

HACKBERRY WOOLLY APHID

Integrated Pest Management for Home Gardeners and Landscape Professionals

A hackberry woolly aphid, sometimes called Asian woolly hackberry aphid (*Shivaphis celti*), was discovered in California in 2002. It infests hackberry, especially Chinese hackberry (*Celtis sinensis*), throughout the state. This aphid was accidentally introduced into the United States in the late 1990s and also occurs from Florida to Texas and northward to at least Tennessee.

IDENTIFICATION

Hackberry woolly aphids secrete pale bluish or white wax over their bodies. These fuzzy masses on leaves are each about 1/10 inch or less in diameter (Fig. 1). This waxy covering usually obscures the insect's gray, green, or yellow body. Winged forms have distinct black borders along the forewing veins. Their antennae have alternating dark and light bands (Fig. 2).

Often the first observed sign of a hack-

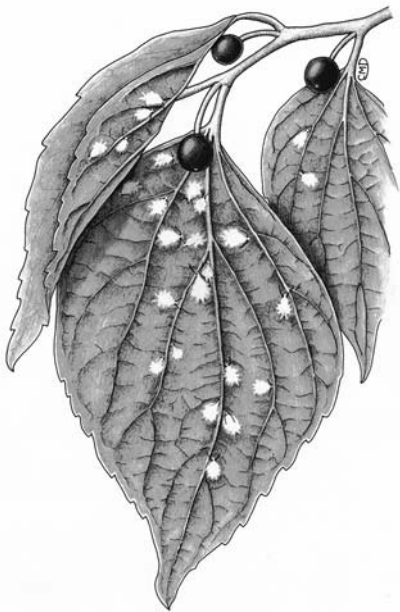


Figure 1. Pale, wax-covered aphids on hackberry leaves.

berry woolly aphid infestation is the copious, sticky honeydew it produces. Check for the insects to confirm that the cause is aphids and not the citricola scale, *Coccus pseudomagnoliarum*, which is the only other honeydew-producing insect that infests hackberry at annoying levels in California. Citricola scale is most common in the Central Valley on citrus and hackberry. Citricola scales are brownish to gray, oval, slightly dome shaped, and remain immobile most of their life. Adult females are mottled gray to brown and blend in with bark, making them hard to spot. Flattened, orangish nymphs occur on the underside of leaves, then move in fall to overwinter on bark. In spring, egg-laying females produce tiny scale crawlers that feed on leaves. See *Pest Notes: Scales*, listed in the Selected Readings section, for more information on scales.

LIFE CYCLE

Hackberry woolly aphid adults, either winged or wingless, give live birth to young aphids during most of the season when hackberry leaves are present. Spring and summer adults are all reproductive females. In fall, winged males are produced, aphids mate, and females lay dark, oval eggs that overwinter on branch terminals. Eggs hatch in spring at bud break. The insect has many generations per year, so aphids can become very abundant. In the San Joaquin Valley, populations have been highest in the spring and fall months with lower numbers occurring through the summer. It is not yet known if the same patterns occur in other areas. *Shivaphis celti* probably occurs only on hackberry trees, which include several species in the *Celtis* genus. It has been reported on at least a dozen *Celtis* species, some of which occur only in Asia.

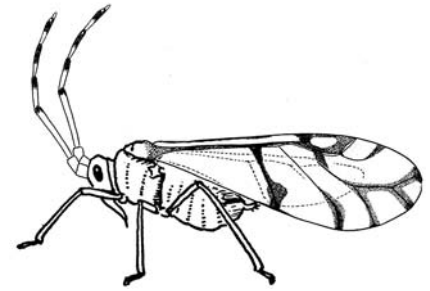


Figure 2. Dark antenna and wing marks visible on a hackberry woolly aphid with wax removed.

DAMAGE

This aphid is a pest because its copious honeydew excretions create a sticky mess and promote the growth of blackish sooty mold on leaves and surfaces beneath infested trees. No long-term or serious damage to hackberry trees has been found after several years of infestations. Insecticides apparently are not warranted to protect the health or survival of infested hackberry but may be justified when honeydew excretions are intolerable to people.

MANAGEMENT

Inspect leaves for waxy masses and insects to be sure that aphids are the cause of annoying honeydew. Citricola scale, described above, also produces honeydew and is easily overlooked. Because plant health apparently is not threatened, take action only where annoyance from honeydew cannot be tolerated.

