

Boxelder Bug

Nuisance Management for Homeowners

by Danielle Gunn and Edward John Bechinski

Boxelder bugs are a common nuisance pest in Idaho homes and yards. Although not particularly harmful, these insects can be aggravating when they are searching for places to spend the winter.

This publication will help you understand both the seasonal biology of boxelder bugs in Idaho, and landscape features that increase pest problems. We discuss the relative importance of these insects as pests. Practical steps you can take to reduce nuisance problems include alternatives to insecticides and safe, effective insecticide use.

Identification

Boxelder bugs develop through three life stages: eggs, nymphs, and adults. Figure 1 shows the actual body sizes of a newly hatched nymph and a mature adult.

Adults are the most commonly encountered life stage. Adult boxelder bugs are flattened, elongate insects approximately one-half-inch long (not including antennae). Overall upper body color is slate gray to black. Reddish orange lines appear behind the head and along the sides of the body (Figure 2). The rest of the body under the wings is red with two rows of black spots. Legs and antennae are black.

Eggs. Small red eggs occur in clusters on boxelder and maple trees. Elongate eggs one-sixteenth-inch long are laid in groups of about ten on the bark and leaves of host trees and surrounding areas. Newly laid eggs are straw-colored but turn red as embryos develop (Figure 3).

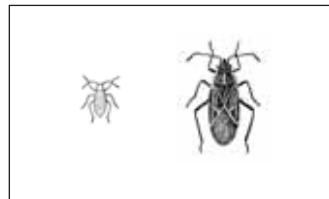


Figure 1. Comparative life-size boxelder bug 1st-stage nymph (left) and adult (right).



Figure 2. Adult boxelder bugs, *Boisea trivittata*, are distinctively marked with red lines on a slate-gray background.



Figure 3. Typical boxelder bug egg mass.

Nymphs are similar to adults in body shape and color but are smaller and wingless. Boxelder bugs develop through six immature nymphal stages. Each successive stage is larger than the last. Newly hatched nymphs are entirely bright red. Older nymphs develop darker markings behind the head. Wings grow over the back as short black pads visible on larger nymphs (Figure 4).

Do not confuse boxelder bugs with their *look-alikes*. Boxelder bugs are members of a group of insects called the true bugs (Order: Hemiptera). Some people confuse true bugs with beetles (Order: Coleoptera). Beetles have hard wing covers that meet in a straight line down the back, while true bugs hold their wings crossed in an x-pattern flat over their back. Several other red and black colored true bugs superficially look like boxelder bugs. The most notable are milkweed bugs (Figure 5), which are more extensively red in color and never occur in massive aggregations around homes.



Figure 4. Immature boxelder bug nymph. Arrow points to developing wings that appear as pads over the back of older nymphs.



Figure 5. Milkweed bugs (left and right above) look like boxelder bugs but are substantially redder in color.

What's in a name?

Idaho is one of a few states in the U.S. having two different species of boxelder bugs. Our most widely recorded type is the western boxelder bug, *Boisea rubrolineata*. It occurs south from the Idaho panhandle through the Treasure Valley and eastward through the Magic Valley. The other species, *B. trivittata*, is correctly called the boxelder bug. First recorded in Idaho during 1891, it appears to be restricted to the eastern third of our state. Hybridization between the two species does not occur.

Venation color on the inner part of the adult bug wings distinguishes our two species. On the western boxelder bug, *Boisea rubrolineata*, the veins are red, while on the boxelder bug, *B. trivittata*, the veins are black (Figure 6).

For practical pest management decisions, it is not necessary to distinguish among species. Both share similar seasonal biology and pose the same pest problems. Unless otherwise noted, we use the single name "boxelder bug" in this publication to refer to both species that live in Idaho.



Figure 6. Pinned specimens of an adult western boxelder bug, *Boisea rubrolineata* (left) and an adult boxelder bug, *B. trivittata* (right). Arrows point to the red veins that differentiate *B. rubrolineata* from the otherwise identical *B. trivittata*, which has black wing veins. The gold-colored spot on the right specimen is the head of the insect pin and not a mark on the insect itself.

Host plants

Boxelder trees (*Acer negundo*) are the primary host plant for insect egg-laying, feeding, and development. This is especially true for *Boisea trivittata*, the species that lives in southeastern Idaho.

