaf necrosis.

Foliar tissue analysis was conducted to confirm if micronutrient accumulation resulted in visual toxicity symptoms of the lower foliage (Table 1). Foliar tissue results confirmed that iron (Fe) and manganese (Mn) exhibited greater tissue concentrations when compared to recommended values for both cultivars. The elevated Fe and Mn foliar tissue concentrations in combination with the low substrate pH values observed from the PourThru test suggest that low substrate pH resulted in the lower leaf necrosis observed.

Management

For optimal growth, the pH needs to be controlled. This starts with a good monitoring routine to determine if it is within the target range. If the pH needs correcting, there are a few options. One option is to use a basic fertilizer to increase the substrate pH over time. Avoid using an acidic fertilizer until the substrate pH returns to the recommended range of 5.5 to 6.2.

Another option is using liquid lime to quickly correct the issue. Use at a rate of 2 quarts per 100 gallons of water to increase the substrate pH by half a unit. Monitor the pH levels closely over the next week and reapply as needed to reach the desired range.

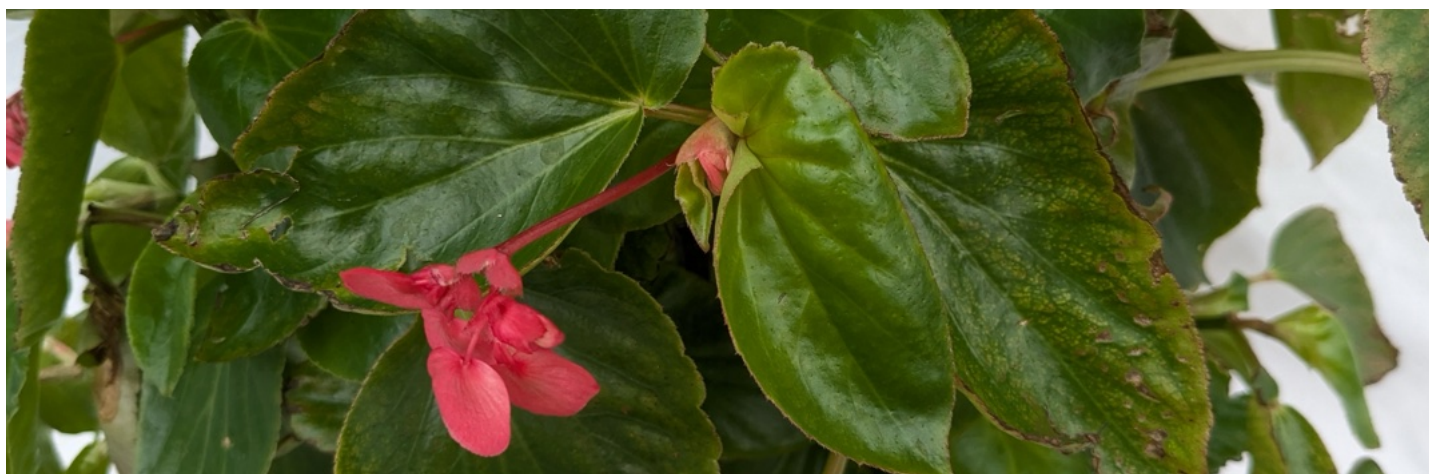
Final Thought

Over the years, we have noticed that Dragon Wing begonias are easy plants to grow. Low pH problems tend to develop later in the season, once the plant has grown and become pot-bound. At this point, less new growth is occurring, and likely, the fertilizer applied is then in excess of demand and causing a substrate pH drop that leads to the Fe/Mn toxicity situation. Monitoring substrate pH and EC throughout the growing season is important to prevent late-season problems.

Table 1. Leaf tissue analysis values for problematic begonias.

Element	Normal Plant ¹	Dragon Wing "Pink"	Whopper "Red Bronze Leaf"
Nitrogen %	4.42	3.44	3.45
Phosphorus %	0.35	0.29	0.31
Potassium %	2.15	2.21	2.43
Calcium %	1.13	1.85	1.65
Magnesium %	0.87	0.92	0.94
Sulfur %	0.27	0.22	0.27
Iron (ppm)	787	1340	1570
Manganese (ppm)	193	465	408
Zinc (ppm)	48.9	40.5	43.4
Copper (ppm)	12.7	5.00	6.18
Boron (ppm)	53.1	39.4	42.0

¹ Normal plant values were sourced from https://www.e-gro.org/pdf/EGRO_2_23.pdf.



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