

Regional Pest Alert



Plum Pox Virus

Origin and Distribution

Plum pox, also called sharka, is considered one of the most devastating viral diseases worldwide of stone fruit, including peaches, apricots, plums, nectarines, almonds, and sweet and tart cherries. The virus distorts and discolors fruit, reduces yield and shortens tree life, but it poses no threat to human or animal health. Infected plants are typically destroyed to prevent the spread of the disease, causing great economic loss to the growers.

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. Plum pox was first found in North America in Pennsylvania in 1999. It was then discovered in eastern Ontario and Nova Scotia, Canada, in 2000 and in western New York and southwestern Michigan in July 2006.

Description

The plum pox virus (family *Potyviridae*, genus *Potyvirus*, PPV) causes chlorotic rings on the fruit and leaves of infected plants. Fruit of infected plants may be of poorer quality and distorted. Symptoms vary depending on the plant type, variety, condition of the plant, time of year and the length of time the plant has been infected. Many trees may not show symptoms the first few years after first infection. Symptoms on mature peach fruit consist of chlorotic rings or line patterns. Apricot and plum fruit will often be bumpy. European plum varieties can develop red discolored areas and drop prematurely, whereas Japanese plums show ring spot symptoms. The D strain can cause severe necrotic spots on leaves of some plum varieties; peaches may have chlorotic spots and streaks, and apricot leaves typically show only mild symptoms. The best-defined symptoms in apricots are found on the pits. They appear as well defined concentric circles. Leaf symptoms are more easily seen in spring.

PPV symptoms are sometimes difficult to distinguish from those of other diseases. They may be confused with rusty spot of peaches and nectarine, bacterial canker as it appears on prune fruit as well as insect-related problems, such as damage from thrips, white apple leafhopper, and San Jose scale.



Premature fruit drop off PPV-infected plum tree cv. *Cacanska rana* (*Cacak's Early*).

Types of PPV

Four PPV strains have been described to date: PPV-D, PPV-M, PPV-EA, and PPV-C. PPV-D strain (Dideron or "D") is widely spread throughout Western Europe. This is the only strain found in the Western Hemisphere, first in Chile, then in Pennsylvania, and subsequently in Canada, New York, and Michigan. The D strain of the virus infects peaches, nectarines, plums, and apricots but not cherries. The D strain can also infect *Prunus* species such as wild plum, cherry plum, purple leaf plum, sand cherry, dwarf flowering almond, black thorn, and Japanese flowering cherry. Research has shown that it is not seed transmitted. The D strain is less aggressive than the M and EA strains.

Biology

Infected peach, nectarine, plum, and apricot trees are the primary source of PPV inoculum. The virus is spread to new areas by moving uncertified infected plant material

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through budding, grafting, and transplanting, and by migrating aphids. Aphids are effective for spreading PPV within a tree and to adjacent trees. Aphids have several generations per year, and they have winged forms for movement from tree to tree.

Spread by aphids over long distances is less common. Natural barriers such as hills and woods help to restrict spread. Several aphid species can serve as carriers for PPV. Among the most important species are the green peach aphid (*Myzus persicae*), leaf curling plum aphid (*Brachycaudus helichrysi*), peach leafroll aphid (*Myzus*



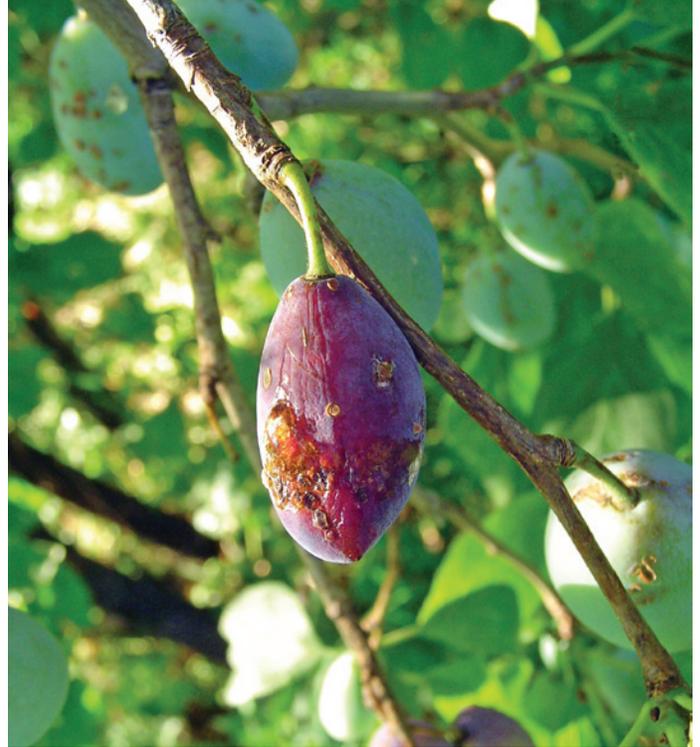
Typical plum pox virus (PPV) symptoms on plum leaves—concentric circular discoloration and mottling.

varians), damson-hop aphid (*Myzus humili*), thistle aphid that over winters on plums (*Brachycaudus cardui*) and the spirea aphid (*Aphis spiraeicola*) as well as many less commonly found in commercial stone fruit orchards. It is important to realize that some aphids such as black cherry aphid (*Myzus cerasi*), mealy plum aphid (*Hyalapterus pruni*), and nonaphid arthropods are not capable of transmitting the virus.

Aphids obtain the virus while probing and feeding on infected plant tissue. When the aphid penetrates the vascular tissue with its stylets, the virus is pulled into the stylets where it remains. Plum pox is a nonpersistent virus, meaning that the aphid retains the virus in its mouthparts and foregut until its next feeding probe, usually less than 1 hour. The virus is transmitted as soon as the aphid spears the cell with its stylets containing sufficient amount of virus obtained by the previous probing. An important point is that the virus does not circulate within the aphid, and it does not replicate itself while in the aphid's body. Infections spread slowly, cell to cell, within plant tissue from the point of initial aphid feeding. Gradually, the infection spreads throughout the entire tree, especially if aphids continue to feed on the tree.

Management

Management strategies of plum pox are aimed primarily at preventing introduction by use of virus-tested clean nursery stock. Once



PPV symptoms on the plum fruit cv. *Cacanska rana* (Cacak's Early).

detected, strict quarantine, eradication, and ongoing surveys are the only useful strategies because once infected, the tree will never be free of the disease.

Insecticide management strategies that keep aphid populations low may help to slow PPV movement in areas where PPV is rare, but it may not be a good idea in some situations. Insecticide treatment can sometimes cause winged forms of the aphids to leave treated areas, taking the virus with them to infect new hosts.

For more information on Plum Pox Virus, please visit

www.ncipmc.org/alerts/plum_pox.cfm

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