

# LEAFFOOTED BUG

*Integrated Pest Management for Landscape Professionals and Home Gardeners*

Leaffooted bugs are medium to large sized insects that feed on fruits, fruiting vegetables, nuts, and ornamentals. They have piercing-sucking mouthparts that allow them to feed on plant parts, particularly seeds. Leaffooted bugs are in the family Coreidae and get their name from the small leaf-like enlargements found on the hind leg. They are closely related to other sucking insects, such as stink bugs (family Pentatomidae) that can also suck juices from plants.

## IDENTIFICATION

There are three common species of leaffooted bugs that are native to California and the western United States. These include *Leptoglossus zonatus*, *L. clypealis*, and *L. occidentalis* (Figures 1-3). Adults of all three species are about 0.75 to 1 inch long and have a narrow brown body. Adults of all three species are similar in appearance, except that:

- *L. zonatus* has two yellow spots just behind the head (on the pronotum) (Figure 1).
- *L. clypealis* has a thorn-like projection called a clypeus that extends forward from the tip of the head (Figure 2).
- *L. occidentalis* has neither of these features (Figure 3).

All three species have a white zigzag pattern across the wings: this pattern is prominent in *L. zonatus* and *L. clypealis* and is relatively faint in *L. occidentalis*.

The brown, cylindrical eggs of all three species are laid end-to-end in a string-like strand on the host plant, often along a stem or leaf midrib (Figure 4). Most egg masses have 10-15 eggs, though more than 50 have been reported. Eggs hatch into small nymphs that have dark heads and dark legs on bodies that range in color from orange to reddish-brown (Figure 5). Small leaffooted bugs can be confused with nymphs of the as-



**Figure 1. *Leptoglossus zonatus* adult.** The two yellow spots on the pronotum behind the head are characteristic of this species. (D. Haviland, UCCE Kern Co.)



**Figure 2. *Leptoglossus clypealis* adult.** The sharply pointed, thornlike clypeus at the tip of the head is characteristic of this species. (J.K. Clark)



**Figure 3. *Leptoglossus occidentalis* adult.** (L.L. Strand)



**Figure 4.** Leaffooted bug eggs are laid end to end in one or more strands. Holes in these eggs on a pistachio hull indicate that larvae have already hatched. (D. Haviland, UCCE Kern Co.)



**Figure 5. Leaffooted bug nymph.** (D. Haviland, UCCE Kern Co.)



**Figure 6.** Nymphs of assassin bugs, which are beneficial predators, resemble leaffooted bug nymphs but are lighter colored. (J.K. Clark)

sassin bug (*Zelus renardii*) (Figure 6). Nymphs of this beneficial insect have light-colored legs and antennae and hatch from barrel-shaped eggs that are grouped together with a white cone top. As leaffooted bug nymphs become larger, they can easily be recognized by the development of the leaf-like projection on the hind legs (Figure 5).

# PEST NOTES

University of California  
Agriculture and Natural Resources

Statewide Integrated Pest Management Program

Publication 74168

May 2014

## LIFE CYCLE

Leaffooted bugs overwinter as adults, typically in aggregations located in protected areas, such as in woodpiles, barns or other buildings, palm fronds, citrus or juniper trees, under peeling bark, or in tree cracks. Cold winters kill many adults, and major outbreaks often occur after mild winters. Overwintered adults live from September/October until late spring. When weather gets warm, typically in March in the San Joaquin Valley and April in the Sacramento Valley, adults disperse to find food sources. Adults are strong flyers that may feed initially on the seeds of winter weeds and later move into gardens, landscapes, and farms in search of early-season fruit and a place to lay eggs.

Overwintering leaffooted bugs can lay over 200 eggs during a two-month period in the spring. Nymphs emerge from the eggs about 1 week after being deposited, after which they develop into adults in 5 to 8 weeks. Adults are long-lived and can lay eggs over an extended period, so the population can consist of all life stages by late June. At this time, overwintering adults are still alive as the first generation of their offspring develop into adults. During the spring and summer, there are typically two to three generations of leaffooted bugs. In the fall, all bugs develop until they become adults that overwinter in aggregations (Figure 7).

Population levels change from year to year depending on weather and parasitism of eggs. Populations are typically highest after mild winters that allow high survival of overwintering adults. Seasonal fluctuations in the number of bugs can also be related to rainfall, food availability, and the prevalence of natural enemies.

**Host Plants.** In the spring, leaffooted bugs often feed on thistles and other weeds. Adults migrate from weedy areas into gardens and landscapes, particularly when fruits have started to ripen. *L. zonatus* is the most destructive of the leaffooted bug species. It feeds on many types of plants and is most commonly reported by

gardeners as a pest of tomatoes (Figure 8) and pomegranates (Figure 7); farmers primarily report it as a pest of almonds, pistachios, and pomegranates. Other important hosts in California include young citrus fruit, cotton bolls, watermelons, and several ornamental trees and shrubs. *L. clypealis* also has a wide host range within gardens, landscapes, and farms and is the predominant species found on desert plants like palm trees, Joshua trees, and yucca. *L. occidentalis*, also known as the western conifer seed bug, is primarily found in association with conifer trees.