Boxelder bugs also reproduce on maples (another species of the genus *Acer*) and infrequently on ash trees. Maples are the preferred host plant for the western boxelder bug, *B. rubrolineata*.

Boxelder bugs suck sap from leaves and stems but prefer to feed on seeds. Boxelder trees grow as separate female (seed-producing) and male (non seed-bearing) plants. Boxelder bugs seldom occur on male trees because these plants do not produce seeds. Even in yards where male and female trees grow side by side with touching branches, boxelder bugs mainly reside on the female trees. This particularly is true after mid-summer when seeds are present. In contrast, the flowers of maple trees have both male and female reproductive parts. Any individual maple tree may support boxelder bugs because all maple trees produce seeds.

Boxelder bugs have been observed feeding on a diverse group of 20 other types of plants, ranging from weedy grasses to ornamental flowers to small fruits. No evidence suggests that boxelder bugs survive and reproduce on these plants.

Seasonal life cycle

Boxelder bugs survive the winter as adults in protected places around home landscapes and inside unheated parts of buildings. Adults sometimes become active outdoors during warm sunny days in late winter. Adult seasonal activity really does not begin until temperatures consistently reach 70°F, and host trees leaf out in April.

In May, overwintered adults fly to host trees, where they lay several hundred eggs in small batches. They also lay eggs on boxelder and maple seeds remaining on the soil from the fall. Eggs hatch in 10 to 14 days. Nymphs initially live on the ground or on low-growing vegetation, where they suck sap from seeds fallen from their host trees. Boxelder bugs normally do not live on trees until seed set in midsummer.

In southern Idaho, nymphs develop into adults by midsummer. A second generation then begins. A single generation likely develops in northern Idaho.

When leaves begin to mature and drop, nymphs and adults move from trees and gather on sunny surfaces such as bare soil, wooden fences, tree trunks, sidewalks, and landscape rocks. Masses numbering thousands of nymphs and adults are not unusual on the sunny southern and western exposures of walls and foundations of residences during early fall. Fall movement from trees increases on warm days in October immediately following the first seasonal frost.

Adult boxelder bugs search for dry, sheltered overwintering sites, such as in bark crevices and hollow tree trunks or under rocks and surface debris. During this time boxelder bugs wander into residences through cracks and crevices in foundations and along door and window casings. Only adults survive the winter. Any remaining immature nymphs die without overwintering when freezing weather arrives.

Pest status

Boxelder bugs become nuisance pests by their sheer presence in and around residences. Two periods of nuisance activity occur: from late-summer through mid-fall when bugs leave their host trees for overwintering sites, and in mid-spring when overwintered adults again become

active and search out places to lay eggs. Other than their nuisance factor, boxelder bugs do not cause any significant harm.

Boxelder bugs that wander into residences during the fall do not reproduce inside. Their liquid feces can stain fabrics; otherwise, bugs do not harm structures. They do not feed on houseplants, stored pantry foods, or anything else inside the home. Boxelder bugs are genetically programmed to find protected places safe from extreme cold where they can hibernate in an inactive, nonfeeding state until spring. Early-emerging individuals occasionally can be seen crawling inside homes during late winter when sunny weather warms unheated attics or crawlspaces where they had been sheltered.

Threats to human health from bugs inside homes are insignificant. Boxelder bugs have no venom and cannot sting. Reports are known of boxelder bugs defensively biting people when pressed against bare skin. Such accidental encounters cause no lasting effects. Some people detect an offensive odor from these insects.

Boxelder bugs are inconsequential landscape pests but can cause deformities by feeding on fruits. Plant feeding by boxelder bugs seldom causes noticeable damage to boxelder or maple trees in home landscapes. Boxelder bugs do sometimes feed during late summer on nearby stone fruits (cherries, nectarines, peaches, and plums), pome fruits (apples and pears), and small fruits (grapes and strawberries). They directly feed on green and ripened fruit by puncturing it with their needle-like mouthparts and sucking juices. Heavy feeding causes roughened pits and dimples on fruit surfaces. Damage usually is insignificant to backyard trees but can become an important issue in commercial orchards.

