The Vote Is Coming! The Vote Is Coming!

During the week of March 30, 2015 ballots will go into the mail, headed to California's winegrape growers to give them the opportunity to vote on continuing the PD/GWSS winegrape assessment.

From Temecula in 1999 (above) to field trials in 2014 (right), great strides have been made in the last 15 years in finding a solution to PD. With many possible solutions currently undergoing field trials, the question has gone from "Can a solution can be found?" to "When will the solutions be available to winegrape growers?"

Since 2001, the assessment has raised money for funding research on finding a solution to Pierce's disease (PD). Over the past 15 years, millions of dollars have been raised and spent on research that has led to the current field trials for several different possible solutions to PD. The research has also led to a massive amount of other useful information that will benefit winegrape growers for decades to come.

During the last referendum five years ago, winegrape growers voted to allow the PD/GWSS Board to direct some of the winegrape assessment funds to research and outreach on other pests and diseases that threaten California's winegrape industry. Thus far the PD/GWSS Board has designated three other pests and one disease as such threats.

In some cases winegrape growers may have multiple vineyards listed under different business names, and thus will receive a ballot for each entity. In the past, this has led to some confusion with people thinking they were sent multiple ballots by mistake. It is important that growers vote and return all the ballots they receive.

The results of the vote will be announced in May or June.

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PD/GWSS BOARD RESEARCH

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WINTER 2015

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Is There an Insect Vector for Red Blotch?

While it may have been around for a long time, the virus that causes red blotch was only recently identified and isolated. Since then a major question being asked about it is: "Is there an insect spreading the virus?"

For years red blotch was grouped with other red-leaf viruses. What was confusing was that vines that looked like they were infected with one of the grapevine leafroll associated viruses (GLRaV) were testing negative for any virus. Then in 2012, a test was developed that identified the virus that causes red blotch. With the test in hand, vineyards were tested for red blotch all across the country, and it was found in vineyards in most regions, especially where winegrapes are grown.

Possible insect vectors were tested in enclosures like these to see if they could transmit red blotch.

To answer the question as to how it was being spread, researchers looked to the usual prime suspect – an insect.

A study conducted in Washington state pointed to the Virginia creeper leafhopper as a vector, but that finding has since been questioned.

Kent Daane, Ph.D. entomologist at UC Berkeley, has been conducting transmission tests with a wide range of insect pests typically found in vineyards, including the Western grape leafhopper, variegated leafhopper, Virginia creeper leafhopper, vine mealybug, blue-green sharpshooter, and grape whitefly.

Using polymerase chain reaction (PCR) assays to test for the presence of red blotch, Daane's team placed the insects on red blotch-infected grapevines in the lab, where they were allowed to feed for up to five days. The insects were then transferred to red blotch free grapevines and allowed to feed for five days. The insects were then removed, and the vines were tested periodically up to a year afterwards. Thus far red blotch has not been found in any of the tested vines. However, the vines will continue to be tested quarterly for a period of two years, as it may take a year or longer for viral populations to reach detectable levels in inoculated vines.

The vines are examined time and time again to see if the red blotch causing virus has been transmitted to the them.

"It is possible that since the Washington group was working with vines that had red blotch from infected seedlings that the virus count was higher, making transmission possible in the Washington test," said Daane. "We know that leafhoppers can pick up the virus, but we have not shown conclusively that they can also transmit red blotch to grapes. So if they are vectors, they are extremely ineffective ones."

Before the test for red blotch became available, it was unknown if nursery stock was infected. Now nurseries are using PCR to ensure that all new vines are red blotch free.

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Researchers Present Their Work at the PD Research Symposium

Nearly 100 people from around the world convened in Sacramento in mid-December for the 13th Pierce's Disease Research Symposium, giving them the opportunity to meet and discuss the latest progress in the search for solutions to Pierce's disease.

"Researchers have followed a strategic path of scientific discovery for several years, and it is beginning to produce real solutions that are now well on their way to our growers," said California's Secretary of Agriculture Karen Ross.

During the poster session, researchers were able to browse the work of their fellow researchers, which often led to enlightening conversations for all involved

The two-day symposium showcased research projects in pest and disease management, crop, vector and pathogen biology, and ecology. A poster session held during the event also gave researchers the opportunity to share their results with peers and growers on an individual basis. Researchers also participated in roundtable discussions where they could share their progress and plan ahead for the coming year. These different venues help foster discussions and further advance the research community's continuing efforts.

"The field is constantly evolving, and it's a challenge to keep up with all of our colleagues' exciting work throughout the year," said David Gilchrist, a professor of plant pathology at UC Davis. "The roundtable discussions helped us get on the same page and collectively decide where we need to go from here."

Many researchers were able to make presentations to their peers about their current research progress.

The symposium is organized by the California Department of Food and Agriculture's Pierce's Disease Control Program. It provides a forum for Pierce's disease and glassy-winged sharpshooter (GWSS) researchers to meet as a group and share information, encouraging scientific collaboration and accelerating research.

