

Structural and Health Pests

Nuisance and Household Pests

Laurel Hansen

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In all cases, follow the instructions on the pesticide label. The *PNW Insect Management Handbook* has no legal status, whereas the pesticide label is a legal document. Read the product label before making *any* pesticide applications.

The National Pesticide Information Center provides guidance in pest identification, control options, pesticides and contracting professional pest management services at <https://npic.orst.edu/>.

Nuisance and household pests—Ant

Many species, including

Carpenter ant (*Camponotus* spp.)

Moisture ant/cornfield ant (*Lasius* spp.)

Odorous house ant (*Tapinoma sessile*)

Pavement ant (*Tetramorium immigrans*)

Velvety tree ant (*Liometopum* spp.)

Thatching ant (*Formica obscuripes*)

Yellow ant (*Acanthomyops* spp.)

Pest description and damage Small, red to black. Constricted in midsection. When winged, forewings are larger than hind wings. Ants may establish nests outside, underneath the house, or in wall voids, etc. Control recommendations can vary with species; proper identification is important.

Management

Seal cracks and crevices where ant may enter structures. Entry points include window and door frames and pipe and wiring chases. Trim outdoor plantings away from the structure and keep landscaping materials such as compost or bark mulch from contacting the siding. Pesticide baits are the best way to combat ants in the structure, especially odorous house ants. Follow label instructions carefully. Be patient: baits may require several weeks to be effective. Over-the-counter pesticide sprays are highly repellent to ants and may

scatter ants throughout a structure. Carpenter ants may not respond as well to baits; services of a licensed pest control professional may be advisable.

See also

Wood-infesting pests—Ant

For further information:

Ants/Integrated Pest Management/School IPM. Washington State University.

<https://schoolipm.wsu.edu/ants>

Nuisance and household pests—Bean weevil

Bruchus rufimanus

Pest description and damage Adult beetle is about 0.125 inch in length, dull, and grayish brown. Larval stage feeds in and destroys dry beans. Often first evidence of infestation is the appearance of exit holes in the stored beans. These weevils will not infest grains, cereals, or other stored products.

Management

Store beans and peas in insect-proof containers. Heating beans or peas to 130°F for 30 minutes prior to storage will kill all stages of beetles. When disposing of any product containing stored product pests, make sure to remove any infected items from the home entirely.

Nuisance and household pests—Bed bug

See:

Public health pests—Bed bug

Nuisance and household pests—Booklouse

Order Psocodea (formerly Psocoptera)

Pest description and damage Booklice (Psocids) are brownish yellow insects about the size of a pinhead. They prefer moist, undisturbed conditions.

Management

Eliminate entry points with caulk. Reduce moisture and increase light and air circulation. Fans and dehumidifiers are recommended. Apply labelled pesticides to cracks and crevices where appropriate.

For further information:

Booklice. Insect Advice from Extension. Pennsylvania State University.

<https://ento.psu.edu/extension/factsheets/booklice>

Nuisance and household pests—Boxelder bug

Boisea rubrolineata

Pest description and damage About 0.5 inch in length and dark color with red longitudinal lines on the back. Annoying when they cluster on and migrate into dwellings. Boxelder bug populations vary considerably from year to year depending on environmental conditions.

Management

Inside homes, insecticides have limited value and are not recommended. Use a vacuum cleaner to pick up bugs in building interiors. Prevent bug entry by repairing screens and caulking around windows and doors, screen soffit, corner trim and attic vents, etc. Sealing is best done during the summer months when the bugs are not present. Avoid smashing bugs as body fluids can stain fabrics or surfaces.

Insecticide treatment has not been very successful. Residual sprays (by a pest control operator) where bugs congregate on building sides and near the foundation may reduce entry indoors but will not eliminate the insects. A professional tree service may treat infested trees near the structure, though adult bugs can fly for several miles from their feeding sites.

For further information:

How to Manage Pests/Pests in Gardens and Landscapes/Boxelder Bug. University of California. <https://ipm.ucanr.edu/PMG/PESTNOTES/pn74114.html>

Nuisance and household pests—Carpet beetle and hide beetle

Dermestidae

Pest description and damage These closely related beetles are about 0.125 inch in length, brown, and oval. They feed on a wide variety of stored products: cereals, seeds, spices, tobacco, dried fruits and nuts, dried skins, feathers, and preserved animal products.

Management

Locate and destroy the source of infestation. Place infested materials in the freezer for three or four days to kill pests, then discard. Thoroughly clean shelves and storage areas. Attachments for some types of vacuum cleaners are useful in removing food particles that may have become lodged in cracks. Clean surfaces with soap and water. Where freezing and vacuuming are not appropriate or adequate, treatment by a qualified professional may be required.

For further information:

How to Manage Pests/Pests in Gardens and Landscapes/Boxelder Bug. University of California. <https://ipm.ucanr.edu/PMG/PESTNOTES/pn74114.html>

Nuisance and household pests—Cheese mite, grain mite, and mold mite

Includes

Cheese mite (*Tyrolichus casi*)

Grain mite (*Acarus siro*)

Mold mite (*Tyrophagus putrescentiae*)

Pest description and damage Very small, light-colored mites often with very long body “hairs.” They may infest stored foods and other organic material such as grain, flour, cereals, dried fruits and vegetables, mushrooms, meats, pet food, cheese, paper, tobacco, molds, bird and animal nests, etc. These mites are usually associated with moist or damp conditions. Piles of brownish “mite dust” may appear on open shelving, around the base of flour sacks, or on the surface of foods. These piles consist of dead and living mites, cast skins, and feces. Prolonged contact with mite infested foods may produce a mild

dermatitis, and other contact may cause bronchial asthma and dust allergies. Also, if mites are taken internally with infested food, stomach disorders can result.

Management

Moisture control is critical: reduce moisture and promote air circulation in storage areas. Store foods only in clean, dry areas. If necessary, use a dehumidifier to reduce relative humidity and prevent mold and mildew. Rotate food materials to remove the older items first. Avoid prolonged storage and inspect bulk foods or feeds routinely. Place stored foods in containers with tight-fitting lids—ideally screw type. Periodically clean the storage areas, especially cracks, crevices, shelving, etc. When products become infested with mites, locate the source of infestation and eliminate it. Suspected mite infested foods can be supercooled (0°F for seven days in a deep freeze), superheated (140°F for 30 minutes in an oven using a shallow pan, or 5 minutes in a microwave), or securely wrapped and disposed of as garbage. If a pesticide is needed in the storage area, spot-treat cracks and crevices only to kill hidden mites.

Nuisance and household pests—Cigarette beetle and drugstore beetle

Includes

Cigarette beetle (*Lasioderma serricorne*)

Drugstore beetle (*Stegobium panicum*)

Pest description and damage Small (0.1 inch) beetle pests of stored products. May feed on any organic material, including grains, cereals, book binding and pages, and spices.

Management

Sanitation is critical: inspect all organic materials in the structure and dispose of infested materials. Insect growth regulators are effective for long-term management. Insecticides are not recommended, though fumigants are sometimes used by licensed professionals in commercial warehouses.

Nuisance and household pests—Clothes moth

Tineola bisselliella

Pest description and damage Yellow or tan and about 0.5 inch across the wings. Larvae are wormlike and may be encased in a silken tubes. Moths avoid light.

Management

Wash or dry-clean woolen clothes before storage. Soiled cloth is more likely to become infested than is clean cloth. Store woolens in containers with tight-fitting lids. “Moth balls” (naphthalene or paradichlorobenzene) are effective in tightly sealed containers; however, long-term exposure may have health effects for humans. Cedar chests may prevent infestations if chests are tightly fitted. Be particularly careful of woolen articles purchased overseas; these should be dry-cleaned before storage. Cold treatment (72 hours at –20°F) has been found effective. Do not spray clothing directly with pesticides.

For further information:

Clothes moth. National Pesticide Information Center. Oregon State University.
<http://www.npic.orst.edu/pest/clothesmoth.html>

Nuisance and household pests—Clover mite

Bryobia praetiosa

Pest description and damage One of the larger mites; usually rust-brown to dull green with long front legs. They migrate into dwellings and are most troublesome in late fall or spring.

