Types of Plum Pox Virus

Four PPV groups exist to date. PPV-D was originally described from apricot trees in southeastern France; PPV-M from peach trees in Greece; PPV-EA from apricot trees in El Amar, Egypt; and PPV-C from sour cherry trees in Moldova.

PPV-induced chlorotic rings and blotches on peach fruit

PPV-M isolates are more aggressive in peach, are aphid vectored more efficiently, and spread more rapidly in an orchard than the D strain. PPV-M has been reported to be seed transmitted, while other PPV strains are known not to be transmitted through seeds. Both PPV strains M and D infest peach, plum, and apricot. The strain present in Pennsylvania has been determined to be PPV-D.

PPV-C infects sweet and tart cherry naturally and has infected other Prunus hosts experimentally. To date, no other PPV strains have been reported to infect cherry naturally. Scientists use several techniques to distinguish PPV strains. They monitor the behavior of host trees. They conduct serological tests such as ELISA and molecular tests such as polymerase chain reactions (PCR). They also sequence the PCR products or cut the PCR products with enzymes at locations in the DNA sequence that are unique to each strain.

PPV symptoms on young fruits of peach (top row) and necatrine

USDA United States Department of Agriculture

Report Infestations

For more information or to report trees and fruit displaying signs of plum pox, contact one of the following government agencies:

USDA-APHIS-PPQ
Plum Pox Program Coordinator
Invasive Species and Pest Mgmt
4700 River Road, Unit 134
Riverdale, MD 20737–1236
(301) 734–8899

Pennsylvania Dept. of Agriculture
2301 North Cameron Street
Harrisburg, PA 17110–9408
(717) 787–4737

FOR MORE INFORMATION and a PHOTO GALLERY OF SYMPTOMS visit the USDA web site at:
www.aphis.usda.gov

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M. Barba, ISPAVE, Italy
G. Herrera, INIA, Chile
J. B. Quiot, INRA, France

USDA United States Department of Agriculture

This informational brochure was produced by The American Phytopathological Society (APS) in cooperation with USDA-APHIS-PPQ. You may download a copy of this brochure at the above web site or obtain additional copies from your State Plant Health Director (listed on above website).

For more information on plant diseases visit the APS web site at: www.scisoc.org

For local information on Plum Pox and other diseases contact your state extension service or department of agriculture office.

PLUM POX

A Devastating Threat to Peaches, Apricots, Plums, Nectarines, Almonds, and Sweet and Tart Cherries

Plum pox, also known as sharka, *is the most devastating viral disease worldwide of stone fruit including peaches, apricots, plums, nectarines, almonds, and sweet and tart cherries.*

Chlorotic rings and blotches on plum fruits caused by PPV

The disease significantly limits stone fruit production in areas where it is established. More than 100 million stone fruit trees in Europe are infected.

First described on plums in Bulgaria in 1915, plum pox has spread to a large part of Europe, the Mediterranean, the Middle East (Egypt and Syria), India, and Chile. In 1999, for the first time in North America, plum pox was detected in a Pennsylvania orchard.

Plum pox is economically important because it can cause fruit to be unmarketable and can decrease the yield of infected trees. The severity of the disease depends on the strain of the virus present and the susceptibility of Prunus cultivars (cultivated varieties of plants).

Chlorotic ring patterns on leaves and distortion of fruit in apricots infected with PPV

The virus causing the disease is plum pox potyvirus (PPV). PPV infects various members of the genus Prunus, such as the stone fruit trees mentioned above. Wild and ornamental species of this genus may also become infected by some strains of the virus. Some weed hosts identified in the field and numerous hosts tested in laboratory settings have also been known to become infected with PPV.

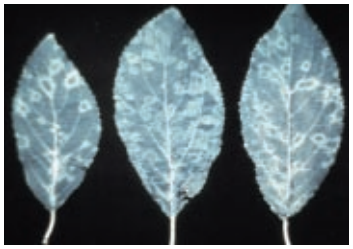
Deformed plum fruit caused by PPV

PPV-induced chlorotic rings and blotches on peach fruit

Identification

Example of PPV-induced color breaking (pink flecks) in certain peach cultivars

In peach, PPV-infected trees may exhibit color-breaking symptoms in the blossoms. This appears as darker pink stripes on the flower petals and can be useful for early season surveys. PPV symptoms can be present in young leaves in the spring and/or on developing fruit. Some trees show no symptoms on leaves or fruit. In Chile, several of the infections have been symptomless, and infections were discovered only through rigorous testing of trees.



Chlorotic ring symptoms caused by PPV in plum leaves

PPV-induced chlorotic blotches in peach leaves

Not all PPV infection in *Prunus* are characterized by a ring symptom on leaves. Several cultivars show yellowing line patterns and blotches, or necrotic (browning) ring symptoms on expanded leaves. Leaf distortion has also been observed. As mentioned above, the leaves of some peach trees in France infected with PPV-M produce a yellowing vein clearing that turns necrotic and causes leaf drop.

PPV-infected fruit can develop yellow rings or blotches, or brown rings, and some plum and apricot fruit can be severely deformed and bumpy. The pits of many infected apricots and some plums show rings.

Because infected Prunus trees exhibit such a wide range of leaf, flower, and fruit symptoms, educating survey crews, diagnosticians, growers, and nurserymen to the range of possible PPV symptoms is crucial to detecting plum pox.

PPV-induced chlorotic rings and blotches on nectarine

Disease Spread

Several aphid species can transmit plum pox within an orchard and from other trees to nearby orchards. Long-distance spread usually occurs as a result of the movement of infected nursery stock or propagative materials.

PPV ring pattern symptoms on apricot fruit and stones

Green peach aphid, *Myzus persicae*

Plum pox is spread from plant to plant by several aphid vectors (insects that suck sap from plants then carry the virus to other plants). Aphids spread plum pox by carrying the virus in a non-persistent manner. The length of time the virus remains on the stylet (part of the aphid's mouthpart) depends on how soon the aphid probes a new plant after acquiring the virus from an infected plant. This means that the virus remains on the stylet from minutes to perhaps a few hours. Studies indicate that at least 14 aphid species can transmit PPV. These species include *Myzus persicae, Aphis spiraecola, A. gossypii,* and *A. fabae.* Some PPV strains have been identified that are not transmissible by aphids.

Control

PPV symptoms on apricot leaves

Control and prevention measures for PPV include field surveys, use of certified nursery materials, use of resistant plants (when available), control of aphids, and elimination of infected trees in nurseries and orchards.

Sources of resistance exist in Prunus but are not abundant. A team of scientists from the United States and France has genetically engineered a PPV–resistant plum (otherwise known as C5), and the resistance can by transferred through hybridization to other plum trees. This provides a unique source of germplasm for future breeding programs worldwide. Similar success has not yet occurred in attempts to genetically modify other Prunus species.