Plant Disease and Insect Advisory

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Bacterial Canker of Tomato

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Bacterial canker was recently observed in a commercial tomato planting. Bacterial canker is caused by the bacterium *Corynebacterium michiganensis*, one of the few gram-positive bacteria that cause disease in plants. The disease is a sporadic but very damaging where it occurs. In Oklahoma, canker has been observed in both field and greenhouse tomatoes.

Bacterial canker can be difficult to diagnose because a variety of symptoms may occur and the canker symptom (stem lesion) is not always produced or is a minor component of the symptom complex. More often the disease causes a systemic infection of the pith or xylem. Plants affected early in their development wilt and die and the disease may be confused with bacterial wilt. Plants infected when older develop a leaf scorch (Fig 1) and begin dying from the bottom up (Fig 2). Splitting the stems of severely affected plants reveals streaks of yellow to reddish brown internal discoloration. Eventually the pith becomes reddish brown in color and mealy in texture. Whitish cankers or blisters on stems and petioles in the upper portion of affected plants may develop (Fig 3). The "bird's- eye" spots may also develop on fruit and can be useful in diagnosing the disease because of their distinct appearance. Fruit spots are small (1/8 to 1/4 inch in diameter) with raised brown centers surrounded by a white halo (Fig 4). Plants that are infected early are killed while those that become infected through spread of the bacterium within the fields may only develop leaf scorch and fruit symptoms.

Fig 1. Leaf scorch on tomato caused by bacterial canker.

Fig 2. Tomato foliage killed by bacterial canker.

Fig 3. White blisters on stems caused by bacterial canker.

Fig 4. Fruit spots caused by bacterial canker.

The bacterium is carried on seed and transplants, and can survive short periods (less than one year) in soil, contaminated greenhouse structures, and wooden tomato stakes. The bacterium survives for longer periods in plant debris and may cycle on nightshade weeds and volunteer tomato plants in the field. In the field, the bacterium is spread by splashing water and wind-driven rain; contaminated equipment; and by pruning, staking, and harvesting activities.

Control of bacterial canker requires strict sanitation and an integrated management strategy. Clean seed and transplants are important for preventing the introduction of the pathogen into greenhouses and fields. Purchase hot-water treated seed or assume that the seed is contaminated and apply a chlorine bleach seed treatment. The chlorine treatment involves soaking seed in a solution of 1 part household bleach (5.25% sodium hypochlorite) and 2 parts water for 1 minute followed by rinsing, drying, and treatment with a fungicide seed treatment. Transplants in the greenhouse should receive a streptomycin spray program prior to transplanting in the field. A weekly spray program with bactericide (copper) is recommended after transplanting. Remove and destroy diseased crop debris or incorporate it into soil soon after harvest is complete. Practice crop rotation with crops other than tomatoes and peppers to avoid carryover of bacteria from year to year. If tomato stakes from a problem field are to be reused, they should be soaked in a 1% bleach solution.

Cucurbit Foliar Disease Update

John Damicone, Extension Plant Pathologist

Anthracnose: Rainy weather this spring and early summer has been favorable for disease development. I recently observed severe anthracnose on cucumbers (Fig 5). Anthracnose is a chronic problem in watermelon, cucumber, and cantaloupe following warm and rainy weather. The disease overwinters on crop debris, seed, and volunteers. A preventive spray program with chlorothalonil (e.g. Bravo) or mancozeb (e.g. Dithane) is effective against anthracnose and other foliar diseases. The spray program should be initiated at early bloom, before symptoms

of disease appear. A base program consists of a minimum of three applications on two week intervals. The interval should be shortened to 7 days during periods of rainy weather or if disease(s) appear.

Fig 5. Anthracnose on cucumber leaves.

Downy mildew: Downy mildew is typically a late-season disease in Oklahoma that does not develop until August. It normally is severe on watermelon, cantaloupe, and cucumbers; and is not a problem here on squash and pumpkin (Fig 6). The disease does not over-winter in Oklahoma but rather spreads northward each year on cucurbit crops. Infected cucurbit crops serve as sources of spore that can survive long-distance aerial transport during cloudy weather. Spores are deposited into new cucurbit fields during rain events. There is a national monitoring program for downy mildew this year for the first time. We have monitoring sites in Stillwater, Lane, and Ft. Cobb OK that were planted in June. There has been no downy mildew found yet in Oklahoma in 2008. The disease has been a major problem this year in the eastern U.S. Sources of this disease nearest Oklahoma are in southeastern Texas and Louisiana (Fig 7). Disease spread in the US and forecasts for potential development in Oklahoma can be monitored at http://www.ces.ncsu.edu/depts/pp/cucurbit/. The protective fungicide program described above is a good start against downy mildew should it become a problem here in 2008. The spray interval will need to be shortened to 7-days and maximum rates of chlorothalonil or mancozeb will have to be used along with other fungicides if and when downy mildew threatens.

