

# Plum Pox in North America - A Tough Nut to Crack!

Sara R. May<sup>1</sup>, Karen L. Snover-Clift<sup>2</sup>, Ruth A. Welliver<sup>3</sup>, John M. Halbrendt<sup>1</sup>, Blake Ferguson<sup>4</sup>, Mike Tiffany<sup>5</sup>, Jan Byrne<sup>6</sup>

<sup>1</sup>Department of Plant Pathology, The Pennsylvania State University, University Park, PA; <sup>2</sup>Department of Plant Pathology, Cornell University, Ithaca, NY; <sup>3</sup>Pennsylvania Department of Agriculture, Harrisburg PA; <sup>4</sup>Canadian Food Inspection Agency, London, ON; <sup>5</sup>Agdia, Inc., Elkhart, IN; <sup>6</sup>Department of Plant Pathology, Michigan State University, East Lansing, MI

## PPV History



Plum pox findings in Europe

Plum pox, also known as Sharka, was first reported in 1915 in Bulgarian plums. From there, it was eventually detected throughout western and eastern Europe, with Spain being the most recent European country to find it in 1984. PPV was first detected in the Western Hemisphere in Chile in 1992.

### Known hosts of plum pox virus

Main Hosts	Other Hosts	Artificially Infected Hosts**
Peach	Wild plum	Flowering plum
Common plum	Cherry plum	Manchu cherry
Japanese plum	Dwarf flowering almond*	Purple leaf sand cherry
Apricot	Blackthorn	Sand cherry
Nectarine	Japanese flowering cherry	

\*Dwarf flowering almond is the only ornamental found to be naturally infected

\*\*Infected in a lab and may be less susceptible in nature

## Plum Pox in PA - Initial Identification

A grower in Adams County first recognized the unusual symptoms of PPV on Encore peach. A representative from the Pennsylvania Department of Agriculture visited the site on September 23, 1999 and collected samples. Initial results indicated that PPV was the cause, so samples were sent to the U.S. Department of Agriculture (USDA). On October 12, 1999, the USDA identified PPV as the cause of the problem and identified it as Strain-D.



Symptoms on Encore Peach in PA  
Image by Jerome L. Frعون, Rutgers Cooperative Research and Extension of Gloucester County

## PPV Surveys in North America

**1999** – In October, PPV was confirmed to be present in PA. A survey of the surrounding area was quickly conducted to determine the extent of the disease.

**2000 – 2002** – A three-year national survey was initiated in 38 states within the U.S. as part of the Cooperative Agricultural Pest Survey (CAPS) program. In 2000, Canada also began a national survey.

**2000** - PPV was not found in any state other than PA. In Canada, PPV was discovered on the Niagara Peninsula in Ontario and at one location in Nova Scotia.

**2001** – In PA, the PPV survey found the first PPV positive trees outside of the orchard setting in residential areas within the quarantine zone. All other states surveyed in the U.S. were PPV negative. PPV positive trees were also found in Canada.

**2002** – In the third year of the national survey in the U.S. all states were negative for PPV except for PA, where the positives were still limited to a localized area in southeastern PA. Positive trees were also identified in Canada, but the numbers were less than those found in 2000 and 2001. It was decided to continue the national survey; however, after the negative results this year, the national survey in the U.S. was scaled back to concentrate on high-risk areas of the country (PA, CA, NJ, NY, MD, MI, and SC).

**2003** – This was a good year for detecting PPV due to sufficient rain and cooler temperatures. Again all states surveyed were negative except for PA where a slightly higher number of positive trees were found. In Canada PPV was also detected and the number of positive trees were slightly higher than in 2002 but the numbers were still less than in 2000 and 2001.

**2004** – Six *Prunus*-producing states were surveyed in addition to PA. 82,132 leaf samples and 14,310 fruit samples were collected and tested nationwide. All states had negative samples except for PA. In Canada, survey results revealed significantly lower levels of PPV.

**2005** – Three *Prunus*-producing states were surveyed in addition to PA. All states were negative again except for PA. Again in Canada there were lower numbers of PPV positive trees. It was determined that surveys in 2006 would not take place outside of PA and Canada.

