Joint Effort to Wipe Out this Disease

New York State Department of Agriculture & Markets (NYSDAM) &

United States Department of Agriculture –Animal & Plant Health Inspection Service (USDA-APHIS)

Working together to protect NY & US agriculture
Joint Effort to Wipe Out this Disease

Collaborating with key New York Partners

**Dr. Marc Fuchs**, Associate Professor
Plant Pathology and Plant Microbe Biology

**Dan Donahue**, Senior Extension Educator – Tree Fruit
ENY Commercial Horticulture Program
NYS Department of Agriculture & Markets

NYS PPV Program Coordinator:
Patricia Sierzenga, Horticultural Inspector 2, NYSDAM

Survey Staff:
Matthew Sweeney, Assistant Horticultural Inspector 2, NYSDAM
Diane Obusek, Assistant Horticultural Inspector 2, NYSDAM
Sean Beckinghausen, Julie Berlinski & Noah Bixby
  - Assistant Horticultural Inspector 1, NYSDAM

Administrative Staff:
Christopher Logue, Director of Plant Industry, NYSDAM
Margaret Kelly, Assistant Director of Plant Industry, NYSDAM
United States Department of Agriculture

Administrative Staff NY:
Mafalda Weldon, NY SPHD, PPV Program Director

Field Staff NY:
Stephen Kubber, PPQ Officer
Barbara Hammerstone, Supervisor USDA APHIS PPQ
Matthew Bradford, Plant Health Safeguarding Specialist

USDA-APHIS-PPQ National:
Don Seaver, National Program Staff Scientist
Lynn Evans-Goldner, National Policy Manager – Pest Mgt.
What is Plum Pox Virus (PPV)?

- Most devastating viral disease of stone fruit
  - From the genus *Prunus*
  - Also known as *Sharka* (Slavic name)
- The virus reduces fruit yields and the marketability of the fruit
- This ends the tree’s productive life
What is Plum Pox Virus (PPV)?

- Can infect all cultivated stone fruit species including:
  - Peach, Plum, Apricot, Nectarine, Almond, Sweet & Sour Cherry
  - Wild & Ornamental Prunus

- Seven strains of PPV have been identified worldwide: D, M, El-Amar, C, W, Rec, & T

- **ALL** United States occurrences of PPV thus far have been attributed to strain D
  - New York has PPV strain D
  - Cherries are NOT affected by the strain of PPV we have in New York
What is Plum Pox Virus (PPV)?

- PPV – D does NOT infect all *Prunus* species

- Main stone fruits of concern:
  - Apricots (*Prunus armeniaca*)
  - Common Plum (*Prunus domestica*)
  - Japanese Plum (*Prunus salicina*)
  - Peach (*Prunus persica*)
  - Nectarine (*Prunus persica var. nucipersica*)

- Poses **NO** Danger to Consumers
What is Plum Pox Virus (PPV)?

PPV (strain D) Susceptible Species

- Fruit Bearing
  - American Plum & Wild Plum
  - Apricot
  - Cherry Plum / Myrobalan Plum
  - Common Plum / European Plum
  - Japanese Plum
  - Sweet Almond
  - Peach
  - Nectarine

- Ornamental
  - Purple Leaf Sand Cherry
  - Purple Leaf Plum
  - Purple Leaf Peach
  - Flowering Almond
  - Western Sand Cherry
  - Black Thorn & Sloe
  - Kwanzan Cherry
  - Japanese Flowering Cherry
  - Nanking Cherry & Hansen’s Bush Cherry
  - Double Flowering Plum
What is Plum Pox Virus (PPV)?

PPV Origin

- **1910**: Virus first reported in Bulgaria (Infected Bulgarian Plums)
  - Spread slowly throughout Eastern Europe
- **1950’s-1970’s**: Spread throughout Western Europe
  - Moved into North Africa, Middle East, India, China
- **1992**: Virus detected in Chile
- **1999**: Virus detected in Pennsylvania, USA
- **2000**: Virus detected in Ontario & Nova Scotia, Canada
- **2006**: Virus detected in Michigan, USA
- **2006**: Virus detected in New York, USA
What is Plum Pox Virus (PPV)?
What is Plum Pox Virus (PPV)?

PPV Symptoms

- **Leaf**
  - Yellow or light green ring patterns, bands or blotches

- **Fruit & Pit**
  - Yellow or light green ring patterns, bands or blotches
What is Plum Pox Virus (PPV)?

PPV Symptom Information

- Vary with timing of infection, cultivar, species, and environment
- Often not apparent until 3 years or more after infection
- Occur sporadically
  - Uneven distribution within the tree
- Newly infected trees are rarely symptomatic
- Symptomless trees act as a silent virus source
What is Plum Pox Virus (PPV)?

PPV Transmission

To a New Region:
1) Propagative Material
   - Grafts
   - Budwood
2) Distribution of Contaminated Material
   - From infected nursery stock
   - From infected plant material to a new location

Once infected, the virus is systematic and occurs in the cytoplasm of the cells in some parts of the plant

Local Transmission:
1) Aphids
2) Propagative Material
What is Plum Pox Virus (PPV)?

Why Eradicate?

