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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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- www.co.kern.ca.us/kernag/
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Research shows GWSS have their urban preferences

GWSS adults and nymphs can use common ornamental plants to find food and shelter outside of the insecticide-treated agricultural crops

The glassy-winged sharpshooter (GWSS) may not be a more "efficient" vector of *Xylella fastidiosa*, the PD pathogen, than the native California sharpshooters, but it's certainly more important.

One aspect of GWSS biology that has resulted in more widespread distribution of the insect and hampered regional control programs is GWSS' ability to feed on a wide range of host plants. Just as important, GWSS feeds on many of the same plant species that host *X. fastidiosa*, which helps bridge the connection between alternate hosts and the pathogen.

Regional insecticide programs, such as the General Beale project in Kern County, have shown that GWSS numbers can be dramatically lowered when citrus orchards are treated.

But what about the urban areas for GWSS control? We believe these sites offer a greater challenge for regional control programs. Restrictions on insecticide use in urban areas, patchy host plant environments, sampling difficulties and rapid GWSS movement between backyard sites are just some of the problems encountered with the development of urban GWSS control programs.

Research goals. Ongoing research in Kern County is investigating GWSS biology and population changes on different host plants, primarily focusing on common ornamental plants. The results have provided evidence that GWSS can utilize many of the ornamental plant species commonly found in residential, city or county, and commercial landscaping.

The project's goal is to determine which combinations of plant species best support GWSS populations during the different seasons. This information will be used to develop an urban-oriented pest management program that targets "weak links" in GWSS biology. Researchers are also looking at changes in natural enemy populations to determine if host plant species can also impact the effectiveness of GWSS egg parasites, such as *Gonatocerus ashmeadi*, or predators, such as spiders.

Study sites. Researchers used arrays of different host plant species in potted plants to follow GWSS and natural enemy densities. The groups of potted plants were located in or near Bakersfield. At each site, common ornamental landscape plants were potted in 3-gallon containers and arranged so that, in each block of plants, GWSS could move freely between the plants. In 2003, the perennial species tested included ivy, photinia, citrus, gardenia, privet, euonymous, hibiscus, agapanthus (lily of the Nile), grapevine, crape myrtle, eucalyptus and oleander.

GWSS eggs, nymphs and adults and GWSS predators and parasitoids were counted weekly from March through October 2003. The study was conducted both in an untreated citrus orchard and in two residential yards. Here, we provide results from the citrus site, which had the highest GWSS densities and the most dramatic differences among host plant species.

Host plant differences. Results show GWSS densities during the "growing season," from March through October, were influenced by host plant species, with a significant difference among host plants in the numbers of GWSS adults, egg masses and nymphs. For example, there was a 20-fold difference in the number of GWSS on ivy, the least preferred host plant tested, and grape, the most preferred (Figure 1).

The data show a similar pattern for GWSS adults (Figure 2) and nymphs (Figure 4). Because these results are presented as a

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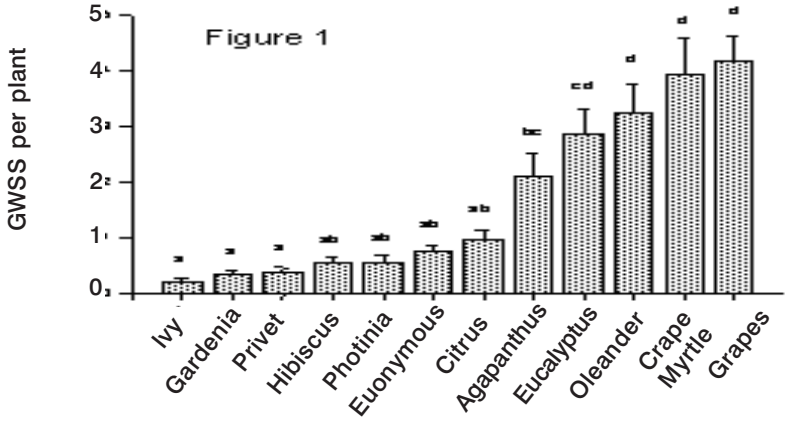
— Kent M. Daane, UC Berkeley, Marshall W. Johnson, UC Riverside, Tarcisio Ruiz, UC Berkeley, Jennifer Hashim, UCCE Kern County



Research shows GWSS have their preferences

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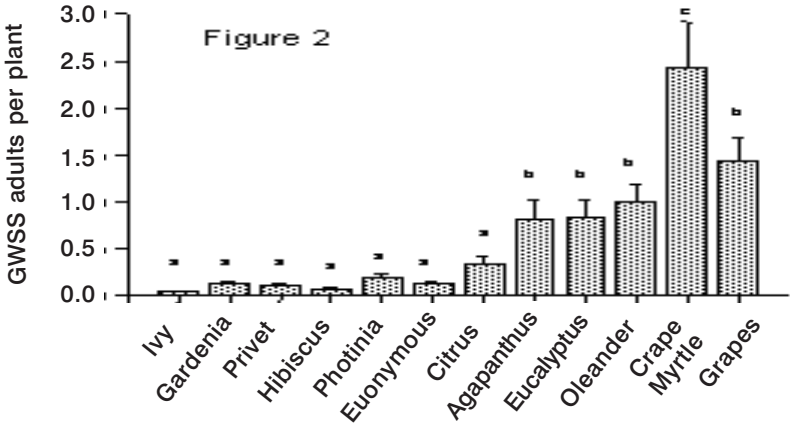
seasonal average, the host plant densities are biased towards those host species that were preferred in June and July, when GWSS densities were the highest in this plot. Interestingly, GWSS egg mass density (Figure 3) was not related to adult or nymph density.

