What Winegrape Growers Should Know About Red Blotch - continued from page 1

UC Cooperative Extension research in Napa and Sonoma counties showed that sugar accumulation was consistently delayed in both Cabernet Sauvignon and Chardonnay even in vines in which the crop had been dropped prior to veraison. However, beyond brix, the effect of the disease on pH, titratable acidity, yield, and vine growth varied between the two cultivars. The effect of red blotch on wine composition is under investigation at the UC Davis Teaching and Research Winery.

Although red blotch disease may seem "new" to the grape industry, it has actually been in California vineyards to some extent for decades. Diagnostic testing of grapevine leaf tissue taken from a 75-year-old herbarium specimen tested positive for GRBaV. The specimen had been collected in 1940 from a vineyard in Sonoma County and preserved at the Center for Plant Diversity/Herbarium at UC Davis.

The PD/GWSS Board has taken steps to fund research into red blotch disease management, including identifying any vector(s) of GRBaV and understanding the effects of the disease on vines. In the meantime, according to the Program Manager of the CDFA Nursery, Seed and Cotton Program, Joshua Kress, growers will soon be able to replant infected vineyards with certified vines propagated from blocks that have tested negative for the virus.

Red blotch symptoms in Merlot late in the season. Notice the red veins which make it easy to differentiate from grapevine leafroll, which typically maintains green veins.

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What Winegrape Growers Should Know About Red Blotch

By Rhonda J. Smith, Viticulture Farm Advisor, UC Cooperative Extension, Santa Rosa, CA

Vines with red leaves are a common sight during the fall in many vineyards in California, and for years some growers attributed those leaves to grapevine leafroll disease (GLD).

As more acreage was planted with certified stock, the incidence of GLD declined, and a different symptom became apparent in red cultivars. University and commercial diagnostic labs confirmed that vines with such symptoms were free of leafroll viruses. Then, in 2011, grapevine red blotch-associated virus (GRBaV) was identified by researchers at Cornell and UC Davis. In 2012, diagnostic labs began to test for GRBaV, and growers and grapevine nurseries received confirmation that many suspect vines were infected with GRBaV.

Early in the season, symptoms of red blotch start as some slight yellowing in the leaves, as can be seen in these Chardonnay leaves.

The virus is known to be transmitted by grafting. As grapevine nurseries eliminated infected vines from their stock, researchers began searching for a vector(s) that can transmit the virus from infected to healthy vines. Besides California, the virus has been confirmed in grape growing regions throughout the U.S. and can infect all grape varieties, including rootstock vines.

Foliar symptoms are variable. The degree of discoloration and necrosis of leaf blades late in the season differs within red and white cultivars.

The disease name, grapevine red blotch disease, is used for all cultivars – even those without reddening in the leaf blades. In red wine grapes, late summer foliar symptoms are irregular areas of red coloration in leaf blades and veins. In white cultivars portions of leaf blades become chlorotic, not red.

Foliar symptoms are variable. The degree of discoloration and necrosis of leaf blades late in the season differs within red and white cultivars. Growers report that symptom severity in red cultivars can vary from year to year in the same blocks. As a result, suspect vines should be tested by a diagnostic lab to verify the presence of GRBaV.

The effect of red blotch disease on fruit composition, yield, and vine growth is mixed. Depending on the growing region and cultivar, most but not all growers report that ripening is delayed.

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INSIDE THIS ISSUE

PD-Resistant Vines Becoming a First Line of Defense Against PD

While Pierce's disease (PD) is on the minds of many growers around the state, a recent increase of PD on the North Coast has put a spotlight on it. While experts are researching a possible cause of the increase, PD-resistant grapevines are paving a defensive line in the area and elsewhere.

Plantings at several vineyards along the Napa River which are experiencing heavy pressure from PD transmitted by blue-green sharpshooters have been taking place over the last few years.

"Plantings of PD-resistant vines in the North Coast and elsewhere in California have been very successful," said Dr. Andy Walker from UC Davis, who has been breeding PD-resistant grapevines for well over a decade. "Plantings in Alabama and Texas have also done extremely well."

Above - Two thousand PD-resistant vines, grafted over established roots in a vineyard along the Napa River in 2014, were thriving this last season.

In 2014, after tasting wine made from PD-resistant winegrapes, Dr. Walker received a request from a winery to bud over rootstocks they had planted along the Napa River with 2,000 vines of two different selections of PD-resistant vines. Not only would this become the largest planting of such vines but the agreement included allowing the winery to crush the fruit for use in their wines, the first time in California that any fruit has been commercialized on such a scale. While any juice will likely be blended with other varietals, this marks a major step in the use of PD-resistant grapevines.

Since 2013, Dr. Walker has been sending selected PD-resistant grapevine cuttings and some rootstocks to UC Davis Foundation Plant Services (FPS), and more are in the pipeline. "We have around 15 there now," said Dr. Walker. After FPS has certified the vines as being disease free, they will be released to nurseries for propagation and eventual sale to winegrape growers. "My hope is that we will have provisional release to the nurseries this year, or next year for sure. But there are also some patent office issues we need to work out," said Dr. Walker.

