2018 Pierce's Disease Research Symposium

The 2018 Pierce's Disease (PD) Research Symposium will be held this December 18 and 19, 2018, in San Diego, California.

Above, researchers as well as other stakeholders from around the globe listened to presentations by their peers on current research. At right, attendees view posters outlining ongoing research during the poster session held during the Symposium.

Although called the Pierce's Disease Research Symposium, it also covers other pests and diseases of winegrapes, reflecting the expanding focus of the PD/GWSS Board.

Researchers and others from around the globe are expected to attend, to learn about recent advances and discoveries regarding PD and other pests and diseases. Together they share a common goal of finding effective, sustainable ways of protecting winegrapes from damage by these pests and diseases.

In connection with the Symposium, a compendium of research progress reports is being prepared and will be available online.

Winegrape growers are encouraged to attend the Symposium as it is an excellent venue for researchers and growers to interact, and for everyone to learn about the latest research, activities, and findings.

For more information and to register for the Symposium, go to http://bit.ly/2OBeS62. Please note that hotel accommodations are not included in symposium registration fees.

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CALIFORNIA PD/GWSS BOARD
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FALL 2018

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New Field Trials Planted in Northern California

On the first of August of this year, new field trials were begun to test the efficacy of modified resistant rootstocks for protecting unmodified scions from Pierce's disease (PD).

Left, a worker readies new vines for the coming winter. Above, a new vine is tagged so it can be carefully tracked throughout the coming years of the field trial.

This research builds on work that discovered five different genes that could impart resistance to PD into winegrapes. Initial field trials tested each mechanism individually. Now researchers are stacking the different mechanisms in combinations of two.

The first round of field trials ran from 2010 to 2017 and used rootstocks modified with a single gene. "The new vines are using two genes each, with an unmodified scion of Chardonnay, and will be trained commercially and evaluated for yield as well as resistance to PD," said Dr. David Gilchrist of UC Davis, the principal investigator for the project. This dual "stacking" approach is expected to provide longer-lasting overall resistance to PD since it offers two different lines of protection from PD.

Resistance Mechanism	Principal Investigator	Gene
Chimeric Antimicrobial Protein	Abhaya Dandekar, UC Davis	CAP
Programmed Cell Death	Dave Gilchrist, UC Davis	PR1 & UT456
Pathogen Signal Molecules	Steven Lindow, UC Berkeley	rpfF
Polygalacturonase Inhibiting Protein	Abhaya Dandekar, John Labavitch, & Ann Powell, UC Davis	PGIP

During the field trials, the vines will be inoculated periodically with *Xylella fastidiosa*, the bacterium that causes PD. The field trials are expected to last three to four years.

INSIDE THIS ISSUE

Update on Traditional Breeding of PD Resistance into Winegrapes

At UC Davis, the decades-long process of breeding Pierce's disease (PD)-resistant winegrapes has now led to 20 PD-resistant winegrape selections being advanced to Foundation Plant Services (FPS) for certification. Of these, five are in pre-release to nurseries. While intended as blending grapes, wines from these PD-resistant vines have shown great flavor profiles on their own.

Above, just a few of the new PD-resistant grapevines that will be available to winegrape growers in the future. Right, a host of high tech machines used to speed up the breeding process by determining which vines have the PD-resistant genes, and which do not.

"These vines have been tested repeatedly for resistance to PD, and they have been evaluated for their wine quality by professionals and other researchers as well, and they will soon be ready for commercial release," said Dr. Andy Walker, the researcher in charge of the breeding effort.

In addition to the 20 winegrape scions, three PD-resistant rootstocks have also been advanced to FPS for certification.

While he initially felt these vines would primarily be used for blending and planted in areas of vineyards with high pressure from PD, that thinking has shifted. "We are now confident that these vines can compete on their own," said Dr. Walker. "Some of the winemakers and growers who have tasted them are quite excited about them from a varietal wine perspective, so we will be naming them and perhaps marketing them as independent wine varieties."

