

# Controlling Bacterial Spot on Tomato and Pepper

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In recent years, growers in the southeastern U.S. have frequently had problems with bacterial spot on tomato and pepper. Four different species of bacteria are involved. One species attacks both tomato and pepper, while the other three infect tomato only.



Bacterial spot mainly damages leaves. Many small, dark spots appear first on older leaves at the base of the plant. Spaces in between spots may turn yellow. Spots quickly spread to blight and kill leaves. Dead leaves usually stay on tomato plants, but pepper plants drop severely diseased leaves. Leaf spots often can be seen on both the top and the bottom of leaves.



Green fruit on tomato and pepper may be spotted or scabbed. Once tomato fruit begin to turn red and the acid content increases, fruit can no longer be infected.



Bacteria may be present on seed, on transplants, and on debris from a previously diseased crop. Wind, rain, and humans spread bacteria from plant to plant. Blowing sand grains that injure leaves give the bacteria an easy entry points.

## Integrated Control

To control bacterial spot on tomato and pepper, growers must use an integrated approach that combines resistance, cultural practices, and spraying. Spraying — by itself — will not work well.

## Resistance

Growing resistant pepper varieties is the best control measure. It is the most cost-effective option that has no environmental impacts. All tomato varieties are susceptible to bacterial spot.

- Choose pepper varieties that are resistant to all 10 bacterial races currently known. As of August 2017, five varieties have complete resistance: PS 09942815, Antebellum, Green Machine, SV3255PB, and SDY 48.
- Pepper varieties with complete resistance do not need to be sprayed. All other pepper varieties must be sprayed (Table 1).

## Cultural Practices

### 1. Crop rotation

Rotate fields out of tomato and pepper for 12 months before planting either crop again. This “rest” period allows crop debris that carries bacteria to decay, which kills the pathogen.

### 2. Clean-up (sanitation)

- Promptly destroy crops after the last harvest to stop bacteria from multiplying in and on plants left in abandoned fields.
- Destroy spring crops before transplanting a fall crop on the same farm, so bacteria do not spread from one crop to the next.
- Do not replant into plastic or organic mulch used for a previous crop. Enough crop debris is left on or in the mulch to carry over the bacteria from crop to crop.

### 3. Spacing

The longer leaves are wet, the greater the risk of bacterial spot. Leaves dry faster after dew or rain when there is more space between rows and extra space between plants in rows. This helps reduce the severity of bacterial spot.

- Space rows 8 to 12 feet apart for tomato and 8 feet apart for pepper.
- Leave a minimum of 24 inches between tomato plants and 18 inches between pepper plants.

### 4. Handling plants

As most growers know, it is easy to spread bacteria when workers handle wet plants. Therefore, sucker, stake, tie, and harvest plants has dried plants have dried after dew or rain.

## HOR 04: Controlling Bacterial Spot on Tomato and Pepper

### Spraying

The four spray programs (Table 1) reduced severity of bacterial spot on tomato in two studies done at the University of Florida over several years.

- No products have curative activity; all spray programs must be started before bacterial spot symptoms can be seen.
- Begin sprays 2 weeks after transplanting in the spring and 1 week after transplanting in the fall.
- Spray on a weekly schedule.
- Use copper at the highest labeled rate. Do not mix copper with Actigard due to phytotoxicity of the mixture.

On fruiting vegetables, Actigard has a 14-day Pre-Harvest Interval (PHI), mancozeb has a 7-day PHI, and Tanos has a 3-day PHI. To make scheduling harvests easier, use Tanos + copper weekly after harvesting starts.

### Organic Control

Organic growers should follow the resistance and cultural recommendations given above with the following note. Certified organic growers are required to use certified organic seed unless certified seed is not available for a specific variety. In this case, certified organic growers may use non-treated seed with permission from the certifier.

Serenade plus copper (Table 1) is an approved organic treatment, as long as the certifier allows preventative treatments with copper and an organic-approved formulation of fixed copper is used. Several different copper products are approved by OMRI (Organic Materials Review Institute, [www.omri.org](http://www.omri.org)).

**Table 1. Four spray programs to manage bacterial spot on tomato**

Spray Program	Week 1	Week 2	Estimated Season Total Cost (10 sprays)
Copper <sup>a</sup> + mancozeb	Copper <sup>a</sup> + mancozeb (2 lb)	Copper + mancozeb (2 lb)	\$210
Actigard <sup>b</sup> alternated with copper + mancozeb	Actigard (0.4 oz)	Copper + mancozeb (2 lb)	\$176
Tanos + copper alternated with copper + mancozeb	Tanos (8 oz) + copper	Copper + mancozeb (2 lb)	\$280
Serenade + copper	Serenade (3 qt) + copper	Serenade (3 qt) + copper	\$370

<sup>a</sup> For rates, see copper fungicide labels. Use the highest labeled rate in all spray programs. For a list of copper fungicides, see the Southeastern U.S. Vegetable Crop Handbook ([www.thepacker.com/guides/pest-production-guides](http://www.thepacker.com/guides/pest-production-guides)).

<sup>b</sup> Do not spray Actigard on bell pepper; this is not a registered use. Actigard is registered on chili pepper. LEAP is a new systemic-acquired resistance activator similar to Actigard that is registered on bell pepper. Do not mix copper with Actigard.

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