Tomato Bacterial Diseases of 2014

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The 2014 growing season brought serious bacterial disease outbreaks in many tomato fields across New York. The three most common **bacterial diseases** of tomato in New York are bacterial canker, caused by *Clavibacter michiganensis* subsp. *michiganensis*, bacterial speck, caused by *Pseudomonas syringae* pv. *tomato*, and bacterial spot, caused by several species of *Xanthomonas* including *Xanthomonas euvesicatoria*. It has been my experience that bacterial canker and bacterial speck are much more common than bacterial spot here in New York. However in 2014 my lab did isolate the bacterial spot pathogen from several fields. While copper can be effective in controlling bacterial diseases, it is difficult to control spread under conducive environmental conditions particularly with wind-blown rain. Cultural practices are a critical component to control of tomato bacterial diseases, and it is important to clean and disinfect anything that may have come into contact with plants. This includes greenhouse tables, benches, floors, hoses, flats, containers, pruning shears, trellising stakes and anything else that could come into contact with the plants. It is important to do thorough cleaning **even if you had no disease last year**. Pathogens could still be present in the greenhouse or on trellising stakes from the previous season and spread to healthy transplants under optimal environmental conditions.

Symptoms of **bacterial canker** can include wilting of plants (often only on one side of the plant), and production of cankers on the stem, but frequently in New York we see curling of leaflets, browning of the leaflet margin and fruit symptoms. The disease can become so severe that total defoliation occurs. This bacterial pathogen can spread systemically through the xylem of a plant, so once a plant is infected there is little that can be done. The most characteristic symptom of this disease is the production of bird's-eye lesions on the fruit with dark centers surrounded by a white ring, but fruit symptoms are not always present. Studies in my lab have shown that tomato fruit are most likely to become infected when they are small (less than ½ inch in diameter), so it is important to apply copper when the fruit are small. Using a DNA fingerprinting method, we have assayed over 50 isolates of the bacterial canker pathogen from NY. Isolates have been collected since 2004, and we now know that while new isolates do enter the state (probably on seed or in transplants) we are also harboring some isolates over winter on-farm. Thus, sanitation is critical in controlling this pathogen.

Bacterial speck was very common in 2014, and seemed to spread quickly perhaps due to cool and wet growing conditions at several times during the season. Symptoms of bacterial speck can occur anytime during the growing season and include small (1/16-1/8 inch) dark brown to black lesions on leaflets and fruit. Foliar lesions are surrounded by a yellow halo, and can be confused with early symptoms of septoria leaf spot or early blight. Bacterial speck lesions are usually first seen on interior leaflets or parts of the plant that are shaded in the morning and have longer periods of leaf wetness. While resistant varieties are available for processing tomatoes, breeders are currently working on getting this resistance into fresh-market varieties. We now have a fairly large collection of isolates of the bacterial speck pathogen, and are studying the diversity in NY.

Bacterial spot thrives in warm (or hot) wet conditions, and is a huge problem annually in Florida and even devastated fields in Pennsylvania in 2014. The bacterium that causes bacterial spot on tomato can also cause bacterial spot on peppers. Symptoms are similar to bacterial speck, but lesions are larger and have a bit of a water-soaked or greasy appearance. As with the other bacterial diseases, symptoms can occur on foliage, stems and fruit. There are actually three different (but related) bacteria that can cause bacterial spot, and we are currently confirming the species present in NY.