Management

Use a vacuum cleaner; avoid crushing the mites. An outdoor perimeter foundation spray by a pest control operator may be necessary in extreme cases.

Nuisance and household pests—Cluster fly

Pollenia rudis

Pest description and damage Resemble houseflies but with a hint of gold color behind the head. They enter houses in the fall and may congregate on the ceiling or at windows. Larvae of cluster flies are earthworm parasites. They do not reproduce inside structures and, if not controlled, will die on their own.

Management

Control is similar to that of houseflies. Seal window and door edges to prevent fly entry. Keep window screens in good repair. Aerosol space sprays may be effective, but will only affect the flies currently in the treated area. An outward-facing fan placed near an open window or door will create a positive air current and reduce the likelihood that flies will enter at that location.

For further information:

Cluster flies: noisy but harmless. Oregon State University Extension Service.

<https://extension.oregonstate.edu/families-health/healthy-homes/cluster-flies-noisy-harmless>

Nuisance and household pests—Cockroach

Includes

American cockroach (*Periplaneta americana*)

Brownbanded cockroach (*Supella longipalpa*)

German cockroach (*Blattella germanica*)

Oriental cockroach (*Blatta orientalis*)

Pest description and damage Cockroaches are 1 to 1.5 inches in length with long, thin antennae, brown to black, with or without strips or bands on the upper surface. The young look like small adults. The German cockroach is the most common roach around human habitation. It is 0.625 inch in length at maturity with two dark streaks behind the head. The brownbanded cockroach is similar but with two transverse straps across the wings. The Oriental cockroach is about 1 inch in length and very dark brown to almost black. They are very common in moist areas, such as basements, and will commonly come into homes that have slab floor construction. They will traffic along pipes within the structure and sometimes will be seen in the upper floors of a building. The American cockroach is large (1 to 1.5 inches) and reddish brown, most often found in basements or areas associated with high moisture.

Roaches move rapidly, live in cracks and crevices, avoid light, and are extremely successful at exploiting dwellings and food. German roaches can be brought into a structure in cardboard boxes or used appliances. Studies have indicated that roach allergens are a significant contributing factor in childhood asthma. It is best not to let a roach infestation continue without addressing it.

Management

Proper identification of the species of cockroach is key to successful management.

German cockroach

Good sanitation is the most important factor for controlling cockroaches. Baits are one of the best products for homeowner use. Baits come in a variety of active ingredients. Place baits under sink, undersides of drawers, along baseboards, near water heaters, and under or near appliances and other places where roaches will most likely infest. Use of over-the-counter sprays, foggers or “bombs” are not recommended as they scatter the roaches throughout the structure and into adjacent units in multifamily dwellings. If baits do not provide the desired control, it is best to consult with a knowledgeable pest control company.

Oriental cockroach

These roaches thrive in excessively moist conditions. Remove any fallen leaves or compost around the perimeter of the structure. Sealing around pipes and wires will help to keep them from entering a structure or using basement pipes to travel to other locations within it. A perimeter pesticide treatment can help keep roaches from entering a structure, but this should only be done after the above-mentioned control measures have been implemented.

For further information:

Cockroaches. National Pesticide Information Center. Oregon State University.
<http://www.npic.orst.edu/pest/roach.html>

Nuisance and household pests—Cricket

Includes

Field cricket (*Acheta assimilis*)

Pest description and damage Dark brown to black jumping insect, 0.75 inch in length. Female has a spear-shape ovipositor. Occasionally, they contaminate food and damage clothing.

Management

Treatment outdoors is not recommended. Inspect around the outside of the structure to locate possible entry points, and carefully examine around the foundation, ground level windows, and doors. Minimize hiding places (wood piles, bricks, brush, compost, and fallen leaves) near the structure. Keep grass and weeds mowed. Inside, crickets can be caught with glue boards located in corners of rooms. Baiting glue boards with cornmeal is also effective.

Nuisance and household pests—Earwig

European earwig (*Forficula auricularia*)

Pest description and damage About 0.625 inch in length, light to dark brown, with light-color legs and a pair of pincers on the rear. They feed on young plants and decaying organic matter and occasionally damage clothing.

Management

Outdoors, eliminate hiding places such as plant debris, mulch, and boards from around foundation. Infestations can be reduced by simple trapping: roll up a newspaper, secure it with a rubber band, and place it in areas where earwigs regularly appear. Place these traps in the evening and dispose of them in the morning. In severe cases an exterior treatment may be necessary, but should only be done after conditions favorable to earwigs have been addressed.

Nuisance and household pests—Elm leaf beetle

Pyrrhalta luteola

Pest description and damage They cause no damage in homes, but are annoying when they migrate into dwellings.

Management

Remove from indoors using broom or vacuum cleaner. Make sure to empty vacuum cleaner and dispose of bag contents outdoors.

Nuisance and household pests—Flea

Includes

Cat flea (*Ctenocephalides felis*)

Dog flea (*Ctenocephalides canis*)

Human flea (*Pulex irritans*)

Pest description and damage Fleas are nest parasites, moving between the host animal and the host's nest. Eggs are laid and larvae develop in the nest. Adults can survive long periods without a blood meal. Larvae do not feed on blood. Fleas may transmit disease and internal parasites (tapeworms).

Management

See also:

Public health pests—Fleas

Preventive treatments for pets include systemic hormones (Lufenuron/Program) and insecticides (Fipronil/Frontline) and nonsystemic insecticides (imidacloprid/Advantage). Pets should first be shampooed, then treated with a quality flea-control product. Consult a veterinarian to determine which flea product is best for your pet.

For house infestations, thoroughly vacuum nesting areas (pet beds, rugs, furniture, etc.). Laundering machine-washable items is advisable, whenever possible. Treat infested areas, such as carpets and baseboards, with a product labeled for interior treatment for fleas (usually linalool, permethrin or pyriproxyfen). Commercial applicators may use Premise (containing imidacloprid). It is particularly important with flea products to read and follow label instructions carefully and to observe cautions because the application is inside the

home. Total release aerosols (“bombs”) or aerosol space sprays are not recommended, as the pesticide does not reach the area where fleas reside.

For further information:

Fleas: treatment and prevention. Oregon Veterinary Association.
<https://www.oregonvma.org/care-health/companion-animals/fleas>

Nuisance and household pests—Flour beetle and mealworm

Includes

Confused flour beetle (*Tribolium confusum*)

Red flour beetle (*Tribolium castaneum*)

Pest description and damage Small, dark to light brown or reddish brown, hard-shelled insects about 0.125 inch in length. They breed and feed in flour, cereals, and condiments.

Management

Thoroughly clean shelves and storage bins. Inspect all food containers and discard those found to be infested. Dry pet food, nuts, and dried fruit often are infested. Store food only in containers that can be closed tightly. Do not store food items in thin plastic bags such as supermarket produce bags. Do not store food longer than 2 months unless frozen.

Nuisance and household pests—Flour moth

Angoumois grain moth (*Sitotroga cerealella*)

Indian meal moth (*Lodia interpunctella*)

Mediterranean flour moth (*Anagasta kueiella*)

Pest description and damage Medium-size moths, roughly 0.125 to 0.75 inch wing tip to wing tip, gray or reddish brown. Moths flying in homes are often the first sign of infestation. Full-grown worms are 0.5 inch in length and white or sometimes pinkish or greenish. Larvae feed on cereals, nuts, dried fruits, pet food and/or treats, bird seed (both wild and domestic) and other products.

Management

Thoroughly clean shelves and storage bins. Inspect all food containers and discard those found to be infested. Store food only in containers that can be closed tightly. Do not store food items in thin plastic bags such as supermarket produce bags. Do not store food longer than 2 months unless frozen. If pet birds are present in the home make sure to clean cage often and store feed outside the home or in a sealed container.

Nuisance and household pests—Fruit fly (vinegar fly)

Drosophila spp.

Pest description and damage Small yellowish flies found around decaying vegetable matter.

