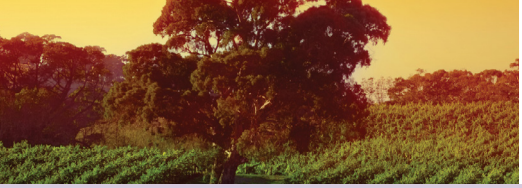

CALIFORNIA PD/GWSS BOARD
Partnership for Winegrape Pest Solutions

2023 – ISSUE 2

bulletin

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

INSIDE THIS ISSUE



# PD/GWSS Board Grants $2.7 Million in New Funding for Research Projects

The Pierce's Disease/Glassy-winged Sharpshooter (PD/GWSS) Board recommended $2.7 million in new funding for 17 research projects investigating PD, grapevine viruses, and vectors over the next three years.


Sixteen projects are new and one is an expansion of a previously approved project. Additionally, 10 previously approved multi-year projects received continued funding for a little more than $1 million for the fiscal year 2023-2024. 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.

"We were pleased with the high number of research proposals we received, especially the increase in projects addressing grapevine viruses," said Dr. Kristin Lowe, PD/GWSS Board research coordinator. "Every research project the PD/GWSS Board funds brings the winegrape grower industry closer to solutions for the pest and disease problems growers face."

The Board received 31 applications for research and outreach funding during its annual request for proposals, the most in several years. The proposals were evaluated by the Board's research screening committee and scientific review panel before being discussed by the full Board at its spring meeting.

The Board has invested over $55 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 Board-funded research at bit.ly/3w27mtc.

*continued on next page*

# New Research Funding in 2023

| 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 | $141,431 |
| | Management of the federal permits for multi-investigator field-testing of transgenic grapevine rootstocks in California | Dandekar, A., UC Davis | $49,175 |
| | Enhancing rootstock-mediated systemic immunity against Pierce's disease in a grafted commercial wine grape variety | Dandekar, A., UC Davis | $120,700 |
| | Developing an efficient DNA-free, nontransgenic genome editing methodology in grapevine | Deluc, L., Oregon State University | $85,950 |
| | Transgenic rootstock-mediated protection of grapevine scion against Pierce's disease by dual DNA constructs | Gilchrist, D., UC Davis | $258,696 |
| | Using a stable, plant-derived antimicrobial peptide to control Pierce's disease | Jin, H., UC Riverside | $149,386 |
| | Using the native grapevine immune system to generate Pierce's disease resistant grapevines | Roper, C., UC Riverside | $220,286 |
| | Identification of novel Californian *Trichoderma* isolates for biological control of Pierce's disease | Wallis, C., USDA ARS | $33,000 |
| Insect | Modeling sharpshooter feeding behavior with a novel 3D approach to insect behavioral visualization | Almeida, R., UC Berkeley | $87,377 |
| Insect & Virus | CRISPR-mediated genome modification of *Homalodisca vitripennis* for the genetic control of Pierce's disease | Atkinson, P., UC Riverside | $219,598 |
| Viruses | Taxonomic status, population structure and identification methods for the vineyard spittlebug *Aphrophora* sp., a suspect *Xylella fastidiosa* vector | Thompson, V., American Museum of Natural History | $7,530 |
| | Epidemiological characteristics of grapevine red blotch disease | Fuchs, M., Cornell University | $251,598 |
| | Resistance to grapevine leafroll-associated virus 3 and its two major mealybug vectors | Fuchs, M., Cornell University | $259,703 |
| | Biology and role of treehoppers in grapevine red blotch disease with emphasis on *Tortistilus albidosparsus* | Zalom, F., UC Davis | $303,233 |
| | Autonomous field-scouting of virus infections in white varieties and pre-symptomatic vines | Brillante, L., CSU Fresno | $113,491 |
| | Identification of grapevine host factors with pro-viral activity to target for resistance against red blotch virus through CRISPR gene editing | Deluc, L., Oregon State University | $184,995 |
| | Mechanisms of fanleaf disease symptom development for novel resistance strategies | Fuchs, M., Cornell University | $225,175 |

