
HACKBERRY WOOLLY APHID

Integrated Pest Management for Home Gardeners and Landscape Professionals

An introduced woolly aphid (*Shivaphis celti*), sometimes called Asian woolly hackberry aphid, infests the widely planted Chinese hackberry (*Celtis sinensis*) and other *Celtis* species. This hackberry woolly aphid also occurs from Florida to Texas and northward to at least Illinois. It also occurs in much of Asia.

IDENTIFICATION

Often the first observed sign of a hackberry woolly aphid infestation is the sticky honeydew it produces (Figure 1). The aphids also secrete pale wax, which covers their bodies (Figure 2). These woolly aphids on shoot terminals and leaves appear as fuzzy, bluish or white masses, each about 1/10 inch or less in diameter (Figure 3). Winged forms have distinct black borders along the forewing veins and their antennae have alternating dark and light bands (Figure 4).

Check for the insects to confirm that the cause of honeydew is aphids and not the citricola scale (Figure 5). Citricola scale (*Coccus pseudomagnoliarum*) is the only other honeydew-producing insect that infests hackberry at annoying levels in California, and it is most common in the Central Valley on citrus and hackberry.

Citricola scale females and older nymphs (immatures) are brownish to gray, oval, slightly dome shaped, and occur on twig bark from fall through spring (Figure 6). Because the scales are immobile most of their life and their mottled gray to brown color blends in with bark, these scales are easily overlooked. In the spring female scales produce tiny flattened, orangish nymphs that settle and feed on the underside of leaves during spring and summer, then move in fall to overwinter on bark.

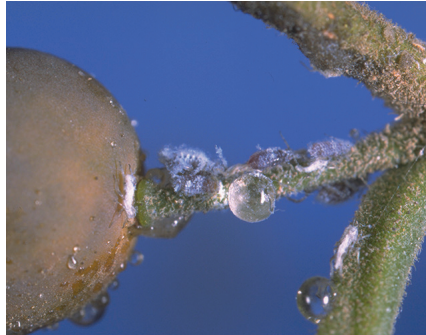


Figure 1. Honeydew drops and aphid nymphs on Chinese hackberry fruit petiole.



Figure 2. Winged adult woolly hackberry aphid.

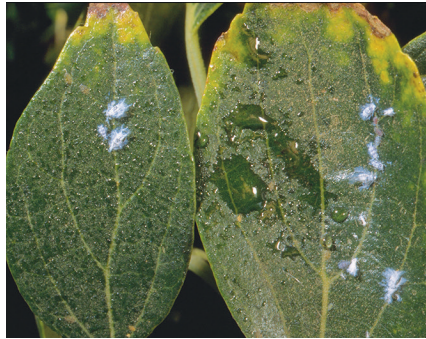


Figure 3. Wax-covered aphids and honeydew on Chinese hackberry.

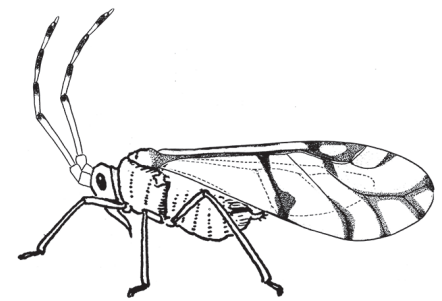


Figure 4. Dark antenna and wing marks on a hackberry woolly aphid.



Figure 5. A just-born aphid nymph (center), wax-covered aphid adult, and citricola scale nymphs (bottom right).



Figure 6. Citricola scale females on twig and tiny nymphs on underside of leaves.

PEST NOTES

University of California

Agriculture and Natural Resources

Statewide Integrated Pest Management Program

Publication 74111

August 2014

For more information, see Pest Notes: *Scales*.

DAMAGE

This aphid is a pest because it produces copious honeydew excretions upon which blackish sooty mold grows creating a sticky mess on leaves and surfaces beneath infested trees. However, no long-term or serious damage to hackberry trees has been found after years of aphid infestations. Insecticides apparently are not warranted to protect the health or survival of infested trees but are applied when honeydew excretions are intolerable to people.