Management

These flies require a source of decaying vegetable matter: locate the breeding site. Destroy breeding media, clean infested areas, store new fruit in the refrigerator whenever possible, and bury culled fruit or vegetable matter. Aerosols containing pyrethrum can be used indoors. If garbage disposal is in the home and fruit flies persist after following the above suggestions, consult with a plumber to make sure the disposal is functioning properly.

Nuisance and household pests—Grass bug

Includes

Arhyssus spp.

Pest description and damage Gray, somewhat larger than lygus bugs. They frequently migrate into dwellings, where they are an annoyance.

Management

Screen doors and windows. Vacuum bugs that get inside.

Nuisance and household pests—Ground beetle

Numerous species of the family Carabidae

Pest description and damage Black beetles, 0.5 to 1 inch in length. They do no damage.

Management

Ground beetles are beneficial insects. Control is not recommended. If they are abundant, it may be due to an infestation of other insects.

Nuisance and household pests—Grass weevil

Trachyploeus bifoveolatus

Pest description and damage Small, light-color insects that migrate into dwellings. Usually a problem in the fall and early spring.

Management

Grass weevils are difficult to control with chemicals. Dispose of beetles by vacuuming or sweeping.

Nuisance and household pests—House centipede

Scutigera coleoptrata

Pest description and damage Short brown body with 15 pairs of very long legs. Fast moving and very fragile.

Management

House centipedes are predatory and, thus, are beneficial. Remove accumulations of materials near the house that provide hiding places. Continuing infestations may indicate a household insect problem, since these are their principal food. Look for insects such as cockroaches, attic flies, boxelder bugs, elm leaf beetles, and others. Controlling these insects may be the key to eliminating the centipedes.

Nuisance and household pests—House fly

Musca domestica

Pest description and damage Nuisance pests that breed in garbage, etc., and can build to intolerable numbers if not controlled.

Management

Inspect and repair window and door screens. Keep garbage in tight containers. Remove all breeding areas, including plant and animal refuse. Where fly populations are high, fly traps can be effective indoors and outdoors—if properly placed. An outward facing fan placed

near an open window or door will create a positive air current and lessen the likelihood that flies will enter at that location.

Nuisance and household pests—Lady beetle

Multicolored Asian lady beetle (*Harmonia axyridis*)

Pest description and damage Rounded with high arching back, usually orange with black spots. In the fall, they may invade houses in large numbers. Biting is occasionally reported, but these bites carry no health effects.

Management

Inspect outside of house for entry points. Seal cracks and crevices with caulk. Ensure tight seals on windows and doors. Concentrate efforts on south and west sides of structures. Repellent pesticides can be used on the outside of structures, but timing is critical to effectiveness. Use of insecticides indoors is not recommended. Beetles found indoors should be vacuumed. Avoid smashing beetles as body fluids can stain fabrics.

Nuisance and household pests—Millipede

Includes

Julus spp.

Orthomorpha gracilis

Pest description and damage Millipedes vary in length up to 2 inches. They are dark, hard shelled, wormlike, and slender with many legs. They cause no damage in the home. Millipedes prefer moist conditions and feed on decaying organic matter. They may migrate into homes and become a nuisance.

Management

Reduce moisture and organic matter from near building entrances. Trim shrubs to promote air circulation and drying near foundation. Reduce mulch thickness and watering schedules. Keep mulch at least 6 inches away from structures. Under wet conditions, millipedes may move toward foundation to avoid wet soil, and control may become difficult. When necessary, using a pesticide labeled for millipedes may help. Be sure to read and follow product label and cautions. Treatment should only be performed after excessive moisture and harborage conditions have been corrected. Products containing cyfluthrin or carbaryl are usually applied.

Nuisance and household pests—Pillbug and sowbug

Includes

Armadillium vulgare

Porcellio laevis

Pest description and damage Light to dark gray, oval, hard shelled, with seven pair of legs. Pillbugs ball up when disturbed, sowbugs do not. Both may do damage in the home, but they feed primarily on decaying organic matter.

Management

Eliminate moist areas where the sowbugs and pillbugs occur. This may mean altering the lawn watering schedule. They are most often found around sidewalks, house foundations and other moist outside places. Drying can be accomplished by removing organic matter, such as grass clippings, leaf litter, and bedding mulches from moist areas. Properly

ventilate basements and crawl spaces. Eliminate entry points into structures with caulk. Seal cracks around basement doors and windows with weather stripping. In some cases a perimeter treatment with a pesticide labeled for sowbugs or pillbugs may be necessary.

Nuisance and household pests—Scorpion

Burrowing scorpion (*Anuroctonus phaiodactylus*)

Forest scorpion (*Uroctonus mordax*)

Northern scorpion (*Paruroctonus boreus*)

Stripe-tailed scorpion (*Paravaejovis spinigerus*)

Pest description and damage Olive to brown, about 1 to 4 inches in length, with four pair of legs, a tail with bulbous stinger, and a pair of pincers. They can inflict a painful, hornet-like sting.

Management

Outdoors, eliminate hiding places such as debris, trash, lumber, and wood and rock piles from around the house. Close entry points to structures. Reduce accumulation of moisture: provide run-off areas for rain water and use gravel rather than organic mulches adjacent to the building foundation. During dry weather, scorpions can be trapped by spreading wet burlap bags around buildings. Exterior application of a pesticide registered for scorpion control may be appropriate.

Nuisance and household pests—Silverfish

Lepisma saccharina

Pest description and damage Slender insects about 0.375 inch in length, wingless, grayish silver or mottled gray, with two long antennae and three long filaments at the tail. They prefer starchy food including paper, paste, and starched clothing. These insects are commonly seen in homes that have wood shake roofs, and they prefer a warmer climate, such as found in attics. Very tolerant of high temperatures.

Management

These insects can be associated with damp conditions in basements, bathrooms, or warehouses. Reducing humidity often eliminates the problem. Do not store cardboard boxes directly on concrete floors. Household insecticides are effective if the infestation is not manageable by other means. Replacing wood shake roofs with non-wood roofing material may be advisable. In some cases, silverfish problems should be handled by a professional pest control company. Insulation treated with borates can be applied over the existing insulation in attic spaces to provide additional control of silverfish. A non-chemical way of trapping silverfish is to apply masking tape to the exterior of a glass jar, this will allow the silverfish to climb up into the jar. Place two to three tablespoons of dry oatmeal in the jar. Silverfish entering the jar cannot climb up the smooth interior. The oatmeal must be replaced every few weeks to avoid other stored product pests from infesting the oatmeal, which can lead to an infestation elsewhere in the home.

For further information:

Silverfish and Firebrats. WSU Extension Community Horticulture Fact Sheet #87.

<https://s3.wp.wsu.edu/uploads/sites/2053/2015/09/87SilverfishFirebrats.pdf>

Nuisance and household pests—Spider

Pest description and damage Eight-legged animals of varying sizes and colors. Spiders are predators of insects: some spin webs but some—the hunters—chase and catch their prey. All spiders use venom to subdue their prey, but the effect of their venom on humans varies widely, from inconsequential to irritating to serious. Three spiders in the Pacific Northwest—the black widow and two species of sac spider—can inflict serious injury if trapped or disturbed. If bitten, seek professional medical attention promptly.

See also:

Public health pests—Spider

Management

In the home, prevent spider and other arthropod infestations by sealing cracks and using tight fitting screens. Gaps under doors are good entryways for spiders. Inspect potted plants before bringing them indoors. Vacuum regularly and reduce clutter such as boxes, old furniture and papers that are not moved for long periods of time. Outdoors, wood piles, old boards, or other debris may harbor spiders. Wear gloves when handling firewood. Be cautious when entering unused areas like old barns, crawl spaces, attics, etc. Knock down webs whenever possible, and keep dense vegetation trimmed away from the building. Household pesticides labeled for spiders are commonly available. Successful treatment for spiders, even by a professional, generally only lowers the population around the structure but does not eliminate spiders completely. Glue traps can reduce spider populations indoors: place them where spiders are frequently seen.

For further information:

Spiders. Washington State Department of Health.

