RIVERSIDE COUNTY GLASSY-WINGED SHARPSHOOTER
AREA-WIDE MANAGEMENT PROGRAM IN THE COACHELLA AND TEMECULA VALLEYS

Principal Investigator:
Nick C. Toscano
Dept. of Entomology
University of California
Riverside, CA 92521
nick.toscano@ucr.edu

Co-Principal Investigator:
Carmen Gispert
UC Cooperative Extension
Indio, CA 92201

Cooperators:
John Snyder
Riverside Co. Dept. Agric.
Riverside, CA 92502
jsnyder@co.riverside.ca.us

Robert Mulherin
Riverside Co. Dept. Agric.
Riverside, CA 92502
rmulherin@co.riverside.ca.us

Reporting Period: The results reported here are from work conducted October 2008 to September 2009.

ABSTRACT
Riverside County has two general areas where citrus groves interface with vineyards, the Coachella and Temecula Valleys. The Coachella Valley with 10,438 acres of table grapes in proximity to 12,000 acres of citrus and the Temecula Valley with 2,000 acres of wine grapes in proximity to 1,000 acres of citrus are vulnerable to Pierce's disease (PD). The grapes in the Coachella and Temecula areas of Riverside County are in jeopardy because of the glassy-winged sharpshooter (GWSS), the vector of the PD bacterium, build up in adjacent citrus groves. Citrus is an important year around reproductive host of GWSS in Riverside County, but also one that concentrates GWSS populations over the winter months during the time that grapes and many ornamental hosts are dormant. GWSS weekly monitoring in citrus in grapes began in March 2000 in Temecula Valley and 2003 in Coachella Valley by trapping and visual inspections. Temecula valley GWSS populations in 2008 reached levels not seen prior to the initiation of the area wide GWSS program in 2000. Coachella Valley GWSS populations have decreased dramatically since the treatment program was initiated in 2003.

INTRODUCTION
The glassy-winged sharpshooter (GWSS) vectors a bacterium that causes Pierce's disease (PD). This insect and bacterium are a severe threat to California's 890,000 acres of vineyards and $30 billion dollar industry. An area-wide GWSS management program was initiated in Temecula in 2000 to prevent this vector's spread into other California grape growing regions. In Temecula Valley itself, the wine grape industry and its connecting tourist industry generate $100 million of revenue for the economy of the area. GWSS/PD caused a 40% vineyard loss and almost destroyed the connecting tourist industry. The area wide GWSS management program initiated in the spring of 2000 saved the industry from a 100% loss. Only a continuation of an area-wide GWSS management program will keep the vineyards viable in Temecula. The table grape industry in the Coachella Valley is represented by 10,465 acres of producing vines, which generate fresh market grapes valued at an average of $110 plus million annually. The GWSS was identified in the Coachella Valley in the early 1990's. Population increases of this insect in Coachella Valley in the last three years have increased the danger of PD occurrence in this area, as has occurred in similar situations in the Temecula and San Joaquin Valleys. In July 2002, the occurrence of *Xf,* the PD bacterium, was found in 13 vines from two adjacent vineyards in the southeastern part of Coachella Valley. With this discovery, and the increasing GWSS populations, there was and is a real need to continue an area-wide GWSS/PD management program. The GWSS area wide management program is needed to prevent an economic disaster to the work forces and connecting small businesses of Mecca, Thermal, Coachella, Indio, etc. that depend upon the vineyards for a big portion of their incomes. Only a continuation of an area wide GWSS/PD management program will keep the vineyards viable in Coachella. At present there are no apparent biological or climatological factors that will limit the spread of GWSS or PD. GWSS has the potential to develop high population densities in citrus. Insecticide treatments in citrus groves preceded and followed by trapping and visual inspections to determine the effectiveness of these treatments are needed to manage this devastating insect vector and bacterium. Approximately 1,600 acres of citrus in Riverside County were treated for the GWSS in April through September, 2009 between a cooperative agreement with USDA-APHIS and the Riverside Agricultural Commissioner's Office under the "Area-Wide Management of the Glassy-Winged Sharpshooter in the Coachella and Temecula Valleys".

