

Peach Stunt Disease and Associated Peach Diseases

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Figure 1. Peach seedlings infected by PDV and PNRSV (left), PDV (center), and uninfected control (right). Photo used by permission of S. Scott from Riley, M. B., Williamson, M. R., and Maloy, O. 2002. Plant disease diagnosis. The Plant Health Instructor. DOI: 10.1094/PHI-I-2002-1021-01.

Peach stunt disease (PSD) is a serious disorder that causes severe stunting of peach trees and reduces fruit yield. It is a result of a simultaneous infection by prune dwarf virus (PDV) and *Prunus* necrotic ring-spot virus (PNRSV) (Fig. 1). Each of these viruses can independently cause several diseases on particular stone fruit species and cultivars. In peaches, infection with either virus is often latent or produces mild symptoms. But, simultaneous infection generally results in PSD, causing severe stunting and yield losses.

Both viruses are members of the genus *Ilarvirus* and share similarities in what plants they infect and how they are transmitted. They are both distributed worldwide and are among the most common viruses associated with peaches.

In 1936, PDV was first shown to cause prune dwarf on plums in New York and Ontario. Since then, it has caused a variety of other disorders, including sour cherry yellows on sour cherries, gummosis on apricots, and, in some severe cases, peach stunt on peaches.

PNRSV appeared on peaches in the United States in 1941. In addition to being an important contributor to PSD, PNRSV increases the severity of sour cherry yellows and causes tatter leaf in sweet cherries, plum line pattern in plums, and peach necrotic leaf spot in peaches. Peach stunt disease has been a problem in California as well as in Australia, where it is known as peach rosette and decline.

Symptoms

Symptoms caused by each of these viruses vary greatly depending on the virus strain as well as the affected host species and cultivar. Each virus is host to members from over 11 plant families, though stone fruits suffer the greatest economic impact. When each virus infects peaches independently of the other, symptoms can be severe or may be mild enough to go unnoticed. But, when PNRSV and PDV both infect peaches to cause PSD, symptoms include:

- Stunting, with a shortening of internodes (regions between the nodes of a plant stem)
- Rosetting (The shortened internodes cause the leaves to be closer together, resembling a rose.)
- Reduced fruit yield (up to 60 percent) and vegetative growth
- Shock, characterized by chlorosis (yellowing) and premature dropping of leaves
- Reduced fruit quality

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- Delay in budbreak
- Increased water sprout production (shoots that grow from the trunk or branches)
- Gummosis (oozing sap)
- Bark splitting

Symptoms of PNRSV infection may include:

- Mosaic (mottled appearance)
- Chlorotic (yellowed) rings and necrotic (dead) spots in leaves
- Delay in budbreak
- Bark splitting and pitting
- Stunting
- Shock
- Poor grafting success in tree nurseries

PDV infection may induce PSD symptoms as well as the development of dark green leaves, a delay or acceleration in budbreak, and fewer blooms and fruit. Leaf symptoms characteristic of singular infections by each of these viruses are often absent in co-infected trees.

Transmission

Both PDV and PNRSV spread through pollen, seed, or by grafting. Natural spread by insects during

pollination within peach orchards is an important means of transmission, occurring more rapidly among trees of the same cultivar. PNRSV is more readily transmitted by seed than is PDV, while PDV may be more readily transmitted through pollen than is PNRSV.

Control

The best way to control these viruses is to plant only virus-free trees. In established, infected orchards, plant any new orchard blocks away from the infected area. When this is not possible, plant a different cultivar than the one already present. This delays the infection of new trees.

For PNRSV control, inoculation with symptomless strains of the virus can prevent infection by more virulent strains. Research to develop transgenic plants resistant to PDV is underway. Additional practical control measures for managing either virus include:

- Removing diseased plants in orchards with low virus incidence
- Avoiding the use of commercial beehives
- Periodically testing trees for the presence of these viruses

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