

Ralstonia solanacearum - Should Vegetable Growers be Concerned?

Sally Miller

What is it?

Ralstonia solanacearum causes southern bacterial wilt of solanaceous crops such as potato, tomato, pepper, tobacco and eggplant in tropical and sub-tropical regions throughout the world, including the southern U.S. Geraniums and certain weed species are also hosts. The bacteria infect plants through roots, natural openings and wounds, often resulting in plant death. The disease is very destructive, and crop losses of 80% or more are not uncommon in areas in which the pathogen occurs. Until recently we have not been very concerned about this disease in the northern tier states and Canada because the common form, called race 1, does not survive the winter in temperate climates. However, another form, called race 3 biovar 2, has surfaced recently. Thought to have originated in the highlands of Peru, this form of the pathogen survives in colder climates and has become a problem for potato growers in Europe, where it causes a disease known as brown rot. Because this form of the pathogen is not considered established (endemic) in the U.S. and has the potential to cause serious losses in food crops, it has been listed as a "select agent" under the Agricultural Bioterrorism Act of 2002.

What has happened so far?

In late fall of 2002, *Ralstonia solanacearum* race 3 biovar 2 was introduced into the U.S. on geranium cuttings from a commercial propagation facility in Kenya. They were rooted at U.S. greenhouses in two states and rooted cuttings were widely distributed. As of April 23, 2003, the pathogen has been detected in geraniums in greenhouses in 26 states, including seven greenhouses in Ohio. One case has been reported in Ontario, Canada. State Departments of Agriculture are carrying out aggressive inspection and testing programs in cooperation with U.S. producers and the USDA; through crop destruction where necessary, quarantine and strict sanitation, it is hoped that the spread of this pathogen will be contained. *Ralstonia solanacearum* race 3 biovar 2 does not spread through air or to a significant extent in splashing water. However, it is very easily moved around in sub-irrigation water, by vegetative propagation and by handling plants.

What does this mean for vegetable growers?

We cannot predict the success of the eradication programs described above. However, eradication efforts after another introduction in 1999 were successful and the pathogen did not become established. If you notice typical symptoms of southern wilt in tomatoes, peppers, etc. (wilting, usually followed by plant death), contact your county agent or send samples directly to the C. Wayne Ellett Plant and Pest Diagnostic Clinic, Ohio State University, Kottman Hall, Columbus, OH 43210. Images of tomatoes and potatoes with symptoms of southern wilt are available on the following USDA APHIS (Animal and Plant Health Inspection Service) website:

<http://www.aphis.usda.gov/ppq/ep/ralstonia/gallery/index.html>. Symptoms on eggplant are shown below. Keep in mind that symptoms of several other diseases, such as Phytophthora blight and Verticillium and Fusarium wilts, also include wilting and plant death.

Figure 1. Bacterial wilt of eggplant caused by *Ralstonia solanacearum* race 1. Photo taken in the Philippines (Sally Miller, Ohio State University).

Source information for this article came from the following websites:

www.growertalks.com/ralstonia/

<http://www.growertalks.com/ralstonia/ralstonia1.asp>

www.aphis.usda.gov/ppq/ep/ralstonia/

<http://www.aphis.usda.gov/ppq/ep/ralstonia/gallery/index.html>

New Weed Threatens Ohio Vegetable Producers

Douglas Doohan, Extension Weed Ecologist

Ohio growers need to be on the look-out for the invasive weed, apple of Peru (Figure 1 a & b). We first encountered this new species in Sandusky and Seneca County in August 2002. Although a few local growers thought it was 'just another weed', we don't think so. According to Country Springs Crop Scout, Jerry Cunningham, he first saw the weed 4 or 5 years ago. Since then it has spread rapidly in the Fremont and Seneca areas and can now be found on about 2,000 acres. One 20 acre pepper field in Seneca County had up to 12 apple of Peru plants per square yard in one part of the field. Some plants were up to 6 feet tall! What particularly alarmed us was that apple of Peru had survived and prospered in this field that had been in corn and Roundup Ready Soybeans for the previous 10 years. Also, the pepper crop had been sprayed with Dual Magnum and Command before planting, cultivated three times and hand weeded once. It was obvious that this new weed was a worthy adversary! Since then we have continued to work on apple of Peru, testing its sensitivity to various herbicides and comparing its growth rate to closely related weed species in the Solanaceae, such as eastern black nightshade. Herbicide tests have helped us understand why it survived so well in the Seneca County pepper field. In the greenhouse it was completely tolerant of field rates of Dual Magnum and Command. It also tolerated several other herbicides including ALS inhibitors that are used on soybeans and vegetables. Apple of Peru, grows much faster than eastern black nightshade, indicating that it will likely be more competitive and cause greater yield losses. We've learned that at least two more outbreaks of apple of Peru exist; the tomato producing area in the mountains of NC and TN and in west GA where peanuts are the crop infested. It also turns out that apple of Peru is a serious problem in other parts of the world. It is one of the worst weeds in the soybean growing areas of Brazil. How does apple of Peru survive herbicide treatments in Roundup Ready Soybeans? We're not sure, but we think it germinates and produces seed after herbicide applications are complete. Sandusky County OSUE Agent Mark Koenig found plants in several soybean fields late last year.