Dr. Walker said he expects the first commercial sales of the vines to begin in 2020, with more being released in following years.

One GWSS Trapped at a Retail Nursery in Madera County

On August 23, 2018, one glassy-winged sharpshooter (GWSS) was found on a trap at a retail nursery in the Madera Ranchos community of Madera County.

Above, yellow sticky traps like this are the industry standard for trapping pests like the GWSS.

In response the Madera County Agricultural Commissioner's Office conducted a delimitation survey around this find.

When GWSS are discovered in a non-infested area, a delimitation survey is initiated that involves placing more traps around the find. In addition, a visual survey is conducted within a one-quarter mile radius of the find.

GWSS delimitation protocols require additional traps and inspections in the area for four weeks. During the first week traps are checked twice, and during the next three weeks, the traps are checked once a week. If after four weeks no additional GWSS are found, it indicates that the trapped GWSS was an isolated incident, and there is no infestation in the area.

To date, no additional GWSS have been trapped.

Just a single GWSS, like the one above, was found on a yellow sticky trap.

on the RESEARCH FRONT

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A grapevine slowly dying as a result of being infected with *Xf*.

Functional Characterization of *pilG*, a Key Virulence Gene, and Evaluation of the Effects of Anti-Virulence Inhibitors on the Virulence of *Xylella fastidiosa*

Principal Investigator: Hong Lin, USDA Agricultural Research Service, Parlier, CA

Xylella fastidiosa (Xf) causes Pierce's disease (PD) of grapevines. Wild-type and a mutant strain of *Xf* with defective *pilG*, a virulence gene that is predicted to play a key functional role in PD, were compared in greenhouse experiments. In the experiment, grapevines inoculated with the mutant strain showed no PD symptoms compared to grapevines infected with *Xf* wild-type. This study indicated that *pilG* is a key virulence gene for PD in grapevines. Anti-virulence molecular screening identified some molecules that effectively suppressed the PD, suggesting that this approach could provide a new target-based strategy for combating PD in grapevines.

Resistance to Grapevine Fanleaf Virus in Rootstocks

Principal Investigator: Marc Fuchs, Section of Plant Pathology, Cornell University, Geneva, NY

Progress is being made towards the development of grapevine rootstocks resistant to grapevine fanleaf virus (GFLV) by expressing RNAi constructs which suppress the growth of GFLV derived from the GFLV genome. Several RNAi constructs were stacked to facilitate broad-spectrum resistance against GFLV. A few modified rootstocks were grown in the greenhouse for evaluation. Measuring their resistance to GFLV will be the next important step of the study. This research is anticipated to provide innovative approaches for managing GFLV in diseased vineyards.

A grapevine with a modified rootstock planted in soil in a greenhouse.

Vines infected with grapevine red blotch virus can have unacceptably low sugar levels.

Timing of Field Transmission of Grapevine Red Blotch Virus

Principal Investigator: Robert R. Martin, Horticultural Crops Research Lab, USDA Agricultural Research Service, Corvallis, OR

The goal of this project is to determine when grapevine red blotch virus (GRBV) is spreading in the vineyard, which could help target control measures to times of the season when the virus is being transmitted in the field. Three vineyards where GRBV had been spreading were used in 2016, and four vineyards were used in 2017. In each vineyard, every plant was given a unique number. The location of each plant was mapped so that it could be determined where virus spread was occurring. Fifteen vines in pots were placed in each vineyard each month starting in April 2016 and continuing through September 2016, and again starting in May 2017 and continuing until October 2017. After one month in the field, the plants were returned to Corvallis, treated with a systemic insecticide, and maintained in a screen house. A total of 300 plants were tested for GRBV in November 2016 and tested negative for GRBV. After overwintering, a set of 90 plants that were trap plants in the 2016 growing season were tested. Again, all plants tested negative for GRBV. Testing of the plants will continue through 2019.

The CDFA PD/GWSS Board partners with other organizations to leverage funding for research projects. Research 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.