

GLASSY-WINGED SHARPSHOOTER

Integrated Pest Management for Home Gardeners and Landscape Professionals

The glassy-winged sharpshooter, *Homalodisca vitripennis*, (formerly *H. coagulata*) is an insect that was inadvertently introduced into southern California in the early 1990s. This insect is native to the southeastern United States and was most likely brought into California accidentally as egg masses in ornamental or agricultural plant foliage.

THE PROBLEM

The glassy-winged sharpshooter is a large leafhopper that obtains its nutrients by feeding on plant fluids in the water-conducting tissues of a plant (the xylem). Feeding on plants rarely causes significant plant damage, although the insects do excrete copious amounts of liquid that can make leaves and fruit appear whitewashed when dry. The excrement is a special nuisance when shade trees are heavily infested because cars parked under the trees tend to become spotted. During hot weather, heavy populations of glassy-winged sharpshooters feeding on small plants may cause them to wilt.

The real problem associated with glassy-winged sharpshooter, however, is that it can spread the disease-causing bacterium *Xylella fastidiosa* from one plant to another. This bacterium is the causal agent of

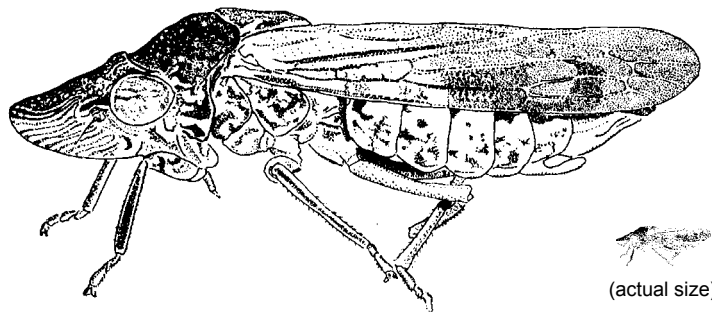


Figure 1. Female glassy-winged sharpshooter.

devastating plant diseases such as Pierce's disease of grape, oleander leaf scorch, almond leaf scorch and mulberry leaf scorch. Other diseases to landscape plants in California include sweet gum dieback and cherry plum leaf scorch. Outside of California, other strains of *X. fastidiosa* cause phony peach disease, plum leaf scald, leaf scorches in sycamore, elm, maple, and oak, and variegated citrus chlorosis, but these diseases have not been detected in California. It should be noted that the strain of *X. fastidiosa* that causes oleander leaf scorch will not cause Pierce's disease in grapes and the strain of *X. fastidiosa* that causes mulberry leaf scorch does

not cause disease in oleanders or grapes. At this time there is no cure for any of these diseases. For more information on oleander leaf scorch, see the *Pest Notes: Oleander Leaf Scorch* listed in References.

When a glassy-winged sharpshooter feeds on a plant that is infected with *X. fastidiosa*, it acquires the bacteria, which multiplies within the insect's mouthparts. The sharpshooter then transfers the bacteria to another plant when it feeds. For more information about *X. fastidiosa* see the Web sites listed in Suggested Reading. It is important to note that *X. fastidiosa* can reside in many plants without causing disease.

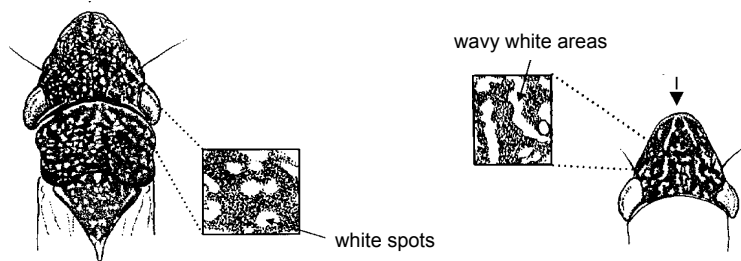


Figure 2. Detail of head of glassy-winged sharpshooter (left) and smoke-tree sharpshooter (right).