## DAMAGE

Leaffooted bugs have piercing-sucking mouthparts that extend more than half of the length of the narrow body. They use this mouthpart to probe into leaves, shoots, and fruit to suck plant juices. The depth of the probing depends on the size of the bug: small nymphs feed shallowly on superficial plant juices, whereas adult bugs probe deep into fruit in search of seeds. If a hard seed is found, such as an almond kernel or juniper berry, the bug excretes digestive enzymes from its mouthparts to liquefy a small part of the seed so that it can be ingested. Leaffooted bug mouthparts are also known to carry a fungal yeast, *Eremothecium coryli* (formerly known as *Nematospora*). When leaffooted bugs feed, this yeast can be introduced into fruit causing a variety of symptoms usually related to discoloration. However, the yeast causes no damage that would limit the ability of the fruit to be harvested and consumed. This infection is most predominant when rains are abundant.

For most ornamental and many garden plants, feeding on the leaves and shoots causes no visual damage and is of little concern. The most destructive damage occurs when bugs feed on fruit. Early-season feeding on nuts like almonds and pistachios can cause the kernel to abort and die, and mid- to late-season feeding on nuts causes a black stain on the kernel. On pomegranates, late-season feeding as the fruit ripens generally causes no external damage but can cause aryls (seed-like structures) to darken and wither, especially if fungal



**Figure 7. Aggregations of *L. zonatus* on pomegranate fruit.**

(D. Haviland, UCCE Kern Co.)



**Figure 8. Leaffooted bug nymphs on tomato.** (R. Ostroff)



**Figure 9. Leaffooted bug excrement on the surface of a pomegranate fruit.**

(D. Haviland, UCCE Kern Co.)

spores gain entry into the fruit through the feeding wound. Large aggregations of leaffooted bugs can also leave excrement on the surface of the fruit that can reduce its aesthetic appeal (Figure 9). Feeding on small fruit (e.g., tomatoes) can cause the fruit to abort, while feeding on medium-sized fruit can result in depressions or discoloration at the feeding site as the fruit expands and ripens. Feeding on mature tomatoes

can cause slight discoloration to the surface of the fruit that should be of no concern to backyard gardeners.

## MANAGEMENT

During most years, leaffooted bug populations are low enough that damage to gardens is tolerable and damage to landscape plants is negligible. When outbreaks occur, a variety of methods will likely be needed to manage this pest, which may include removing overwintering sites or the use of weed host removal, row covers, physical removal, natural enemies, and insecticides. Achieving good control will likely require some combination of these methods.

**Remove Overwintering Sites.** Adult bugs overwinter in woodpiles, under the bark of eucalyptus, juniper, or cypress, and in outbuildings. Large numbers may pass the winter in culls of fruit such as pomegranates. Remove these overwintering sites where possible or inspect them for leaffooted bugs.

**Weed Removal.** Weedy areas serve as a food source for leaffooted bugs during winter and spring, when fruits are not available. Try to eliminate such areas near your garden or keep weedy areas closely mowed.

**Row Covers.** Covering plants with a row cover material can prevent feeding by leaffooted bugs. A row cover is a light, permeable material, usually made of polypropylene or polyester. Row covers are sometimes used to extend the harvest season past the first few frosts but are also valuable for preventing damage by a wide range of pests. Covers must be applied early, before bugs arrive and lay eggs on plants; otherwise, bugs will be trapped inside. Unfortunately, row covers will prevent pollinators and beneficial insects from reaching plants. Some garden plants like tomatoes are self-pollinating, but whiteflies or aphids may build up if beneficial insects are excluded.

**Physical Removal.** Thoroughly examine plants for all stages of the pest, daily to several times per week. The bugs may be hidden inside dense foliage

layers or fruit clusters, and they may hide or fly when startled. Handpick and crush the bugs or brush them off plants into soapy water. Wear gloves because of the odor they will emit when handled. A handheld vacuum dedicated to catching the bugs can be effective at reducing numbers, if used regularly. It is especially important to remove the bugs as early in the season as possible, when the very young nymphs are tightly clustered together, and morning is best to reduce movement and flight. Be sure to also destroy the egg masses found on the underside of leaves.

For late-season infestations in pomegranate trees, prune trees so that there is a space between tree limbs and the ground. Leaffooted bug nymphs can easily be knocked out of the tree using a stick, by physically shaking the tree limbs, or using water from a pressure nozzle on a garden hose. Once bugs fall on the ground, they can be smashed. This method is effective against nymphs but will not dislodge eggs. It is less effective against adults, which are able to fly away. For this reason, this method should be repeated once every 1 to 2 weeks as necessary, until the majority of the bugs have disappeared. Laying a white ground cover beneath the plant can aid in seeing the insects when using this control method.

