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# A THORN IN THE VINE: Navigating the Ongoing Battle Against the Glassy-Winged Sharpshooter

*Is the glassy-winged sharpshooter (GWSS) really that big of a deal?* That's a logical question for growers who have joined the winegrape industry since the Pierce's Disease Control Program (PDCP) started and GWSS control measures were enacted. *The answer is yes.* 



The glassy-winged sharpshooter is a very serious vector of Pierce's disease.

"The double threat of GWSS and PD, the fatal grapevine disease the pest spreads, is a constant risk to our grape industry," said Joseph Damiano, PDCP statewide coordinator. "Without the comprehensive and coordinated containment and management programs we have in place to protect vineyards, the pest could easily spread throughout the state's grape growing regions."

GWSS populations have been mainly contained to the southern San Joaquin Valley and 18 GWSS infestations outside of this area have been eradicated, thanks to statewide containment and management efforts funded by the state and federal governments and industry. This gives researchers, funded by the PD/GWSS grower assessment, time to develop practical control strategies and search for long-term, sustainable solutions to PD and GWSS.

If the comprehensive efforts to control, treat, and address GWSS and PD ended, it wouldn't be long before grape

growers across the state could be facing GWSS and PD in their vineyards and paying for it soley out of their own pockets. According to a 2013 economic study conducted by the Robert Mondavi Institute Center for Wine Economics at the University of California, Davis, PD was estimated to cost \$100 million+ per year, even with public control programs in place. The cost could increase by \$185 million+ each year if GWSS were to freely spread throughout California. The researchers are currently working on updating these economic estimates (see page 3).

"GWSS is a very serious vector of PD, carrying the *Xylella fastidiosa* bacteria that causes PD far and wide once it's infected," said David Morgan, PDCP entomologist.



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A Multi-Pronged, Collaborative Approach to Keep GWSS at Bay

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# **On the Research Front**

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Now Online: 2023 PD/GWSS Board Research Projects at a Glance Morgan said the reason GWSS is a bigger problem than native sharpshooters is because GWSS is much larger and lives longer, quickly builds to high populations, flies and hitchhikes effectively, and feeds on a wide range of plant hosts. GWSS is also able to feed on the woody part of grapevines, inserting the *Xf* bacteria into the grapevine where it spreads quickly causing a systemic and fatal infection.

"The risk of history repeating itself, with the devastation PD brought to Temecula's vineyards in the late 1990s, is a stark reminder of the crucial need for continued collaborative and coordinated actions from grape growers, nurseries, the citrus industry, counties, the state, and the United States Department of Food and Agriculture to curb



In 2023, over 59,000 beneficial wasps that kill GWSS eggs were released in eight counties, including in response to Solano County's GWSS infestation.



The USDA's area-wide control program uses GWSS population data from over 14,000 traps deployed in Fresno, Kern, Madera, and Tulare counties to prioritize treatments.

But biocontrol alone can't keep GWSS populations low enough to stop the spread of PD in agriculture settings. The USDA coordinates areawide management programs in large, agriculturally diverse grape and citrus production areas to suppress GWSS populations in the southern San Joaquin Valley.

Traps are deployed in four counties to monitor GWSS populations and develop strategic treatment plans. With limited funds and widespread GWSS populations, treatments are applied in late fall through early winter, when GWSS move to citrus orchards as temperatures drop. Ever strategic, their teams prioritize treating non-organic citrus with the highest GWSS population levels, GWSS finds near vineyards, and finds outside of existing infested

the spread of GWSS in California," said Damiano.

The PDCP employs a multi-pronged approach of biocontrol, rapid response, and nursery activities, along with the USDA's area-wide control program, to keep GWSS populations at bay. Learn more about all the activities in <u>"Five Key Steps to Slow the Spread of</u> <u>the Glassy-Winged Sharpshooter"</u> (bit.ly/47tvRAc).

The PDCP has also been using biological control agents, tiny wasps that destroy GWSS eggs, as a key approach to controlling GWSS. Without posing any threat to humans, these parasitic wasps kill GWSS eggs and help suppress GWSS populations. More than 2.8 million biological control agents have been released at agricultural, riparian, and urban sites in 16 counties since 2001. In 2023, over 59,000 wasps were released at 176 field sites in eight counties. Of PDCP's many responses to a GWSS infestation, the release of beneficial insects is often the quickest.

"How important is the release of these beneficial parasitoid wasps?" asks Morgan. "90% of all GWSS eggs in the Central Valley are killed by our biocontrol agents." area boundaries. In 2023, over 14,000 traps were deployed in Fresno, Kern, Madera, and Tulare counties, over 79,000 GWSS were trapped, and pesticides were applied to over 17,700 acres of citrus.

"Key to mitigating the spread of PD and GWSS are grape growers treating their vineyards and removing diseased vines and citrus growers continuing to support treatments in their orchards," said Beth Stone-Smith, California assistant state plant health director, USDA. "These proactive measures are necessary to continue to have a thriving agriculture system for California's many commodities and growers."