<https://www.doh.wa.gov/CommunityandEnvironment/Pests/Spiders>

Nuisance and household pests—Springtail

Collembola

Pest description and damage A small insect approximately 0.125 inch or less in length; can be gray, pink, blue, or black. They often are found in large numbers in moist situations.

Management

Eliminate moist breeding areas inside the house. Inspect home to make sure there are no plumbing leaks. Eliminate moisture, especially excessively moist conditions under the building. Remove leaves, mulch, etc., from around foundation. In some cases it is necessary to have the interior of the home treated in conjunction with eliminating excessively moist conditions.

Nuisance and household pests—Strawberry root weevil

Otiorhynchus ovatus

Pest description and damage They cause no damage in homes but are annoying when they migrate into dwellings.

Management

Remove from indoors using broom or vacuum cleaner. Make sure to empty vacuum cleaner and dispose of bag contents outdoors.

Nuisance and household pests—Tick

Dermacentor spp.

Ixodes spp.

Ornithodoros spp.

Pest description and damage Ticks are blood-feeding ectoparasites. Some transmit disease to humans.

Management

Keep grassy and weedy areas trimmed to reduce harbor for tick hosts. Tick populations on a property can be evaluated by dragging a white cloth through vegetation. Ticks will attach to the cloth and can be seen easily against the white background. The reservoir tick host, which carries Lyme disease, is the white-footed mouse (deer mouse). Several products are available that attract mice to feeding stations where they may be treated with an insecticide.

Ticks attached to humans or pets should be removed promptly. Remove ticks immediately by grasping between thumb and index finger and pulling straight out. Do not twist. Wash area with soap and water. Apply antibiotic ointment. Watch for any redness or swelling. If irritation persists, contact a physician. Repellents containing diethyl toluamide (DEET) are effective; use the lowest effective concentration—usually less than 30% DEET. Follow label instructions carefully. Around the outside of the home, tick populations can be reduced by using residual insecticides. Follow label instructions. For tick control on pets, consult a veterinarian.

See also:

Public health pests—Tick

For further information:

Ticks. Washington State Department of Health.

<https://www.doh.wa.gov/CommunityandEnvironment/Pests/Ticks>

Nuisance and household pests—Wasp (yellowjacket)

Vespula spp.

Pest description and damage Bee-like insects with yellow and black, or white and black, bands on abdomen.

Management

Some professionals in the PNW collect wasps to be used in the manufacture of allergy injections. Once a nest has been treated, it cannot be collected for this purpose. Before attempting to treat nests on your own, contact a pest control professional to inquire whether a collector is in your area. Wasp nests should be treated in evening when wasps are less active with a pesticide formulated specifically for wasp nests. Do not treat nests with any household chemicals or common fuels such as bleach, gasoline, or diesel; these products are more toxic than most labeled pesticides. Commercial pest control operators should be contracted to do this work if you are subject to severe reactions to wasp, hornet, or yellowjacket stings.

See also:

Public health pests—Wasp and bee

For further information:

Bees and Wasps. Washington State Department of Health.

<https://www.doh.wa.gov/CommunityandEnvironment/Pests/BeesandWasps>

Purchasing Pest Management Services

Do not be alarmed if you learn or suspect that structural pests may be attacking your home; it will not collapse or be destroyed. Pest management should be considered merely as another repair that may be necessary to maintain your house in sound structural condition.

Do not rush into purchasing pest management services. Damage usually develops slowly. Presence of these pests in a house seldom constitutes an emergency. Any additional damage done over a few weeks or even a few months makes little difference. You always have ample time to purchase service wisely and at your convenience.

Purchase service from a reliable firm. Select a pest management service with the same care and discrimination you would exercise in choosing any other service. Deal only with reliable firms that have an established place of business.

Questions to ask before hiring a pest management professional

- ✓ Are you properly licensed with the state department of agriculture? *Ask to see their license.*
- ✓ Can you provide a list of references? *Most companies will be happy to share their success stories with you.*
- ✓ Will I receive a written report of your findings, proposed treatment, and costs? *Obtain at least three estimates and compare services.*
- ✓ What are the terms of your service agreement? *Understand the provider's obligations and yours, too.*

For further information:

Selecting a Pest Control Company. National Pesticide Information Center.

<https://npic.orst.edu/pest/selectpc.html>

Public Health Pests

Craig S. Hollingsworth and Laurel Hansen

Latest revision—March 2025

In all cases, **follow the instructions on the pesticide label**. The *PNW Insect Management Handbook* has no legal status, whereas the pesticide label is a legal document. Read the product label before making *any* pesticide applications.

Public health pests—Bed bug

Cimex lectularius

Pest description and damage Bed bugs are wingless, flattened, oval, brown insects that feed on blood. They are about half the size of a pencil eraser. One species, *Cimex lectularius*, is generally associated with infestations of human dwellings, however closely related species, such as bat bugs and swallow bugs, have also been known to infest houses and to bite people. In recent years, bed bug infestations have become common throughout the world, and have been reported from homes, hotels, cruise ships as well as used furniture stores, moving vans, clothing stores and other places where people congregate. A bedbug can live up to one year without a blood meal. Bed bugs hide in mattress seams, behind mirrors and pictures on walls, behind furniture against walls, in wall cracks and crevices, drawers and cabinets, and in similar spots. Low level infestations are generally found near the host's nest (i.e., the bed), but as populations grow, they tend to spread throughout the dwelling. They bite at night, leaving the host to hide during the day. Bed bugs can be carried into living spaces on clothing or luggage, but infestations are also known to occur as a result of introducing infested furniture or clothing to the home.

Bed bug bites cause a range of symptoms, depending on the host's susceptibility: human susceptibility is highly variable. Some people, especially those exposed over a long period of time, show little or no reaction to the bites – which appear as small red spots that may not itch. People never bitten before may suffer from local inflammation, anemia, intense itchiness, and sleeplessness.

Management

Controlling bed bugs is difficult: the services of a knowledgeable professional are strongly recommended. Proper identification of the pest species, careful inspection of all potential harborages, steam cleaning, vacuum extraction and the application of pesticides are required. Monitoring devices are available which allow the verification of the presence of bed bugs. Because most pesticides have no effect on eggs, more than one pesticide application is usually required. Over-the-counter insecticides or “bombs” are not advised

as bed bugs can be scattered outside of their current harborage area and create a more difficult control situation.

Bed bug populations have increased in recent years and it is not uncommon for travelers to encounter them in hotels and other lodging. Travelers are advised to examine the edges of mattresses and furniture near the bed before unpacking their luggage. A common place for beds in hotels to reside is behind the headboard of the bed. If luggage has suspected exposure to bed bugs, all clothing should be treated in a hot clothes dryer for 20 minutes and luggage and other hard goods should be carefully vacuumed, steam cleaned and treated with a pesticide labeled for bed bugs. Certain types of vacuums with HEPA filters are recommended when extracting bed bugs and their eggs. Great care must be taken when transferring any infested bedding, clothing or small furnishings as bed bugs can be transferred to other rooms or residences. Laundry bags that dissolve in the washer can be used. When these bags are used, laundry must be dry when placed in the bags, as any moisture will cause the bags to dissolve. Infested items can be stored under dry conditions in the sealed bags while waiting to be laundered. Mattresses and box springs should be encased in a bed bug proof encasement. Dissolvable bags and mattress/box spring encasements can be purchased through a pest management professional.

Freezing conditions can kill bed bugs in small appliances and other items. For details, see: https://www.bedbugs.umn.edu/sites/bedbugs.umn.edu/files/y2014m05d23_using_freezing_conditions_to_kill_bed_bugs.pdf

For further information:

Bed Bugs: a growing problem everywhere. Oregon State University Extension Service.

<https://extension.oregonstate.edu/pests-diseases/insects/bedbugs>

Bed Bugs: Recognition and Management. Washington State University Extension Fact Sheet FS070E.

