

Landscape Disease Bulletin

Pierce's Disease of Grape and Oleander Leaf Scorch

History

Pierce's disease of grape was first reported in 1882 in the Santa Anna River Valley near Anaheim in Southern California. The disease at that time was known as Anaheim grapevine disease or grape mystery disease. The United States Department of Agriculture assigned a plant pathologist, Newton B. Pierce, to study the disease and he made his final report in 1891, which did not identify the cause of the disease. The disease destroyed the wine grape industry in Southern California during the 1880's, killing 40,000 acres of grapes in the Anaheim area, resulting in the closing of 50 wineries. Today the disease is known as Pierce's disease of grape. Since the initial outbreak of Pierce's disease in the 1880's, grapes have been difficult to grow in Southern California.

Cause of Pierce's Disease

Pierce's disease is caused by the bacteria *Xylella fastidiosa*. During the 1930's it was believed that the disease was caused by a virus. In the early 1970's experiments showed that antibiotic treatments suppressed the symptoms and that immersing vines in hot water cured diseased grape vines. In 1978, a bacterium was cultured from infected vines and it was shown that the bacterium was the cause of the disease. Pierce's disease often occurs in 'hotspots' in vineyards, where all the vines are infected. The disease spreads mostly from weedy host plants on the edge of vineyards, and is common among plants growing within the first 100 meters from a hotspot location. In California, wild grasses, sedges, and lilies are frequent hosts in hotspot areas. Native bushes, and trees are also often infected. The bacteria is moved from plant to plant by many genera of insects such as sharpshooter leafhopper and spittlebugs, which are referred to as vectors.

Distribution

Pierce's disease is only known from North America through Central America and has been reported from some parts of northwestern South America. *Xylella fastidiosa* is widely distributed in native plants throughout its natural range in the Americas. In Florida, and other southeastern states, Pierce's disease has precluded commercial production of most European varieties of grape. Some muscadine grapes and hybrids of American wild grape species with European grapes (*Vitis vinifera*) are tolerant or resistant to Pierce's disease.

Pierce's disease seems to be restricted to those portions of North America with mild winters. The disease is less prevalent where winter temperatures are colder, such as at higher altitudes, farther inland from ocean influences, and at more northern latitudes. It has been found in all southern states that raise grapes commercially, from Florida to California, and in Mexico and Central America. In the southeastern states, from Florida through Texas, Pierce's disease is the single most formidable obstacle to the growing of European-type (*Vinifera*) grapes.

New Disease of Oleander

A new disease of oleander was observed in the early 1990's in Riverside County and soon after in Orange County. The disease has been named oleander leaf scorch and was shown to be caused by *Xylella fastidiosa*. It has now spread to Santa Barbara, San Diego, San Bernardino and Los Angeles counties.

Transmission

Xylella fastidiosa lives in the water conducting tissue of plants (the xylem) and is spread (vectored) from plant to plant by leafhoppers and spittlebugs. The most important insect vector in Los Angeles County is the leafhopper known as the [glassy-winged sharpshooter](#). The glassy-winged sharpshooter was first observed in Orange County in the early 1990's and is now well established throughout Southern California. Other native sharpshooters, such as the smoke-tree sharpshooter and the blue-green sharpshooter, also act as vectors. The insect vectors acquire the bacteria from infected plants while feeding on the xylem sap. Once the bacteria is acquired, an adult vector retains the bacteria for the remainder of its life.

The isolates of *Xylella fastidiosa* from grape do not infect oleander and the isolates from oleander do not infect grape. The removal of oleanders will not prevent the infection of grapes that are nearby.

Symptoms

Grapes

Early season symptoms on infected vines include stunted or delayed growth, and some canes may fail to bud out.

Midsummer symptoms during the first year of infection appear as sudden drying or scorching of the margin of the leaf. On red grape varieties the leaf develops a red color along the edge of the brown margin. White grapes do not develop the red color. Affected leaves fall off later in the season leaving the petioles attached to the canes. Grape clusters stop growing, wilt and dry up. Canes develop patches of brown and green due to irregular maturation of the cane. Brown streaks can be seen in the current-season wood when cut in cross section or longitudinally.



Red color along the edge of the brown leaf edge occurs in red grape varieties in midsummer.

Oleander

Leaves on one branch will turn yellow and droop. This is quickly followed by scorching of the tips or margins of the leaves. As one branch develops symptoms and dies other branches start showing symptoms. Often the first symptom observed is the tips of the leaves turning brown.

Control

There are no practical controls for diseases caused by *Xylella fastidiosa* and there are no registered pesticides which control *Xylella* diseases. Controlling the vector and removing infected plants has not been effective at preventing the spread of *Xylella* to healthy grapes or oleanders. Experimental treatments with antibiotics have inhibited symptom development but are not commercially feasible. Infected oleanders usually die within 3 to 5 years after initial symptoms are observed or sooner. Diseased grape vines become nonproductive and can die in 1 to 2 years after infection.



The diagnostic symptoms on oleanders infected with *Xylella fastidiosa* are brown tips and margins of leaves.

Other Ornamental Hosts

Since the mid-1970s, many other strains of *Xylella fastidiosa* have been discovered, and almost all of these cause leaf scorching of woody perennials such as American elm, maple, mulberry, or plum. In some plants, such as peach and alfalfa, the bacterium slows and stunts plant's growth. Several commonly grown trees in California have recently been diagnosed with *Xylella* infections in Riverside County. These include liquidambar, olive and purple leaf plum. Symptoms are similar to oleander leaf scorch with scorching on the margins of the leaves and poor growth in the spring.

Further Reading

More information on *Xylella* diseases can be found at the following websites:

<http://www.cnr.berkeley.edu/xylella>

<http://ucceventura.xlrn.ucsb.edu/IPMHome.htm>

<http://danr.ucop.edu>

<http://www.ucr.edu/news/gwss>