

# PLANT & PEST ADVISORY

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## Plum Pox Virus

*Norman Lalancette, Ph.D., Plant Pathology and Jerome L. Frecon, Agricultural Agent*

**P**lum Pox Virus (PPV), a serious disease infecting peaches, nectarines, apricots, almonds, plums and other fruit and ornamental *Prunus species*, was recently found on peaches and plums in Pennsylvania. This potentially devastating disease has previously never been found in North America. PPV was first identified in Bulgaria about 1918. Since then, it has been found in all European countries, Egypt, Turkey, Syria, India, and most recently Chile. The latest information indicates that more than 100 million *Prunus sp.* fruit trees are infected in Europe. Strict quarantine regulations have until this time kept it out of the US.

We observed symptoms on Encore peach samples brought to the Fruit Variety Showcase by a grower from Adams County, PA on September 9, 1999. After comparing these symptoms to plum pox pictures in the *Compendium of Stone Fruit Diseases*, published by the American Phytopathological Society, an e-mail describing the symptoms was sent to peach scientists. Digital pictures were taken and e-mailed to responding scientists. Peach pathologists and virologists suggested indexing the fruit for plum pox and other viruses, and viroids. This information was relayed to The Pennsylvania State University Cooperative Extension staff and faculty at the Fruit Research Station in Biglerville.

After extensive investigative work and utilization of the latest virus identification technology, the USDA Animal Plant Health Inspection Service (APHIS), the USDA Agricultural Research Service (ARS), and the Pennsylvania Department of Agriculture (PDA) determined that the virus was plum pox, strain D. The identification was based on the use of a number of serological and laboratory tests. Currently the virus has been found in 14 orchard blocks of trees in Latimore and Huntington Townships in Adams County, PA within a 2 mile radius of the 13.5 acre peach orchard where we saw the original fruit with the plum pox symptoms.

We are concerned about this serious disease and are providing this information for a number of reasons:

- a) the size and importance of our peach industry in New Jersey;
- b) the symptoms were found on Encore which is one of our most important varieties;

**SEE VIRUS ON PAGE 2**



*Plum Pox Virus on Encore Peach Photo by Jerome L. Frecon*

**VIRUS FROM PAGE 1**

- c) many of the peach trees planted in New Jersey come from Adams County nurseries.

According to information provided by the PDA, many trees have been tested in other areas of Adams County and no positive samples have been found in the townships where the *Prunus sp.* nursery trees are grown. One of the nurserymen has assured us no positive readings have been found in their nursery stock, and many of the trees are being shipped from production sites in other states where the virus has never been reported. A letter has been mailed by this nursery describing the steps they will take in shipping nursery stock, which trees were grown in their Pennsylvania nursery, and which trees were not grown in Pennsylvania and will be shipped. Copies of this letter are available from the Rutgers Cooperative Extension Office in Gloucester County.

The goal of all parties concerned in educating and investigating PPV is to determine how the virus got to Adams County and how to eradicate it so it does not spread to other areas.

**Symptoms**

Leaf symptoms in plums consist of pale green chlorotic leaf spots, rings and lines that are visible from early summer until defoliation. These markings can become necrotic. Markings are usually restricted to a few leaves per tree. These symptoms are difficult to see and do not stunt the tree. In peaches the virus appears in the first leaves to expand and consists of chlorotic vein clearing, vein banding, and twisting of the leaf lamina. Leaf symptoms in apricots are similar to those in plums but are less noticeable.

Symptoms on the plum fruit consist of bleached or light colored rings and blotches in fully expanded fruit. These markings tend to disappear as the fruit

colors and reaches maturity. Sunken rings and spots occur on some cultivars. Red rings and spots can occur on the stones. Red rings and spots can occur on the stones. Affected plums are low in sugar and tasteless. Plums will drop prematurely and help in identifying infected trees in a block. Peach fruit exhibit pale or dark rings, lines and spots that disappear at ripening. The Encore fruit pictured maintained these symptoms throughout storage. Affected peaches are sometimes deformed. Apricot fruit can exhibit the most severe symptoms, similar to plum, but more severely marked, misshapen fruit, with flavorless and dry flesh around the stone, which is marked with pale rings, lines or spots.