"Each year I grow even more impressed by the progress we have made," said Al Rossini, a member of the PD/GWSS Board and a winegrape grower from Denair, Calif. "This year's symposium is no exception. From both a grower's and board member's perspective, it showed that some extraordinary scientific leaps have been made, and many commercial applications are on the horizon."

The proceedings for the 2014 PD Research Symposium can be downloaded from the CDFA website at www.cdfa.ca.gov/pdcp/. Also see the section of this newsletter titled "On The Research Front" for information on some of the new research that was reported on at the symposium.

Is There an Insect Vector for Red Blotch? – continued from page 1

One thing is clear, however, red blotch does spread in vineyards. Dr. Andy Walker has seen red blotch spread across a vineyard in Napa where some of his Pierce's disease (PD) resistant vines have been planted for a few years. "The vines are proving to be PD resistant, but now they are so infected with red blotch I will have to abandon that test site."

To try to better understand how red blotch is spreading, Daane's team monitored the progression of red leaf diseased vines in an established 50-acre vineyard where the spread of GLRaV was mapped from 2009-2012. Not all symptomatic vines from previous years tested positive for GLRaV, and in 2013 they recorded possible red blotch-symptomatic vines in addition to mapping the spread of GLRaV infected vines. Out of the 25 vines from 2009-2012 that showed "red leaf" symptoms but tested negative for GLRaVs, 17 (68%) were positive for red blotch. All vines testing positive were recorded as symptomatic in 2011 or 2012, indicating that red blotch was present in the plot at least by 2011. However, the mystery of how red blotch spreads only deepened as infected vines were randomly distributed within the plot, indicating that infection had not spread out from previously infected vines.

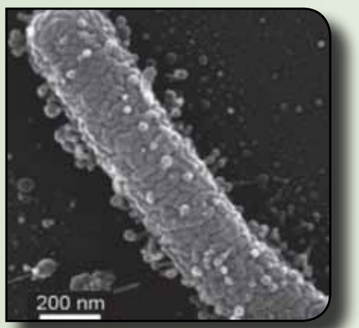
"In some vineyards red blotch does appear to move, but in most blocks movement has not been observed," said Daane. "We have looked at all the common insects as possible vectors, and we are now starting to look at the uncommon and rare insects as vectors. So it is possible that we could have a very rare vector that is extremely effective, or it could still be that one of our common insects is just a very ineffective vector."

Substrate-Borne Vibrational Signals in Intraspecific Communication of the Glassy-Winged Sharpshooter

Principal Investigators: Rodrigo Krugner, San Joaquin Valley Agric. Sci. Ctr. USDA ARS, Parlier, Calif., and Valerio Mazzoni, Fondazione Edmund Mach (FEM) Research and Innovation Center, San Michele all'Adige, Italy

Up until now, little has been known about how the glassy-winged sharpshooter (GWSS) and similar insects communicate with one another. Using a laser vibrometer, researchers detected microscopic vibrations within the insect and surrounding plants, and then boosted the signal to produce an audible recording. This research found that male insects have two distinct mating calls, while female insects have just one. With this knowledge in hand, researchers hope to develop tools that will repel or attract GWSS in the field using audio files of mating calls and other vibrations that affect insect behavior.

Using the laser vibrometer to record the sounds the GWSS make.



Membranous vesicles forming on the surface of cells of *Xf*

Elucidating the Process of Cell-to-Cell Communication in *Xylella fastidiosa* to Achieve Pierce's Disease Control by Pathogen Confusion

Principal Investigator: Steven Lindow, Dept. of Plant & Microbial Biology, University of California, Berkeley, Calif.

Xyella fastidiosa (Xf) produces an unsaturated fatty acid called diffusible signal factor (DSF) that functions as a signal molecule, controlling the expression of genes that influence the pathogen's ease of movement through the grape plant. In this study, researchers examined similar unsaturated fatty acids that could function like DSF, confusing the pathogen and preventing it from spreading from the initial infection point to other parts of the plant. Possible substitutions were identified, including common palmitoleic acid. The researchers will soon test new ways to introduce DSF into grape plants, including a method that uses surfactants (soap) to help vines absorb DSF from an external application for possible future use in established vineyards.

Monitoring for Insecticide Resistance in the Glassy-Winged Sharpshooter in California

Principal Investigators: Thomas M. Perring and Nilima Prabhaker, Dept. of Entomology, University of California, Riverside, Calif.

In this study, researchers are examining the effectiveness of insecticides used to control GWSS infestations in vineyards in Kern and Riverside counties. The research shows that GWSS have yet to develop any significant resistance to imidacloprid, dinotefuran, bifenthrin, fenpropathrin and chlorpyrifos, and have shown little change since previous tests conducted from 2001-2003. The only pesticide that did not demonstrate a high mortality rate was the less commonly used dimethoate, an organophosphate.

A GWSS feeding on a winegrape vine.