**Natural Enemies.** Native egg parasites, such as the tiny wasp, *Gryon pennsylvanicum* (Figure 10), if not disrupted, may reduce leaffooted bug populations by killing the eggs before they hatch. Adult leaffooted bugs may be parasitized by certain tachinid flies, such as *Trichopoda pennipes*, which lays its eggs on the sides of large nymphs or adults of several species of true bugs. Leaffooted bug predators include birds, spiders, and assassin bugs. Although they may control only a small number of the bugs, natural enemies are important to preserve because they control other pests as well. Avoiding use of persistent broad-spectrum insecticides and assuring pollen and nectar sources for adult beneficials are important ways to protect natural enemies.



**Figure 10.** The parasitoid *Gryon pennsylvanicum* lays its eggs inside of the eggs of leaffooted bug. Parasitoid eggs hatch into larvae that develop into adults within the leaffooted bug egg. (D. Haviland, UCCE Kern Co. )

**Insecticides.** Insecticides are rarely needed for leaffooted bug control because small blemishes on most fruit are tolerable in gardening situations and because landscape plants are rarely damaged. Also, because they are primarily seed feeders, leaffooted bugs are most common on garden plants near harvest, when the application of pesticides to fruits that are going to be consumed is undesirable. In addition, most insecticides available to homeowners only have temporary effects on the leaffooted bug.

However, in severe cases, insecticides can be considered as a last resort. If needed, insecticides will be most effective against small nymphs. Therefore, monitor infested plants for egg masses and try to make insecticide applications when small nymphs are present. The most effective insecticides against leaffooted bug are broad-spectrum, pyrethroid-based insecticides, such as permethrin. However, these products are quite toxic to bees and beneficial insects. Insecticidal soap or botanicals, such as neem oil or pyrethrin, may provide some control of young nymphs only. If insecticides are used close to harvest, make sure to observe the days-to-harvest period indicated on the insecticide label; and wash the fruit before eating.

## REFERENCES

Buss, L.J., S.E. Halbert, and S.J. Johnson. 2013. *Pest Alert: Leptoglossus zonatus - A new leaffooted bug in Florida* (Hemiptera: Coreidae). Available online at [www.freshfromflorida.com/Divisions-Offices/Plant-Industry/Plant-Industry-Publications/Pest-Alerts/Pest-Alerts-Leptoglossus-Zonatus-A-New-Leaffooted-Bug-In-Florida](http://www.freshfromflorida.com/Divisions-Offices/Plant-Industry/Plant-Industry-Publications/Pest-Alerts/Pest-Alerts-Leptoglossus-Zonatus-A-New-Leaffooted-Bug-In-Florida).

Chi, A.A. and R.F. Mizell III. Western leaffooted bug. University of Florida web site. Available online at [http://entnemdept.ufl.edu/creatures/citrus/leptoglossus\\_zonatus.htm](http://entnemdept.ufl.edu/creatures/citrus/leptoglossus_zonatus.htm).

Taylor, S. 2009. *Leptoglossus clypealis* Heidemann, 1910: (Heteroptera: Pentatomomorpha: Coreidae). Univ. of Illinois at Urbana-Champaign, Illinois Natural History Survey. Available online at [http://www.inhs.uiuc.edu/~sjtaylor/coreidae/Leptoglossus\\_clypealis.html](http://www.inhs.uiuc.edu/~sjtaylor/coreidae/Leptoglossus_clypealis.html).

Bentley, W. J., R. H. Beede, K. M. Daane, and D. R. Haviland. 2012. Insects and Mites from *UCIPM Integrated Pest Management Guidelines: Pistachio*. UC ANR Publication 3461. Available online at <http://www.ipm.ucdavis.edu/PMG/r605100511.html>.

Grafton-Cardwell, E. E., D. Carroll, W. J. Bentley, D. R. Haviland and V. Walton. 2013. Insects and Mites from *UCIPM Integrated Pest Management Guidelines: Pomegranate*. UC ANR Publication 3474. Available online at <http://www.ipm.ucanr.edu/PMG/r621100111.html>.

Zalom, F. G., C. Pickel, W. J. Bentley, D. R. Haviland, and R. A. Van Steenwyk. 2012. Insects and Mites from *UCIPM Integrated Pest Management Guidelines: Almond*. UC ANR Publication 3431. Available online at <http://www.ipm.ucanr.edu/PMG/r3300411.html>.

**AUTHORS:** Chuck Ingels, UCCE Sacramento and David Haviland, UCCE Kern Co.

**TECHNICAL EDITOR:** M. L. Flint  
**EDITOR:** K. Beverlin

**This and other Pest Notes are available at [www.ipm.ucanr.edu](http://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 **UC Statewide Integrated Pest Management Program**  
University of California, 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.