

Title:

Report on the Eastern New York Bacterial Canker Cultural Practice Demonstration

Grant source:

New England Vegetable Growers Association - \$1000 for transportation expenses

Project Leader:

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Project Cooperators and Locations:

John Gade - Albany, Richard Ball - Schoharie and Richard Moses - Washington Counties. Applicable throughout the Northeast

Abstract:

For Northeast vegetable growers, bacterial canker can be a very serious tomato production problem. Bacterial canker is difficult to control because early symptoms are difficult to detect on infected seedlings or plants. Bacterial canker can spread quickly and easily. There are many sources of inoculum. There is no chemical treatment that is effective. Researchers have concluded the foundation of control lay in sanitation and preventive measures. Not all growers have an ongoing problem with bacterial canker. Working with five vegetable growers who have a chronic problem with bacterial canker, the goal of this demonstration was to see if hot water seed treatments would reduce bacterial canker in the field. A hot water bath was obtained for the growers to use. Two of the five growers did not hot water treat their seed as the seed was fungicide coated and they did not want to wash it off. Three growers used the hot water treatment on seed. One grower saw a reduction of disease levels while the other two growers did not see any significant reduction in the amount of bacterial canker in the field. The conclusion we drew from this was the growers needed to do a better job with all the other sanitary practices from the greenhouse to the field.

Background:

Tomato production in New York is estimated at \$12,300,000 (1999 Census of Agricultural Statistics) and although acreage of tomatoes grown is not large, the value of the crop is high. Tomatoes are grown in almost all the growing areas and locally-grown and fresh tomatoes are a staple at most roadside farm stands, farmer's markets and many supermarkets. Depending on the year, losses to growers can be in the 80-90% range. Not every farm has serious losses. Certain farms have bacterial problems every year to some degree. On wet years, those farms can experience staggering losses. Growers have asked why neighboring farms often do not seem to have the problem.

Bacterial canker is difficult to control. The disease has many sources of inoculum. Bacterial canker can start from infected seed, contaminated greenhouse conditions, over-wintering disease infected tissue in the field and plant contact with inoculum from many different sources (equipment, irrigation, staking, etc.). Once seedlings are growing, bacterial symptoms are very difficult to detect due to the vascular nature of the disease.

Bacterial canker is probably surviving on-farm over the winter and we need to focus on greenhouse sanitation and cultural practices. If new strains are identified, this may indicate that the pathogen is arriving on contaminated seed and that seed treatments are necessary. Many studies have shown that both clean seed and sanitation are crucial to maintaining bacterial canker-free tomatoes.

To control bacterial canker, multiple strategies must be employed. First, the pathogen can be seed borne, and thus the control strategy must begin with the seed. Second, the pathogen can survive in the greenhouse, on transplanting trays and on stakes, so sanitation of all materials used in the propagation of the plants is essential. Third, the highly infectious nature of the disease, the presence of sources of inoculum, and the absence of effective chemicals for treatment mean that sanitation and preventive measures must be enforced throughout the life of the tomato plant.

Objectives:

- 1) Evaluate hot water seed treatment and see if it has an impact in reducing bacterial canker in the field.
- 2) Disseminate the results throughout New York and Massachusetts (New England) via field meetings conference presentations, newsletter articles, etc

Procedures:

Beginning in February, a seed hot water bath was passed between the five growers. The farms participating in this demonstration were chosen because they have had ongoing, year in year out, problems with bacterial canker. Each grower had expressed a strong desire to eliminate canker from their farms and a willingness to cooperate in the various practices involved. Two of the five growers decided not to hot water treat their seed. They had purchased seed with fungicide seed treatments and did not want to wash the fungicide off the seed. Tomato seed lots were divided into two groups with one group hot water treated (HWT) and the other group was not treated.

Greenhouses were sanitized and the treated seedlings were kept as separate as possible from the other untreated seedlings and the rest of the tomato crop. The tomato seedlings were transplanted to the field and inspected weekly for signs of bacterial canker. Each week the plants were rated on a 0 to 5 scale, 0 being no bacterial canker present and 5 indicating heavy bacterial canker infestation levels.

While the growers agreed to hot water treat their seed, there was considerable worry as to whether the germination of the seed would be decreased. In the end, this was not a problem.