<https://pubs.extension.wsu.edu/recognizing-and-managing-bed-bugs>

Public health pests—Flea

Cat flea (*Ctenocephalides felis*)

Dog flea (*Ctenocephalides canis*)

Human flea (*Pulex irritans*)

Pest description and damage Fleas are the bane of every dog and cat – and their owners. Adult fleas are external parasites of warm-blooded animals. They bite people and pets. The bite often results in swelling and prolonged itching.

Adult fleas must get a blood meal to finish development. However, flea pupae (the stage before adults) can survive for long periods, waiting to detect the presence of a warm-blooded animal. This is why vacant premises can remain infested for an extended time. When pupae detect an animal, they complete development and emerge as adults that go in search of a blood meal.

Immature or larval fleas look like small white worms. They do not bite but instead feed on hair, shed skin, and dried blood in the animal's bedding or nest.

Management—flea control program

Flea collars do not have much effect against fleas, especially if the home is infested.

Aerosol foggers or bombs have become a popular way for homeowners to dispense

insecticides. However, these do a poor job of coverage. Essentially, they throw the insecticide into the air, thus treating only those exposed surfaces where the insecticide lands. Liquid formulations, carefully applied with some type of pressure applicator are a better choice, as they achieve much better coverage and might even be less expensive. Because fleas are nest parasites, outdoor insecticide treatments are unnecessary and of little value. Adult fleas do not survive for long away from their animal host.

Step 1

Vacuum rugs, drapes, and furniture thoroughly using a properly functioning vacuum cleaner and a fresh collector bag. Pay particular attention to areas where pets sleep. Discard or empty the bag outside because it contains fleas, flea larvae, and eggs that may re-infest the house. If appropriate, launder items in warm or hot soapy water.

Step 2

Treat rugs, furniture, and any outdoor sleeping areas (such as a dog house) with one of several flea sprays that contain an insect growth regulator insecticide as one of the active ingredients. Use these products according to label instructions.

A pesticide spray may contain other insecticides (often pyrethrin), but it must contain an insect growth regulator (IGR), such as s-methoprene, to be most effective. IGRs act by disrupting flea development: non-biting larvae never develop into adults and eventually die. IGRs are virtually nontoxic to humans and pets and are long-lasting, up to 7 months by some reports. IGRs act slowly, and for this reason, they frequently are combined with other, faster acting, insecticides which provide control of biting adult fleas.

Veterinarians are a good source of recommendations for appropriate pesticide products and have access to the latest flea control materials available. Flea “foggers” or “bombs” are ineffective and should not be used.

Step 3

Successful eradication of fleas is dependent on SIMULTANEOUS treatment of the pets and premises. Consult your veterinarian about products that are available to use on your pet. Shampoo your pet when dirty and use flea products when fleas are present.

Pet-applied and oral flea products

While these products can be effective, the three-step program outlined above still is recommended to rid the dwelling of fleas, and it is the least expensive approach. It is very important to read and follow the label directions on any flea product. Cats are especially sensitive to flea products. Using pesticide products not specifically labeled for cats can put their health at risk: fatalities have been reported. If a pet appears to have an adverse reaction to any product, contact a veterinarian immediately.

- fipronil (Frontline)
- imidacloprid (Advantage)
- lufenuron and milbemycin oxime (Sentinel)
- nitenpyram (Capstar).

For further information:

Flea and flea control. Oregon State University.
<https://entomology.oregonstate.edu/sites/agscid7/files/entomology/flea.pdf>Fleas: treatment and prevention. Oregon Veterinary Association. <https://www.oregonvma.org/care-health/companion-animals/fleas>

Public health pests—Human lice

Pest description and damage Three species of lice affect humans. They can be distinguished by where on the body they appear.

Scientific name	Common name	Location on host	Egg (nit) attachment
<i>Pediculus humanus capitis</i>	head louse	head or neck	head hair
<i>Pediculus humanus humanus</i>	body louse	body or clothing	clothing
<i>Phthirus pubis</i>	crab louse	pubic area	pubic hair

These grayish-white ectoparasites spend their entire life cycle on their hosts, except for the body louse, which rests on clothing when not feeding. This characteristic of the body louse creates the potential for widespread infestations under unsanitary conditions.

Management

Body lice are rare in industrialized countries, except among the indigent population, and can be effectively controlled by regularly changing and laundering clothes. Pubic lice are generally transmitted through intimate human contact: infestation should be treated under a doctor's supervision. Head lice are a common problem among children in schools and day-care facilities. Transmission is most often through direct contact; indirect transmission (via clothing, hats, brushes, etc) is much less common.

See also:

<http://agrilife.org/citybugstest/files/2015/08/Devore-et-al-2015.-Head-lice-Guidance-for-Clinician-Pediatrics-135.pdf>

Public health pests—Mite

Various species of *Acari*

Pest description and damage Mites that may affect humans directly can be divided into four general groups: those that 1) parasitize humans; 2) normally parasitize birds, or mammals other than humans, but occasionally may bite humans; 3) infest human food; and 4) feed on plants and occasionally become pests when they enter homes in large numbers.

The most important mite parasitizing people is the human itch mite, *Sarcoptes scabiei hominis*, which causes scabies. Human itch mites cause itching that is most intense when the mites are stimulated by warmth; for example, when the person is in bed. They tunnel just under the skin and appear as reddened streaks. Scabies can be confused with other conditions, so suspected cases should be confirmed by a physician. Confirmed cases require medical treatment. The mites are transmitted by direct personal contact and through bedding, clothing, etc. Clothing can be disinfected by hot laundering or dry-cleaning.

Mites that normally parasitize rodents or birds occasionally may invade homes. Such invasions are most likely when the mites' normal hosts have been removed; for example,

during rodent control efforts. Tropical rat mite bites are irritating and occasionally cause painful dermatitis. Northern fowl mites and chicken mites will bite humans and cause itching. Mouse mites will bite and can transmit diseases. Any of these mites is controlled best by identifying the source and removing it. This may involve trapping rodents and destroying bird nests. Concurrent use of insecticides may be necessary in the case of heavy infestations.

Flour mites, fruit mites, sugar mites, house mites and cheese mites infest food and can also cause grocer's itch and other dermatitis symptoms. They are controlled best by identifying and destroying the source. Straw itch mites may cause conditions that have been called grain itch, straw itch, mattress itch, and hay itch. Straw itch mites normally are beneficial because they prey on stored grain pests, but when they run out of normal food, they attack humans and cause a very itchy bite.

See also:

Nuisance and household pests—Cheese mite, grain mite and mold mite

Clover mites and house mites do not attack humans, but they occasionally enter homes in large numbers. Clover mites often move from outdoor lawns into homes in the fall. A 6 to 24 inch grass-free band all around the house may prevent such invasions. Once they have entered, a vacuum cleaner is effective in reducing their numbers. Avoid crushing clover mites, because that may stain fabrics. House-dust mites occur in homes and occasionally cause allergic reactions. Their detection and identification require special equipment and techniques.

See also:

Nuisance and household pests—Clover mite

Public health pests—Mosquito

Culicidae

Pest description and damage Mosquitoes can be an irritating nuisance and can transmit certain diseases to humans and animals through blood feeding. Female mosquitoes must obtain a blood meal in order to lay eggs. Eggs are laid in still waters (ponds or containers), and therefore control efforts should be directed at these places. Good water management practices (breeding source reduction) can reduce mosquitoes significantly.

Biological control of mosquitoes using *Gambusia affinis*, a top minnow that feeds on mosquito larvae, has proven successful in many log ponds and other permanent bodies of water. However, use of gambusia is not permitted in all states, so consult the appropriate state Fish and Game agency before considering introducing them.

Bacillus thuringiensis var. *israelensis* (*Bti*) is a biologically derived insecticide for mosquito control. It is an endospore-forming bacterium, which larvae must ingest. *Bti* is most effective on young larvae. Effectiveness is reduced in waters with high organic content.

Use conventional insecticides only after taking steps at source reduction and biological control. Because mosquitoes breed only at the edges of large bodies of water, treatment can be confined to these edges.

