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Arkansas Plant Health Clinic Newsletter

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Tomato

Pith Necrosis

Bacterial diseases of tomato and pepper are endemic wherever these crops are grown. Tomato Pith Necrosis caused by the bacterium *Pseudomonas corrugata,* and other *Pseudomonas* spp. is widespread in some tomato growing regions. It primarily affects older plants and symptoms usually do not show until fruit begin to develop. Early symptoms are wilting of young foliage and chlorosis and wilting of older leaves. Leaves often curl up and turn brown on their margins. Dark brown to black lesions develops on the surfaces of lower stems. Inside the affected stems, the pith tissue is darkly discolored and eventually becomes chambered and hollow. Adventitious roots may grow from these sections of symptomatic stems. The symptoms may advance up the stems with eventual collapse and death of the plant. Pith necrosis is more common with low night temperatures, high nitrogen levels, and high humidity. It is thought that the disease is possibly seedborne. Control recommendations are avoidance of excessively high nitrogen fertilizers, and overhead sprinkler irrigation. Workers should avoid working among the plants while foliage is wet. Rotation is perhaps the best tool.

Tomato Bacterial Pith Necrosis- *Pseudomonas corrugata, Pseudomonas* spp.

Photo by Jason Pavel, University of Arkansas Cooperative Extension

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Tomato Bacterial Pith Necrosis-

***Pseudomonas corrugata*, *Pseudomonas* spp.**

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Bacterial Stem Rot

Bacterial Stem Rot of tomato occurs in both the greenhouse and the field and is most common on trellised and staked tomatoes. The causal agent is Pectobacterium carotovorum syn. Erwinia carotovora subsp. carotovora. Wilting of the plant typically starts at the time of first fruit harvest. The pith disintegrates leaving a hollow stem. You may determine the hollow stem syndrome by pinching the stem. When the stem is cut open, a brown discoloration is observed. Occasionally black slimy lesions form on the outer surface of a stem. The stem becomes black and sloughs off easily. Wounding is the route by which the bacterium enters the plant. Good sanitation practices and crop rotation are the means used to control Bacterial Stem Rot.

Tomato Bacterial Stem Rot-

Pectobacterium carotovorum* syn. *Erwinia carotovora* subsp. *carotovora

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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Tomato Bacterial Stem Rot-

Pectobacterium carotovorum* syn. *Erwinia carotovora* subsp. *carotovora

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Bacterial Canker

Bacterial Canker, caused by the bacterium Clavibacter michiganensis subsp. michiganensis, is easily confused with Bacterial Stem Rot. Both diseases cause 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. However, stem cankers do not 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 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. Dark rings of dead tissue surround these spots. 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.

Tomato Bacterial Canker-

Clavibacter michiganensis* subsp. *michiganensis

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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Tomato Bacterial Canker-*Clavibacter michiganensis* subsp. *michiganensis*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Tomato Bacterial Canker-*Clavibacter michiganensis* subsp. *michiganensis*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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. There will be a dark discoloration and soft rot of the pith. This bacterial disease is easily distinguishable from other bacterial and fungal wilts. A simple lab test method is diagnostic. Cut the stem and suspend in a glass of water. In 3-5 minutes, a milky exudate will begin streaming from the cut end. 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.

Tomato Bacterial Wilt-*Ralstonia solanacearum*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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Tomato Bacterial Wilt-*Ralstonia solanacearum*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Tomato Bacterial Wilt-*Ralstonia solanacearum*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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. Practice a three-year rotation where no peppers, tomato, eggplant or potato is grown in that spot. Additional measures consist of using clean transplants, seed treatments, elimination of cull piles near production areas, and the timely application of bactericides when necessary. Practice a preventive copper + mancozeb spray program from bloom until the first-formed fruit are 1/3 their final size. Kocide is labeled for tomato in Arkansas for bacterial diseases.

Tomato Bacterial Speck-*Pseudomonas syringae* pv. *tomato*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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Tomato Bacterial Speck-
Pseudomonas syringae* pv. *tomato

Photo by John Gavin, University of Arkansas Cooperative Extension

Tomato Bacterial Speck-
Pseudomonas syringae* pv. *tomato

Photo by John Gavin, University of Arkansas Cooperative Extension

Tomato Bacterial Speck-
Pseudomonas syringae* pv. *tomato

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Bacterial Spot

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. Lesions may enlarge and coalesce to blight large portions of the leaf surface. 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

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blisters. They reach 6.35mm (1/4inch) in diameter as they age, becoming brown, and scab-like. A developing lesion may have a faint to prominent halo that eventually disappears. The pathogen survives in seed, crop debris, and volunteers. Controls are the same as for Bacterial speck.

Tomato Bacterial Spot-
Xanthomonas campestris* pv. *vesicatoria

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Tomato Bacterial Spot-
Xanthomonas campestris* pv. *vesicatoria

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Pepper Bacterial Spot-
Xanthomonas campestris* pv. *vesicatoria

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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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.

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