**Causal Agent**

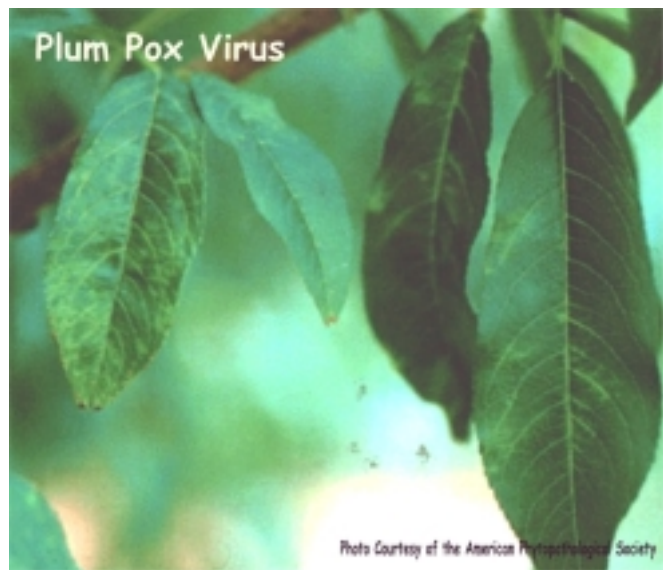
Plum pox is a member of the potyvirus ( potato virus Y) group. There are two major serogroups of PPV: the M strain or Marcus serotype and the D strain or Dideron serotype. The D strain, which was the one identified in PA, incites less severe chlorosis and necrosis than the M strain. Other strains of PPV have recently been isolated from sour and sweet cherry.

**Disease Cycle**

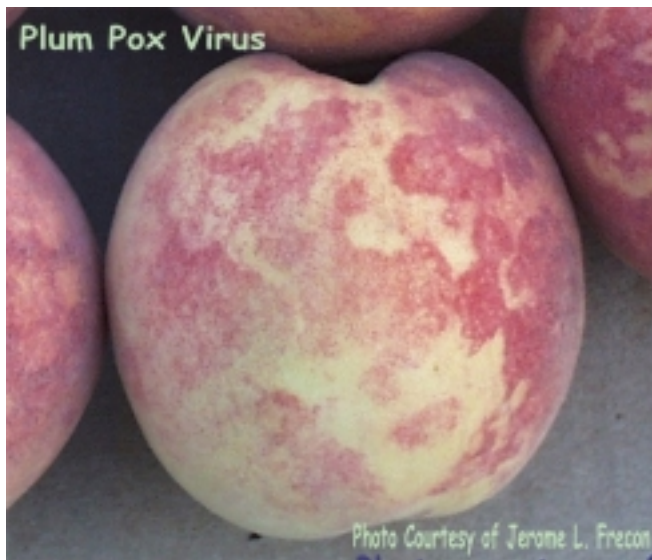
Unlike plant pathogenic fungi, viruses cannot penetrate plant tissue on their own accord. Thus, they need a vector or some other mechanical means of entry into plant tissue. In the case of PPV, aphids are known to transmit PPV in a non-persistent manner, which means the virus persists in the aphid's mouthparts for only a few to several hours after feeding on an infected host. Results of studies examining the spatial spread of PPV by viruliferous aphids indicates that aphids preferentially move to trees only several tree spaces away. Thus, viral spread by aphids is slow and not considered as important as movement via plant material.

Movement of diseased plant material accounts for much of the spread of PPV in Europe. For example, if

**SEE DISEASE CYCLE ON PAGE 3**



*Photo Courtesy of the American Phytopathological Society*



#### DISEASE CYCLE FROM PAGE 2

an asymptomatic infected tree branch is used for budwood, then all subsequent grafted trees will harbor the virus. These trees may not be noticeably infected when young, as the virus does not usually stunt the tree. However, more obvious symptoms will eventually become observable at a latter date, as with the symptoms that were observed on the fruit from PA.

Within the tree, infection is slow to become systemic and is often confined to one or two limbs. Because symptoms can be mild or transient, considerable spread can occur before symptoms appear. According to work done at the USDA, trees may be infected 3 to 5 years before any symptoms are exhibited.

Within the genus *Prunus*, plum pox virus infects apricots, plums, almonds, peaches, sweet cherries and a number of ornamentals, rootstocks, and wild species. The virus has a wide experimental host range, including shepherd's purse, woolflower, cockscomb, American wormseed, Indian paint, nettleleaf goosefeet, cluster bean, tassel flower, globe amaranth, hop, henbane, tomato, white sweet clover, tobacco, pea, common groundsel, common chickweed, landino clover, common vetch, hairy vetch and many others.

