

# Ants: The Secret Partner of the Virus-Vectoring Vine Mealybug

By: Stephanie Bolton, Ph.D., Lodi Winegrape Commission, PI for “Grapevine virus management in Lodi: A collaborative research and integrated outreach effort to solve a statewide challenge.”

Small groups of farmers, scientists, viticulturists, pest control advisors, and extension personnel meet monthly in Lodi diners to understand how to manage vine mealybugs and viruses (funded by the American Vineyard Foundation, CDFA’s PD/GWSS Board, and the Lodi Winegrape Commission).

We research our local situation while comparing it to other regions in California and worldwide to best provide practical, timely advice for our winegrowing community. After input was received from Brett Chandler (Associate’s Insectary), it became very clear that with leafroll virus we had more than just mealybugs to worry about.

Some ants, such as the Argentine ant in Crush District 11, act as intelligent, workaholic vine mealybug leafroll virus “vector assistants.” Ants farm the mealybugs for their sweet golden honeydew. They also move the mealybugs (and therefore leafroll virus) around on a vine and from vine to vine in a vineyard, and they physically fight off the mealybug’s natural enemies including the *Anagyrus* wasp and the *Cryptolaemus* beetle.

Difficult to eradicate, invasive Argentine ants are classified as a “superorganism” because when one colony of these ants meets another colony, instead of fighting each other for territory, they join forces to create a giant colony. Our California Argentine ant supercolony extends from Ukiah to Mexico.

In Lodi we are searching for economically feasible and effective methods for controlling Argentine ants in larger vineyards (50+ acres) to add to our mealybug biocontrol and leafroll virus management strategies, bringing a healthier balance to our vineyard ecosystem and allowing us to keep farming winegrapes profitably and responsibly. More and more, growers across California are assuming that every vine mealybug is potentially infected with leafroll virus. They are taking many actions such as incorporating not just reactive but also preventive pheromone mating disruption, releasing beneficial insects in vineyards, inspecting all nursery shipments for vine mealybugs, conducting more frequent trapping and scouting for vine mealybugs, talking with their neighbors about mealybugs and viruses, training virus scouting crews, scheduling vineyard work from the least-infected to the most-infected (with vine mealybug) vineyards, recognizing the value of purchasing CDFA-certified planting material, testing their vineyards for virus infections, and selecting rootstocks carefully when replanting on top of a leafroll virus vineyard removal.

On April 4th, 2019, winegrape growers are invited to our annual Mealybug & Virus Outreach Meeting in Lodi. Check the Lodi Winegrape Commission website for details at [www.lodiwine.com](http://www.lodiwine.com).



Above, an ant carrying a mouthful of vine mealybug eggs along a drip line in a California vineyard. Photo provided by Mario Salinas.

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### Bob Wynn, Long-Time Statewide Coordinator of the PD Control Program, Leaves State Service

- After 44 years of service to the state, Bob Wynn bids farewell.

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### On the Research Front

- PD flared up recently in Napa and Sonoma counties, and researchers are trying to find out why.
- GWSS in Kern County are showing signs of imidacloprid resistance. Research is trying to find out just how widespread that resistance is and what might be done about it.
- Researchers are looking at ways to manage red blotch in vineyards.

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### 2018 PD Research Symposium Review

- While the symposium is over, the research goes on. The event drew over 90 people to San Diego to hear presentations and discuss the latest research on PD, GWSS, and other pests and diseases of winegrapes.

# Bob Wynn, Long-Time Statewide Coordinator of the PD Control Program, Leaves State Service

Robert (Bob) L. Wynn, Jr., Statewide Coordinator of the Pierce's Disease (PD) Control Program since its inception in 2000, stepped down from his position on January 25, 2019.

Bob is a lifetime resident of California and is a graduate of UC Berkeley and CSU Sacramento. He began his career with the California Department of Food and Agriculture (CDFA) in 1975, serving 44 years with the state.

