

Pierce's Disease

Identification in Tulare County Vineyards

Pierce's disease (PD) is a killer of grapevines caused by a bacterium, *Xylella fastidiosa*, which plugs the vines' water conducting tissue. Vines die within three to five years depending on variety; young vines die much more quickly than mature ones. All commercial grape varieties are susceptible to PD, but Red Globe, Emperor, Calmeria, Fiesta, Barbera, and Chardonnay are particularly susceptible. This same bacterium also causes alfalfa dwarf disease and almond scorch disease. The PD bacterium infects a wide variety of other hosts, such as bermudagrass, that show no symptoms but serve as reservoirs from which leafhopper vectors can transmit bacteria to grapevines. The leafhopper vectors active in the San Joaquin Valley are the green sharpshooter and redheaded sharpshooter. The glassy-winged sharpshooter is a much more efficient vector of PD and can spread the bacteria from vine to vine. With the introduction of the glassy-winged sharpshooter, early detection and removal of infected vines will be paramount in the management of PD.

Delayed Growth

Delayed shoot growth in the spring is the first indication the vine is diseased, and growth can be delayed by several weeks. With new infections, only shoots from a single cane or spur will show delayed growth; however, in the final stages of the disease almost all the shoots are delayed and much of the vine trunk is dead. Winter injury and poor wood maturity also cause delayed growth in the spring which can be confused with PD. However, delayed growth resulting from winter injury or poor wood maturity will show up in a large number of vines grouped in the vineyard. With PD, vines with delayed growth are scattered with a greater number nearest the source of bacteria—bermudagrass patches within the vineyard or an alfalfa field, pasture, or riparian area next to the

vineyard.

Leaf Mottling

In the spring, diseased vines will usually have mottled leaves at the base of affected shoots. The mottling looks a little like zinc deficiency, and leaves are often deformed and smaller than healthy ones. Mottling increases with disease severity. Newly infected vines may only have mottling on shoots from an individual spur or cane. These vines will appear to recover, but more intense symptoms will appear by summer as the bacteria multiply and spread in the vine from the initial site of infection. Mottled leaves at the base of shoots often develop marginal burn by summer.

Leaf and Petiole Drying

As summer progresses, an increasing number of leaves will burn or scald and dry. Scalding begins as dry spots along the margin of the leaf, and these spots become necrotic and then progressively enlarge, often leaving concentric zones of discolored and dead tissue. Leaves that have completely dried will fall from the vine leaving a green petiole still attached to the shoot or cane. Attached petioles will continue to dry from the tip down. Petioles that remained attached to the cane after leaf fall are diagnostic for PD.

Fruit, Canes and Roots

Flower clusters will shatter excessively on affected vines, and many clusters will dry after bloom, the number depending on the stage of the disease. At any time after early July, some or most of the fruit remaining on the vine may dry. The fruit of colored varieties often develops color prematurely. The woody portions of canes, spurs, and trunk appear dry when cut with a knife, especially on chronically infected vines. The bark on one-year-old canes matures irregularly and shows immature, green patches. The root system dies following the death of the top.





Vine dying from Pierce's disease - 3 to 4 years after infection (Thompson seedless).



Mottling of base leaves the 2nd season after infection (Thompson seedless).



Petioles of leaves remain attached to cane after leaf fall (Fiesta).



Irregular "patchy" bark maturity is prominent on many varieties (Ruby Seedless).



Cluster showing delayed development and shriveling (Red Globe).



Young vines are highly susceptible and die in 1 or 2 years (Rubired).

Author: Bill Peacock, Tulare County Farm Advisor.

11/00