UofA UNIVERSITY OF ARKANSAS DIVISION OF AGRICULTURE
Cooperative Extension Service

Sherrie Smith
Rick Cartwright

SPDN Southern Plant Diagnostic Network

Department of Plant Pathology

PLANT HEALTH CLINIC NEWS

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This bulletin from the Cooperative Extension Plant Health Clinic (Plant Disease Clinic) is an electronic update about diseases and other problems observed in our lab each month. Input from everybody interested in plants is welcome and appreciated.

Tomato

Its tomato season and we're starting to see a lot of tomato problems. **Bacterial stem rot** is one of the bacterial diseases of tomato that causes wilt. The causative agent is *Erwinia carotovora* subsp. *carotovora.* It is found most often on staked or trellised tomatoes as a result of pruning wounds. The removal of suckers and leaves is the most common way injuries occur that allows entry of the bacterium. The first symptom is a wilt of the plant at first fruit harvest or later. The pith usually disintegrates, causing a hollow stem symptom. The stem becomes wet and slimy from bacterial growth in the pith area. Pinching the stem will detect the hollow area. Occasionally, the outer stem turns black and sloughs off. Control is achieved through the use of good sanitation practices. All crop debris should be rigorously cleaned up every season.

Tomato Stem rot

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Tomato Stem rot

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Bacterial canker

Bacterial canker is caused by the bacterium *Clavibacter michiganensis* subsp. *michiganensis*, and is easily confused with Bacterial stem rot. Bacterial canker also causes a wilt of the plant. First symptoms are a downward turning of lower leaves, marginal necrosis of leaflets, wilting of leaflets, and the upward curling of leaflet edges. Adventitious roots may develop on the stem and a prominent white zone is often found at the nodes. Stems may or may not develop externally discolored streaks with stem cankers forming. Stem cankers do not, however, always form. Internally, the stem tissue first becomes streaked with light yellow to brown streaks which later turn reddish brown. This is particularly obvious at the nodes. What differentiates this Bacterial canker and Bacterial stem rot from Bacterial wilt is the absence of copious amounts of bacterial streaming from a cut stem. Bacterial canker produces only a moderate amount of streaming. Sometimes pale green to creamy-white blister-like leaf spots may be found. These spots are surrounded by dark rings of dead tissue. The fruit symptoms have similar spots, referred to as bird's-eye spot. Clean seed and disease-free transplants are the best methods of avoiding bacterial canker. Clippers and pruning tools should be disinfected between plantings and rows. Stakes that are reused should be washed with a 1% bleach solution. Tomato debris should be removed from the field or incorporated to aid in decomposition. Crop rotations for 3 seasons with a non-host crop are very helpful in fields with a history of bacterial canker.

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Tomato Bacterial canker

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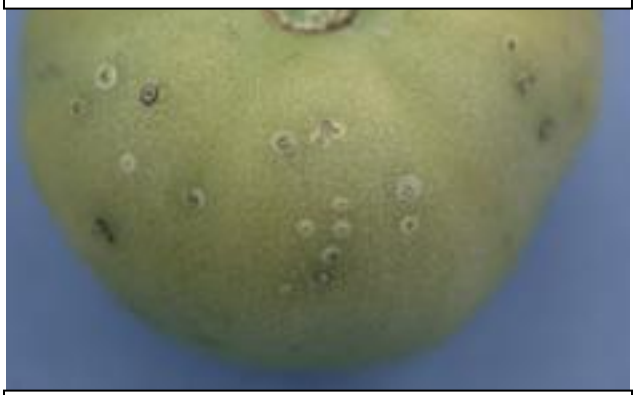
Tomato Bacterial canker



Mary Ann Hansen, Virginia Polytechnic Institute and State University, Bugwood.org

Bacterial wilt

The symptoms of bacterial wilt, caused by *Ralstonia solanacearum*, are wilting of younger leaves, followed by a rapid wilting of the entire plant. This bacterial disease is easily distinguishable from other bacterial and fungal wilts. If the stem is cut and suspended in water, a white, milky stream of bacterial cells and slime start flowing from the cut end in 3-5 minutes. If the infection is severe the water becomes milky in 10-15 minutes. The best defense against this bacterial wilt disease is the use of resistant cultivars and crop rotation.

Bacterial wilt

J.P. Jones APS Image Library

Bacterial spot

Bacterial diseases of tomato and pepper are endemic wherever these crops are grown. Bacteria spot, caused by *Xanthomonas campestris* pv. *vesicatoria* affects all aboveground parts of the plant. Lesions are generally brown and circular on the leaves, stems, and fruit spurs. The spots are water soaked during wet or rainy periods. During dry periods the center of the lesions may fall out, giving a tattered appearance. Fruit lesions begin as tiny raised blisters. They reach 6.35mm (1/4inch) in diameter as they age, becoming brown, and scab-like. A

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developing lesion may have a faint to prominent halo that eventually disappears. The pathogen survives in seed, crop debris, and volunteers. Control measures consist of crop rotation, using clean transplants, seed treatments, elimination of cull piles near production areas, and the timely application of bactericides when necessary. Kocide is labeled for tomato in Arkansas for bacterial diseases.

Bacterial spot

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Pepper bacterial spot

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Bacterial speck

Bacterial speck is caused by *Pseudomonas syringae* pv. *tomato*. Lesions on leaflets are round, dark brown to black. Large areas of tissue may be killed as spots coalesce. Lesions on stems and peduncles are elongated. Fruit lesions are minute specks that are dark and rarely exceeding 1mm (.04inch). A dark green halo may be associated with the fruit spot. Controls are the same as for Bacterial spot.

Bacterial speck

APS Images

Bacterial speck lesion on stem

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Bacterial speck on leaves

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Fusarium wilt

Young plants are often stunted with drooping leaves. The bases of infected stems become enlarged. On older plants the symptoms often develop on one side of the plant with leaflets turning yellow and drooping. The remaining foliage eventually turns yellow followed by wilting and eventual collapse of the plant. The pith remains healthy, but the vascular tissue becomes dark brown. This symptom is adequate for diagnosis of fusarium wilt. There is no cure or treatment. Plants with Fusarium wilt should be pulled up and destroyed. Resistant varieties are available.

Late blight

Late blight, caused by *Phytophthora infestans*, is a very destructive disease of both tomato and potato. The clinic has been seeing more Late blight than usual due to the continual cool, wet weather. Leaf symptoms begin as indefinite, water-soaked spots, which enlarge rapidly into pale green to brown lesions and cover large areas of the leaves. When humidity is high, the undersides of the lesions may be covered with a gray to white moldy growth. Infected stems and leaves becomes brown, shrivels, and dies. Fruit lesions appear as dark, olive-green to brown greasy spots that may enlarge and encompass the entire fruit. Soft rot of the fruit follows.

Fusarium wilt

USDA Cooperative Extension Slide Series, Bugwood.org

Late blight

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Eliminating cull piles and tomato crop debris is vital in reducing inoculum sources for this disease. There are no real sources of resistance. Fungicides are essential when weather conditions favor the development of Late blight. Quadris, Cabrio, Ridomil gold, and Gavel are labeled for Late blight.