**CDFA Secretary Karen Ross, left, presents Bob Wynn with a resolution from California's State Assembly honoring him for his years of service to the State, during the January 25, 2019 joint meeting of the PD/GWSS Board and the PD Advisory Task Force.**



It was on December 6, 2000, that Bob accepted a gubernatorial appointment from then-Governor Gray Davis as the Statewide

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**CDFA Secretary Karen Ross**

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Coordinator for the newly created Pierce's Disease Control Program at the California Department of Food and Agriculture (CDFA). In this vital position, Bob coordinated the statewide efforts directed against PD and its aggressive invasive vector, the glassy-winged sharpshooter (GWSS). This involved the coordination of multi-agency, industry and academic institution segments in statewide pest prevention and research strategies, which are now in use to control and contain the spread of PD and its vectors, including the GWSS. Before accepting the current position, Bob served as CDFA's director of Plant Health and Pest Prevention Services division and Inspection Services division.

Through three gubernatorial administrations Bob maintained his role as the head of the PD Control Program and also served as a Senior Advisor to the CDFA secretaries, gaining

the respect of all who worked with him.

"I am so grateful to Bob Wynn for his years of dedicated service to agriculture, the Department of Food and Agriculture, and to the citizens of this state," said CDFA Secretary Karen Ross. "Bob's leadership, institutional knowledge and insights, management skills and investment in building relationships with partners that quickly turn into friendships that last a lifetime have contributed mightily to the success of the Pierce's Disease Control Program and many other initiatives of CDFA. I am personally indebted to him for agreeing to stay throughout my term as Secretary to serve as a Senior Advisor. It is hard to imagine doing this job without Bob Wynn on the team!"

Reflecting on his years as Statewide Coordinator, Bob said, "So many people have contributed over the years to the success of the Pierce's Disease Control Program, we would have to let the ink pour like wine to name them all. Secretary Ross's support was instrumental long before she held that title, dating back to her service as president of the California Association of Winegrape Growers.

"Back when the program began, it was then-Secretary Bill Lyons who worked with Karen, and with me and with grape growers, nursery growers, citrus growers, and all of our other partners to build California's response to this unprecedented threat. As I leave the CDFA team, I feel very fortunate to have worked with so many fine and professional women and men at the agency and specifically the PDCP staff (past and present) whom I consider family. I am also extremely grateful for the opportunity to work with so many dedicated members of industry who have spent countless hours helping ensure the success of our programs.

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**"I'll always treasure the relationships and lifelong friendships I've been able to build and maintain over the years." Bob Wynn**

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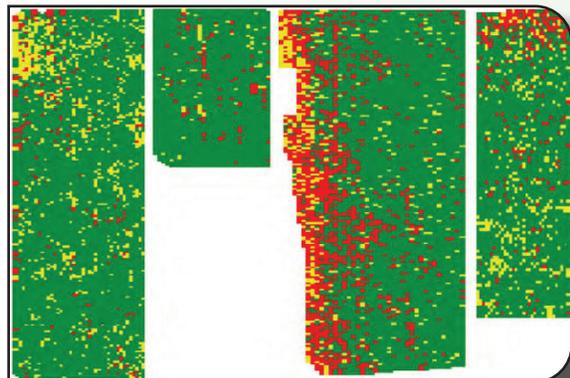
"I'll always treasure the relationships and lifelong friendships I've been able to build and maintain over the years. It has been the strength and durability of these relationships that has made the past two decades so successful. If you need me, I'll be tending to some vines of my own up in the foothills, enjoying time with my wonderful family and tending to the many friendships I've developed along the way."



## Evaluating Potential Shifts in Pierce's Disease Epidemiology

Principal Researcher: Rodrigo Almeida, Dept. Environ. Sci., Policy, & Mgmt., UC Berkeley

With Pierce's disease (PD) reemerging in Napa and Sonoma counties, researchers are determining what factors are driving disease rates up so that management strategies can be devised and immediately implemented. The research team's findings have shed new light on the effectiveness of pruning to cure *Xylella fastidiosa* (*Xf*), the distribution of *Xf* strains in California, and the infectivity status of blue-green sharpshooters (BGSS). Severe pruning of *Xf*-infected grapevines does not work for disease management since it does not cure plants of infection. Rather than a single strain of *Xf* throughout the state, California's grape-growing regions have different strains of *Xf*. The *Xf*-infection rate of BGSS fluctuates during the year and is higher in late fall/winter.



Above, the distribution of PD in a vineyard. Infected vines are red, while yellow are dead or replaced vines.