#### Control

Based on experience in Europe, once plum pox is established it is very difficult to eradicate. Control involves the purchase of nursery stock certified as virus-free. Trees are grown from tested propagation material in isolation from potential sources of the PPV and are inspected before they are distributed. The most widely used test for identification is the enzyme-linked immunosorbent assay (ELISA). Results should be evaluated cautiously since distribution of the virus can occur unevenly in the tree. Besides

ELISA tests, molecular based tests like the polymerase chain reaction (PCR) are also used for identification. Also, a number of known susceptible indicator plants, such as *Prunus tomentosa* (Nanking cherry), can be used for detection. Suspect buds are grafted in the Nankings seedlings and typical foliar symptoms for plum pox will appear.

Frequent inspection and the removal of infected trees can prolong the productivity of orchards with low levels of infection. Good aphid control is important. Where PPV is widespread it is necessary to plant tolerant cultivars. Unfortunately only a few immune or resistant apricot cultivars are available; none are commercially grown. There are no resistant commercial peach cultivars, but some are tolerant or less susceptible. Different cultivars of each host often show differential responses to infection.

#### Current/Future Status

The infected orchards or trees and roots in Adams County orchards will probably have to be removed and burned. Efforts are underway to appropriate and provide compensation for the loss of these orchards.

According to APHIS it may be necessary to conduct more extensive surveys and to establish tree certification programs for the virus. Workshops are being set up to educate researchers, extension workers, nurserymen, growers, regulatory officials and other interested parties on PPV.

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# 1999 Year of Adversity for Peach Growers in SNJ

*Jerome L. Frecon, Agricultural Agent*

This was a year of much adversity for New Jersey Peach growers, packers, shippers, and marketers. The spring was relatively normal and with the mild winter, growers started the season with the potential for a great crop of peaches. Bloom was heavy on most varieties. The bloom season was free of frost and pest pressure. A few growers did a significant amount of blossom thinning. Fruit set was heavy.

On May 24<sup>th</sup> the first setback occurred when approximately 15% of the peach crop in the Mullica Hill, Swedesboro and Hammonton areas were hit by a bad hailstorm. Most growers hit lost 100% of their crop. A few were able to salvage some fruit in areas of their orchard not severely hit. At this time rainfall was from .4 to 1.25 inches below normal. While the season was just about normal in development, growers began thinning hard and early because of the heavy fruit set. Unfortunately, except for a few showers in Cumberland and western Gloucester County very little rainfall fell for the next 6 weeks. By August 16<sup>th</sup> rainfall was 4 to 7 inches below normal. Most growers were spending much time and energy irrigating to try and maintain fruit size until a few rain showers in mid-August. Temperatures during the first 2 weeks of July were 6 to 9°F above normal. Average temperatures during the first week of August were also 7 to 9°F above normal. Some of the newer varieties planted did not color or retain their firmness during this extremely hot weather.

Peach harvest was following a normal harvest schedule for southern New Jersey as reflected by truckload shipments recorded by The Federal State Market News Service. Increased plantings of earlier varieties like Sentry were also reflected in more volume during the weeks ending July 11<sup>th</sup> and July 16<sup>th</sup>. It was difficult to compare the '99 shipping season to '98 because the prior season was 2 weeks earlier. However the shipping season ended on September 12<sup>th</sup> in 1998 while peaches were still being shipped on October 7, 1999 when the last market news report was issued from Bridgeton.

Total peach shipments for '98 were 1,812,400 1/2 bushel boxes while in '99 only 1,684,700 1/2 bushel boxes were shipped. This was under earlier estimates and was a reflection of either too many 2 1/2 inch or smaller fruit, too many softs, or simply fruit that could not be shipped because of lack of demand on the wholesale market. A comparison to the '97 shipping season is probably more valuable because volume movement for the entire season was similar to 1999. Two things were somewhat different related to

movement. In '99 significantly more early to early-midseason fruit were shipped, and more late season fruit (or at least that was shipped late).

The worst part of '99 was the great disappointment in movement and prices. With the increased costs, particularly in thinning and irrigation, there was hope that prices would be strong. Early in the season it was apparent it would be difficult to sell 2 1/4 to 2 1/2 inch diameter fruit. However, shippers were surprised as the season progressed, particularly in mid-August, when some growers were moving 2 1/2 inch fruit at well below the cost of production. While the market increased slightly around Labor Day it was downhill for the rest of the season. Some growers/shippers could simply not sell all of their beautiful 2 3/4 inch and up late season fruit.