Management

Preventing mosquito bites

Avoiding mosquito bites is the best way to prevent disease transmission. Avoid being outside during periods of high mosquito activity, particularly around dawn and dusk. When exposure to mosquitoes is unavoidable, wear a light-color, long-sleeve shirt and long pants, and apply an effective insect repellent with proven compounds, such as DEET (N, N-diethyl-m-toluamide) or oil of lemongrass. During warm periods, windows and doors should be protected by intact screens or out-facing fans to prevent mosquitoes from entering the house.

Reduce breeding sites around homes and other structures. Look for areas that collect or hold standing water over extended periods. These may include clogged gutters, low spots in the yard or landscape, wheelbarrows, buckets, discarded tires, tarps or any other object that can hold more than a tablespoon of water. Removing standing water discourages mosquito production by eliminating breeding sites. Bird baths and water troughs should be cleaned and water replaced every 12 to 14 days. Where water cannot be removed, larvicides should be considered.

Pesticides for mosquito control

Pesticides used in mosquito control are designated as either adulticides or larvicides. Adulticides are used to control flying mosquitoes, while larvicides are applied to water and kill immature mosquitoes. Larvicides include insect growth regulators, bacteria (e.g., *Bacillus thuringiensis* var. *israelensis*), and oils which have low toxicities to mammals and other non-target organisms. Adulticides require contact with the insect and can provide a temporary reduction in pest numbers. Only materials specifically registered for mosquito control should be used.

Mosquito control and municipal organizations

Mosquito control is most effective when done over a relatively large area. Therefore, control efforts are often organized by forming mosquito abatement or vector control districts. The first step in organizing a formal program of mosquito control is to establish the severity of the problem and identify potential breeding sites. In the Pacific Northwest, the Northwest Mosquito and Vector Control Association is a source of information on local vector control problems.

Public health pests—Scorpion

Burrowing scorpion (*Anuroctonus phaiodactylus*)

Forest scorpion (*Uroctonus mordax*)

Northern scorpion (*Paruroctonus boreus*)

Stripe-tailed scorpion (*Paravaejovis spinigerus*)

Pest description and damage Olive to brown, about 1 to 4 inches long, with four pair of legs, a tail with bulbous stinger, and a pair of pincers. They can inflict a painful, hornet-like sting.

Management

Outdoors, eliminate hiding places such as debris, trash, lumber, and wood and rock piles from around the house. Close entry points to structures. Reduce accumulation of moisture: provide run-off areas for rain water and use gravel rather than organic mulches

adjacent to the building foundation. During dry weather, scorpions can be trapped by spreading wet burlap bags around buildings. Exterior application of a pesticide registered for scorpion control may be appropriate.

Public health pests—Spider

Pest description and damage There is much confusion regarding poisonous spiders in the Pacific Northwest, even among the medical community. While all spiders use venom to subdue their prey (hence, all spiders are “venomous”), the bites of most spiders are often only mildly irritating. Only three spiders of medical importance live in the PNW. The black widow spider commonly occurs in association with humans and presents a real danger of poisonous bites. The other spiders of concern are two species of sac spiders in the genus *Cheiracanthium*. These are found frequently in houses, but few bites from these spiders in the PNW have been documented. A fourth spider, the hobo spider (or aggressive house spider), has long been blamed for spider bites but has now been exonerated: there is no scientific evidence that it produces necrotic bites.

Many spider bites reported in the PNW are attributed, unfortunately, to a spider that does not even live here, namely the brown recluse spider. While the bite of the hobo spider is similar (see below), the brown recluse spider does not naturally occur in the PNW. The only known cases of this spider have been linked to people moving into the PNW from areas of known infestation.

The following discussion will help differentiate these spiders:

1. Black widow spider

Latrodectus spp.

Occurs in the PNW generally in dry, undisturbed areas such as firewood piles, old lumber, dry crawl spaces, bales of hay, etc. Black widows may be found in houses, under furniture, in dark corners, and amid stored items. Many believe black widows are found only east of the Cascade Mountains. They may also be found west of the Cascades, especially on dry, open, south-facing slopes. Black widows can be very abundant in southwest Oregon.

The adult female is 1.5 inches in diameter, including legs, and is jet black with red markings on the underside of her abdomen. Males and immatures may be striped white or yellow. This spider is secretive, not aggressive, and rarely causes bite injuries. The venom is neurotoxic and may lead to systemic effects, sometimes even death.

2. Yellow-legged sac spider

Cheiracanthium inclusum and *C. mildei*

Sac spiders occur throughout the U.S., commonly in dense vegetation. They are also well adapted for living indoors. The body of a full-grown spider is about 0.3 inch long and with legs extended to 0.75 inch. Color is generally yellowish but may be pale gray. There are no conspicuous markings and the body is covered with fine hairs. Legs are long and delicate. Eight eyes are arranged in two rows. They have long fangs and are capable of inflicting painful bites.

Reference:

<http://webdoc.agsci.colostate.edu/bspm/Arachnida%20%28Arachnids%29/Yellow-legged%20sac%20spiders.pdf>

3. Hobo spider or aggressive house spider

Tegenaria agrestis

Commonly found in the PNW in and around houses, barns and sheds. It is a member of the funnel-web spider group. This is a relatively large spider (body size, excluding legs, 0.375 to 0.625 inch; 1 to 1.75 inches including legs) with long, hairy legs and chevron-shape abdominal markings. Despite the common name, “aggressive house spider,” this spider is no more aggressive than others and reported bites from this are relatively rare. Until recently it was thought to be dangerously venomous, however, recent research indicates that the bites from this spider are no more dangerous than bites from most other spiders: the U.S. Centers for Disease Control (CDC) has removed it from its list of poisonous spiders.

4. Brown recluse spider

Loxosceles reclusa

This spider’s range is confined to the south-central U.S. It is not found in the PNW. In the PNW, bites from hobo spiders are often erroneously attributed to the brown recluse. It is generally smaller than a hobo spider, is much less hairy, lacks the chevron markings on the abdomen, and most often has a distinctive violin-shape mark in the center of the thorax. Its venom is necrotic, causing wounds that may be slow to heal.

Management

Spider bites—what to do if bitten

If bitten by a spider, it is important to capture and preserve the specimen (preferably in rubbing alcohol) for identification. This information can be important in determining an effective treatment. The following steps are recommended after a bite:

- Immediately apply an ice pack to the bite to reduce any swelling.

- Sterilize the bite with hydrogen peroxide or iodine to prevent infection.

- Most spider bites rarely cause more than localized redness and burning at the bite site. If serious symptoms develop, such as fever, nausea, stomach cramps, or ulceration of the bite, contact a physician immediately.

Further information on first aid for spider bites can be found at:

<http://www.mayoclinic.org/first-aid/first-aid-spider-bites/basics/art-20056618>

Preventing spider bites

Many spider bites may be prevented by reducing the numbers of spiders near or in living areas. Black widows and hobo spiders both prefer dark, cluttered spaces, such as attics, garages, basements, crawl spaces, closets, storage areas, under and behind furniture, rocks and woodpiles, and foliage against exterior walls. Frequently cleaning house interiors and reducing clutter disrupts their shelters and exposes them for removal. Trimming foliage back from exterior walls removes outdoor shelters. When working in areas that may harbor these spiders, it is prudent to wear gloves, a heavy, long-sleeve shirt, long pants, and shoes or boots. A hat is also helpful in crawl spaces and when pruning foliage. Clothing stored for long periods in areas where spiders are likely to live should be vigorously shaken before wearing.

It is rarely useful to apply pesticides or fumigate a house to control or eliminate spider infestations. This should be considered only where infestations are extreme. Pesticides and fumigants do not provide long-term control. At most, only the local spider population is affected, and spiders from the surrounding areas will simply move in and take advantage of the “vacancies.” Glue traps can reduce spider populations indoors if placed where spiders are frequently seen.

Contact from spiders in firewood—treatment and avoidance

While several products currently are registered for use on firewood, treating firewood is generally neither advisable nor necessary. Inhaling smoke from treated wood may be hazardous. The best approach to handling firewood or debris that may harbor poisonous spiders is to wear gloves and a heavy, long sleeved shirt. Check the firewood for spiders before bringing it into a residence—banging each piece on the ground beforehand will often dislodge any resident spiders. Burning firewood promptly will reduce the possibility that spiders will disperse into a residence or eggs will hatch.