IDENTIFICATION AND BIOLOGY

The glassy-winged sharpshooter is a large insect compared to other leafhoppers. Adults are about $\frac{1}{2}$ inch long and are generally dark brown to black when viewed from the top or side (Fig. 1). Wings are clear with red venation, but appear dark brown due to the body coloration beneath them. Before laying eggs, the female secretes a chalky white substance that she transfers to the upper wings forming

PEST NOTES

University of California
Agriculture and Natural Resources

Publication 7492

Revised February 2007

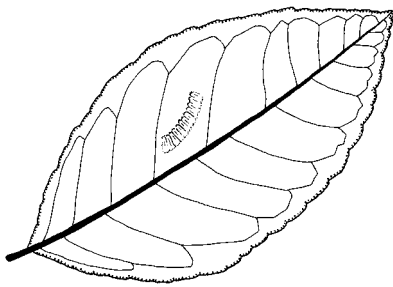


Figure 3. Glassy-winged sharpshooter egg mass in lower surface of leaf.

white spots. After laying the eggs, she covers them with this chalky material by transferring it from the wings. Thus, the white spots on the wings are only visible on females shortly before laying a batch of eggs and are not present on males. The abdomen is whitish or yellow. The head is brown to black and covered with numerous ivory to yellowish spots (Fig. 2). These spots help distinguish glassy-winged sharpshooter from a close relative, smoke-tree sharpshooter (*Homalodisca liturata*), which is native to the desert region of southern California. The head of the smoke-tree sharpshooter is covered with wavy, light-colored lines, rather than spots (Fig. 2). In profile, the immature stages (nymphs) of the glassy-winged sharpshooter look similar to that of the adult, except they are smaller, wingless, uniform olive-gray in color, and have prominent bulging eyes.

Females lay their eggs in masses of about 10 to 12 under the lower leaf surface of young, fully developed leaves. The eggs lay side-by-side in a single layer. When it is first laid, each individual egg appears as a greenish blister beneath the epidermis of the leaf (Fig. 3). The female covers the egg mass with the white chalky material making it more visible. Shortly after the eggs hatch, the leaf tissue begins to turn brown. The dead leaf tissue remains as a permanent brown scar.

The glassy-winged sharpshooter ranges over many habitats, including agricultural crops, urban landscapes, native woodlands, and riparian

vegetation. It is reported to feed on hundreds of plant species. Hosts for the glassy-winged sharpshooter vary widely and include woody plants and annual and perennial herbaceous plants. It occurs in unusually high numbers on citrus. Common landscape and garden host plants include bird of paradise, eucalyptus, euonymus, citrus, crepe myrtle, pittosporum, sunflower, hibiscus, xylosma, and cottonwood, among many others. Host preference changes according to availability and nutritional value of the host plant at any given time. Well-irrigated and well-fertilized plants may become a host when in other situations they would not.

In southern California and in the San Joaquin Valley, glassy-winged sharpshooter has two generations per year. It overwinters as an adult feeding on citrus and other non-deciduous plants and can move to deciduous plants in January and February where they feed on the sap from the leafless twigs before returning to the nondeciduous plants during cooler evening hours. These overwintering adults begin lay-

ing eggs in February but lay most of their eggs in late March and April. First generation eggs are found on non-deciduous hosts such as citrus and ornamentals where adult females have overwintered. Nymphs hatch in 10 to 14 days and feed on the leaf petioles or small young succulent stems while they progress through five immature stages. In summer first generation adults begin to appear in May through July. Egg laying for the second generation occurs between mid-June through October. The nymphs emerging from these egg masses develop into overwintering adults.