The success of these programs hinges on grape growers, whose continued support of the PD/GWSS assessment and the PD/GWSS Board makes the work possible. Their active participation in treatment and trapping makes the work effective. Growers can reduce their risk by not planting vines near citrus, especially organic growers, treating their vineyards for GWSS, and removing vines that have PD. Growers can also advocate for continued cross-industry partnerships, especially with citrus and nursery, and federal support.





A grapevine showing symptoms of Pierce's disease

### Costs of Pierce's Disease in the California Grape and Wine Industry and Benefits from the PD Control Program and Research and Development

#### Project leaders: Julian Alston and Rachael Goodhue, University of California, Davis

The team last analyzed the cost of Pierce's disease to the California winegrape industry in 2013, estimating that PD costs more than \$100 million per year, even with public control programs in place. The cost would increase, they estimated, by more than \$185 million per year if the Pierce's Disease Control Program ended and the glassy-winged sharpshooter spread freely throughout California. The team is updating its estimates to determine the current costs of PD to

the winegrape industry, and the costs and benefits of the PDCP and the PD/GWSS Board. Read "The Economic Consequences of Pierce's Disease and Related Policy in the California Winegrape Industry" at <u>bit.ly/46UKKd8</u>.

# **Progression of Pierce's Disease Symptoms and** *Xylella fastidiosa* **Colonization of Grapevines Under Field Conditions**

Project leaders and cooperators: Rodrigo Almeida, University of California, Berkeley; Monica Cooper, University of California Cooperative Extension, Napa County; and Matthew Daugherty, University of California, Riverside

The researchers are studying Pierce's disease progression in a 10-year-old vineyard after infecting 13 wine grape cultivars, grown under commercially relevant conditions at a research station, with *Xylella fastidiosa (Xf)*. They've observed that varieties respond differently to infection, that there is variability in plant winter recovery, and that *Xf* strains appear to differentially survive the winter in plants. This is particularly important because winter curing is still the only mechanism that completely and permanently cures grapevines from *Xf* infections, and the mechanism behind this plant response needs further research to be thoroughly understood.



A vineyard with vines killed by Pierce's disease



A grapevine showing symptoms of grapevine leafroll disease

# Resistance to Grapevine Leafroll-Associated Virus 3 and its Two Major Mealybug Vectors

#### Project leaders: Marc Fuchs and Greg Loeb, Cornell University

The team set out to develop grapevines resistant to grapevine leafroll-associated virus 3 (GLRaV3), grape mealybug, and the vine mealybug using RNA interference (RNAi). RNAi is a potent mechanism for regulating gene expression that targets and degrades specific RNA molecules. The team is using RNAi against the virus and the two insect vectors by combining multiple double-stranded RNA (dsRNA) constructs. The production of grapevine plants stably transformed with dsRNA constructs against GLRaV3 and the two mealybug pests is progressing.

The CDFA PD/GWSS Board partners with other organizations to leverage funding for research and outreach projects. Funding partners include the American Vineyard Foundation, the Consolidated Central Valley Table Grape Pest and Disease Control District, the USDA Agricultural Research Service, and other organizations.

# Now Online: 2023 PD/GWSS Board Research Projects at a Glance

The Pierce's Disease and Glassy-winged Sharpshooter Board is pleased to release the "2023 PD/GWSS Board Research Projects at a Glance," showcasing pivotal work from the past year aimed at combatting winegrape pest and disease challenges.

#### The report is available online at <u>bit.ly/PDResearchProjects23</u>.

With consistent, reliable funding from the PD/GWSS assessment, leading scientists can pursue innovative solutions to PD and other serious grapevine pests and diseases, including brown marmorated stink bug, European grapevine moth, grapevine fanleaf disease, grapevine leafroll disease, grapevine red blotch disease, mealybugs, and spotted lanternfly. The research overseen by the Board is critical to advancing knowledge, improving practices, and guaranteeing the longevity of the California winegrape industry.

"The PD/GWSS Board ensures that growers' dollars are spent wisely and productively to find solutions to our industry's pest and disease issues," said Dr. Kristin Lowe, the PD/GWSS Board research coordinator. "Our current research portfolio includes cutting-edge science that we hope will open up even more options for sustainable and durable pest and disease control for California winegrape growers."

Since 2001, the Board has invested over \$55 million in research and outreach to protect vineyards, mitigate the impact of pests and diseases, and deliver practical and sustainable solutions. The focus of current research projects ranges from investigating pests and diseases to evaluating existing control methods to exploring new promising control strategies. The 2023 report presents the results of 30 projects, underscoring pioneering discoveries, effective practices, and valuable industry recommendations.

Learn more about the Board's research program at <u>bit.ly/PDBoardResearch</u>. The Board will review proposals for 2024-2025 funding at its April meeting.

> BIOCONTROL INSECTS released in 2023

59,000+

**79,000+** GWSS TRAPPED in the Area-Wide Treatment Program in 2023 **17,700+** ACRES TREATED for GWSS in Area-Wide Treatment Program in 2023

2023 PD/GWSS Board Research Projects AT A CLANCE

Online at bit.ly/PDResearchProjects23