## Management of Insecticide Resistance in Glassy-Winged Sharpshooter Populations Using Toxicological, Biochemical, and Genomic Tools

Principal Researchers: Richard Redak, Bradley White, and Frank Byrne  
Dept. of Entomology, UC Riverside

Having confirmed in 2016 that glassy-winged sharpshooters (GWSS) in the General Beale Road citrus-growing area in Kern County were exhibiting high levels of imidacloprid resistance, the research team broadened the geographic range of its resistance monitoring program. They also investigated levels of cross-resistance in GWSS populations which were subject to chemical control in grapes, citrus, nursery, and urban environments. They detected substantial differences in susceptibility to imidacloprid among GWSS in Kern, Tulare, and Riverside counties, with resistance appearing to be directly related to previous pesticide usage. Of major concern is the cross-resistance between imidacloprid and acetamiprid, as well as low levels of resistance to the pyrethroid fenpropathrin.



Research indicates that GWSS are showing signs of resistance to chemicals used in their control.

## Ecology of Grapevine Red Blotch Virus

Principal Researchers: Marc Fuchs and Keith Perry, Plant Pathology and Plant-Microbe Biology Section, Cornell University

Red blotch is a recently recognized viral disease of grapevines that is widely distributed in vineyards in the United States, and information on how it spreads is limited. The research team studied changes in disease incidence over time in selected vineyards in California and New York. They found the spread of the virus may be related to the population density of the three-cornered alfalfa hopper, the only known vector. Surveys of vineyard middle-row cover crops over five years indicated they do not play a major role in virus spread. These findings support disease management recommendations based on careful selection of planting material and reduction of virus inoculum in vineyards through roguing and vineyard removal.

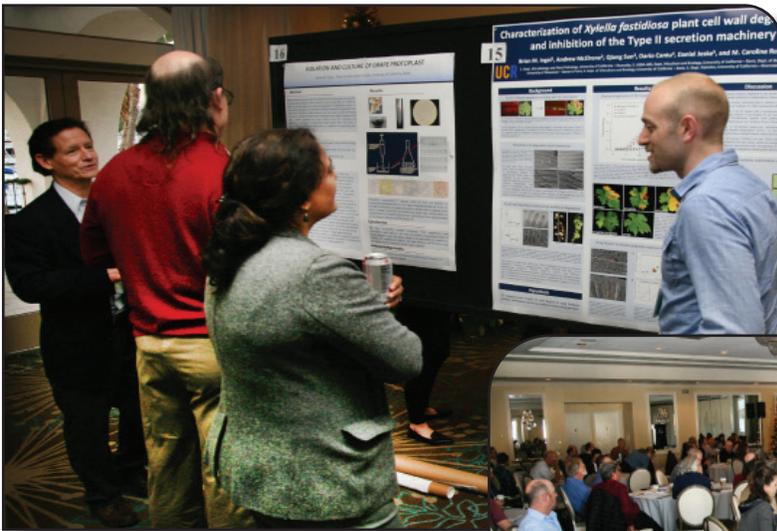


Vines infected with grapevine red blotch virus can be found in vineyards throughout the USA.

# 2018 PD Research Symposium Review

The 2018 Pierce's Disease (PD) Research Symposium was held in San Diego on December 18-19. The symposium highlighted research progress on several fronts relating to winegrape pests and diseases.

As with the past couple of symposiums, there was more to talk about than just PD and the glassy-winged sharpshooter. Grapevine leafroll disease, red blotch virus, and vine mealybug were some of the other pests and diseases discussed among the 90-plus researchers and stakeholders in attendance.



“Traditionally this symposium is absolutely informative and instructive, and an incredible means of bringing together people who have diverse interests in exploring both Pierce’s disease and the glassy-winged sharpshooter. This intermingling of disciplines has really proven to be quite informative as well as motivating for the researchers attending,” said David Gilchrist, Ph.D., from UC Davis.

“We appreciated scientists and stakeholders once again coming together to discuss the latest research developments on PD and

other pests and diseases of winegrapes,” said Tom Esser, Environmental Program Manager with the CDFA and organizer of the event. “Seeing the progress being made, as described in the presentations, posters, and written reports, is encouraging, and we look forward to learning more in the future as research on winegrape pests and diseases continues.”



Above, a few of the researchers discuss some of the research presented at the symposium during the poster session. At right, attendees listen to one of the many presentations made during the two-day research symposium.

To download a copy of the 2018 PD Research Symposium Proceedings, go to [www.cdfa.ca.gov/pdcp/research.html](http://www.cdfa.ca.gov/pdcp/research.html)