



# RESEARCH

## PD/GWSS BOARD

### bulletin



While some strains of *Xf* produce symptoms in grapevines, like the one pictured above, others do not

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## *This Won't Hurt A Bit!*

Imagine a shot that would prevent grapevines from getting Pierce's disease (PD). While the concept may seem far-fetched, one scientist in Florida has shown very positive results that could lead to just that – a PD shot for vines.

For the past 20 years, Donald L. Hopkins, Ph.D., a professor of plant pathology with the Mid-Florida Research & Education Center in Florida, has been working with benign strains of *Xylella fastidiosa* (*Xf*), the bacterium that causes PD in grapevines and leaf scorch in almonds, as a control method and getting some very positive results.

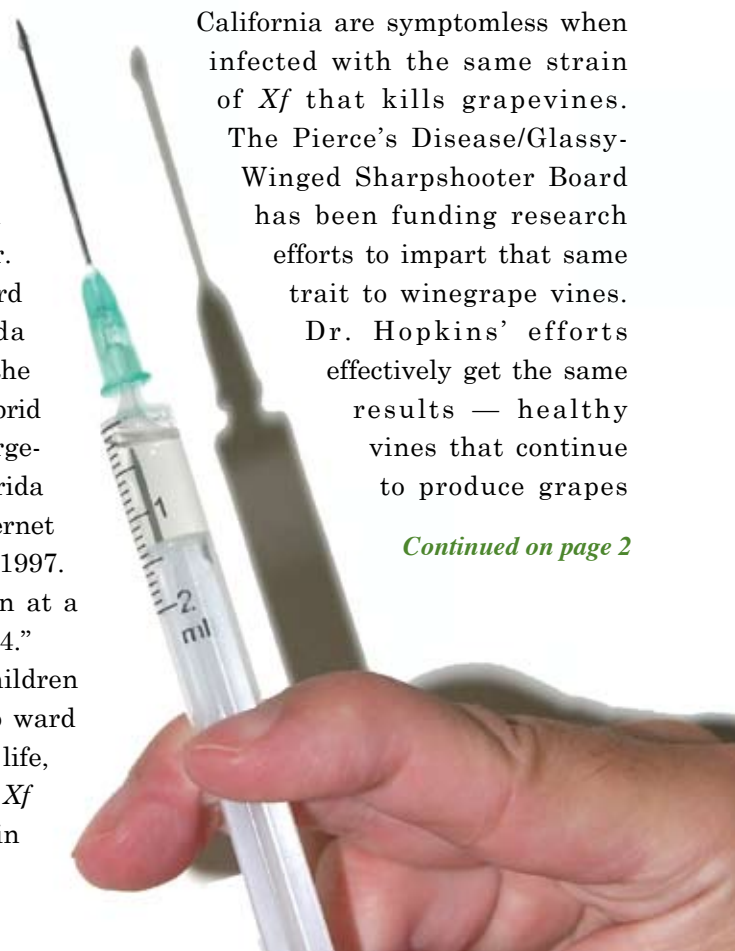
"We began to conduct greenhouse tests on biocontrol with benign strains of *Xf* around 1990," said Dr. Hopkins. "We did our first vineyard test at the University of Florida research vineyard in Leesburg in the spring of 1992 using an American hybrid grape, Himrod. Next, we did a large-scale test in the University of Florida vineyard in a new planting of Cabernet Sauvignon/Freedom in the spring of 1997. Then we put our first test plots in at a Florida commercial vineyard in 2004."

In much the same way that children are given smallpox vaccinations to ward off the onset of the disease later in life, Dr. Hopkins discovered a strain of *Xf* that does not produce symptoms in

infected grapevines and wards off Pierce's disease in the vines. The difference between the vaccination for humans and the shot for vines is that the vine does not have an immune system like humans. What actually happens is that the benign *Xf* invades and infects the vine, but it is a strain that doesn't produce any symptoms. With the benign strain occupying the plant, the vine becomes resistant to PD. The result is a vine that is symptomless and continues to produce grapes.

