



Brian E. Whipker  
bwhipker@ncsu.edu

Joshua Henry

# Gerbera: *Diagnosing Lower Leaf Purplish-Black Spots*

*Low substrate pH induced micro-nutrient (iron/ manganese) toxicity is discussed on gerbera (Gerbera jamesonii).*

Gerberas are a major spring crop with millions of them being grown in North Carolina. On a recent visit to a greenhouse, purplish-black spotting on the lower leaves was observed (Fig. 1). In severe cases, the entire leaf was covered with dark spotting (Fig. 2) and a pale yellow discoloration was observed (Fig. 3). The plants were just starting to bloom and were being grown on the cool side.

A pourthru test was conducted on three plants. The electrical conductivity (EC) values were: 1.04, 0.53 and 0.69 mS/cm. The EC was on the lower end of the spectrum, but adequate for plants beginning to flower. The pH values were: 5.2, 5.2, and 5.4, respectively. These were on the low side. Based on testing other gerbera crops over the years, it has been observed when the substrate pH drops below the 5.2 to 5.4 range, purplish-black spotting occurs. 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 cooler growing conditions and low fertility. Other later transplanted crops did not have symptoms.

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Figure 1. Purplish-black spots appear on the lower foliage of gerbera when the substrate pH is lower than 5.4.

Photo by Brian Whipker

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### CONTRIBUTORS

**Dr. Nora Catlin**

Floriculture Specialist  
Cornell Cooperative Extension - Suffolk County  
[nora.catlin@cornell.edu](mailto:nora.catlin@cornell.edu)

**Dr. Chris Currey**

Assistant Professor of Floriculture  
Iowa State University  
[ccurrey@iastate.edu](mailto:ccurrey@iastate.edu)

**Thomas Ford**

Commercial Horticulture Educator  
Penn State Extension  
[tgf2@psu.edu](mailto:tgf2@psu.edu)

**Dan Gilrein**

Entomology Specialist  
Cornell Cooperative Extension - Suffolk County  
[dog1@cornell.edu](mailto:dog1@cornell.edu)

**Dr. Joyce Latimer**

Floriculture Extension & Research  
Virginia Tech  
[jlatime@vt.edu](mailto:jlatime@vt.edu)

**Dr. Roberto Lopez**

Floriculture Extension & Research  
Purdue University  
[rglopez@purdue.edu](mailto:rglopez@purdue.edu)

**Dr. Neil Mattson**

Greenhouse Research & Extension  
Cornell University  
[neil.mattson@cornell.edu](mailto:neil.mattson@cornell.edu)

**Dr. Rosa E. Raudales**

Greenhouse Extension Specialist  
University of Connecticut  
[rosa.raudales@uconn.edu](mailto:rosa.raudales@uconn.edu)

**Dr. Beth Scheckelhoff**

Ext. Educator – Greenhouse Systems  
The Ohio State University  
[scheckelhoff.11@osu.edu](mailto:scheckelhoff.11@osu.edu)

**Lee Stivers**

Extension Educator – Horticulture  
Penn State Extension, Washington County  
[ljs32@psu.edu](mailto:ljs32@psu.edu)

**Dr. Paul Thomas**

Floriculture Extension & Research  
University of Georgia  
[pathomas@uga.edu](mailto:pathomas@uga.edu)

**Dr. Brian Whipker**

Floriculture Extension & Research  
NC State University  
[bwhipker@ncsu.edu](mailto:bwhipker@ncsu.edu)

**Heidi Wollaeger**

Floriculture Outreach Specialist  
Michigan State University  
[wolleage@anr.msu.edu](mailto:wolleage@anr.msu.edu)

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A tissue sample was submitted for nutrient analysis. The recommended range for iron is 60-130 ppm and 30-260 ppm for manganese in Floriculture Principles and Species by Dole and Wilkins. Elevated levels of iron (3080 ppm, >23X higher than the upper limit of the recommended range) and manganese (1240 ppm, >4X higher than the upper limit of the recommended range) were found.

Both the pourthru pH values and tissue analysis confirm that the problem was due to a low substrate pH induced iron/manganese toxicity.

### Management

Monitor gerberas to make sure that the substrate pH is within the recommended range of 5.8 to 6.2. The added stress of growing the plants cool can sometimes lead to problems. One possible reason is that all fertilizers are acidic when mixed. The acidic affect of the fertilizer can have a greater influence on lower the substrate pH than the acidic/basic reaction than occurs with nutrient uptake by the plant.

### 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

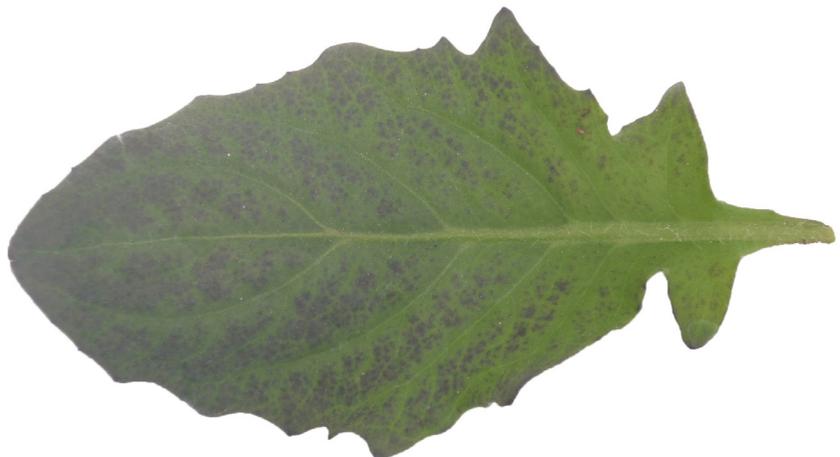


Figure 2. As symptoms advance, most of the leaf develops a purplish-black coloration.

Photo by Brian Whipker



Figure 3. A pale yellow leaf color can also develop when symptoms become more advanced.

Photo by Brian Whipker

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 0.5 pH units. Two quarts can be used through the injector. Additional 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 0.8 pH units. This treatment will also provide excessive potassium and cause a spike in the substrate electrical conductivity (EC). So the following day 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

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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<sub>3</sub>)**

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!