LIFE CYCLE

Hackberry woolly aphid adults, either winged or wingless, give live birth to aphid nymphs during most of the season when hackberry leaves are present. Spring and summer adults are all reproductive females. In the fall, winged males are produced; the aphids mate, and females lay eggs that overwinter on branch terminals (Figure 7). Eggs hatch in the spring as the hackberry produces leaves. In the San Joaquin Valley, hackberry woolly aphid populations typically are highest in the spring and fall with lower numbers and less honeydew production during the summer. The insect has many generations per year.

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, apply insecticide only where annoyance from honeydew cannot be tolerated.

Honeydew Monitoring. Water-sensitive cards can be used by landscape managers to efficiently monitor honeydew dripping from trees. This technique provides a consistent measure of changes in aphid abundance and helps you decide when to take control action and afterwards to evaluate the effectiveness of your actions. The effort required to monitor honeydew

can be warranted on tall trees where the honeydew-producing insects may be located too high to easily observe, where there is a low tolerance for dripping honeydew, and when managing many trees, such as along city streets and parking lots.

Monitor honeydew with the bright yellow cards sold for evaluating insecticide spray coverage and calibrating sprayers. Cards develop distinct blue dots upon contact with honeydew or water droplets. These droplet monitoring cards generally must be mail ordered and are different from the yellow sticky traps used to monitor winged insects. Regularly monitor honeydew beneath plants, such as the number of drops during four hours on the same time of day once a week. Label and save the cards from each monitoring date, and visually compare the cards among sample dates. For more information on monitoring honeydew, see *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*.

Cultural Control

Provide trees with appropriate soil moisture, avoid compacting topsoil, and prevent prolonged waterlogging of soil near trunks. Excess irrigation promotes certain root decay pathogens and may contribute to a malady of undetermined cause that has killed many Chinese hackberry in some locations in California. Avoid fertilizing 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 small enough for hosing to be practical.

Biological Control

The convergent lady beetle, multicolored Asian lady beetle, syrphid flies, and lacewing larvae are common aphid predators. No parasitic wasps or other natural enemies specific to this pest species have been reported in California. Several parasitic wasps of the *Trioxys* species attack this aphid in Asia, and the introduction of these natural



Figure 7. A black aphid egg overwintering on a twig bud.

enemies is one long-term possibility for managing this pest.

In many California situations, natural enemies do not provide adequate biological control of this aphid. Nevertheless, avoid spraying hackberry with broad-spectrum, persistent insecticides that kill natural enemies; because the citricola scale, another major hackberry pest, is well controlled by parasites in some locations.

Chemical Control

Before applying insecticide, make sure plants are receiving appropriate cultural care and take steps to conserve natural enemies. Completely read and follow the product label instructions for the safe and effective use of the insecticide. Insecticides can have unintended effects, such as contaminating water, poisoning pollinators and natural enemies, and causing secondary pest outbreaks.

Nonresidual, Contact Insecticides

Where trees can be sprayed, completely covering shoot terminals and the undersides of leaves with a nonpersistent, contact insecticide can provide partial control of hackberry aphids. Available nonpersistent, contact insecticides include narrow-range or horticultural oils (e.g., Bonide Horticultural Oil), insecticidal soap (Safer Brand Insect Killing Soap Concentrate II), and pyrethrin products, which are often combined with piperonyl butoxide (Ace Flower & Vegetable Insect Spray, Garden Tech Worry Free Brand Concentrate).

These insecticides have low toxicity to people and pets and relatively little adverse impact on the populations of pollinators and natural enemies and the benefits they provide. These products will give only partial control because aphids' woolly wax protects them from sprays; and it is difficult to obtain thorough spray coverage of aphids, especially on large trees. Because these insecticides provide no residual control and aphids have several generations each year, more than one application per season is generally needed.