The movement of nectarines was not better for most of the season. Prices were sluggish, if you could move the fruit. It was difficult to track prices for white fleshed peaches, but most growers/shippers seemed to be able to move the fruit reasonably well.

Why was price and movement so bad? Tracking volume movement from the southern states confirmed their crop was substantially down. Both Georgia and South Carolina were not much of a factor during August and September. Michigan had practically no peaches while Pennsylvania shippers had good volume but experienced the same fate as New Jersey.

The big story was California. While early season estimates were equivalent to '98, these kept being revised as the season progressed. Tracking volume movement verified that California was shipping large volumes of fruit from mid-August through October. Final figures posted by the Administrative Board of the California Tree Fruit Agreement show total shipment of 20,468,000 boxes of peaches in '99, or 2,135,000 packages more than '98. Even worse was the 20,394,000 boxes of nectarines. This represented a 3,476,000 package increase over '98. Armed with a multimillion dollar advertising budget, shipping this much fruit, much of it into Eastern markets, was pretty tough competition for New Jersey shippers.

It is apparent from recent supermarket consolidation figures there are fewer buying organizations and those that buy are larger. As retailers get larger they demand more from shippers. Demand for PLU sticker, slotting fees, consumer packages, cooperative advertising, other incentives, and service may be making it more difficult to get sales for New Jersey peaches. With all of the competition in the supermarket for shelf space, and not too much perceived sympathy for product movement from the small farmer, New Jersey peach growers/shippers are at a disadvantage.

**SEE ADVERSITY ON PAGE 5**

## Determine Lime Needs Prior to Spring Planting

Joseph R. Heckman, Ph.D., Soil Fertility

Fall is an excellent time to soil test to determine the need for, and type of, lime to apply to neutralize soil acidity and maintain adequate supplies of calcium and magnesium. Careful attention to liming prior to planting orchards and vineyards is very important. Once the crop is established it is difficult to correct a soil acidity problem using surface applications of lime. Because lime is slow to react in soil, it should be applied at least six months in advance of planting to insure that the target soil pH has been achieved.

Lime can be applied at any time of the year if weather and soil conditions permit. Fall applications have the advantage of allowing the lime to react in the soil prior to the start of the next growing season. □

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## Calendar of Events

**January 25, 26, & 27, 2000** - Mid-Atlantic Fruit and Vegetable Convention (Formerly Tri-State Horticultural Meetings). Hershey Lodge and Convention Center, Hershey, Pa. Contact Bill Tietjen at RCE of Warren County (908-475-6505) or Jerry Frecon at RCE of Gloucester County (856-307-6450) for registration information.

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### ADVERSITY FROM PAGE 4

Consumer demand for fresh New Jersey peaches may be waning. Many farm marketers reported declines up to 50% in sales on many produce items in summer and fall. Could it be that we consumers are spending too much time eating away from home and not taking the time to visit our Garden State Farm markets? Or has all the negative information on peach pesticide usage scared our consumers?

1999 was a year of adversity or a challenge. Hopefully we can look ahead and find solutions for 2000. □

## Fall Orchard Weed Control

Brad Majek, Ph.D., Weed Science

Now is the time to begin your 2000 orchard weed control program. Fall herbicide applications have several advantages over other times of the year. Many winter annuals and certain perennials are more susceptible now than other times of the year. Once the crop is harvested, farmers can find time to make the applications that are more difficult to schedule at other times. Crops in adjacent fields are harvested, and trees and shrubs are dormant, so drift injury is less likely to occur than in other months.

The first consideration is the sod growing between the tree rows. Apply 1.5 to 2.0 pints of 2,4-D amine in late October or early November to control **broadleaf weed** problems in the sod, including common **dandelion**. Weeds in the sod may not seem like a big problem now, but in the spring, flowering weeds, including **dandelion**, interfere with pollination by attracting bees out of the trees down to the orchard floor. After bloom, flowering weeds continue to attract bees into the orchard, which limits the choice of insecticides that can be used. Common **broadleaf weeds** are also alternate hosts for insect pests, such as **cat facing insects**, **nematodes**, and **virus diseases** of peaches and apples.

