TEXAS A&M AGRILIFE EXTENSION

Extension Plant Pathology
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PLP-005

PLANT PATHOLOGY & MICROBIOLOGY

# Peach Stunt Disease and Associated Diseases of Peach

**Introduction:** Peach stunt disease (PSD) is a serious disorder characterized by severe stunting of peach trees and reductions in fruit yield which result from simultaneous infection by prune dwarf virus (PDV) and *Prunus* necrotic ringspot virus (PNRSV). Each of these viruses can cause several diseases on particular *Prunus* species and cultivars when infecting independently of the other. In peach, however, independent infection with either virus is often latent or only induces mild symptoms, while simultaneous infection generally results in PSD, causing severe stunting and yield losses. Both viruses are members of the genus *Ilarvirus* and share similarities in their host ranges and modes of transmission. They are both distributed worldwide and are among the most common viruses associated with peach. PDV was first demonstrated to be the cause of prune dwarf on *Prunus domestica* in New York and Ontario in 1936 and has since proved to be the cause of a variety of other disorders, including sour cherry yellows on *P. cerasus*, gummosis on *P. armeniaca*, and, in some severe cases, independently causing peach stunt on *P. persica*. PNRSV was first reported in 1941 from peaches in the U.S. In addition to being an important contributor to PSD, PNRSV can increase the severity of sour cherry yellows, cause tatter leaf in *P. avium*, plum line pattern in *P. domestica*, and peach necrotic leaf spot in *P. persica*. Peach stunt disease has been problematic in California as well as in Australia, where it is referred to as “peach rosette and decline”.

Peach seedlings infected by: PDV and PNRSV (left), PDV (center), uninfected control (right)

**Symptoms:** Symptoms caused by each of these viruses vary greatly depending upon the strain of the virus present as well as the affected host species and cultivar. Each virus is host to members from over 11 plant families, though *Prunus spp.* suffer the greatest economic impact. When PNRSV and PDV co-infect peach to cause PSD, symptoms include stunting, with a shortening of internodes, rosetting, and a reduction in fruit yield and vegetative growth; shock, characterized by chlorosis and premature defoliation of leaves; reduced

fruit quality; a delay in budbreak; an increase in water sprout production; gummosis; and bark splitting. Fruit yield may be reduced by up to 60%. When each virus infects *P. persica* independently of the other, symptoms can be severe, or may be mild enough to go unnoticed. Symptoms of PNRSV infection may include mosaic, chlorotic rings, and necrotic spots in leaves; a delay in budbreak; pitting and splitting of bark; stunting; shock; and poor bud and scion take in nurseries. PDV infection may induce symptoms observed with PSD, as well as development of dark green leaves, a delay or acceleration in budbreak, and a reduction in the number of blooms and fruit. Foliar symptoms characteristic of singular infections by each of these viruses are often absent in co-infected trees.

**Transmission:** Both PDV and PNRSV can be spread through pollen, seed, or by grafting. Evidence suggests that natural spread within peach orchards via insects during pollination is an important means of transmission. Additionally, it has been demonstrated that natural spread of both PNRSV and PDV during pollination occurs more rapidly among trees of the same cultivar. PNRSV is more readily transmitted by seed than PDV while PDV may be more readily transmitted via pollen than PNRSV.

**Control:** The most important way in which these viruses can be controlled is by ensuring that only virus-free trees are planted thus, preventing their introduction. In established infected orchards, any new orchard blocks should be planted away from the infected area. When this is not possible, it is recommended that a different cultivar be planted than the one present in the established orchard so as to delay the speed with which new trees will become infected. For PNRSV control, inoculation with symptomless strains of the virus has been shown to prevent infection by more virulent strains. Research for the development of transgenic plants resistant to PDV is currently underway. Additional control measures which may be practical for the management of either virus include removing diseased plants in orchards with low virus incidence, avoiding the use of commercial beehives, and testing trees for the presence of these viruses periodically.

Image by Simon Scott (Professor, Clemson University)

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September 14, 2012