

## Monitoring the Resurgence of Pierce's Disease in Kern County Vineyards

David Haviland, Farm Advisor and Affiliated IPM Advisor, UCCE, Kern County

For more than a decade grapevine PCAs have been keeping a close tab on the status of glassy-winged sharpshooters (GWSS) and Pierce's disease (PD) in vineyards throughout the state. Initially in the late 1990s interest was focused on Riverside County as photos of sick and removed vineyards hit the press from regions around Temecula. In the early 2000s the concerns expanded as GWSS became entrenched in the lower San Joaquin Valley. Since then interest has expanded as GWSS has continued its northward movement, localized eradication efforts have been made, and impacts to the viticulture and ornamentals industries have been documented.

This article focuses on one of the famed regions of GWSS and PD history called the General Beale area. Due to outbreaks of GWSS in this southeast region of Kern County in the late 1990s, this area became home to the Kern County GWSS Pilot Project and USDA-led Areawide Control Program that were initiated in 2000 and 2001, respectively.

### Monitoring for glassy-winged sharpshooters

Since the early 2000s there has been a large-scale monitoring program for GWSS in Kern County. Traps were placed in a grid throughout the county anywhere that GWSS hosts such as grapes and citrus were found. During the early years of the program there were 141,925 (2001) and 185,014 (2002) GWSS captured annually (Fig. 1). Based on these captures, areawide treatment programs were established in the General Beale region in 2001, northward into the Edison and Highway 65 regions in 2002, and then westward in 2003. In each of these regions, one regionally-synchronized application of insecticides was sufficient to cause significant reductions in GWSS numbers for about three years. As a result, during the periods from 2004 through 2008 the annual county-wide captures averaged 7,841 per year. This is a >95% reduction in GWSS captured.

However, despite the early successes of the areawide treatment programs, GWSS densities have been creeping back up during the past five years (Fig. 1). From 2009 to 2011 GWSS captures increased to an average of 36,709 per year. This is approximately 5 times higher than in the previous five years, despite the fact that treatments to hotspots such as the General Beale area were being made every year. Then in 2012 and 2013 GWSS populations increased to over 100,000 annually (177,128 in 2012



Adult glassy-winged sharpshooters are the primary vector of Pierce's Disease. Photo: D. Haviland

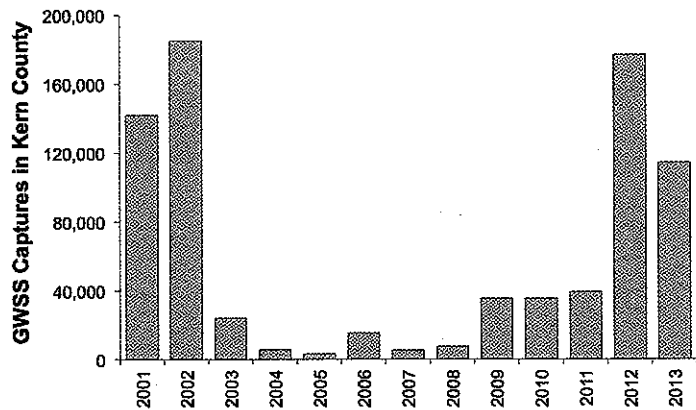
and 114,475 in 2013). Nearly all of these insects were concentrated in the General Beale area whereas captures in the tens of thousands of acres of grapevines in the remainder of the county were for the most part negligible.

At this point nobody is certain as to why GWSS numbers have increased so dramatically in the General Beale area. Some of the most common hypotheses are that 1) eucalyptus trees in windbreaks in that region provide a protected refuge for GWSS during areawide treatments, 2) GWSS is becoming resistant to the neonicotinoid-based insecticides that are predominantly used in the areawide treatment programs, and 3) abnormal weather caused shifts in GWSS phenology such that treatments were not made at the optimal timing. At this point nobody knows which of these reasons might be right and there is always the possibility that all of them have contributed to the increases in trap catches.

### Monitoring for Pierce's Disease in the General Beale area

Due to the importance of GWSS captures in Kern County the table grape industry has partnered with the University of California for nearly a decade to monitor the status of Pierce's Disease in the region. The data have been used for epidemiological studies on the movement

**Figure 1.** Annual captures of glassy-winged sharpshooter in Kern County, 2001 to 2013. (source: Beth Stone-Smith, USDA APHIS)



Murray Prior of the UC Cooperative Extension office in Kern County surveys vines that are symptomatic for Pierce's Disease. Photo: D. Haviland

and distribution of the disease as well as to help growers identify and remove infested vines.

During 2013 personnel with the University of California Cooperative Extension office in Kern County surveyed 20 different table grape vineyards in the General Beale area for Pierce's Disease from late July through November. Vineyards were chosen based on our past history of survey sites, knowledge of PD distribution, and trap catches of GWSS. Surveys were done using a four-wheeler based on visual symptoms. Surveyors looked for vines expressing PD symptoms that included stunted shoot growth, leaf scorch, persistent petioles, irregular cane maturity and shriveled fruit. Samples from symptomatic vines were sent to the California Department of Food and Agriculture for confirmation of the disease.

**Key findings from the survey are as follows:**

- 38% of vineyards that were previously uninfected now contained at least one PD-positive vine.
- PD was reconfirmed in all survey locations that previously had the disease.
- The number of vines with PD was higher in 2013 than in 2012 for 89% of the vineyards that had at least one positive vine each year.
- Vineyards planted to Red Globe had the highest incidence of PD. The number of positive vines in mature vineyards of all other varieties was typically less than 1 per acre.
- PD positive vines were found in 80% of young vineyards that were 2 years old or younger regardless of variety. In two of those vineyards the percentage of infected vines was greater than 15%.
- Exponential increases in PD occurred in Red Globe

vineyards where weeds (alternate hosts for PD) were not managed and roguing of PD positive vines did not occur. This includes an ~80 acre vineyard with more 20,000 infected vines.

**Conclusions**

Data from GWSS trapping programs and PD surveys both suggest that occurrence of this vector-borne disease is on the rise in the General Beale area. The good news is that PD outside of this area is quite low. The bad news is that if current trends continue there is the risk of disease spread out of the General Beale area and into other parts of the county.

Successful efforts to get back on top of the problem will require the joint efforts from many groups. Areawide treatment coordinators need to determine how to successfully reduce overwintering GWSS populations in citrus. Grape growers need to aggressively treat GWSS in their own vineyards, manage weeds to prevent them from serving as alternate hosts for PD, and monitor for and rogue infected vines. For vineyards with PD levels that make it impractical to rogue individual infected vines, entire vineyard removal should occur.

Unless all of these steps are completed there is significant risk that the localized increase of PD in the General Beale area could expand into a much more significant problem throughout the nearly 100,000 acres of vineyards in Kern County. It is not possible for any one group to become the solution to the problem, but if all groups work together there is an excellent probability for success. 🍷