**grant durations will be one to three years*

# on the RESEARCH FRONT

CALIFORNIA PD/GWSS BOARD

*Partnership for Winegrape Pest Solutions*


The Virus Vision app can help identify diseased vines

## Improved Decision-Making for Grapevine Leafroll and Red Blotch Diseases Using Rapid Identification Tools and a Regional Approach to Monitoring and Management

***Project leaders: Monica L. Cooper and Jennifer K. Rohrs, UC Cooperative Extension, Napa***

Key mitigation efforts for grapevine leafroll and red blotch diseases include sourcing virus-screened plant material, removing individual diseased vines (roguing) or redeveloping high-incidence blocks, and reducing vector populations. Successful roguing requires accurate identification of diseased vines, which can be challenging when symptoms are confusing, asynchronous, or absent. This project is improving the accuracy of visual assessments using artificial intelligence and an "in-house" LAMP-GRBV assay. The pilot version of the Virus Vision app is over 87% accurate in identifying diseased blocks. An updated version of the app, with more photos in its database, will be released and tested in fall 2023. Learn more at bit.ly/ucce-red-blotch.

## Genomics Resources for Identification, Tracking, Surveillance, and Pest Management of Vine Mealybug in Vineyards

***Project leaders: Lindsey Burbank, Rachel Naegele, and Mark Sisterson, United States Department of Agriculture – Agricultural Research Service, and Dario Cantu, University of California, Davis***

Continued use of chemical control for insect pests such as vine mealybugs (VMB) is likely to lead to insecticide resistance. DNA sequence information for VMB will enable the development of new pest control technologies. A high-quality VMB reference genome was created from single insect DNA extraction and the team continues to refine the reference genome using data from male and female vine mealybugs. This information will be used to track pest populations, evaluate the prevalence of insecticide resistance, and develop new pest control technologies based on novel genetic targets.

Cages holding vine mealybugs in the lab

Phytotoxicity assessment in grape seedlings treated with repeated doses of two different Zinkicide® formulations.

## Systemic Formulations of Antibacterial Nanoparticles for Pierce's Disease Management

***Project leaders: Leonardo De La Fuente, Auburn University; Lindsey Burbank, United States Department of Agriculture, Agricultural Research Service; and Swadeshmukul Santra, University of Central Florida***

The team successfully tested an antibacterial chemical treatment ("Zinkicide®") with blueberries and tobacco infected with *Xylella fastidiosa (Xf)* and showed significantly reduced pathogen populations and symptoms. The team modified the formulation to improve performance at lower doses and began testing it in grapes. The first experiments on grapevines did not reduce *Xf* colonization. Ongoing work will test modified zinc-based compounds and explore alternative formulations without zinc.

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.

# Pierce's Disease Found in Humboldt County

Pierce's disease (PD) was found for the first time in the Willow Creek area of Humboldt County in the fall of 2022. The finding is noteworthy since PD is less likely to be prevalent in the colder climate of Northern California.

The Humboldt County Department of Agriculture hosted a meeting with local growers in April to educate and assist them in identifying and managing PD. There are about 100 acres of wine grapes in Humboldt County. The County will continue to test new grape leaf samples with the spring bud break.

County staff cannot confirm how PD got to Humboldt County. A number of insects can spread *Xylella fastidiosa* (*Xf*), the bacterium that causes PD, including the glassy-winged sharpshooter (GWSS) and the blue-green sharpshooter (BGSS). County staff have not detected GWSS in the area. The BGSS is more commonly found in coastal grape-growing areas.

Pierce's disease has been reported in almost half of California counties. Historically, the northern limit of PD has been the north Bay Area, North Coast, and the southern Sacramento Valley as *Xf* is intolerant to cold winter temperatures. But a research team, funded by the PD/GWSS Board, is investigating *Xf* overwintering and climate adaption after finding *Xf* at multiple sites in Mendocino County in 2020.

The field trial, led by Rodrigo Almeida and Monica Cooper, provides strong evidence that *Xf* populations infecting grapevines in California are adapted to regional climates. Infected grapevines may recover depending on what time of year they're infected and how cold it gets over the winter, but historical overwinter curing trends may be shifting due to climate change. Also, grapevine cultivars vary not only in susceptibility to PD but also in overwinter curing rates.