OBJECTIVES
1. Delineate the areas to be targeted for follow-up treatments to suppress GWSS populations in the Temecula and Coachella Valleys for 2010.
2. Determine the impact of the GWSS area-wide treatments to suppress GWSS populations in citrus groves and adjacent vineyards.

METHODS, RESULTS AND CONCLUSIONS
The programs in Coachella and Temecula were dependent upon grower, pest management consultants, citrus and vineyard manager's participation. The areas encompass approximately 28,000 acres. Representatives of various agencies were involved in the program, they were as follows: USDA Agricultural Research Service, USDA Animal and Plant Health Inspection Service, California Department of Food and Agriculture, Riverside County Agricultural Commissioner's Office, University of California-Riverside, UC Cooperative Extension, and grower consultants. Representatives of these agencies meet to review the program. Newsletters are sent to growers, managers, wineries, and agencies with information on GWSS

populations and insecticide treatments via e-mail. The information from Temecula is sent weekly, while information from Coachella goes to the various parties monthly.

The GWSS/PD citrus groves and vineyards within the GWSS/PD management areas were monitored weekly to determine the need and effect of insecticide treatments on GWSS populations. In August, 2008, because of the lack of GWSS trap catches in Coachella valley, a bi-weekly schedule was initiated. Yellow sticky traps (7 x 9 inches) were used help determine GWSS population densities and dispersal/movement within groves and into vineyards (**Figures.1 & 2**). Approximately 1,400 GWSS yellow sticky traps are monitored in the Riverside county area wide program. Based on trap counts and visual inspection, approximately 1,000 acres of citrus were treated in Temecula valley for GWSS in 2009. In 2009, 600 acres of citrus were treated in Coachella Valley for GWSS area wide management. Because of high Temecula GWSS trap catches in the late summer and early autumn of 2008 and GWSS trap catches in January, 2009, imidacloprid (Admire Pro) applications in citrus were initiated in April, 2009 (**Figure 3**). Admire Pro was applied at the rate of 14 oz/acre. Of the 1,000 acres of treated citrus, 72 acres of organically farmed citrus were treated with Omni Oil 6E at the rate of 1%/acre and PyGanic (1.4% Pyrethrins) at 18 oz/acre. Because of the low residual of the organic insecticides the organic citrus was treated three times during the season. Omni Oil was applied in June on the citrus, followed by PyGanic treatments in July and September.

For a successful area-wide GWSS management program with large acreages of citrus, a management program has to be maintained. Organic insecticides are not as effective as the neonicotinoid insecticides such as imidacloprid for controlling GWSS. Therefore, organic insecticides will have to be applied more frequently than its synthetic counterpart. In our Riverside County GWSS area wide program organic citrus groves pose challenges to area-wide GWSS management programs.