Management options

Boxelder bug management depends on pest exclusion methods. It may also require outdoor barrier sprays of insecticides along the exterior foundations of buildings to prevent pest movement into homes.

Bug-proof your house. Prevent bugs from entering your home by caulking around windows and weather-stripping around door thresholds. Cracks along poorly fitting sliding patio doors provide easy entry into homes. Repair torn

screens and cover vents under eaves and in attics with fine-mesh screening to exclude bugs. This also will help keep out spiders and other home-invading pests.

Physically remove bugs. Shop vacuums are well-suited for physically removing living bugs both inside buildings and outdoors. Dispose of the vacuum contents inside a sealed bag so surviving bugs do not escape.

Cut down and replace nearby boxelder trees. Consider eliminating female (seed-bearing) boxelder trees and replace them with nonhost trees. This will help reduce but not necessarily eliminate nuisance problems. Adult boxelder bugs are highly mobile. Infestations can come from trees hundreds of yards from the site of the problem.

Rake and destroy seeds. If it is not practical or desirable to remove host trees, rake and destroy any boxelder and maple seeds lying on the ground early in the spring. The generation of nymphs that hatches before trees set seeds primarily survives on seeds lying on the ground from the previous year.

Apply insecticides as outdoor barrier treatments along the foundation of residences. Boxelder bugs often congregate during the fall on sunny southern and western exposures of homes, garages, and sheds. By treating those areas with an appropriate insecticide, you can create an effective but limited chemical barrier that kills boxelder bugs before they enter buildings. You can hire a professional to apply insecticides or you can do it yourself using over-the-counter insecticides.

Table 1 lists products widely available to homeowners in Idaho. A single spray of any one of these products should be equally effective in providing immediate bug control that lasts 10 to 14 days or longer.

It is not necessary to spray every time you see bug activity. Insects will contact a lethal dose from the chemical residues that remain after the spray has dried. Premixed, ready-to-use liquid sprays in trigger-pump containers not only are convenient, but also reduce potential health hazards by minimizing your accidental contact with concentrated insecticides.

Unless otherwise directed by the label, spray a 3-foot-wide continuous band of insecticide on the

soil outside around the building foundation, spraying upwards on the exterior foundation another two or three feet. Spray around doors, windows, utility line entrances, vents, and other openings through exterior walls where bugs can enter buildings.

All of the products listed in Table 1 are nerve poisons that pose at least some risk of acute toxicity to people, pets, and wildlife. The U.S. Environmental Protection Agency (EPA) classifies most of these home barrier products as slightly toxic to people by inhalation, skin contact, or ingestion. These have the word CAUTION printed on the label, which designates the lowest (least toxic) EPA category. A few are moderately toxic to people; these say WARNING on the label. None of the homeowner products are designated by DANGER, the label signal word identifying products that can seriously burn skin or eyes.

“Least-toxic” alternatives to products in Table 1 include insecticidal soap sprays and diatomaceous earth dusts. You can use commercial insecticidal soap sprays to wash boxelder bugs from outside walls and foundations of buildings. These products are essentially nontoxic to peo-

ple; however, they only kill pests by direct contact with the wet spray. Once the soap spray has dried, there is no more killing action. Forcefully spraying water from a garden hose may be equally effective in removing and killing bugs crawling on buildings.

Only three diatomaceous earth products are available to homeowners for outdoor use: *Safer Brand Ant & Insect Killer*, *Natural Guard Crawling Insect Control*, and *Concern Diatomaceous Crawling Insect Killer*. These products only can be applied as a light, dry dust to patios, window wells, and around door thresholds. These fine dusts kill by abrading the outer body covering of insects. They can irritate eyes and nasal passages of people and pets.

It is neither necessary nor desirable to spray entire home landscapes to kill boxelder bugs. Broad-scale application potentially exposes people and pets to pesticide residues; these residues also can be highly disruptive to backyard wildlife and beneficial insects such as pollinating bees, lady beetles, and other natural biological control agents.

Table 1. Insecticides recommended for control of boxelder bugs as OUTDOOR SPRAYS on foundations of homes, around doors, windows and eaves, and on the soil next to building foundations.