But it also depends on what the nurseries want. "The nurseries will only grow what there is a demand for," said Dr. Walker. "So part of the goal for holding tastings of wines made from PD-resistant vines is to educate and inform the growers of their flavor profiles." It won't be long before the vines are showing up in vineyards and then a few years later becoming part of the wines being sold to the public.

For now, scientists and growers will have to contend with the recent increase in PD. Some possible factors for the increase are that it is just part of the normal PD disease cycle or vine stress related to the drought. But while many may be puzzled about the complicated set of factors contributing to the recent increase in PD around the state, help is on the way. Besides Dr. Walker and other researchers continuing work on PD-resistant vines and other disease management options, the PD/GWSS Board funded a three-year study to investigate the current outbreak of PD. The research team, led by Dr. Rodrigo Almeida at UC Berkeley, has already begun working on this important issue.

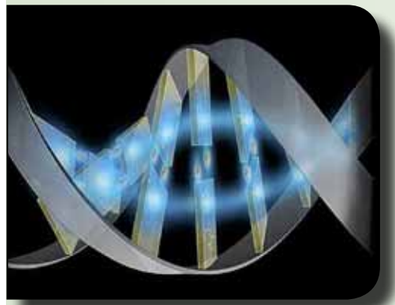
Right - Vintners, winery owners, and others gather for a tasting of wines made from PD-resistant winegrapes at the UC Davis Oakville Station on January 21, 2016.

The Riverside County Glassy-winged Sharpshooter Program in the Temecula Valley

Principal Investigator: Matt Daugherty, Dept. of Entomology, UC Riverside

The glassy-winged sharpshooter (GWSS) area-wide control program in the Temecula Valley has been in place for approximately 15 years and relies mainly on insecticide applications in citrus groves to control the GWSS before they move into vineyards. This program is viewed as critical for reducing the spread of PD in vineyards. As part of the control program, citrus groves are monitored regularly for GWSS. In 2015, like the previous two years, despite no insecticide applications being made to target them, the GWSS catch in Temecula was relatively modest. The results from 2015 suggest that there is no evidence of a GWSS resurgence in the region, unlike portions of the southern Central Valley. Treatments made for the Asian citrus psyllid may be a possible explanation. Although the recommended treatment timings are slightly different for Asian citrus psyllid versus GWSS, applications made for its control may aid somewhat with GWSS control.

Above - A single GWSS feeding on a grapevine in Temecula.



Deciphering the genetic code to *Xf* may be key to understand how to defeat it.

Whole Genome Sequence Analyses of *Xylella fastidiosa* Pierce's Disease Strains From Different Geographical Regions

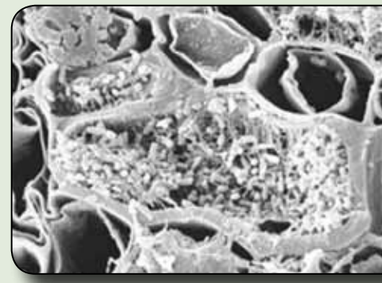
Principal Investigator: Jianchi Chen
USDA San Joaquin Valley Agricultural Sciences Center, Parlier, CA

Researchers determined genome sequences for two Pierce's disease-causing *Xylella fastidiosa (Xf)* strains, one from Florida and one from Taiwan. The Florida strain was used as a standard reference for related taxonomy research. Genome sequencing of the Taiwan Pierce's disease strain was the result of collaboration between the USDA Agricultural Research Service and National Chung Hsing University. Whole genome sequence comparison between the Taiwan strain and the strain from Florida, as well as with existing sequences from California and Texas, showed that the Taiwan Pierce's disease strain was highly similar to American Pierce's disease strains. However, some variations were found for this strain. While the biological nature of these variations remains unclear, they could be used to assist in future strain differentiation.

Characterization of Different California Strains of *Xylella fastidiosa* by Fatty Acid Methyl Ester Analysis

Principal Investigator: Christopher M. Wallis
USDA San Joaquin Valley Agricultural Sciences Center, Parlier, CA

Different subspecies of *Xylella fastidiosa (Xf)* are often detected and characterized by genotyping. However, other methods to detect and characterize different *Xf* strains should also be investigated. Characterization of the composition of fatty acids that comprise bacterial cell membranes is one phenotyping approach to distinguish bacterial species, subspecies, and strains. Fatty acid composition of cell membranes in theory could determine interactions between bacteria and their hosts as well. This research showed that fatty acid profiling performed by a technique involving extraction of fatty acids and analyzing by gas chromatography can be done. Results generally demonstrated that fatty acid profiling can separate different subspecies of *Xf.* Additional strains and replication will be performed to verify and expand results. When completed, fatty acid profiling will provide complementary data to genotype-based studies.



Xf blocking the xylem of a grapevine. It's the blockage that leads to the burnt leaves and eventual death of the vine.