Glassy-winged sharpshooter has become established in most of southern California and in certain localized sites in central and northern California. There is great concern that this insect may eventually invade most California counties. Figure 4 shows the areas in California where this sharpshooter has been found and counties where it is feared that the pest may spread. California county agricultural commissioners are following this pest



Figure 4. Distribution of glassy-winged sharpshooter in California as of September 2006. Infested areas are dark gray and "at risk" areas are light gray.

closely. For the most recent information, see the California Department of Food and Agriculture Web site listed in Suggested Reading.

MANAGEMENT

The principal reason for controlling the glassy-winged sharpshooter is to prevent the spread of the *Xylella* bacterium to susceptible plants. Because very low numbers of sharpshooters can spread the disease, it is not known how effective insecticides applied to suppress sharpshooters will be in controlling disease spread; research is currently underway to study this issue.

The current strategy for containing the problem is to keep the insect out of new areas. This requires careful monitoring and detection as described below. If glassy-winged sharpshooter is found in an area not currently known to have this pest, immediately contact the local agricultural commissioner's office (the address and phone number are usually found in the telephone directory under "County Government").

In areas where the glassy-winged sharpshooter is established, efforts are underway to bring in biological control agents for long-term management and several effective egg parasites are present in California. Chemical treatments can be applied to reduce glassy-winged sharpshooter numbers, but are generally not required to protect the health of plants not susceptible to the *X. fastidiosa* bacterium and have limited application in residential landscapes.

Detection and Monitoring

Even though this insect is large enough to be seen with the naked eye, it is very inconspicuous in nature. The brown coloration of the insect blends very well with the color of the twigs where it is usually found, and it hides by moving to the other side of the twig or branch when it detects movement or is otherwise approached or disturbed. A very fine mist or a whitish, powdery coating on leaves or fruit may indicate heavy glassy-winged sharpshooter feeding. Large, yellow sticky traps are commonly used in orchards to monitor for the adults. Sweep nets are also

used to monitor for glassy-winged sharpshooter in agricultural situations. Glassy-winged sharpshooter infestations can also be determined by examining the underside of plant leaves for egg masses.

Cultural Control

There are no known cultural controls for glassy-winged sharpshooter. But preventing transport of infested plant material to areas where glassy-winged sharpshooter has not been found can slow its spread in California. Nurseries shipping plants out of an infested area must follow rigorous plant inspection and treatment before the plants are shipped and then the plants must be inspected again after they arrive at their destination.

Biological Control

The most important biological control agents are small wasps that are egg parasites in the *Gonatocerus* genus that attack glassy-winged sharpshooter egg masses starting in spring. In some areas these parasites have been providing quite effective control. The rate of parasitism gradually increases over the season. During the first period of egg laying in spring, parasitism is usually between 10 to 50%, but during the second egg-laying period in late summer and early fall, it can reach as high as 90 to 100%. Eggs parasitized by these tiny wasps are easily identified by pinpoint holes found at one end of the egg (Fig. 5). Spiders, assassin bugs, and praying mantis are predators of motile glassy-winged life stages. Lacewing will eat glassy-winged sharpshooter eggs. Work is currently under way to find additional biocontrol agents.

Chemical Control

In areas where glassy-winged sharpshooter is not well established, local agricultural commissioners will treat infestations with various insecticides to eradicate this pest when it is discovered.

Where glassy-winged sharpshooter is established, insecticide treatments to reduce populations of this pest may be used on some *Xylella*-susceptible plants to slow the spread of the dis-

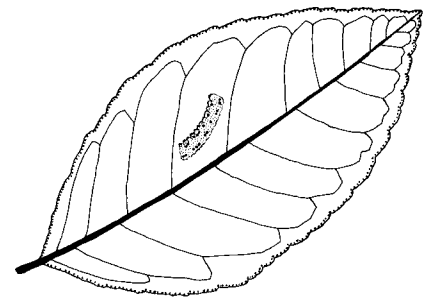


Figure 5. Parasite emergence holes in glassy-winged sharpshooter egg mass.

ease, primarily grapes. Treatment of glassy-winged sharpshooter on oleander, however, is not generally recommended because insecticides are not effective enough to stop the spread of the disease. Management of glassy-winged sharpshooter is not normally recommended on plants not susceptible to disease because the pest will cause only limited damage. However, on some preferred hosts, such as lemon, both yield and fruit quality can be reduced after season-long infestations of high populations (more than 100 glassy-winged sharpshooters per tree). Nevertheless, chemical control is not recommended unless the fruit is being produced for commercial sale.