Active ingredient	Commercially available products for homeowners	Application type	Signal word
beta-cyfluthrin	<i>Bayer Advanced Home Pest Control Indoor & Outdoor Insect Killer</i>	trigger-pump	Caution
	<i>Bayer Advanced Carpenter Ant & Termite Killer Plus Concentrate</i>	requires mixing	Caution
	<i>Bayer Advanced Home Power Force Carpenter Ant & Termite Killer Plus Concentrate</i>	requires mixing	Caution
	<i>Bayer Advanced Power Force Carpenter Ant & Termite Killer Plus Concentrate</i>	requires mixing	Caution
bifenthrin	<i>Bifen HG Home & Perimeter Insecticide</i>	trigger-pump	Caution
	<i>Ortho Ortho-Klor Termite & Carpenter Ant Killer Concentrate</i>	requires mixing	Caution
	<i>Ortho Ready-to-Use HomeDefense Indoor & Outdoor Insect Killer₅</i>	power-sprayer	Caution
	<i>Ortho Termite & Carpenter Ant Killer Concentrate</i>	requires mixing	Caution
carbaryl	<i>Bayer Advanced Complete Insect Killer for Gardens Ready-to-Use</i>	power-sprayer	Caution
cyfluthrin	<i>Ace Home Insect Control₄</i>	trigger-pump	Caution
	<i>Bayer Advanced Garden Power Force Multi-Insect Killer Ready-to-Use</i>	trigger-pump	Caution
	<i>Green Thumb Ready-to-Use Home Insect Killer₃</i>	trigger-pump	Caution
	<i>Real-Kill Home Insect Control Indoor & Outdoor Insect Killer</i>	trigger-pump	Caution
	<i>Schultz Lawn & Garden Insect Killer Concentrate</i>	requires mixing	Caution

Table 1. Cont'd

Active ingredient	Commercially available products for homeowners	Application type	Signal word
deltamethrin	<i>Enforcer BugMax365 One Year Home Pest Control</i>	trigger-pump	Caution
	<i>Enforcer BugMax Insect Killer Concentrate</i>	requires mixing	Caution
	<i>Enforcer Home Pest Control XII</i>	trigger-pump	Caution
	<i>Green Light Roach Ant & Spider Control</i>	trigger-pump	Caution
	<i>Hi-Yield Kill-a-Bug II Indoor-Outdoor Spray</i>	trigger-pump	Caution
deltamethrin + bioallethrin	<i>Pro Exterminator Residual Crawling Insect Killer Plus</i>	aerosol	Caution
esfenvalerate	<i>Bonide House Guard Ready-to-Spray Perimeter & Foundation Insect Control</i>	hose-end	Caution
gamma-cyhalothrin	<i>Spectracide Triazicide Once & Done! Insect Killer₂ Concentrate</i>	requires mixing	Caution
lambda-cyhalothrin	<i>Hot Shot Home Insect Control Clear Formula₂</i>	trigger-pump	Caution
	<i>Martin's Cyonara Lawn & Garden Insect Control</i>	requires mixing	Caution
	<i>No-Pest Home Insect Control₄</i>	trigger-pump	Caution
	<i>Schultz Ready-to-Use Home Insect Killer₂</i>	trigger-pump	Caution
	<i>Spectracide Ant Shield Home Barrier Insect Killer₁</i>	trigger-pump	Caution
	<i>Spectracide Bug Stop Home Insect Killer</i>	power-sprayer	Caution
	<i>Spectracide Bug Stop Indoor Plus Outdoor Insect Killer</i>	trigger-pump	Caution
	<i>Spectracide Flea & Tick Killer₃</i>	power-sprayer	Caution
	<i>Spectracide Terminate Termite & Carpenter Ant Killer₂</i>	power-sprayer	Caution
	<i>Spectracide Triazicide Lawn & Garden Insect Killer</i>	trigger-pump	Caution
	<i>Spectracide Triazicide Once & Done! Insect Killer</i>	trigger-pump	Caution
<i>Spectracide Triazicide Soil & Turf Insect Killer Concentrate</i>	requires mixing	Caution	
malathion	<i>Ace Dilutable Concentrate Malathion 50 Insect Spray</i>	requires mixing	Warning
	<i>Green Thumb Malathion Insect Killer Spray Concentrate</i>	requires mixing	Warning
	<i>Ortho Malathion 50 Plus Insect Spray Concentrate</i>	requires mixing	Warning
	<i>Ortho Malathion Plus Insect Spray Concentrate</i>	requires mixing	Warning
	<i>Ortho Mosquito B Gon Tree & Shrub Spray Concentrate</i>	requires mixing	Warning
	<i>Schultz Malathion Concentrate</i>	requires mixing	Warning
	<i>Spectracide Malathion Insect Spray Concentrate</i>	requires mixing	Warning
permethrin	<i>Ace Soil & Turf Insect Control Concentrate</i>	requires mixing	Caution
	<i>Bee Gone Insecticide Concentrate</i>	requires mixing	Caution
	<i>Hi-Yield 38 Plus Turf, Termite & Ornamental Insect Control</i>	requires mixing	Caution
	<i>Spectracide Bug Stop Garden & Lawn Insect Control Concentrate</i>	requires mixing	Caution
	<i>Terro Termite & Carpenter Ant Killer Concentrate</i>	hose-end	Caution
permethrin + tetramethrin	<i>Zero In Roach & Ant Killer Ready to Use Liquid</i>	trigger-pump	Caution