Results:

Schoharie Trial

	<u>6/14/05</u>	<u>6/21/05</u>	<u>6/28/05</u>	<u>7/5/05</u>	<u>7/19/05</u>	<u>7/26/05</u>	<u>8/2/05</u>
1) Sunstart (HWT)	0	1	1.5	1.5	2	3	4
2) Puebla (HWT)	0	1	1	1.5	1.5	2	3
2) Carolina Gold	1	1	1.5	2	2.5	3.5	4.5
2) Sunstartion (HWT)	1	2	2	2	2.5	3	4
3) Sunshine (HWT)	1	2	2	2.5	2.5	3	4
3) Sunstartion (HWT)	0	1	1.5	2	2	2.5	3
7) Sunstart	1	2	2.5	3.5	4	4.5	5
8) Sunchief (HWT)	1	2	2.5	2.5	2.5	3	4
9) Jolly Elf	0	1.5	2	3	3.5	4	5
10) Sunstart (HWT)	0	1	1.5	1.5	2.5	4	4.5

There were no differences between the hot water treatment and the seeds that did not receive the HWT. It was felt the seedlings were infected somewhere in the greenhouse or it was also possible the field location chosen was heavily infected with bacterial canker in the soil.

Albany Location

	<u>7/2/05</u>	<u>7/9/05</u>	<u>7/22/05</u>	<u>7/29/05</u>	<u>8/5/05</u>	<u>8/19/05</u>
Sebring - HWT	0	0	1	1	1.5	2
Sebring - HWT	0	0	0	0.5	0.5	1
Mt. Fresh	0	0	0	0.5	1	1.5
Mt. Fresh	0	0	1	1.5	2	3
Sebring	0	0	1	2	2.5	4
Sebring	0	0	0.5	1.5	2	3
Sebring	0	0	0.5	1	1.5	2.5

While bacterial canker infections did not start till later in the season compared to the Schoharie location, the disease did come into the crop. It is possible the dry summer contributed to the lateness of the disease infection but again, there does

not appear to be any difference between the HWT and the non-treated seed. Disease levels by the end of the season in the field were not very high in either treatment.

Washington location

<u>Variety</u>	<u>6/16/05</u>	<u>6/23/05</u>	<u>6/30/05</u>	<u>7/8/05</u>	<u>7/22/05</u>	<u>7/29/05</u>	<u>8/18/05</u>
Mt. Fresh 1	0	0	0.5	0.5	1.5	3	4.5
Mt. Fresh 1 (HWT)	0	0	0	0	0	0.5	0.5
Sunbrite 2 (HWT)	0	0	0	0	0.5	0.5	1
Sunbrite 2	0	0	0	0.5	1	2.5	4
Mt. Fresh 2 (HWT)	0	0	0.5	0.5	0.5	1	1.5
Mt. Fresh 2	0	0	0	0.5	1	1.5	2.5
Sunbrite 3	0	0	0.5	0.5	1.5	2.5	4
Sunbrite 3 (HWT)	0	0	0	0	0	1	2
Mt. Fresh 3 (HWT)	0	0	0	0	0.5	1	2

The Washington County location did seem to show that the HWT seed in the long run had lower levels of bacterial canker. By July 22 almost all the plants showed some levels of bacterial canker but by August 18 the untreated plants showed generally twice the bacterial canker levels. It is possible this grower was more successful with his greenhouse sanitary practices than the other two growers.

Discussion:

The growers were not eager to try hot water treatments for their tomato seed. All expressed fear the treatment would decrease germination. One grower fell asleep while treating his seed. He estimated his seed was “cooked” for an additional 20 minutes to half hour. When planted, none of the three growers seed showed reduced germination. All the growers said they learned that seed treatment is not such a bad thing. All the growers felt they could do a better job with greenhouse sanitation.

The Washington county trial results may show a reduction in bacterial canker but this trial would have to be replicated in order to demonstrate positive results conclusively.

It must be remembered these growers have year in, year out bacterial canker problems on their farms. What this trial clearly shows is that one technique alone will not eliminate bacterial canker. The complete spectrum of greenhouse and field sanitation needs to be carried out in order for the disease to be eliminated.