The main material used to protect *Xylella*-susceptible plants in both commercial agriculture and urban landscapes is imidacloprid, which is registered for home and professional landscape use on nonfood crops. Imidacloprid is sold in two formulations: one for soil application and one for foliar application. The soil-application formulation provides the most effective, long-lasting control and is less disruptive to the biological control provided by the parasitic wasps (although it is quite toxic to some predatory lady beetles, such as the vedalia beetle), but it takes several weeks to become effective. Foliar applications of this material are effective for a much shorter period of time and may disrupt biological control agents, and thus are much less desirable.

In instances where the white excrement produced by this pest causes intolerable residues on cars or other surfaces,

other insecticides can be applied to infested foliage to provide immediate relief. The least toxic and disruptive to biological control are insecticidal soaps and oils. Insecticidal soaps and oils are only effective in killing the soft-bodied nymphs of the glassy-winged sharpshooter and must directly contact the insect to kill it, so thorough coverage of the plant or tree foliage is essential. Applications of these materials need to be repeated at about 7- to 10-day intervals. Other insecticides are available for foliar applications. However, these materials are *much more damaging* to the parasitic wasps that are being introduced for long-term control.

REFERENCES

Varela, L. G., R. J. Smith, and P. A. Phillips. 2001. *Pierce's Disease*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 21600.

For more information contact the University of California Cooperative Extension in your county. See your telephone directory for addresses and phone numbers.

AUTHORS: L. G. Varela, UC Statewide IPM Program, Sonoma Co.; J. M. Hashim-Buckey, UC Cooperative Extension, Kern Co.; C. A. Wilen, UC Statewide IPM Program, San Diego Co.; and P. A. Phillips, UC Statewide IPM Program, Ventura Co.
TECHNICAL EDITOR: M. L. Flint
DESIGN AND PRODUCTION: P. N. Galin
ILLUSTRATIONS: Figs. 1 & 2: R. W. Garrison; Figs. 3 & 5: C. M. Dewees; Fig. 4: adapted from Calif. Dept. Food & Agric. Web site

Produced by IPM Education & Publications, UC Statewide IPM Program, University of California, Davis, CA 95616-8620

This Pest Note is available on the World Wide Web (www.ipm.ucdavis.edu)



This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Pest Management.

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This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.

Wilen, C. A., J. S. Hartin, J. M. Henry, H. S. Costa, M. Blua, and A. H. Purcell. June 2006. *Pest Notes: Oleander Leaf Scorch*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7480. Also available online, <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7480.html>.

SUGGESTED READING

For current information regarding glassy-winged sharpshooter see the Calif. Dept. of Food and Agric. Web site, <http://www.cdfa.ca.gov/phpps/pdcp/index.htm>.

For a map of infested sites in California see the Calif. Dept. of Food and Agric. Web site, <http://www.cdca.gov/gwss/gwmap.htm>.

For the latest University of California news releases on glassy-winged

sharpshooter and links to other UC Web sites on this topic see <http://news.ucanr.org/mediakits/gwsskit/gwsskit.shtml>.

For more information on plant diseases caused by *Xylella fastidiosa* see the University of California, Berkeley Web site, <http://nature.berkeley.edu/xylella>.

For more information about the biological control of glassy-winged sharpshooter see the University of California, Riverside Web site, <http://www.biocontrol.ucr.edu/gwssbiocontrol.html>. ♦

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Pesticides applied in your home and landscape can move and contaminate creeks, lakes, and rivers. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways..

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