For treatment of spider bites, the medical community is referred to: Wasserman, G.S. and P.C. Anderson, 1984, Loxoscelism and necrotic arachnidism, J. Tox. Clin. Tox. (1983–1984) 21:451–472.

For further information:

Spiders. Washington State Department of Health. <https://doh.wa.gov/community-and-environment/pests/ticks>

Public health pests—Tick

1. Ixodid (hard-bodied) tick

Includes *Dermacentor* spp., and *Ixodes* spp.

Pest description and damage Rocky Mountain wood tick (*Dermacentor andersoni*) is one of the most important species. Found in eastern Oregon, it can transmit Colorado tick fever, Rocky Mountain spotted fever, and tularemia. *Ixodes pacificus* and *Dermacentor occidentalis* are the two species most commonly found on humans in western Oregon. *I. pacificus* is the main vector of Lyme disease in western Oregon.

Ticks are wingless, blood-sucking parasites about 0.2 inch long or smaller, and belong to the same class as spiders and mites. Their bodies are flat and usually a dark color. Adults and nymphs have four pair of legs, larvae only three.

2. Argasid (soft-bodied) tick

Ornithodoros spp.

These soft ticks have been responsible for several human cases of tick-borne relapsing fever in the past several years in eastern Oregon. These ticks normally are found in the nests of small mammals and are primarily nocturnal.

Management

Prevention and control

Tick populations around dwellings can be reduced by removing habit of ticks and vertebrate hosts, especially rodents and deer. Remove brush and high vegetation, and

mow lawns. Tuck pant legs into boots and shirts into trousers when walking in tick-infested areas. Use repellent on exposed body surfaces and on clothing. Repellents containing DEET (N,N-diethyl-meta-toluamide) are best. Use products with 30% DEET or less. Check clothing and body twice daily and remove ticks. Showering with soapy water after being in tick-infested areas will reduce likelihood of tick attachment. Tick management in the northeast and upper midwest United States is more critical: recommendations for tick management in the Northeast may be relevant where ticks are a problem elsewhere: <http://www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf>.

For further information:

Ticks. Washington State Department of Health. <https://doh.wa.gov/community-and-environment/pests/ticks>

Public health pests—Wasp and bee

Hymenoptera

Pest description and damage Yellowjackets and hornets can be serious pests during late summer months. They become more aggressive and dangerous later in the summer and as summer turns into autumn. A few people (1 to 2 percent) are severely allergic (hypersensitive) to yellowjacket venom, and a sting can be life-threatening.

Yellowjackets and hornets are heavy-bodied wasps, black with yellow or white markings. They live in gray, papery nests below ground, suspended above ground, or in the wall voids of houses. Hunting workers search for other insects, carrion, or rotting fruit. The time of year will determine the type of food source the workers will seek out, but generally they are attracted to any meat-based or sugary food. Food is carried back to the nest where it is fed to nest mates. Stings usually occur through accidental contact with the nest or nest entrance. Workers vigorously defend the nest and queen against intruders.

The yellowjacket or hornet nest is initiated by a queen whose sole responsibility is to lay eggs. The queen begins a nest in the spring by laying a few eggs and raising these workers to adults. At this point the queen may no longer leave the nest to hunt. Workers provision, expand, and defend the nest all season long. As spring and summer pass, the nest grows as new workers are reared and assume their role. By the end of summer, nests may contain hundreds or even thousands of workers. It is at this time of the year (August–September) that they are most troublesome and dangerous.

By fall the nest also has produced a crop of new queens and male yellowjackets (drones). By the time of first frost, most workers and male wasps have died and only new, fertilized queens remain. New queens leave the nest to find a protected spot to spend the winter. Slow moving yellowjackets or hornets seen in the early spring are usually emerging queens. They are commonly found on window sills as they are attracted to the light. They are generally slow and docile, can sting, if stepped on or threatened.

Management

Chemical

Control may be necessary when yellowjacket or hornet nests are near human activity. Treat nests at night with an approved aerosol insecticide. Treating at night is more effective

because workers are inside the nest and relatively calm. Use one of the aerosols that claim to propel a stream of insecticide up to 20 feet, so that you can stand a safe distance away and spray directly into the nest opening. These aerosols are referred to as "wasp and hornet spray" or a similar name. Use products specifically labeled for yellowjacket control. Do not pour gasoline, diesel, or paint thinner into nests. This is dangerous, environmentally harmful, and illegal.

In some areas, wasps are collected for their venom, which may be used to produce allergy injections. Local pest control company may offer to locate and remove wasps; usually there is no charge to the consumer for this service. However, only venom from wasps from nests that have not been treated with pesticide may be used.

Trapping

Nontoxic yellowjacket traps are available in yard and garden stores. The most effective traps for the western yellowjacket use a synthetic attractant called n-heptyl butyrate to lure workers into a trap from which they cannot escape. Fruit juice or various meats can be used as attractants but are not as effective. Traps can provide some temporary relief for picnics, etc., by drawing workers away from people, but they are ineffective for area-wide nest control even though many yellow jacket workers may be trapped. It is important to place traps away from the house. Some people are allergic to the venom of yellowjackets and others are allergic to bee stings. Both reactions can be life-threatening. If you are particularly sensitive to yellowjacket venom, be cautious in late summer and early fall when the insects are most numerous. Bee stings can occur anytime bees are out of their hives, but are far less common. Honey bee hives should not be destroyed. Local beekeepers will usually remove accessible colonies of bees. County Extension offices and some pest management professionals can provide referrals to local beekeepers.

Other commonly encountered wasp species are mud daubers and paper wasps. Mud daubers build mud tubes, often seen on flat surfaces. Paper wasps build small, open nests suspended vertically from tree branches or roof eaves. Paper wasps are distinguished by their long legs and thin "waists." Both mud daubers and paper wasps are less aggressive and normally will not sting or swarm when away from their nest. If the nests are unsightly, they can be power-washed in the fall, after activity has ceased. In some cases, treating the house eaves with an appropriately labeled pesticide during spring and summer will discourage continued building of nests.

For further information:

Bees and Wasps. Washington State Department of Health. <https://doh.wa.gov/community-and-environment/pests/bees-and-wasps>

Yellow Jackets and Paper Wasps. Washington State University Cooperative Extension EB0643 <https://s3.wp.wsu.edu/uploads/sites/1384/2016/07/Yellowjackets-and-Paper-Wasps.pdf>

Wood-Infesting Insect Pests

Laurel D. Hansen

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In all cases, **follow the instructions on the pesticide label**. The *PNW Insect Management Handbook* has no legal status, whereas the pesticide label is a legal document. Read the product label before making *any* pesticide applications.

Wood-infesting pests—Ant

Ants are found everywhere and, like termites, bees, and wasps, are social insects that live in colonies consisting of thousands of individuals. Because they are so numerous, pest management companies rate ants as the number one insect problem they encounter in residences.

Carpenter ant

Camponotus spp.

Carpenter ants are the most important structural insect pest in many areas of the Pacific Northwest (PNW) because of their habit of constructing nests inside dwellings. They are particularly commonly observed in the spring. Homes near forested lands tend to have more carpenter ant activity than do those in suburban or urban areas. Large black ants – often carpenter ants – may frequently be found throughout a house, both inside and out, as well as in surrounding areas. Color is not a reliable identifying characteristic: in the PNW there are several species of carpenter ants that vary from black, to red and black.

Carpenter ants vary in size within each species. The most common carpenter ant infesting structures is *Camponotus modoc*, a black ant with red-brown legs.

Carpenter ants commonly nest in standing trees (living or dead), stumps, logs, or on the forest floor. Worker ants from a large “parent” colony, found outside, will frequently move into a dwelling as a “satellite” colony. Workers, often in the thousands, appear in different size classes: majors, medias, and minors. Major workers are called soldiers of the nest, while minor workers mostly expand the nest and collect food. Communication and travel between the colonies are maintained, and the satellite colony may contain larvae, pupae, and winged reproductives. Only parent colonies contain the functional queen, eggs, and early instar larvae.

