The glassy-winged sharpshooter (GWSS), *Homalodisca coagulata and Xylella fastidiosa:* An Emerging Success

Economic and Ecological Impact: The glassy-winged sharpshooter (GWSS), *Homalodisca coagulata* (Fig. 1) is an effective vector of *Xylella fastidiosa* (*Xf*), a bacterial pathogen that causes devastating diseases in a wide variety of agronomic and horticultural crops, as well as landscape ornamentals and shade trees. Some of these diseases are emerging as serious, destructive diseases of important crops (e.g., almond, citrus, coffee, grapevines, peaches, plum) in North and/or South America. In addition, a number of other non-crop plant species are hosts for *Xf*. The threat to wine, table, and raisin grapes (more than 750,000 acres; total economic value more than $33B) and almonds (more than 525,000 acres; value more than $730M), alone, if realized, would be devastating to the California economy. ARS responded to the PD epidemic by organizing an Emergency PD/GWSS Research Response Team (PD/GWSS Team) that made site visits to areas of the PD epidemic in southern California in 2000, and developed a Strategic Plan of action. Since that time, the ARS effort on xylella diseases and GWSS has expanded greatly, through redirection of resources and personnel (there are currently 38 senior scientists engaged in full- or part-time PD/GWSS research at 16 locations), receipt of additional base-funding, and due to a greatly expanding network of Federal, state, and university collaborations. To coordinate the current research effort, ARS conducted a strategic planning process in 2003 that resulted in the document "ARS *Xylella fastidiosa* Diseases – Glassy-winged Sharpshooter, Strategic Plan."

Fig. 1. The glassy-winged sharpshooter is the culprit behind the spread of Pierce's disease among grapevines. The insect infects the plant with the bacterium *Xylella fastidiosa* when it feeds on the sap from the xylem tissue of a vine.

Fig. 2. This parasitic wasp, *Gonatocerus triguttatus*, lays its eggs in glassy-winged sharpshooter eggs embedded in leaves.

Significant Accomplishments: ARS scientists at Kearneysville, West Virginia conducted large-acreage replicated field trials at locations near Temecula, California, and determined that particle film, Surround WP, was very affective in controlling leafhoppers and sharpshooters in grape. The scientists also determined that season-long applications of Surround did not have negative effects on grape quality and yield and that this material was compatible with other pesticides and spray tank additives typically used in grape. This information was transferred to the makers of Surround WP (Engelhard Corp., Iselin, NJ) which resulted in the material's registration for use against GWSS in grape and citrus. This accomplishment was acknowledged by a USDA Secretary's Honor Award to the Pierce's Disease/Glassy-winged sharpshooter Team in 2003. In addition, ARS scientists at the Beneficial Insects Research Laboratory in Weslaco, Texas, are leading an international effort to find nonchemical methods to stop this invasive leafhopper. Two *Gonatocerus* species, *G. triguttatus* (Fig. 2) and *G. metanotalis* are the most promising species found to date.

Future: In addition to PD, strains of Xylella cause almond leaf scorch in California and citrus variegated chlorosis (now in Brazil and potentially devastating to the U.S. citrus if it gains access here). The relationship between recent increases in the incidence of almond leaf scorch disease In the Central Valley of California to PD and the GWSS is currently unknown. Additional research on the biology of the organism is needed.

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