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Kern/Tulare

GWSS Update



A project of the Glassy-winged Sharpshooter Task Force of Kern and Tulare Counties. Participants: Agricultural Commissioner's Offices of Kern and Tulare Counties, California Department of Food and Agriculture, University of California-Cooperative Extension, U.S. Department of Agriculture (APHIS and ARS Divisions).

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Making progress: An update on the Pierce's Disease Monitoring and Control Program in Kern County

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If you have recently viewed the trapping data for the General Beale project or the Northern area, you will undoubtedly agree that the glassy-winged sharpshooter (GWSS) just won't go away in Kern County.

Low-level GWSS populations are here to stay, and data from Kern and Temecula indicate that a three-year resurgence following area-wide treatments is expected. In light of this information, I thought it necessary to give an update on the Pierce's Disease (PD) projects in Kern County.

Learning from the General Beale Pilot Project. In 2001, USDA-APHIS initiated the General Beale Pilot Project, an area-wide monitoring and insecticide treatment program to reduce population densities of GWSS as a means of limiting the spread and economic impact of PD. We developed a companion project to determine the changes in the incidence of PD in table-grape vineyards over time in the pilot area and to examine factors such as vine age, cultivar susceptibility, proximity to GWSS habitat (citrus) and individual vineyard management techniques.

In 2001, we surveyed 13 vineyard blocks by visually inspecting vines for PD symptoms, collecting samples from symptomatic vines and testing (by ELISA) for *Xylella fastidiosa* (Xf). In 2002, the project was expanded to 41 vineyard blocks, including eight of the original 13 surveyed vineyards and 35 additional blocks. A profile was created for each vineyard, including the following variables: GPS coordinates, cultivar, vine age, row by vine spacing, pruning/trellising system, weed index and proximity to other host crops of GWSS.



Following the survey, all vines found to have confirmed Xf infections were removed during the dormant period.

Data from this project were compiled in GIS and database formats by the Center for the Assessment and Monitoring of Forest and Environmental Resources (CAMFER) at UC Berkeley and the Department of Entomology at UC Riverside. GWSS population data were collected from weekly sticky card trap counts set up on a quarter-mile grid by the cooperative area-wide trapping program.

Results. Following four consecutive years of survey and sampling in the General Beale pilot area, results indicate an increase in the incidence of PD from 2001 to 2002 and significant decreases in disease incidence each year thereafter.

Effect of cultivar. Perhaps the most interesting discovery of this project is that, in 2002, 99 percent of the PD-infected vines in the General Beale area were in Redglobe and Crimson Seedless vineyards. In 2003 and 2004, these same vineyards accounted for over 93 percent of the diseased vines. Within the General Beale area, the infection rate in cultivars other than Redglobe and Crimson Seedless was essentially negligible. Furthermore, these two varieties comprise only 22 percent of the acreage surveyed in the General Beale area.

(continued on page 2)

Following four consecutive years of survey and sampling in the General Beale pilot area of Kern County, results indicate an increase in the incidence of Pierce's Disease from 2001 to 2002 and significant decreases in disease incidence each year thereafter. (Photo: Catherine Merlo)



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(continued from page 1)

A hypothesis, proposed by CDFA senior plant pathologist Barry Hill to explain this phenomenon, is that the vineyards of all six cultivars were subjected to similar inoculation pressure by GWSS. However, in susceptible cultivars (Redglobe and Crimson Seedless) many of the inoculations resulted in infections that survived the following winter dormancy and progressed to chronic PD. By contrast, almost all of the inoculations that occurred in the other (resistant) cultivars resulted in infections that did not survive winter dormancy, and the vines were healthy and uninfected the following year.

The components that make a cultivar "susceptible" or "resistant" depend on: 1) the rate at which the *Xf* multiplies and spreads into protected winter refuge areas (cordons, trunks) and into green shoots the following spring/summer to thereby be a "source" for GWSS acquisition, and 2) the timing of GWSS acquisition/inoculation events, or that the infective GWSS must feed early enough so that there is sufficient growing time remaining for *Xf* to multiply and spread to the refuge where it can survive the following winter dormancy.

Experiments to test this hypothesis and other mechanisms of table-grape cultivar susceptibility are in progress at both the Kearney Agricultural Center in Parlier and at UC Riverside.

Effect of vine age. Losses from Crimson Seedless involved two adjacent vineyard blocks which were less than three years old. Younger vines are more susceptible to PD than older vines, and it is possible that the losses in these vineyards were primarily related to their more vulnerable age rather than cultivar susceptibility. Mature Crimson vines may not have been so heavily impacted.

Proximity to vector hosts. Based on intensive surveys in the pilot project, citrus was found to be the primary overwintering host for GWSS. Citrus-grape interfaces are common in the pilot project area, and migration of GWSS between the two during the spring and summer are probable. The abundance of GWSS in the area prior to 2002 is likely responsible for the increase in



Based on intensive surveys in the pilot project, citrus was found to be the primary overwintering host for GWSS. (Photo: Catherine Merlo)

the incidence of PD from 2001 to 2002. The subsequent reduction in the numbers of PD-positive vines from 2002 to 2004 is associated with a reduction in GWSS numbers and removal of diseased vines. GWSS numbers have remained relatively steady from 2002 to present, with small peaks during the summer months.

The future of the monitoring project. This is the last year of the project, and we plan to focus on the General Beale, Northern and Western areas beginning in September 2005.

We have learned, and continue to learn, a great deal from the project. For example, we demonstrated that cultivar selection played an important role in the epidemiology of PD in the General Beale pilot area, although future experiments are in progress to better understand the differences in cultivar susceptibility.

Furthermore, researchers at UC Riverside are utilizing geostatistics to characterize the spatial distribution and create distribution maps of PD in Kern County. From an applied standpoint, this project demonstrates that effective PD control can be obtained with a combination of area-wide GWSS management, monitoring for and removal of infected vines.

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California wine-grape growers approve PD assessment referendum

California's wine-grape growers have approved a referendum on the program that funds research on Pierce's disease and the glassy-winged sharpshooter that spreads it.

The "yes" vote means wine-grape farmers will continue to pay an annual assessment based on the value of their crop through March 2011, and a board of growers and winemakers will continue to advise CDFA Secretary A.G. Kawamura on the use of these funds for research and related activities to keep the PD threat at bay.

The final vote tally showed that growers approved continuing the assessment by a margin of nearly nine to one.

The assessment rate for the 2005 harvest is set at \$2 per \$1,000 of crop value.