NOTES:

Products are listed alphabetically, not by order of implied effectiveness. ALWAYS READ AND EXACTLY FOLLOW THE PRODUCT LABEL. Information here does not substitute for, or replace, instructions printed on the label. The relative hazards of any pesticide to human health can be judged by the signal words POISON, DANGER, WARNING, or CAUTION printed on the pesticide label, where

CAUTION = slightly acutely toxic if ingested, inhaled, or by skin contact OR with slight potential for eye and skin irritation;

WARNING = moderately acutely toxic to humans if ingested, inhaled, or by skin contact OR with moderate potential for eye and skin irritation;

DANGER (without the accompanying word POISON) = corrosive pesticides that can permanently blind or cause severe skin injury;

DANGER-POISON = pesticides that EITHER are highly acutely toxic if ingested, inhaled, or by skin contact OR pesticides that pose significant risks to wildlife or the environment; products labeled DANGER-POISON only can be used by certified (state-licensed) pesticide applicators, not homeowners.

We recommend against treatment of host trees for the same reasons. One would have to repeatedly treat the entire tree from midsummer through early fall. Even then, boxelder bugs potentially could arrive in the yard from trees in the surrounding area.

Except for extreme infestations, we recommend against homeowner use of insecticides inside home living spaces for boxelder bugs. The pest is too mobile and too secretive for effective, judicious insecticide use inside the home. Bug-bomb aerosols can kill exposed insects, but bugs invading after insecticide disperses will continue to be a nuisance. Aerosol fumigants might kill boxelder bugs inside wall voids, creating an equally intolerable nuisance when their malodorous decaying bodies attract scavenging beetles and rodents. It is more effective to apply exterior perimeter sprays and prevent pest entry in the first place.

ALWAYS read and follow the instructions printed on the pesticide label. The pesticide recommendations in this UI publication do not substitute for instructions on the label. Due to constantly changing pesticide laws and labels, some pesticides may have been cancelled or had certain uses prohibited. Use pesticides with care. Do not use a pesticide unless both the pest and the plant, animal, or other application site are specifically listed on the label. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock. Trade names are used to simplify the information; no endorsement or discrimination is intended.

The authors

Danielle Gunn, Reservation Extension Educator, Fort Hall Reservation; and **Edward John Bechinski**, Professor of Entomology, respectively, University of Idaho.

Photography credits

Figure 1. USDA Division of Entomology Circular 28.

Figure 2. Ries Memorial Slide Collection #1905. Used with permission of Entomological Society of America.

Figures 3, 4, and 5 (left). Oregon State University, Ken Gray Slide Collection.

Figure 5 (right). Dennis J. Schotzko, University of Idaho. Used with permission.

Figure 6. Edward John Bechinski, University of Idaho.

University of Idaho Extension

Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Charlotte V. Eberlein, Director of University of Idaho Extension, University of Idaho, Moscow, Idaho 83844. The University of Idaho provides equal opportunity in education and employment on the basis of race, color, national origin, religion, sex, sexual orientation, age, disability, or status as a disabled veteran or Vietnam-era veteran, as required by state and federal laws.

October 2008

© 2008 by University of Idaho

\$4.00