Cultural Control

Excess irrigation promotes certain root decay pathogens and apparently contributes to tree death from a malady of undetermined cause that has killed many Chinese hackberry in some locations in California. Providing trees with appropriate soil moisture is the single most important action to promote tree health. Avoid fertilizing

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Publication 74111

University of California
Agriculture and Natural Resources

June 2005

hackberry unless nutrient deficiency has definitely been diagnosed. Excess nitrogen has been shown to increase aphid numbers on certain other plant species. A forceful stream of water will dislodge and kill some aphids and wash away honeydew on plants that are small enough for hosing to be practical.

Biological Control

Classical biological control through introduction of natural enemies is one long-term possibility for managing this pest. Several parasitic wasps in the genus *Trioxys* attack this aphid in Asia. No parasitic wasps or other natural enemies specific to this pest have been reported yet in the United States. Predators such as the convergent lady beetle, multicolored Asian lady beetle, syrphid flies, and lacewings feed on aphids. However, in many California situations they currently do not provide adequate biological control. Nevertheless, avoid spraying hackberry with broad-spectrum, persistent insecticides that kill natural enemies, in part because citricola scale, another major hackberry pest, is well controlled by parasites in at least some locations.

Chemical Control

Foliar Spraying. Limit any foliar spraying to short-persistent, low-toxicity materials such as insecticidal soap or oil. However, soaps and oils will give only partial control because it is difficult to obtain the required thorough spray coverage of aphids on the undersides of leaves, especially on large trees. The aphid's woolly wax also protects it from sprays. Applications may need to be repeated because these materials provide no residual control.

Dormant Spray. Thorough application of horticultural oil (supreme, superior, or narrow-range oil) to twig terminals during the dormant or delayed dormant season (after buds swell, but before leaves open) may be effective for killing some overwintering eggs on twigs; however, delayed dormant sprays are unlikely to give complete control of aphids and will not prevent aphids from nearby sources flying in to colonize trees after leaves have opened. Dormant oil sprays are an effective treatment for controlling citricola scale, and aphid reduction could be a side benefit.

Trunk Injection and Implantation.

Avoid injecting or implanting pesticides or other materials into hackberry trunks or roots. Chinese hackberry are susceptible to an unexplained, tree-killing malady. The suspected cause is a vascular wilt pathogen, which may be mechanically spread by unsterilized tools that contact internal parts of multiple hackberry trees. It would be unfortunate if implants or injections to provide short-term control of an aesthetic or annoying honeydew problem killed trees by spreading the undiagnosed malady.

Soil Injection or Drenching. A single soil injection or soil drench using systemic insecticide has been shown to provide effective season-long control. The systemic insecticide imidacloprid (Bayer Advanced Garden Tree & Shrub Insect Control, Merit) is available to both homeowners and professional applicators. The home-use product (Bayer Advanced Garden Tree & Shrub Insect Control) is measured into a bucket, diluted with water, and poured onto soil near the base of the tree trunk, as directed on the label (Fig. 3). Late winter to early

