

## GERANIUM XANTHOMONAS MANAGEMENT

### Causal Agent

*Xanthomonas campestris* pv. *Pelargonii*

### Common Names

Bacterial blight, bacterial wilt, bacterial stem rot, bacterial leaf spot

### Hosts

*Geranium* spp. and *Pelargonium* spp. including Zonal and seed (*Pelargonium* x *hortorum*), ivy geraniums (*P. peltatum*), Martha Washington (*P. domesticum*), and hybrids.

### Symptoms & Signs

Variable depending on host, variety, culture, and environment. Primarily, brown necrotic leaf spotting with or without yellow halos and V-shaped browning or yellowing from the outside to the inner part of the leaf. Systemic wilting of the entire plant can occur. Wilting while roots are healthy (ex. no symptoms of *Pythium*) can be another indicator of *Xanthomonas*.



*Symptoms and signs of Xanthomonas (Xanthomonas campestris* pv. *Pelargonii*) on geranium. Scout for small circular, yellow lesions on tops of leaves. Lesions will become necrotic and coalesce as disease progresses. Advanced disease symptoms often present as V-shaped lesions.

### Requirements for Disease

- 1) Susceptible host plants (see above).
- 2) Temperatures ranging from 70 to 80 °F (21 to 26 °C) are optimal for pathogen proliferation.

### Managing an Infestation

**\*Have a disease diagnostic lab conduct tests to confirm whether *Xanthomonas* is the culprit first.\***

- 1) Treat all geraniums in the area (including infected crops) with labeled bactericide. This will protect healthy plants in the area and reduce the chance of spread while infected plants are disposed of.
- 2) Wait for treated crops to be completely dry. Bag symptomatic plants where they sit on the bench.
  - Remove symptomatic plants and a “buffer zone” of non-symptomatic plants within several feet surrounding them – especially if crops have been overhead irrigated. Dispose of all debris on growing surfaces with infected plants.
- 3) Throw infected plants in the garbage. Do not compost plants or save the containers/soil.
  - Refrain from using greenhouse carts to avoid contaminating equipment and spreading disease.
- 4) Treat all growing surfaces where infected plants were with a sanitizing agent.
  - Using 2 different sanitizers is a good insurance policy. For example, apply a peroxide-based product (ex. Zeritol) and allow to dry completely, then follow-up with a quaternary ammonia product (ex. KleenGrow, GreenShield II).
- 5) Quarantine other geraniums in the area for observation. Closely monitor all other geraniums on site.
  - If symptoms start to appear on geraniums in other production areas, send samples to a diagnostic lab for testing to confirm.

### **Chemical Control Options**

Copper-based products, mancozeb, and some biological/biorational products can prevent the spread of *Xanthomonas*. However, bactericides must be used preventatively. **Reactive application of IPM products to infected plants may slow disease progression but will not work curatively.** Products for preventative control of *Xanthomonas* include:

<b>Trade Name</b>	<b>Active Ingredient(s)</b>	<b>FRAC</b>	<b>Reapplication Frequency</b>
CuPro	copper hydroxide	M01	7 – 14 d interval
Phyton 27/35	copper sulfate pentahydrate	M01	7+ d interval
Protect Dithane	mancozeb	M3	10 – 14 d interval 7 – 10 d interval
Regalia	extract of <i>Reynoutria sachalinensis</i>	P5	7 – 10 d interval
Companion	<i>Bacillus subtilis</i> GB03		14 – 28 d interval
Stargus	<i>Bacillus amyloliquefaciens</i> F727	BM 02	7 – 10 d interval
Triathalon BA	<i>Bacillus amyloliquefaciens</i> D747		10 – 14 d interval
ZeroTol 2.0	hydrogen peroxide & peroxyacetic acid	NC	3 – 10 d interval

\*Trade names shown are examples of products labeled for controlling *Xanthomonas* that have been vetted as effective by controlled research trials. However, alternative products with the same active ingredient may be used in place of ones mentioned here.

### **Additional Resources**

[University of Massachusetts Geranium - Xanthomonas](#)

[BALL TECH ON DEMAND Geranium At Risk](#)

[University of Massachusetts Cleaning and Disinfecting the Greenhouse](#)

[GrowerTalks Examining Xanthomonas by Margery Daughtrey](#)

[BALL TECH ON DEMAND Sanitation](#)