

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.

How does it spread?

- Water such as splashing or overhead irrigation
- Plant debris

Managing an Infestation

****FIRST, have a disease diagnostic lab conduct tests to confirm whether Xanthomonas is the culprit.****

- 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 or soil.*
 - Refrain from using greenhouse carts to avoid contaminating equipment and spreading disease.
- 4) Use a sanitizing agent to treat *all growing surfaces* where infected plants were located.
 - Using TWO 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:

Trade Name	Active Ingredient(s)	FRAC	Reapplication Frequency
CuPro, Kocide 50DF	copper hydroxide	M01	7–14 d interval
Camelot O	copper octanoate	M01	7–10 d interval
Nordox 30/30	copper oxide + metallic zinc	M01	7–14 d interval
Nordox 75WG	copper oxide	M01	7–14 d interval
Cuprofix	copper sulfate	M01	7–14 d interval
Phyton 27 & Phyton 35	copper sulfate pentahydrate	M01	7+ d interval
Protect	mancozeb	M3	10–14 d interval
Dithane			7–10 d interval
Regalia	extract of <i>Reynoutria sachalinensis</i>	P5	7–10 d interval
Cease	<i>Bacillus subtilis</i> QST713	BM 02	7+ d interval
Companion	<i>Bacillus subtilis</i> GB03		14–28 d interval
Stargus	<i>Bacillus amyloliquefaciens</i> F727		7–10 d interval
Triathalon BA	<i>Bacillus amyloliquefaciens</i> D747		10–14 d interval
KleenGrow	didecyl dimethyl ammonium chloride	NC	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 <i>Xanthomonas</i> 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](#)