Many of the plants native to California are symptomless when infected with the same strain of *Xf* that kills grapevines. The Pierce's Disease/Glassy-Winged Sharpshooter Board has been funding research efforts to impart that same trait to winegrape vines. Dr. Hopkins' efforts effectively get the same results — healthy vines that continue to produce grapes

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in an environment filled with PD — but use a totally different approach.

In the late 1980s, Dr. Hopkins observed that strains of *Xf* would lose virulence in culture; however, some of these strains could still colonize the grapevine to a certain degree.

“We also observed that some isolates of *Xf* obtained from hosts other than grapes could colonize grapevines without causing symptoms. Because of other research publications on cross protection for disease control, I decided to evaluate the effect on disease incidence and severity by inoculating grapevines with the benign strains prior to inoculating with pathogenic strains.”

Hopkins said that after many greenhouse and vineyard tests, the EB92-1 strain of *Xf* was the most effective strain for biocontrol and the most consistent from test to test.

This spring, field trials using the benign *Xf* strain moved to California thanks to funding from the PD/GWSS Board. A total of 600 vines have been planted so far. The first planting of 200 vines is in an organic vineyard in Temecula. A second planting of 200 vines is in Sonoma and a third in Napa.

Bruce Kirkpatrick, Ph.D. with the Department of Plant Pathology at U.C. Davis, is heading up the

California project.

“Half of the vines are inoculated with the benign *Xf* and the other half were left untreated,” said Dr. Kirkpatrick.

“The project is planned for five years, unless everything gets infected sooner,” said Dr. Kirkpatrick. “Otherwise, I’d say that when well over half of the non-protected vines develop PD, we’ll have enough data to statistically analyze.”

The test plantings consist of six different varieties spread out among the three sites. Each site has one variety known to be very susceptible to PD, while the other varieties are less susceptible.

“We expect to see the first symptoms of PD in vines by next August if the disease pressure is decent,” said Dr. Kirkpatrick.

Even if the tests are successful, winegrape growers needn’t be in the market for a hypodermic set just yet.

“If these tests are successful, the next step will be performing larger tests with more varieties. Then once the industry decides that this is a control method they want to embrace, there will be more tests to determine the best method for commercially deploying the benign strain in both new and existing vineyards,” said Dr. Kirkpatrick.

## *“Best Winery in California,” Thanks to PD/GWSS Board*

In 2001, while driving around Temecula and seeing dead vineyard after dead vineyard, it would be hard to believe that in 2008 there would still be any wineries left in the area. In fact, most in the wine industry were predicting that what had happened in Temecula was just the start of what would be sweeping up the state, laying waste to much of California’s wine and grape industry.

Yet in 2008, South Coast Winery in Temecula was named the “Best Winery in California” at the California State Fair commercial wine competition. Master Winemaker Jon McPherson thanked the Pierce’s Disease/Glassy-winged Sharpshooter Board for the role they played in the winery’s success.

Thanks in large part to an areawide control

program and advances in the scientific community’s understanding of how Pierce’s disease (PD) is spread by the glassy-winged sharpshooter (GWSS), the rest of the state has been spared the devastation that hit Temecula in 1999 and 2000.

“Had it not been for the Board’s support of research efforts, this wine region would have vanished. Instead, we have new hope and are prospering. It’s like the phoenix rising from the ashes,” McPherson said.

While no cure has been found yet for PD, advances have been made in detection, control and growing practices which have allowed an area like Temecula to thrive once again as a wine-producing region and has prevented the spread of GWSS to other wine regions in California.

