PROTECTING VINEYARDS FROM PIERCE'S DISEASE VECTORED BY THE GLASSY-WINGED SHARPSHOOTER: PRELIMINARY OBSERVATIONS

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The first line of defense for vineyards outside the current range of the glassy-winged sharpshooter (GWSS) is avoiding, or at least delaying, a new infestation of this insect vector of bacterial plant pathogens, particularly the bacterium *Xylella fastidiosa* which causes Pierce's Disease (PD). Growers should take every precaution to avoid the introduction of this new bacterial vector into their area. Potential avenues of spread such as the movement of infested nursery stock (all life stages), in harvested grapes (adults), or in vehicles (adults and nymphs) returning from infested areas during the season need to be shut down. Importation of landscape nursery stock from infested nurseries in southern California, Kern County or other known areas of infestation for the purpose of home or office beautification projects should be avoided.

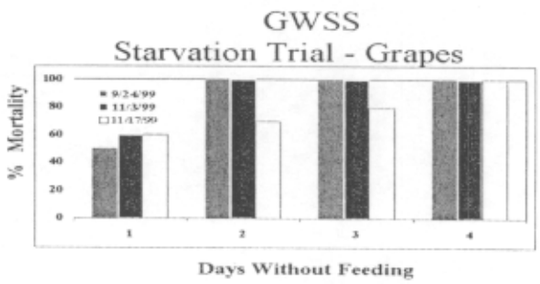
Like native sharpshooters, the glassy-winged sharpshooter (GWSS) will have to be managed outside the vineyard. There are several possibilities which growers are already considering even in the absence of documented success. Border plantings of trap crops such as an early, vigorous grape variety or rootstock (e.g. *Vitis rupestris*) or young lemon trees may provide some protection. GWSS should be attracted to these prior to the vineyard leafing out in the spring. Repeated contact insecticide applications to these trap plants might help prevent successful movement into the vineyard. More innovative solutions may also be warranted, especially when the vineyards are located adjacent to excellent hosts such as citrus. Some Temecula area grape growers have attempted to set up lease agreements for portions of their neighbors' citrus orchards. In this way they could establish control of the GWSS situation within the adjacent citrus plantings. By managing GWSS populations within the adjacent citrus through repeated insecticide applications, they hope to stop the sharpshooters at an important source.

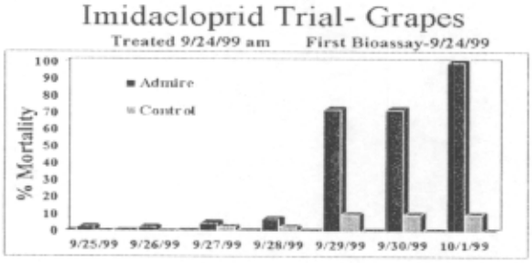
Managing GWSS inside the vineyard will pose a near heroic challenge since this introduced sharpshooter, unlike native sharpshooters, likes grapevines and will breed within vineyards. This insect appears to be relatively easy to kill. Insecticides such as chlorpyrifos (Lorsban), which is typically used for scale insect control in citrus, is just one example. GWSS was suppressed for nearly three months after a chlorpyrifos application for red scale was made in early April of 1999 in a three-year old lemon orchard in Ventura County. Short-lived contact insecticides, even if repeatedly used, will likely leave windows of opportunity for GWSS transmission of *X. fastidiosa*. Long-lived, systemic insecticides such as imidacloprid (Admire, Bayer Corp.) can suppress GWSS populations for at least several weeks and possibly up to two months or more with minimal if any impact on beneficial species. In an experiment conducted in the same three-year old Ventura County lemon orchard during 1999, imidacloprid was applied through the mini-sprinkler irrigation system and resulted in 91-95% reduction in GWSS activity for up to two and a half months. However, evidence from this replicated trial indicated that the sharpshooters were not killed out right by the treatment (as they are with the chlorpyrifos) , but rather avoided the treated trees and aggregated into trees within the untreated plots. Insects caged on treated trees did not die right away and continued to feed, but at a greatly reduced rate compared to those caged on untreated trees and eventually died of starvation after a week or more of being caged.

In a similarly treated vineyard in Ojai during 1999, GWSS were observed to continue to feed on treated vines for one week or more depending upon how soon after treatment they were exposed to the treated vines. Reduced feeding activity was again observed with those insects placed in sleeve cages on treated vines compared to those on the untreated controls. It is not known if feeding times on the treated vines were sufficient for transmission of the *Xylella* bacterium had they been carrying it. Four replicated bioassays were conducted, each at a successively greater interval post-treatment. Exposure at greater intervals post-treatment resulted in longer survival times before death ensued, presumably from starvation/dehydration (Figures 1a-d). Insects held on treated canes all survived longer than insects held in cages within the vine canopies, but without access to food (canes). These control insects all died from starvation/dehydration within the first 48 hours in the bioassays conducted during September and October when maximum daytime temperatures were 90-95° F and within 96 hours for a later bioassay conducted during mid-November when maximum temperatures were 75-80° F.

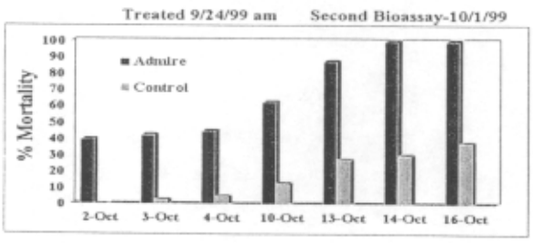
In another research project using annual systemic imidichloprid applications alone from 1995 to 1997,

esearchers at the University of Georgia clearly failed to protect a newly planted vineyard of *vinifera* grapes. They merely achieved an 18-month delay in the eventual 100% infection of the vineyard with PD. In this study, there were additional sharpshooter species involved, but GWSS was the predominant species responsible for considerable vector feeding pressure. Vector pressure along with bacterial inoculum sources from outside the vineyard are critical elements in the success of disease prevention programs within a vineyard. A "within vineyard" treatment strategy for grape growers will likely fail if used alone rather than in combination with other management options outside the vineyard.

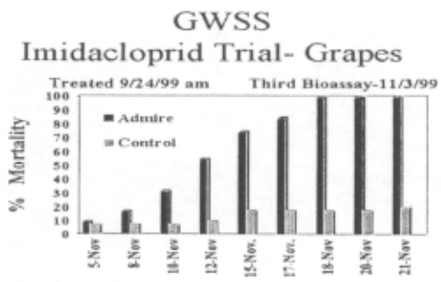




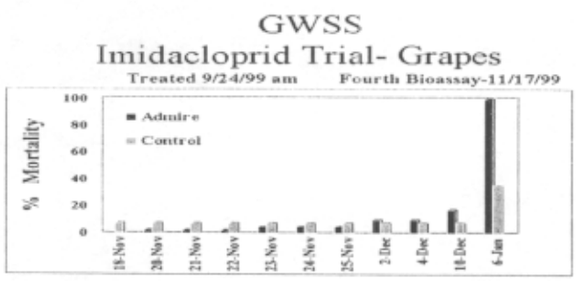
GWSS mortality after continual exposure to Admire-treated vines during the first week post-treatment.



GWSS mortality after continual exposure to Admire-treated vines during the second and third weeks post-treatment.



GWSS mortality after continual exposure to Admire-treated vines during the sixth, seventh and eighth weeks post-treatment.



GWSS mortality after continual exposure to Admire-treated vines during the eighth through the fifteenth week post-treatment.