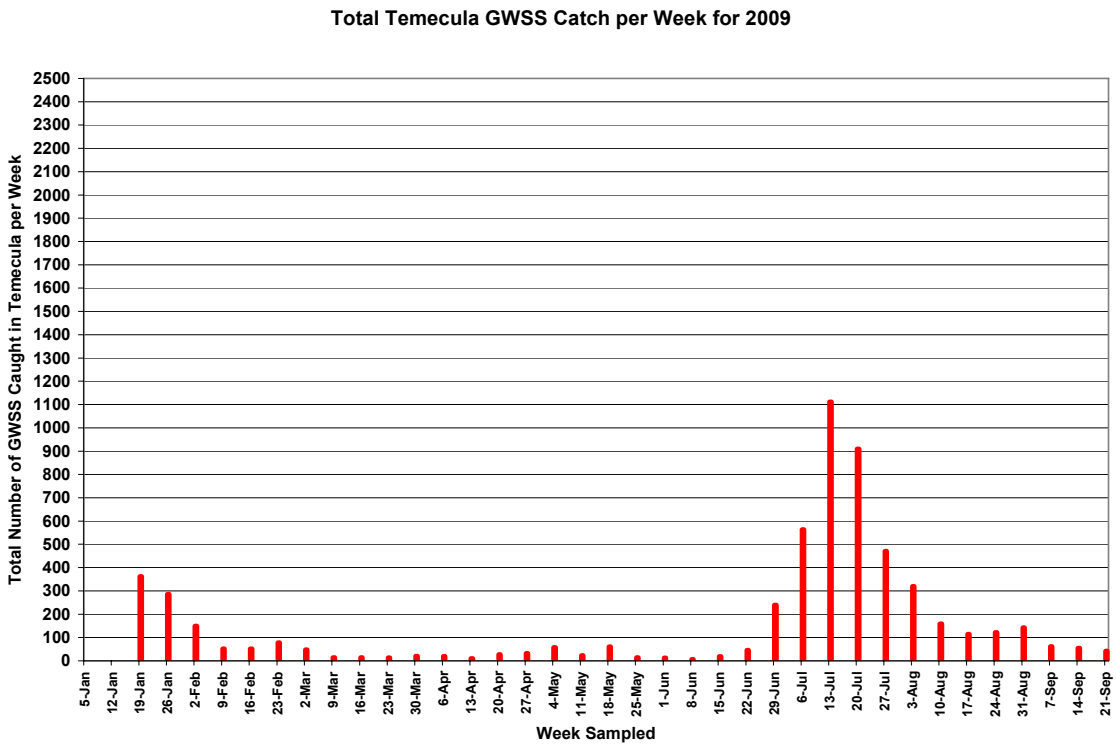

Figure 1. In 2009, high numbers of adult glassy-winged sharpshooters were caught on the yellow sticky traps in Temecula, with populations peaking in July reaching a total of approximately 1,100 trapped.

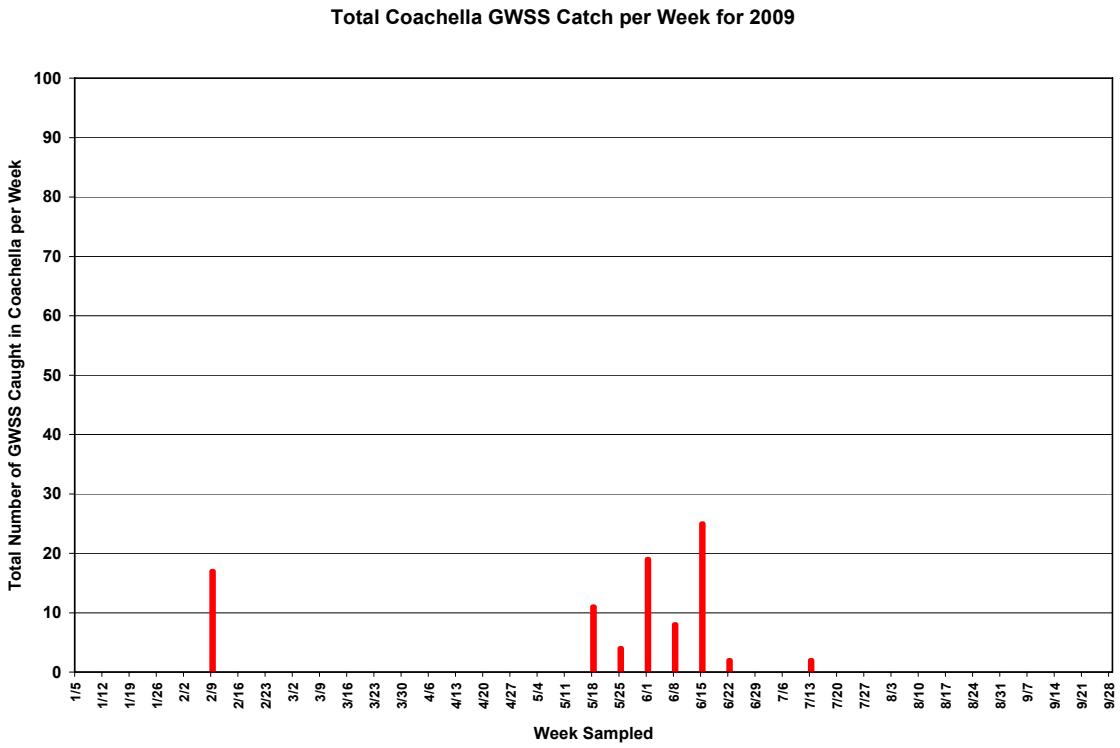

Figure 2. Glassy-winged sharpshooter populations in Coachella Valley peaked in June with a high of 25 trapped.