# On The Research Front



## THE BENEFITS AND COSTS OF ALTERNATIVE POLICIES FOR THE MANAGEMENT OF PIERCE'S DISEASE

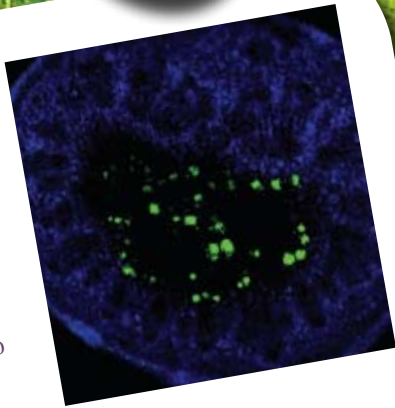
PROJECT LEADER: JULIAN M. ALSTON, UC DAVIS, IN COOPERATION WITH M. ANDREW WALKER, UC DAVIS; KYM ANDERSON, UNIVERSITY OF ADELAIDE; MARK HODDLE, UC RIVERSIDE; PHILIP G. PARDEY, UNIVERSITY OF MINNESOTA; JENNIFER S. JAMES, CALIFORNIA POLYTECHNIC STATE UNIVERSITY, SAN LUIS OBISPO; AND NICHOLAS KALAITZANDONAKES, UNIVERSITY OF MISSOURI-COLUMBIA



The first phase of the project will analyze the potential economic impact on California if Pierce's disease and the glassy-winged sharpshooter are not kept under control. Dr. Alston will also develop a framework for evaluating the commercial viability of new technologies and innovations developed through the PD research program.

## FUNCTIONAL TESTING AND DELIVERY OF PIERCE'S DISEASE-SPECIFIC PROMOTERS FROM GRAPE

PROJECT LEADERS: DAVID GILCHRIST AND JAMES LINCOLN, UC DAVIS, IN COOPERATION WITH DOUGLAS COOK, UC DAVIS



The team discovered gene components, called promoters, which control the expression of other genes, which would be instrumental in controlling Pierce's disease. In the final year of the project, the researchers will address the characterization and use of this enabling technology. The promoters the team discovered can be used by the research community as a diagnostic tool to monitor the response of grapevines to the bacteria that causes PD.

## SIGNIFICANCE OF RIPARIAN PLANTS IN THE EPIDEMIOLOGY OF PIERCE'S DISEASE

PROJECT LEADER: KENDRA BAUMGARTNER, USDA, ARS AT UC DAVIS, IN COOPERATION WITH SARAH GREENLEAF, CALIFORNIA STATE UNIVERSITY SACRAMENTO, AND NORM SCHADD, USDA, ARS

The removal of riparian hosts, known as riparian vegetation management, offers some promise as a control method for PD. This study was the first to look for a correlation between riparian plants and the incidence of PD in vineyards. Most recently, the team discovered that periwinkle is significantly correlated with a high incidence of PD and may play a bigger role in the spread of PD than previously thought.



# Pierce's Disease Control Program Update

At this time last year, 14 counties were wholly or partially infested with GWSS. With the infestation in Solano County declared eradicated at the end of 2007, now only 13 counties contain infestations.

Also in 2007, no GWSS were detected in Rancho Cordova in Sacramento County or in Blossom Hill in Santa Clara County. If there are no finds in either of these two areas by October 31, then the infestations will be eligible to be declared eradicated.

## Fresno County

Twelve GWSS were found through August 13 outside of, but very close to, the county's existing GWSS regulated area's boundary. The county is treating these new locations with Merit.

## Santa Clara County

On August 7, an adult GWSS was detected in a trap in the Evergreen area of San Jose. This is the first GWSS detected in Santa Clara County this year. The county treated three commercial shopping areas and surrounding street trees with Merit.

## Madera County

On July 3, two GWSS were detected in two separate traps at a nursery. The nursery was treated with carbaryl on two occasions and delimitation traps placed in surrounding crops were checked daily for a week. No additional GWSS life stages have been detected.

## Budget Funds Full-Time Inspection Stations

\$7.099 million in the 2008 state budget will fund the operation of 16 border stations statewide on a full-time basis to inspect for invasive pests. Currently only two inspection stations are staffed on a full-time basis. "The Legislature and Governor made a good decision to step up our vigilance at more border stations," said Paul Kronenberg, President of Family Winemakers of California.



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