

Pierce's disease symptoms

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Pierce's disease (PD) is a lethal disease of grapevines caused by a bacterium that resides in the vine's water conducting vessels (xylem). The pathogen, *Xylella fastidiosa* is limited to the xylem and is transmitted to grapevines primarily by insect vectors. As the bacteria replicate, tyloses (outgrowths of nearby cells) form inside the xylem that along with bacteria cells plug the xylem vessels and obstruct sap flow.

PD symptoms first appear as yellow (chlorotic) areas typically at the margins of the leaf blades or on the leaf lobes of some varieties that move inwards toward the petiole. Chlorotic areas often turn brown then necrotic thus giving the appearance of a leaf scorch. In white cultivars there may be a yellow border between the green tissue and brown or necrotic regions (Figure 1). In red cultivars there is typically a distinct band of red or orange color at the leading edge of necrotic areas (Figure 2).

Beginning in mid or late summer, severely affected leaf blades drop off leaving the petioles attached to the cane, giving the appearance of "match sticks" (Figure 3). Canes lignify irregularly producing patches of green surrounded by mature, brown wood (Figure 4). Clusters on symptomatic canes often shrivel.

PD is notable for its patchiness within a vine – often one cordon or even one cane can show strong symptoms while the rest of the vine appears healthy. There is a wide variation in the expression of leaf and vine symptoms that are somewhat similar to other grapevine diseases such as trunk diseases caused by fungal pathogens (Figure 5); red blotch disease caused by a virus (Figures 6 and 7) and salt toxicity (Figure 8).

Common PD symptoms

PD photos by Jack Clark



Figure 1. PD symptoms in white cultivar.



Figure 2. PD symptoms in red cultivar



Figure 3. "Match sticks": persistent petioles.



Figure 4. Irregular wood maturity.

Leaf symptoms similar to PD symptoms



Figure 5. Esca (measles) trunk disease.



Figure 6. Red blotch disease in Chardonnay.



Figure 7. Red blotch disease in Zinfandel.



Figure 8. Salt toxicity.

Photos by R. J. Smith