**2006** – It was decided to do one more year of surveys in states outside of PA. This was the first year that PPV was detected in the U.S. outside of PA, with positive finds in both New York and Michigan. Due to favorable weather for detecting PPV, slightly higher numbers of positive trees were found in Canada, but the number was still lower than any year before 2005.

## Plum Pox in New York

• NY planned to process 10,000 survey samples for PPV in 2006.

• On 7/10/2006 the 1<sup>st</sup> find of PPV on two plum trees from Niagara County was confirmed by the U.S. Department of Agriculture's National Plant Germplasm and Biotechnology Laboratory in Beltsville, MD. An additional 20,000 survey samples were proposed.

• On 8/21/2006 a 2<sup>nd</sup> find of PPV on peach from another location in Niagara County was confirmed. Additional samples were proposed for 2006.



PPV symptoms on European Plum

Image by R. Scorza, USDA, Appalachian Fruit Research Station, Kearneysville WV

## PPV – The fight rages on!

Location	Number of samples tested since 2000	Trees Destroyed since 2000
Pennsylvania	Over 1.3 million	1,614 acres of commercial orchards and 214 homeowner properties have received orders to remove one or more trees
Canada	3,477,000	266,000 trees removed so far mostly in commercial orchards
New York	155,915	The PPV positive trees have been removed
Michigan	180,000	The PPV positive tree has been removed

### Quarantined areas in Pennsylvania



•Survey data indicates that the eradication program in PA is working.

• A large portion of the quarantine zone has been rescinded for 2007 because it has remained free of PPV for three years.

•Surveys to detect reservoirs of PPV in native plants have been negative.

•The Pennsylvania Department of Agriculture, in collaboration with USDA/APHIS, has determined that eradication of PPV is feasible and remains the best approach to safeguard the US stone fruit industry from this disease.

### Quarantined areas in Canada



## Plum Pox in Michigan

• 2,500 samples were collected under the CAPS program in 2006.

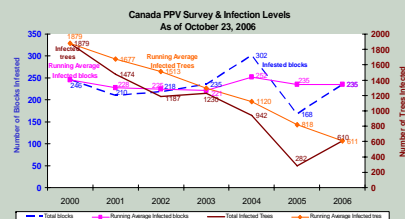
• On 8/11/2006 the USDA lab in Beltsville, MD confirmed the presence of PPV on a plum sample from the Southwest Michigan Research and Experiment Center (SWMREC).

• After this positive find, host trees within a 5 mile radius of the positive tree were surveyed including all 14,000 host trees at the SWMREC

• A total of 53,244 samples were processed in 2006. All but the one plum sample have tested negative.

### Pennsylvania Surveys 2000 – 2006 in Four county Quarantine area (Adams, Cumberland, Franklin, and York counties)

Year	Orchard Samples	Homeowner Samples	Other Samples	Total Samples	Total Positives	% Positive
2000	51,429	547	586	52,562	399	0.776
2001	80,012	5,556	1,326	86,894	27	0.034
2002	90,388	15,748	1,913	108,049	7	0.008
2003	155,970	36,530	6,845	199,345	11	0.006
2004	166,306	42,730	2,059	211,095	4	0.002
2005	213,005	51,158	3,280	267,443	5	0.002
2006	166,522	5,702	4,418	216,642	6	0.002



## 2007 Plans

**Pennsylvania** – Survey will focus first on the four counties where some quarantine has been in place. Survey numbers should be similar to 2006 (262,086 samples). Quarantine and eradication guidelines will follow previous years.

**Canada** – 900,000 samples are planned and eradication of infected trees and exposed orchard blocks will continue.

**New York** – Planning to process 100,000 samples.

**Michigan** – Planning to sample the same 5 mile radius around the positive find and hope to also survey 25% of the susceptible *Prunus* statewide. Quarantines will soon be put into place by the Michigan Department of Agriculture.

These plans can only be effective with the availability of funding for surveys and compensation for eradication efforts.