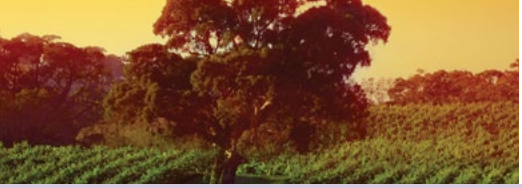


CALIFORNIA PD/GWSS BOARD
Partnership for Winegrape Pest Solutions

ISSUE 3 – 2022

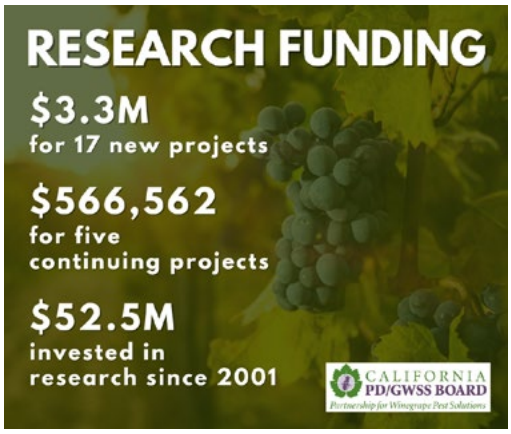
# bulletin

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

INSIDE THIS ISSUE

# PD/GWSS Board Funds 17 New and Five Continuing Research Projects

The Pierce's Disease/Glassy-winged Sharpshooter (PD/GWSS) Board recommended $3.3 million in new funding for 17 research projects investigating PD, grapevine viruses, and vectors over the next three years. The recommendation was approved by California Department of Food and Agriculture Secretary Karen Ross. View a list of newly funded research projects on the next page.




"I am inspired by the PD/GWSS Board's great example of government and private sector partnership," said John Aguirre, past president of the California Association of Winegrape Growers. "When considering research funding, the Board is driven by fact-based decision-making and careful consideration of spending grower dollars."

The Board invites researchers to submit funding proposals every December for annual research funding distribution. Twenty-two project proposals were submitted this year and evaluated by the Board's research screening committee and scientific review panels before being discussed by the full Board at its spring meeting. Additionally, five previously approved multi-year projects were approved for continued funding in the amount of $566,562 for the fiscal year 2022-2023. These include modeling *Xylella fastidiosa* transmission using fluid dynamic simulations; genetic approaches to controlling GWSS; rapid identification tools for monitoring and managing viruses; field testing of transgenic grapevine rootstocks; and investigating the impact of grapevine red blotch virus.

The Board has invested close to $52.5 million since 2001 in research and outreach to protect vineyards, prevent the spread of pests and diseases, and deliver practical and sustainable solutions. The consistent, reliable funding made possible by the winegrape grower assessment means that California's wine industry supports leading scientists dedicated to finding solutions to PD and other serious pests and diseases of winegrapes.

Learn more about the Board's research and outreach activities at bit.ly/3yzAuau.

# Research Projects Beginning in 2022

| Topic | Title | Project Leader | Total Funding* |
|---|---|---|---|
| Pierce's Disease | Progression of Pierce's disease symptoms and *Xylella fastidiosa* colonization of grapevines under field conditions | Almeida, R., UC Berkeley | $105,221 |
| | Development of tools for precise breeding of grapevine cultivars resistant to Pierce's disease | Cantu, D., UC Davis | $316,436 |
| | Enhancing rootstock-mediated systemic immunity against Pierce's disease in a grafted commercial wine grape variety | Dandekar, A., UC Davis | $97,093 |
| | Systemic formulations of antibacterial nanoparticles for Pierce's disease management | De La Fuente, L., Auburn University | $104,311 |
| | Advancing biopesticides for management of Pierce's disease | Eskalen, A., UC Davis | $151,379 |
| | Field evaluation of cross-graft protection effective against Pierce's disease by dual DNA constructs expressed in transgenic grape rootstocks | Gilchrist, D., UC Davis | $68,099 |
| | Transgenic rootstock-mediated protection of grapevine scion against Pierce's disease by dual DNA constructs | Gilchrist, D., UC Davis | $244,010 |
| | Identification of novel Central Valley *Trichoderma* isolates for biological control of Pierce's disease in California | Wallis, C., USDA-ARS | $44,000 |
| Insect | Substrate-borne vibrational signals in intraspecific communication of the blue-green sharpshooter | Krugner, R., USDA-ARS | $101,389 |
| Insect & Virus | Resistance to grapevine leafroll-associated virus 3 and its major mealybug vectors | Fuchs, M., Cornell University | $239,428 |
| Viruses | Propogating the premier US grape collection for protection in a Foundation Greenhouse | Al Rwahnih, M., UC Davis | $647,905 |
| | Developing an efficient DNA-free, non-transgenic genome editing methodology in grapevine | Deluc, L., Oregon State University | $59,483 |
| | Ecology of grapevine red blotch disease | Fuchs, M., Cornell University | $251,377 |
| | Mechanisms of fanleaf disease symptom development for novel resistance strategies | Fuchs, M., Cornell University | $139,180 |
| | Virus-based delivery of interfering RNAs targeting grapevine leafroll-associated virus(es) | Kuo, Y-W., UC Davis | $386,559 |
| | Investigating the relationship between grapevine red blotch virus titer levels, years of infection and symptomology | Oberholster, A., UC Davis | $292,940 |
| | Protoplast-mediated gene editing for disease resistance | Tricoli, D., UC Davis | $98,387 |