Dormant Spray. Thorough application of horticultural oil (sometimes also called supreme, superior, or narrow-range oil) to twig terminals during the dormant or delayed dormant season (after buds swell, but before leaves open) can kill overwintering eggs on twigs. Delayed dormant spraying is unlikely to give complete control of aphids and will not control aphids that fly in from other hackberry trees after leaves have opened. However, dormant oil spray provides good control of citricola scale, and aphid reduction could be a side benefit if treatment is needed for scales.

Systemic Insecticides

Systemic insecticides are absorbed by one plant part (e.g., trunks or roots) and moved (translocated) to leaves or other plant parts. In comparison with systemics that are sprayed onto foliage, products labeled for soil drench or injection or for trunk injection or spraying minimize environmental contamination and may be more effective. Trunk application of systemic insecticides can provide relatively rapid control. There is a longer time delay between soil application and insecticide action. Properly applied, one application can provide effective control for the entire growing season. If applying systemic insecticide, use soil drench or injection or a trunk spray whenever possible (Figure 8).

Systemic neonicotinoid insecticides for use on landscape plants include imidacloprid (Bayer Advanced 12 Month Tree & Shrub Insect Control,

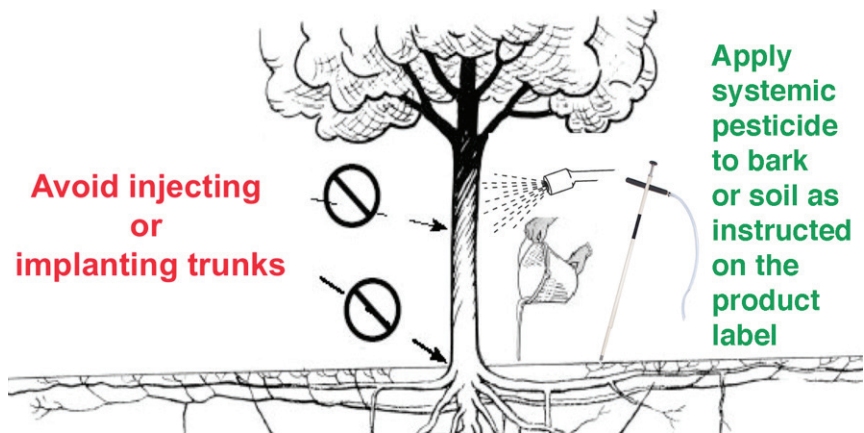


Figure 8. When applying systemic pesticides to trees, spray bark or drench or inject soil whenever possible as directed on product labels instead of injecting or implanting trees with pesticide.

Bonide Annual Tree & Shrub Insect Control Concentrate), which can easily be drenched into soil around the tree trunk using the mix-and-pour method as directed on the product labels. The neonicotinoid dinotefuran is also available for aphid control by home users (Green Light Tree & Shrub Insect Control with Safari 2G and Ortho Tree & Shrub Insect Control Granules). Dinotefuran (Safari) and imidacloprid (Merit) are also available to professional applicators.

Late winter is an effective time to apply imidacloprid. However, this is before you can know whether aphids will become abundant enough to warrant the application. Spring and summer application of a neonicotinoid can be effective on trees that receive regular irrigation, such as those growing in lawns. Delaying the application and monitoring regularly allows you to limit insecticide use to situations where aphids or their honeydew are becoming too abundant. No treatments should be conducted during the fall, because hackberry leaves will soon drop naturally.

Systemic insecticides can cause spider mite outbreaks and foliage sprays of them can be toxic to beneficial insects that contact spray or treated leaves. Systemics can translocate into flowers and have adverse effects on natural enemies

and pollinators that feed on nectar and pollen. Although hackberry's tiny flowers are wind pollinated, do not apply systemic insecticides to plants during flowering or shortly before flowering; wait until after plants have completed their seasonal flowering unless the product's label directions say otherwise. With soil application, when possible, wait until nearby plants also have completed flowering, as their roots may take up some of the soil-applied insecticide.