Fig 6. Downy mildew on watermelon

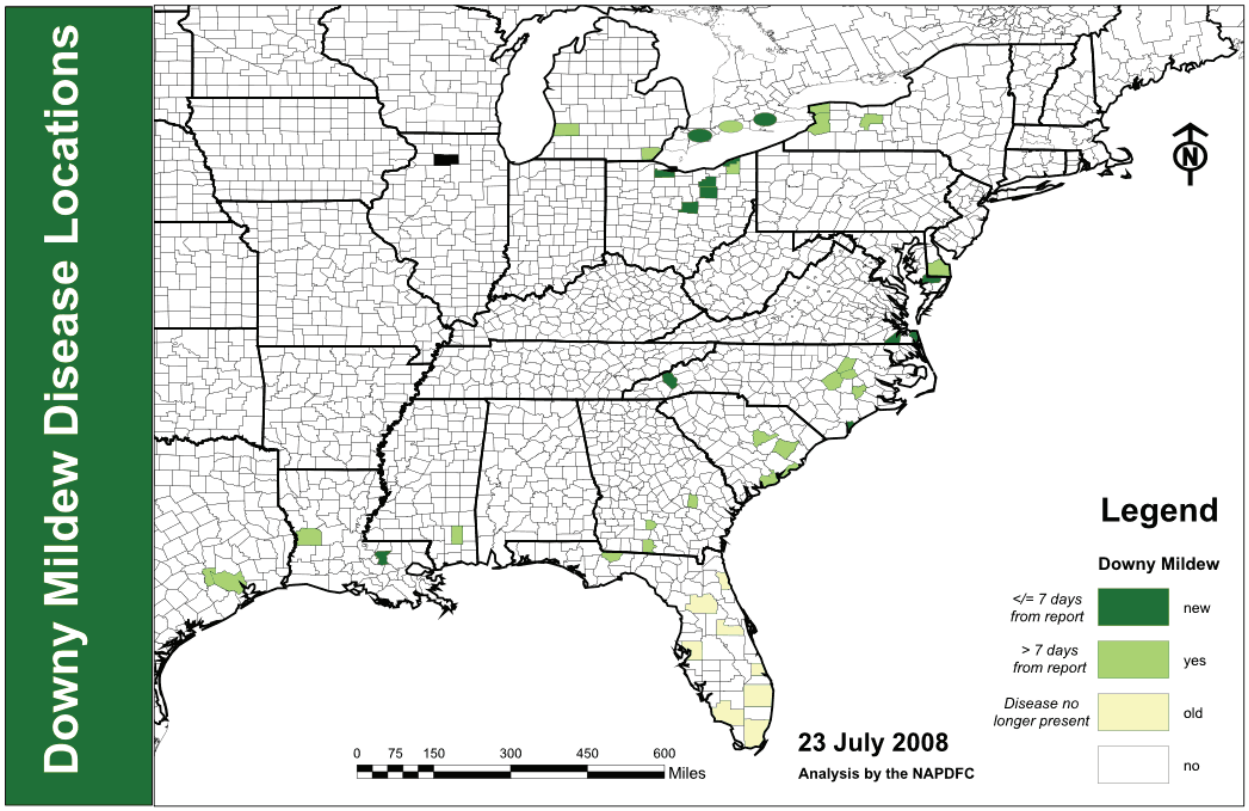

Fig 7. Distribution of cucurbit downy mildew in the US to date in 2008.

Powdery mildew: This disease is mostly a problem on squash and pumpkin, and although it affects susceptible varieties of all cucurbits crops (Fig 8). Good resistance is available in cucumber and pumpkin. Powdery mildew on squash has been light so far but expect the disease to become a problem on pumpkins when temperatures cool in the fall. A base fungicide program for pumpkins should consist of three applications on a 14-day schedule beginning about August 1 to Aug 15. Sulfur and the DMI (triazole) fungicides Nova and Procure are most effective on powdery mildew. Sulfur should not be used on watermelons.

Fig 8. Powdery mildew on pumpkin.

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