- To stop the spread of the Virus in the United States

Significant Economic Losses:
- Jeopardizes our $1.4 million stone fruit industry
- Reduces fruit yield, fruit marketability & shortens productive lifespan of orchards
- Renders stone fruit trees useless for fruit tree production
Following the discovery of PPV in New York State, the U.S Secretary of Agriculture declared an emergency to effectively carry out an eradication program in the State

**Plum Pox Virus Program**

- New York State Department of Agriculture and Markets, Division of Plant Industry, Plum Pox Survey Eradication Program (NYSDAM)
Plum Pox Virus Survey

NYSDAM Commercial Orchard Survey
Block Information

- **Block Code**
  - Each block of Prunus is given its own individual identification code
  - **34-015-01**
    - 34 = County Code
    - 015 = Individual Grower Code
    - 01 = Block Number

- **Start Tree**
  - The first tree in every block is regarded as the start tree
  - This tree will have a cow tag around its trunk with the block code written on the tag

All Grower information remains confidential.
Plum Pox Virus Survey

Sampling Methods

1) 1 Tree 1 Sample
   - 8 Leaves from each tree
   - 100% of trees surveyed

2) 2 Tree 1 Sample
   - 4 leaves from tree #1 &
     4 leaves from tree #2
   - 100% of trees surveyed

3) Modified Quadratic
   - 50% of trees surveyed

4) Quadratic
   - 25% of trees surveyed
All surveyors will be wearing NYSDAM T-Shirts and carry official identification cards with name and photo.
Plum Pox Virus Survey

Sampling

- Photograph of leaves with sampling tags
- Photograph of leaves in a sealed plastic bag
PPV Testing Process

- Leaf petioles aligned
- 0.5 Grams of tissue are cut from each sample
- Grinding Buffer added
- Remaining tissue stored in cooler
Plum Pox Virus Survey

PPV Testing Process

- Sample is ground with a tissue homogenizer
- Leaf extract is tested for PPV with ELISA in microtiter plates using specific antibodies
Plum Pox Virus Survey

PPV Testing Process

- Three Day Process
- If virus is present, the liquid in the well will turn yellow
- Any sample reading 2 times higher than the negative control is flagged as a suspect
Plum Pox Virus Survey

PPV Testing Process

- If the tissue was flagged as a suspect:
  - Remaining tissue will be sent to the USDA Beltsville Lab for retesting and confirmation
  - The suspected tree and neighboring trees will be all be re-sampled and sent for testing

- RT-PCR Testing
  - Reverse Transcription Polymerase Chain Reaction
  - Make diagnosis with a low concentration of virus
  - 5000 times more sensitive than ELISA
PPV Testing Process

- If retested samples are positive:  
  - Destruction orders will be issued

Virus Management:
- No chemical control available to prevent, eliminate or cure PPV
- The spread of the disease is controlled by eliminating infected trees
PPV Management

Destruction Orders:
- All Infected trees within a 50 meter radius around the positive tree must be removed and destroyed
- Sucker shoots also need to be removed
Plum Pox Virus Survey

Destruction Photos
Plum Pox Virus Survey

Destruction Photos

11/29/2010

11/29/2010
Plum Pox Virus Survey

Required Removal Compensation:

- 85% Federal
- 15% State

Removal Costs:
- New York State reimburses up to $1,000 per acre
Once the disease becomes established

- Control and prevention measures include:
  - Elimination of infected trees in nurseries and orchards
  - Field surveys
  - Use of only certified nursery materials
  - Establishment of a Regulated Area
  - Established of a Nursery Stock Regulated Area
Plum Pox Virus Survey

Regulated Area

- 1 mile radius surrounding the location where plum pox virus has been detected

Regulated Area Protocol:

- Growers, Nurseries & Distributors:
  - **No** Planting
  - **No** Propagation,
  - **No** sale of susceptible fruit-bearing & ornamental varieties
Nursery Stock Regulated Area (NSRA)

11.5 kilometer radius surrounding the location where plum pox virus has been detected

The following Cities, Hamlets, Towns & Townships are under Quarantine for PPV:

- City of Beacon in Dutchess County, New York
- City of Poughkeepsie in Dutchess County, New York
- Town of Fishkill in Dutchess County, New York
- Town of Poughkeepsie in Dutchess County, New York
- Town of Wappinger in Dutchess County, New York
- City of Newburgh in Orange County, New York
- Town of Newburgh in Orange County, New York
- Hamlet of Marlboro in Ulster County, New York
- Town of Marlborough in Ulster County, New York
- Town of Plattekill in Ulster County, New York
Nursery Stock Regulated Area (NSRA) Protocol:

- **Commercial Stone Fruit Orchardist:**
  - YES Planting
  - NO Propagation

- **Nursery Growers & Distributors:**
  - NO Planting
  - NO Propagation
  - NO sale of susceptible fruit-bearing & ornamental varieties UNLESS you have a NYS Compliance Agreement
    - With compliance agreement, can only sell within NSRA
Nursery Stock Regulated Area (NSRA) Map

Plum Pox Virus Quarantine 2015-2016
Dutchess, Orange, and Ulster Counties
Draft

Regulated Area
Quarantine Area
Nursery Stock Regulated Area
Border Survey
2015 Total Samples: 2,436
PPV Survey - Niagara County

Woodlots Survey

2014 Total Samples: 1,487
Plum Pox Virus Survey

Path to Eradication

2015 Hudson Valley Survey

Ulster County: 10,718 Samples
Orange County: 9,562 Samples
Columbia County: 2,165 Samples
Dutchess County: 553 Samples
Plum Pox Virus Survey

Path to Eradication

After Positive PPV Detection:
- Beginning of Intensive Sampling
  - 3 Continuous Years of Clean Survey
    - Release of Regulated Area (1 mile zone)
  - 6 Continuous Years of Clean Survey
    - Release of Nursery Stock Regulated Area (11.5km zone)