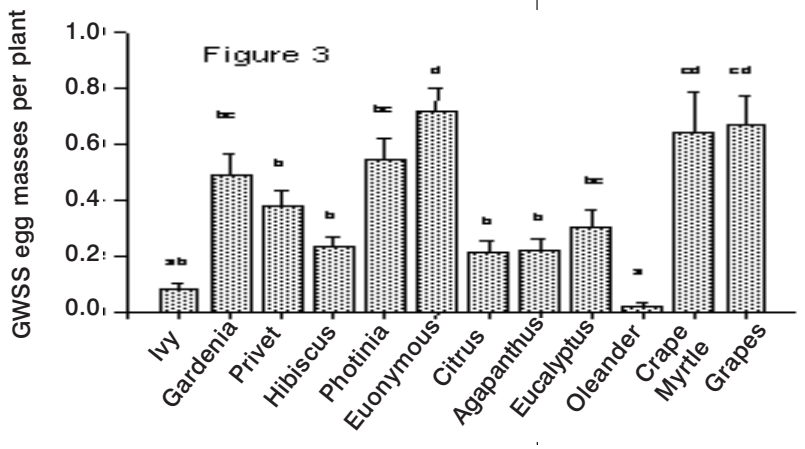
Within each array of potted host plant species, plants were close enough to each other that GWSS adults could fly and nymphs hop between adjacent host plants. Citrus was the more preferred overwintering host plant. During the summer months, however, there was a clear preference for crape myrtle for egg deposition and feeding. The most obvious differences between egg deposition and nymph abundance were with oleander, which had few eggs masses (Figure 3) and many nymphs (Figure 4), and euonymus or photinia, which had the opposite abundance pattern.

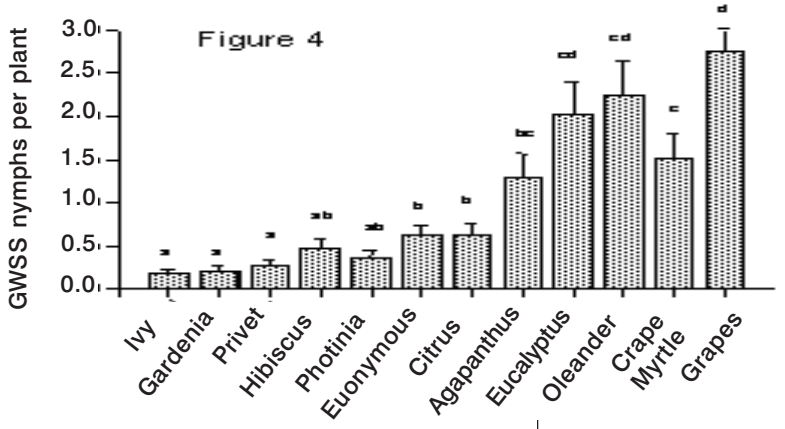
What the results reveal. The results add to the growing evidence that GWSS adults have strong ovipositional preferences, and the host plants that the adult GWSS are attracted to may be different from those that GWSS nymphs have a feeding preference for. For example, GWSS nymphs were more common on oleander, which had fewer GWSS egg masses, than in citrus, which had the most GWSS egg masses. We believe this difference is a result of both GWSS adults and nymphs switching among host plants for better food resources throughout the season, and to different levels of predator and parasitoid activity.

Another possibility is that egg and nymph mortality was different among treatments. Support is found in the significantly positive relationship between the number of spiders, the most common predator group, and the number of GWSS egg masses. In contrast, there was no relationship between the density of egg masses with either GWSS nymphs or adults. For example, the spider density most closely follows the egg mass density (Figure 3) rather than the number of nymphs. Is this because the spiders feed most commonly on GWSS eggs and small nymphs?

The results also show what has now become evident in many studies: that natural enemies significantly reduced the number of GWSS, as evident by the reduction of GWSS from the egg to the nymphal stages. The most common parasite was the egg parasite *Gonatocerus ashmeadi*, followed by *G. triguttatus*. Overall, there was a reduction of about 3.9 eggs to 0.22 large GWSS nymphs per plant — or a 94.3 reduction.







Application for control programs? The results suggest that the kinds of ornamental plants used can greatly impact the GWSS density in urban areas. Other questions are still to be answered. For example, do these urban GWSS disperse to nearby agricultural regions? Can ornamental landscapes can be manipulated to reduce the overall GWSS population? Will the ornamental plant choice change the GWSS development time or natural enemy population?

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