

Plant Pathology Fact Sheet

Bacterial Canker of Tomato

by Kenny Seebold

Bacterial canker is a potentially serious disease of tomato that can occur in commercial plantings and home gardens. This infectious disease is capable of spreading rapidly, resulting in devastating losses. It is a particularly difficult disease to manage because not only is there no cure, but the pathogen can be hard to eradicate once it has been introduced into a greenhouse, garden, or field.



FIGURE 1. SYMPTOMS OF WILT DUE TO BACTERIAL CANKER

SYMPTOMS

Tomato plants of all ages are susceptible to bacterial canker; all above-ground parts are susceptible. Symptoms on seedlings include

small, water-soaked lesions on foliage; stunting; and wilting. Seedlings affected by bacterial canker will die in many cases.

Wilting is also evident in field plants and is often the first symptom to be observed (FIGURE 1). Infected stems split, resulting in the open cankers that give this disease its name (FIGURE 2). When cut lengthwise, diseased stems show a reddish-brown discoloration of the vascular system. The pith may be discolored and grainy (mealy) or pitted. Wilting and vascular discoloration are indicative of a systemic infection of the tomato plant.



FIGURE 2. MARGINAL NECROSIS OF LEAVES, CALLED "FIRING"



FIGURE 3. CLOSE-UP OF THE FOLIAR “FIRING” SYMPTOM

Secondary symptoms appear as a marginal browning or necrosis (also called “firing”) on older leaves (FIGURES 3 & 4). Firing occurs when the populations of *Cmm* present on the leaf surface cause foliar infections. A yellow margin may border the brown tissue and affected leaves tend to curl upward.

The primary fruit symptom occurs as raised lesions with white margins. These “bird’s eye” spots, which are roughly 1/16 inch in diameter, reduce fruit quality. A yellow to brown internal breakdown of the fruit can occur when the bacterium invades the fleshy tissue.

CAUSE AND DISEASE DEVELOPMENT

Bacterial canker is caused by the bacterium *Clavibacter michiganensis* subsp. *michiganensis* (*Cmm*). This organism is introduced into plantings primarily via infected seed or transplants. *Cmm* can be present in low levels on symptomless plants, multiplying rapidly when favorable weather conditions are present. Once the bacterium enters through leaf stomata and/or small wounds, systemic infection occurs. The pathogen is spread within plantings by splashing rain and by human activity. Warm temperatures (75°F to 90°F) along with high moisture or relative humidity favor disease development. Once established, *Cmm* can survive on plant residues for as long

as 3 years, and will persist on stakes and equipment for up to 7 months.

DISEASE MANAGEMENT

Control of bacterial canker can be difficult once symptoms are observed. A preventive disease management program is the best defense.

Planting stock

Use certified pathogen-free seed and transplants. Avoid saving seed from previous crops unless necessary (i.e., heirloom tomatoes). If seed must be saved, avoid collecting seed from obviously diseased plants.



FIGURE 4. STEM CANKER AND PITH NECROSIS SYMPTOMS

Seed can be hot-water treated or soaked in a solution of bleach (1 part bleach to 3 or 4 parts water). Producers of heirloom tomatoes should use one of these methods routinely since they face a greater risk from seedborne pathogens. For more information on seed treatment, refer to Appendix I in the UK Cooperative Extension Service Publication ID-36, *Vegetable Production Guide for Commercial Growers*.

Crop rotation

Rotate away from tomatoes and other solanaceous crops for at least 3 years.

Sanitation

Remove symptomatic seedlings in the greenhouse as quickly as possible and destroy them. Greenhouses should be cleaned and sanitized thoroughly between

production cycles; sterilize containers, benches (and other surfaces), and tools with a solution of 1 part bleach to 9 parts water (10 percent). Do not re-use potting media.

In the garden or field, symptomatic plants and their immediate neighbors should be removed from the production area and buried or incinerated; however, this may not be practical if more than a few plants are affected. Stakes from infested fields should also be destroyed. If bacterial canker was a problem in the previous year, implements, tools, and cages should be sanitized prior to use.

Cultural practices

Irrigate early in the morning to minimize the length of time that foliage is wet, whether in the greenhouse or field. If possible, use drip irrigation or a soaker hose rather than overhead irrigation once plants are in the garden or field. Avoid working tomatoes

when the foliage is wet because bacterial canker can easily be spread when stringing, suckering, or harvesting. Incorporate crop residues as quickly as possible at the end of the season to promote thorough breakdown of potentially contaminated plant material.

Chemicals

Applications of fixed copper plus mancozeb may reduce epiphytic (superficial) populations of *Cmm* before symptoms appear, but they generally have little impact on disease control.

ADDITIONAL RESOURCES

- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky)
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

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