The North Central Pest Management Center at Michigan State University has given our laboratory a \$10,000 grant to conduct a survey of fields in NW Ohio this summer to delineate the infestation. We've also received a smaller grant from the Ohio Fruit and Vegetable Research and Development Program to test herbicides on apple of Peru. Some growers wonder if money from the check-off program should be used to conduct research on this new weed. I've wondered about that too, but only for a few seconds. My wish is that apple of Peru does turn out to be 'just another weed', like some others that have shown up in Ohio fields. My justified fear is that apple of Peru turns out to be more like velvetleaf, giant ragweed and giant foxtail, species that 30 to 40 years ago, many farmers thought were just other weeds. The apple of Peru infestation may yet be small enough that spread to other areas may be prevented and present infestations eradicated if the industry acts quickly. However figuring out how to do this will take time and money. We have applied to OARDC for a Small Industry Matching Grant for the money we will receive from OFVRDP, and we've also applied for a competitive USDA grant to support research in OH, NC and GA.

What can you do? Watch for apple of Peru in your fields and your neighbors. In NW Ohio call Mark Koenig, OSUE Agent for Sandusky County, or call me (330 202 3593) or send an email (doohan.1@osu.edu). We will come and check your field and give you advice on control. Watch VegNet and the Weed Workshop (www.oardc.ohio-state.edu/weedworkshop) for more information and tips on identifying and controlling apple of Peru. Plan on attending a workshop at the OARDC Vegetable Crops Branch in Fremont on tentatively scheduled for June 4th (8 AM) and the Vegetable Grower Tour scheduled for that area on June 19th.

Figure 1. a) Mature apple of Peru in pepper field in Seneca Co., OH and b) flower, leaf and lantern-shaped seed fruits of apple of Peru.

Crop Reports May 9, 2003
Hal Kneen & Bob Precheur

Southeast:

Scattered rainfall this past week from trace amounts up to 4 inches including hail in some areas. Starting to stake tomatoes as some plants have been out for 4 weeks, Plants are growing rapidly and flowering and setting fruit with warm nights above 50 degrees. Tomato growers are being forced to move to 20 lb flat boxes rather than the traditional handle baskets.

Peppers, cucumbers and tomatoes are planted for this season. Melons are being transplanted this weekend if rain permits.

Continuing to plant sweet corn probably until June 10th. Sweet corn is growing real well and at various stages of development.

Plasticulture strawberry picking began 2 days ago.

Cabbage is moving along and first harvest to be around Memorial day.

Central:

Sweet corn on plastic in about the 10-12 leaf stage. Corn on bare ground at 6-8 leaf stage. Plasticulture strawberries are about 10-15 days from first harvest depending on how much of the warm weather hangs around. Planting operations have been interrupted due to rainfall every other day. Some areas are getting heavy downpours. Asparagus and rhubarb picking in full swing.

What's New At The VegNet Web Site

Problem Of The Week

A pictorial comparison of Squash Vine borer damage and Bacterial Wilt in pumpkins. While the symptoms are similar, there are some key differences.

Check it out. Click on the 'Problem of the Week' button of the left side.

Highlights From the Pumpkin and Muck Crops Field Days

Couldn't make it to Celeryville on July 25th or forgot about The Pumpkin Field Day on August 7th, then take a look at just a few of the highlights from these two field days.

Click on the 'Talk Between The Rows' button on the VegNet homepage.

2001 Slide Presentations

Pepper Variety Slides 2001 | HTML Slide Show

Pumpkin Variety Slides 2001 | HTML Slide Show

Go to the Library Section under Research Reports.

VegNet Vegetable Schools

A series of slide presentations are now available in order to update you on the latest pumpkin and sweet corn research. We begin with 6 pumpkin topics in Pumpkins

101 and have 10 slide presentations available in Sweet Corn 101. In sweet corn.

Powerpoint presentations and html online slide shows are available now. Go to the VegNet homepage.

Pumpkins 101

The use of trap crops and Admire for cucumber beetle control and New varieties for 2001. We have presentations on cover crops for disease control and pumpkin fungicide use.

Perimeter Trap Cropping. Online html slide show | Perimeter Trap Cropping. PPT, 7 Mbytes

See also the Research Results section on the home page for text version of the report.

Pumpkin Variety Slides 2001 | HTML Slide Show

Sweet Corn 101

Presently only Powerpoint presentations available. Coming Soon: Online HTML slide shows. Check back often Nine topics including:

Aspects of Variety Selection based on Disease Control [ppt 40 KB]

Internet Link To "Reactions of Sweet Corn Hybrids to Prevalent Diseases" Dr. Jerald Pataky www.sweetcorn.uiuc.edu

Producing Early Sweet Corn [ppt 3.5 Mbytes]

Managing Weeds in Sweet Corn [ppt, 9 Mbytes]

Sweet Corn Herbicides & Variety Sensitivity. [ppt 2Mbytes]

Sweet Corn Development and Critical Periods for Irrigation Management [ppt 1.6 Mbytes]

Flea Beetle Management in Sweet Corn [ppt 510 KB]

How To Keep Worms Out of Sweet Corn Ears [ppt 8.3 Mbytes]

Role of Bt Transgenic Hybrids in Sweet Corn Pest Management. [ppt 21.2 Mbytes]

Bt Sweet Corn Efficacy in OH, 1999-2000 [ppt, 208 KB]

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