**grant durations will be one to three years*

# on the RESEARCH FRONT

CALIFORNIA PD/GWSS BOARD

*Partnership for Winegrape Pest Solutions*

## Substrate-Borne Vibrational Signals in Intraspecific Communication of the Blue-Green Sharpshooter

***Project Leaders: Rodrigo Krugner, United States Department of Agriculture, Agricultural Research Service***

The goal of this project is to reduce the spread of Pierce's disease (PD) by developing new techniques to control blue-green sharpshooter (BGSS) populations. Research shows other leafhoppers communicate solely by vibrational signals, but further investigation is needed with BGSS to identify communication signals that are relevant for the management of PD. Interfering with the vibrational signals required for mating and reproduction can lead to environmentally benign ways of suppressing BGSS populations.

**Blue-green sharpshooter.** *Photo by Katja Schulz from Washington, D. C., USA, CC BY 2.0*

## Development of Tools for Precise Breeding of Grapevine Cultivars Resistant to Pierce's Disease

***Project Leader: Dario Cantu, University of California, Davis and Summaira Riaz, United States Department of Agriculture, Agricultural Research Service***

This is a new project that builds on and continues Dr. Andrew Walker's work on the identification, characterization, and utilization of wild grape accessions that are genetically resistant to Pierce's disease (PD). In 2006, a major quantitative PD resistance locus was identified in *Vitis arizonica*, a North American wild grape species, and named *PdR1*. Using traditional breeding methods, *PdR1* was introduced into elite white and red wine grapes that were released in 2019 and are available to growers. This project aims to characterize all known alternative forms of *PdR1* to allow the precise and faster introduction of a diverse set of sources of PD resistance into additional grape cultivars.

**Breeding PD-resistant winegrapes.**

**The team will compare how well four biological control products work, including *Paraburkholderia phytofirmans* shown above.**

## Advancing Biopesticides for Management of Pierce's Disease

***Project leaders: Akif Eskalen, University of California, Davis***

This project will field test natural biological products for control of Pierce's disease (PD). Research funded by the Pierce's Disease/Glassy-Winged Sharpshooter Board led to discoveries of beneficial endophytic bacteria including *Paraburkholderia phytofirmans*, *Pseudomonas viridiflava*, and *Achromobacter xylosoxidans*. The team will compare how well these biological control products and a fourth bacteriophage technology, XylPhi-PD, work. This research will generate the data needed for the commercialization of new biopesticides that grape growers can use to manage PD.

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.

# Insects Deployed for Glassy-Winged Sharpshooter Eradication in Solano County

Eradication efforts are in full force against the glassy-winged sharpshooter (GWSS) infestation in Vacaville's Browns Valley neighborhood in Solano County, including the release in April of over 900 tiny, stingless wasps. The wasps are natural enemies of GWSS, destroying GWSS eggs while not harming humans or other insects. More biological control wasps will be released every few months.

The Pierce's Disease Control Program (PDCP) has been using biological control since 2001 as an important component of its integrated pest management approach to reduce GWSS populations. Upon adult emergence and mating, the female wasp lays its eggs inside GWSS eggs, and the immature wasp completes its development by feeding on the GWSS eggs. Then the adult wasp emerges from the GWSS egg, mates, and female wasps then search for more GWSS eggs in which to lay their eggs. Through the repeated life cycles, the parasitic wasps kill GWSS eggs and contribute to the suppression of GWSS populations. Learn more at bit.ly/3LttyRf.

Other eradication tools deployed by the Solano County Agriculture Department and the PDCP include visual surveys, trapping, and insecticide treatments. Approximately 95% of residential properties in the area have been treated since October 2021 and 140 sticky traps set up in the area will be checked every two weeks to monitor the GWSS population.

**Agricultural officials are using visual surveys, trapping, insecticide treatments, and biological control to eradicate the glassy-winged sharpshooter infestation in Solano County.**
*Photos from Solano County Agriculture Department.*

The Solano County infestation, discovered during routine trapping in October 2021, is the only current GWSS infestation north of the Madera County area. To see a map of GWSS infestations, visit bit.ly/3PXhLTN.