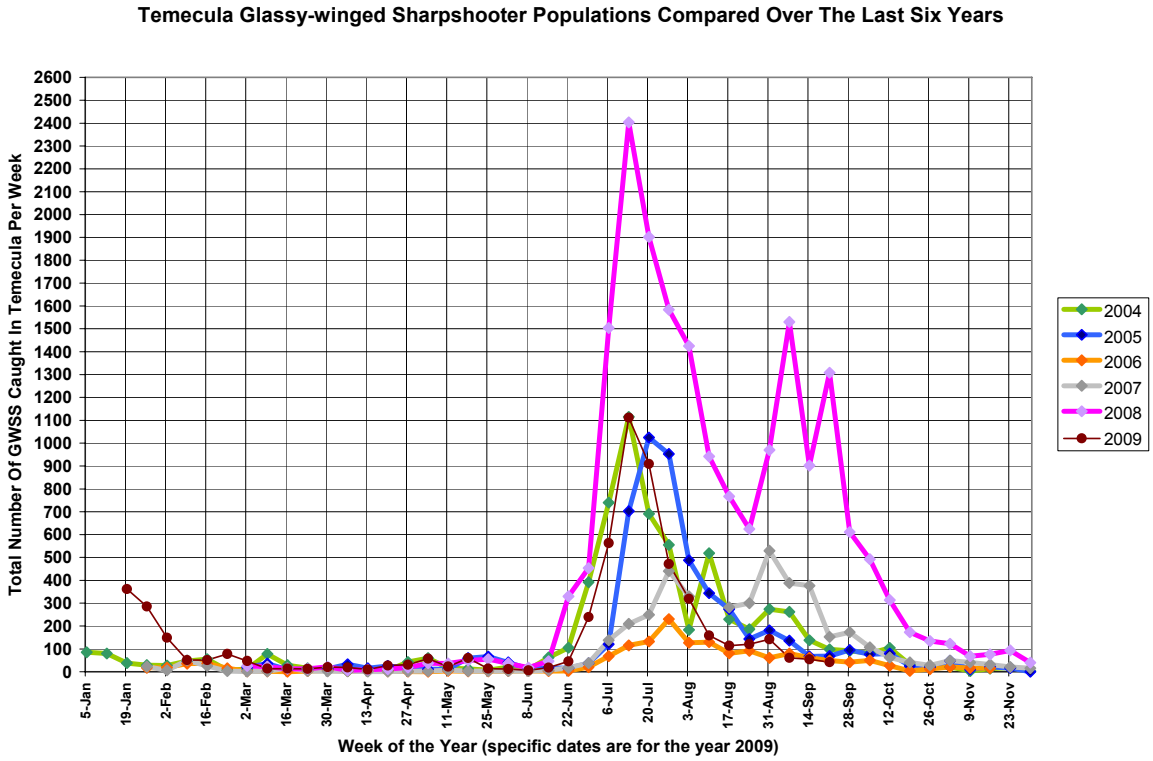

Figure 3. Glassy-winged Sharpshooter populations compared over the last six years

FUNDING AGENCIES
Funding for this project was provided by the USDA Animal and Plant Health Inspection Service, and the CDFA Pierce's Disease and Glassy-winged Sharpshooter Board.

ACKNOWLEDGEMENTS
We would like to especially thank Ben Drake of Drake Enterprises for his input and counsel and the grape and citrus grower, managers and pest control advisors for their needed cooperation to make the Riverside County GWSS area wide management program successful. We want to thank Heavenly Clegg for her development of the Temecula GWSS newsletter and Gevin Kenny for managing the Temecula GWSS monitoring and data analysis.

Section 3: Pathogen Biology and Ecology