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Kern County Vegetable Crops

July 2019

Bacterial Canker in Tomatoes

Bacterial canker, caused by *Clavibacter michiganensis pv. michiganensis* is a very destructive disease of tomatoes found throughout the world. Periodic outbreaks of this disease have a great potential to cause significant damage to tomato crops. Initial inoculum can come from several sources such as contaminated seed, diseased transplants, infested plant debris, infected volunteer tomato plants and weeds, seedling flats, and contaminated wooden stakes. The pathogen spreads easily in the field through worker movements, equipment, or by irrigation water and infects plants through natural openings (hydathodes), and abrasion wounds. The pathogen can survive in soil for short periods in the non-decomposed previous tomato crop debris. Both primary (systemic/vascular) and secondary (foliar) infections on tomato plants can result in significant damage.

Symptoms

Initial symptoms appear as curling, wilting and marginal necrosis of lower leaves, which sometimes may be limited to one side of the plant (Pic 1, 2). Leaf symptoms are often described as ‘firing’ due to the yellowing and scorched appearance. As the leaves wilt and die, the petiole remains green, attached and turgid. Light brown streaks may develop on the stems and these streaks darken with time. Stems can develop cracks and can split open paving way for secondary spread. Light brown to reddish brown discoloration develops in the vascular tissues especially at the nodes and near the soil line (Pic 3). Small creamy white erumpent

Pic 1: Yellowing and marginal necrosis of leaves

spots with brown centers develop on the fruits. These characteristic ‘birds-eye’ spots later become brown and necrotic (Pic 4). Overall, the pathogen causes extensive wilting, necrosis and eventually death of the plants in the field. Infections tend to be more severe in heavily fertilized young plants such as greenhouse-produced transplants. Plants infected later in the season may be less affected, however early infections may result in extensive damage.

Pic 2: wilting and yellowing of leaves

Pic 3 Vascular discoloration in the stem

Pic 4 'Bird-eye' spots on fruits

Management

Bacterial canker may be one of the most difficult to manage diseases of tomatoes due to challenges in diagnosis, secondary spread in the field and various sources of inoculum.

1. Disease free seed: The most effective strategy is to use disease free certified seeds and transplants. Hot water treatments or the standard hydrochloric acid method can be used for seed disinfestation. However, the hydrochloric acid treatment may not treat the pathogen present under seed coat.

2. Disease free transplants: Use sterilized potting mix, clean and disinfect flats, racks and stakes used in the greenhouse. Remove all plant material from the greenhouse before starting a new crop of transplants. Minimize hours of leaf wetness and regulate pressure from overhead irrigation to prevent wounding of transplants.
3. Early detection: If infection occurs early in the season, remove and destroy infected plants. Also, remove healthy plants adjacent to the diseased plants.
4. Clean fields: Clean equipment and other tools in between planting. Minimize worker movement when the plants are wet. Always disinfest tools when handling or pruning plants. Control solanaceous weeds and volunteer plants. Discard wooden stakes from the infected fields.
5. After harvest, make sure to incorporate all the plant tissue to ensure good decomposition. Once the residue decomposes, the pathogen will not survive in soil and the field will not be at risk of canker.
6. Copper fungicides offer limited benefits against systemic infections as these acts only on the surface. However, use of bactericides may be justified during wet weather.
7. Crop rotation: rotate out of the tomato crop for about two years.
8. Currently, there are no resistant varieties for bacterial canker.

If the disease is suspected in the field, please contact your local farm advisor for diagnosis or use Agdia Immunostrips for *Clavibacter michiganensis* subsp. *michiganenis* (Cmm) for quick diagnosis in the field. There are other diseases with similar symptoms such as Fusarium wilt, verticillium wilt, and pith necrosis. Therefore, it is recommended to get the plant samples tested by a certified laboratory.

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