Winter **annual weeds** are germinating in the tree row now. Some, including **camphorweed** and **horseweed** (also called mare's tail), can grow three to four feet high and don't bloom until mid to late summer. Others bloom in late spring or early summer, and attract bees into the orchard throughout the growing season.

Starting your residual weed control program for next year in November will improve the control of winter annual weeds that are difficult to kill in the spring. Summer annual weeds will also be controlled in the spring, reducing the urgency of spring herbicide applications. Apply 1.5 to 2.0 pints of 2,4-D amine plus 1.1 to 2.2 pounds of simazine (Princep Caliper 90 or other labeled products) or 1.0 to 2.0 quarts of the 4L formulation per acre to the weed free strip under the trees in November. Use the higher rates on fine textured soils with higher organic matter and lower or medium rates on coarse texture sandy soils low in organic matter.

Decide what herbicide you will use for annual grass control next year. If your choice is Sinbar 80DF, apply 2,4-D and simazine (Princep) in November. Apply the Sinbar tank-mixed with Karmex in the spring. Surflan, Solicam, or Prowl (nonbearing trees only) is more effective if at least part of the total amount to be used can be applied in the fall. Apply 2.0 pounds of active ingredient per acre of Surflan, Solicam, or Prowl (nonbearing trees only) in November tank-mixed with 2,4-D and simazine (Princep). Apply the remainder in the spring tank-mixed with Karmex for late summer weed control. □

# The Garden State Re-Engineering Initiative

David Lee, Agricultural Agent and Jerome L. Frecon, Agricultural Agent

"The Garden State Re-Engineering Initiative" is a program established to help enhance the managerial capabilities of New Jersey's valued agriculture producers. This is a voluntary educational program sponsored by Rutgers Cooperative Extension in cooperation with the New Jersey Farm Bureau and the New Jersey Department of Agriculture. Its aim is to meet the ever increasing needs of the state's agricultural producers and their families for financial and risk management education and, in so doing, increase the number of successful viable farms in New Jersey.

In order to thrive in today's rapidly changing agribusiness environment, the program will enable you, the producer, to:

- Conduct in-depth financial analyses for your farming operations
- Take a deliberate and knowledgeable approach to risk management
- Establish and maintain periodic contact with outside expertise

## What does it have to offer?

- Use of Finpack<sup>1</sup>, the most comprehensive agricultural financial planning and analysis software available
- Crisis-intervention strategies for financially distressed farms
- Small-group workshops and/or one-on-one consultations
- Evaluation of agronomic management practices
- Unlimited access to computers
- Flexibility to meet your individual needs
- Complete confidentiality

## Financial Analysis and Planning

- Evaluate your farm's financial situation; identify strengths and weaknesses
- Monitor and document financial performance, direction, and progress
- Examine liquidity, solvency, profitability, efficiency, and repayment capacity
- Develop planning information for the future
- Explore enterprise and operational alternatives
- Make informed loan decisions
- Develop:
  - ✓ Balance Sheets
  - ✓ Cash Flow Plans
  - ✓ Long Range Plans

- ✓ Year End Analyses
- ✓ "What if" Scenarios

## Risk Assessment and Planning

Learn How to:

- Identify your risk tolerance
- Manage risk in the following five major areas:

### Production Risks:

- weather, pests, disease, inputs, machinery

Marketing Risks:

- price fluctuations, government, unanticipated forces

Financial Risks:

- access to debt capital, cash flow needs, equity changes

Legal Risks:

- business structure, contracts, taxes, safety, environmental

### Human Resource:

- family, hired labor, calamities, estate planning

Utilize the following established risk management tools and strategies:

- ✓ Enterprise Diversification
- ✓ Crop Insurance
- ✓ Contract Production
- ✓ New Technology Evaluation
- ✓ Marketing and Contingency Plan Development
- ✓ Legal Language and Compliance Interpretation

**Problem Solving Teams<sup>2</sup>** If you are interested in exploring new ideas custom-made to your farm, we can assist you in this endeavor. Continued follow-up assistance by agricultural professionals may be implemented through problem solving advisory teams. The members of the team are selected by the farm family and may include an agricultural lender, nutritionist, veterinarian, crop consultant, extension educator, and/or other related advisor. The purpose of the team will be to provide expertise on priority management issues and focus on the development of farm and family goals.

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<sup>1</sup>Developed by the Center for Farm Financial Management of the University of Minnesota

<sup>2</sup>Adapted and modified from the Dairy Advisory Team Model developed by the Pennsylvania State University □

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