Injections and Implants

Avoid injecting or implanting pesticides or other materials into hackberry trunks or roots. With trunk injection and implantation, it is difficult to repeatedly place insecticide at the proper depth. These methods also injure woody plants and can spread plant pathogens on contaminated tools. Chinese hackberry are susceptible to an unexplained, tree-killing malady, which may be a vascular wilt pathogen that could 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.

When injecting or implanting into multiple plants, scrub any plant sap from tools or equipment that penetrate bark and disinfect tools with a registered disinfectant (e.g., bleach) before moving to work on each new plant. At least 1 to 2 minutes of disinfectant contact time between contaminated uses is generally required. Consider rotating work among several tools, using a freshly disinfected tool while the most recently used tools are being soaked in disinfectant. Avoid methods that cause large wounds, such as implants placed in holes drilled in trunks. Do not implant or inject into roots or trunks more than once a year.

Residual, Foliar Sprays

Foliar sprays of broad-spectrum insecticides with residues that can persist for weeks are not recommended for aphid control in landscapes and gardens. Pesticides to avoid include carbamates (carbaryl or Sevin), organophosphates (malathion), and pyrethroids (bifenthrin, fluvalinate, permethrin). These are highly toxic to natural enemies and pollinators and can cause outbreaks of spider mites or other pests. Because their use in landscapes and gardens can run or wash off into storm drains and contaminate municipal wastewater, these insecticides are being found in surface water and are adversely affecting nontarget, aquatic organisms.

REFERENCES

- Dreistadt, S. H., J. G. Morse, P. A. Phillips, and R. E. Rice. 2007. *Pest Notes: Scales*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7408. Available online at <http://www.ipm.ucanr.edu/PMG/PESTNOTES/pn7408.html>.
- Flint, M. L. 2013. *Pest Notes: Aphids*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7404. Available online at <http://www.ipm.ucanr.edu/PMG/PESTNOTES/pn7404.html>.
- Halbert, S. E., and P. M. Choate. 2013. *Asian Woolly Hackberry Aphid, Shivaphis celti* Das (Insecta: Hemiptera: Aphididae). Gainesville: Univ. Florida Extension Publ. EENY288. Available online at http://entnemdept.ifas.ufl.edu/creatures/trees/asian_hackberry.htm.
- Dreistadt, S. H., J. K. Clark, and M. L. Flint. 2004. *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*. 2nd ed. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 3359.
- AUTHORS:** A. B. Lawson, California State University, Fresno; and S. H. Dreistadt, UC Statewide IPM Program, Davis.
- TECHNICAL EDITORS:** M.L. Flint and K. Windbiel-Rojas
- EDITOR:** K. Beverlin
- ILLUSTRATIONS:** Figs. 1–3 and 5–7: J. K. Clark; Fig. 4. Adapted from E. O. Essig and S. I. Kuwana. 1918. Proceedings of the California Academy of Science 8(3):95 and USDA.1952. Insects. The Yearbook of Agriculture; Fig. 8. Produced by the UC ANR Statewide Integrated Pest Management Program, University of California, Davis, CA.
- This and other Pest Notes are available at www.ipm.ucanr.edu.**
- For more information, contact the University of California Cooperative Extension office in your county. See your telephone directory for addresses and phone numbers, or visit <http://ucanr.org/ce.cfm>.
- University of California scientists and other qualified professionals have anonymously peer reviewed this publication for technical accuracy. The ANR Associate Editor for Pest Management managed this process.
- 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.
- Produced by:
Statewide Integrated Pest Management Program
 University of California
 2801 Second St.
 Davis, CA 95618-7774



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, rivers, and oceans. 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 the 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.

ANR NONDISCRIMINATION AND AFFIRMATIVE ACTION POLICY STATEMENT

It is the policy of the University of California (UC) and the UC Division of Agriculture & Natural Resources not to engage in discrimination against or harassment of any person in any of its programs or activities (Complete nondiscrimination policy statement can be found at <http://ucanr.edu/sites/anrstaff/files/183099.pdf>).

Inquiries regarding ANR's nondiscrimination policies may be directed to Linda Marie Manton, Affirmative Action Contact, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1318.