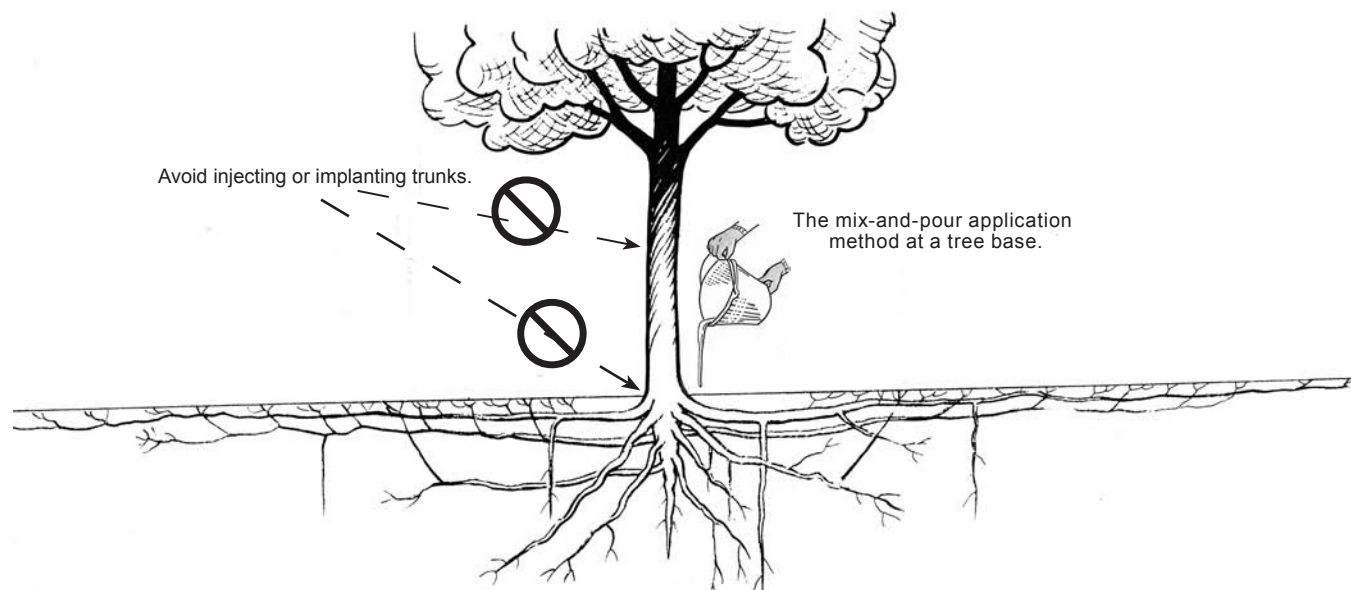


Figure 3. When applying systemic pesticides to trees, make an application to soil whenever possible as directed on product labels instead of injecting or implanting trees with pesticides. Injecting or implanting trunks injures trees and creates wounds that can provide entry sites for pests.

spring (when the new leaves flush) is believed to be the most effective time for a soil treatment in California.

Summer application of the material may still be effective when applied to trees that receive regular irrigation, but studies on mid-season treatments have been limited. No treatments should be conducted during fall, because hackberry leaves will soon drop naturally. Consult *Pest Notes: Aphids* for more information on aphid management and *Pest Notes: Scales* for suggestions if citricola scale is infesting hackberry; both are listed in the Selected Reading section.

Rates for Professional Applications. Imidacloprid applied once early in the season at the low label rate controls

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your telephone directory for addresses and phone numbers.

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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.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

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.

aphids on hackberry for the entire season according to recent study. For example, the Merit Professional label may state that 1 to 2 oz of material will treat 30 inches of cumulative trunk diameter. In this case, 1 oz should be enough to control aphids on three trees that each has a 10-inch diameter when measured at breast height.

In this instance:

$$3 \text{ trees} \times 10 \text{ inches diameter per tree} = 30 \text{ inches of cumulative trunk diameter.}$$

When calculating the amount of pesticide to use, the diameter of the tree can be difficult to estimate, but it is easily calculated from circumference (Table. 1).

SELECTED READING

Dreistadt, S. H., R. J. Gill, J. G. Morse, P. A. Phillips, and R. E. Rice. 2001. *Pest Notes: Scales*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7408. Also available online at www.ipm.ucdavis.edu/PMG/selectnewpest.landscape.html.

Flint, M. L. 2000. *Pest Notes: Aphids*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7404. Also available online at www.ipm.ucdavis.edu/PMG/selectnewpest.home.html.

Halbert, S. E., and P. M. Choate. 1999. An Asian Woolly Hackberry Aphid, *Shivaphis celti* Das (Homoptera: Aphididae). Fla. Dept. Agric. & Consumer Services Ent. Circ. 392. Available online at <http://www.doacs.state.fl.us/pi/enpp/ento/entcirc/ent392.pdf>. ❖

Table 1. Calculating Trunk Diameter: It's Easy

<p>Diameter (the straight line distance through a trunk) Circumference (the distance around the trunk)</p>	
<p>Trunk circumference × 0.32 = trunk diameter.</p>	
<p>When calculating the amount of pesticide to use, diameter can be difficult to estimate, but is easily calculated from circumference.</p>	
<p>Encircle the trunk with a string (then measure the string's length) or use a flexible ruled tape to measure circumference at breast height. Trunk circumference × 0.32 = trunk diameter. Therefore, a trunk that is 32 inches around has a diameter of about 10 inches (32 inches × 0.32 = 10 inches).</p>	

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.

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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