Each spring, carpenter ant nests release large numbers of winged females and males. Do not be too alarmed by this phenomenon; most of the inseminated queens die before they

can start new nests. The queens mate with winged males and quickly shed their wings; thus, you rarely see ants with wings after the swarm.

Carpenter ants do not eat wood, they only nest in it. They eat protein (dead insects) and sweets, especially aphid honeydew, collected from outdoors. Because carpenter ants can build nests in sound, dry wood as well as in wall voids, crawl spaces, and within foam and other insulation, they are capable of causing structural damage and must be taken seriously.

There are several ways to detect a carpenter ant nest. You may find sawdust piles near ant entryways. The sawdust is kicked out as excavation proceeds. You may observe ants trailing into or out of the dwelling, perhaps through a crack or under the siding (this, by itself, does not locate the nest, it only indicates the presence of one or more nests somewhere inside). You also may hear scraping sounds made by worker ants as they enlarge the nest inside a wall or rustlings of the winged reproductive ants (the house must be very quiet). Finally, nests often are uncovered during remodeling/construction.

In early spring, before aphids and other food is abundant, workers may forage indoors for water or food, often in kitchens and bathrooms. Common but overlooked passageways into a house are routing holes for telephone, TV, and electrical cables, especially if the cables pass near trees that harbor aphids.

Control of carpenter ants is best left to competent pest management professionals. They have the experience and the tools necessary to locate nests and apply pesticide products effectively and safely. Drilling wall voids, applying materials inside, underneath and in attic spaces may not be necessary to control carpenter ants, as exterior perimeter treatment with non-repellent materials will control them. If performed during the high foraging season, pesticide is transferred among ants, ultimately eliminating the nest in the structure. When carpenter ants are seen inside during winter, it is best to vacuum them up and wait until the spring foraging season to initiate treatments. Certain bait formulations containing indoxacarb or thiamethoxam have been used successfully against carpenter ants. However, carpenter ants can be finicky eaters, so baits are not always effective. Carpenter ant insecticides for use in wall voids or as a perimeter treatment include bifenthrin, boric acid, cyfluthrin, cypermethrin, deltamethrin, fipronil, and permethrin.

Moisture ant

Lasius spp.

Moisture ant queens are often mistaken for queen carpenter ants but are lighter in color and smaller. Moisture ant workers are yellow to dark brown and all the same size. Moisture ants are frequently associated with rotting wood in houses. The colony usually starts in decayed wood (often in cellulose debris within crawl spaces) and workers then bring moisture into the structure, thereby increasing damage. When you find these ants, it should alert you to search for a wood decay problem in or under the building. Removing infested wood and controlling moisture eliminates most moisture ant problems.

These ants are an indication of wood decay problems in or under the building. Removing infested wood and controlling moisture eliminates most moisture ant problems. Location of infestations may require competent pest management professionals.

Velvety tree ant

Liometopum spp.

Velvety tree ants get their name from a glistening abdomen comprised of dense, fine hairs. Two species may infest structures: the red and black California velvety tree ant (red thorax, black head and abdomen) and a second (aka pine tree ant) entirely dark brown species. The size ranges from 0.13 to 0.25 inch (3-6 mm) long, depending on which of the two species is encountered. Workers, when crushed, give off a distinct odor similar to that of an odorous house ant.

Velvety tree ant infestations resemble those of carpenter ants. They are capable of mining wood, only to a lesser extent. They also infest foam insulation. The nests are usually located outside a structure and may trail several hundred meters to enter a structure. A colony of these ants may have many queens and numerous nest sites. Velvety tree ants form trails into buildings for nesting purposes, but typically are not seen around human or pet food. They primarily feed on honeydew and insects.

Living and decayed portions of trees and branches should be removed from around the house. Treatments similar to those used for carpenter ants have been effective for velvety tree ant infestations.

Wood-infesting pests—Beetle

Beetles are the most diverse group of insects on earth and yet, only a few species are important as structural pests. Given the long duration that beetle larvae feed within wooden timbers, they can cause extensive damage to houses and commercial buildings.

Ambrosia beetle

Platypodidae

Ambrosia beetles are small, dull brown or black, with compact, cylindrical bodies and short legs. Adult beetles and larvae depend on the ambrosia fungus for food. The fungus requires a high wood moisture content to thrive. Important species in the Northwest are *Trypodendron lineatum* and *Gnathotrichus retusus*.

Ambrosia beetles are pests of felled trees and cut logs. The name is derived from the beetle's habit of cultivating fungi or "ambrosia" on the walls of its tunnels. Ambrosia beetles tunnel in the sapwood and heartwood, sometimes producing a bluish stain. True bark beetles also may produce a blue stain effect, but they mine under the bark in the cambial tissue.

Logs are most susceptible for about 3 months after felling. Logs cut in the previous fall through March of the following year are highly susceptible. The greatest attack rates are from mid April to late May.

Pheromone traps are available to help locate infestations, but they are not an effective means of control. Damage may sometimes be prevented by applying an insecticide to logs. However, it can be very difficult and expensive to get adequate coverage. Once larvae start to tunnel, insecticides are ineffective.

Use products with labels appropriate for treatment of felled trees and logs. Check and follow label instructions.

False powerpost beetle

Anobiidae

Most wood-boring beetles found in structures in the PNW belong to the family Anobiidae, the false powderpost beetles. Often, they are mistakenly called powderpost beetles. Anobiids are typically pests of softwoods (e.g., Douglas-fir, hemlock, cedar), but certain species occasionally are found in hardwoods such as maple, walnut, and oak.

The western deathwatch beetle, *Hemicoelus gibbicollis*, is responsible for most of the beetle-related damage to wooden structures along coastal areas. Although common in older buildings with crawl spaces or basements, their small size 0.13 to 0.38 inch (3 to 6 mm) and dark color means these insects are rarely observed. Any wooden timber with a moisture content of 13% to 18% is subject to attack. Adult beetles lay eggs in cracks and depressions of structural timbers, predominantly Douglas-fir. Upon hatching, larvae bore into wood, produce a pellet-like frass, and may continue to feed for 5 or 6 years or longer. Eventually they tunnel toward the surface, pupate, and emerge as adults during summer. The cycle continues until all available nutrition has been depleted. Often, only powdery frass and a wooden shell are all that remain of a structural timber.

Management of anobiids involves replacing severely damaged wood and eliminating conditions that cause the wood to become moist. Proper ventilation and drainage, removal of wooden debris, and installation of a vapor barrier in the crawl space reduces the likelihood of an infestation.

Sodium borates are highly effective against structure-infesting anobiids. Adult beetles are not repelled by borates and lay eggs normally. Eggs and newly emerging larvae do not survive. However, it may take several years for all existing populations present in an infested structure to ingest a lethal dose of this pesticide. Fumigation is rarely, if ever, necessary for control of structure-infesting anobiids.

Other wood-infesting beetles

Bostrichidae

Damage to woodwork and furniture by this group of beetles consists of round holes about 0.25 inch (6 mm) in diameter made by adults, and irregular, longitudinal tunnels made by the larvae. Larvae are grub-like and somewhat enlarged near the head.

- Black polycaon (*Polycanon stouti*) attacks any softwood and several hardwoods. It sometimes burrows in the softwood inner panel of certain three-ply veneers. Damage to the inner panel may not be noted until panels have been made into furniture and adult beetles bore out through the veneer.
- Lead cable borer (*Scobicia declivis*) has the interesting but troublesome habit of boring into electrical cables. Short-circuits may take place when damaged cables become damp.
- Bamboo borer (*Dinoderus minutus*), is commonly found in bamboo baskets, picture frames, and furniture from Asia. Remove and replace infested materials or, if considering chemical options, have the situation evaluated by a licensed pest management professional.

Flatheaded borer

Buprestidae

Oval emergence holes appearing in siding, flooring, or other parts of a structure indicate activity of one of the beetles in the family Buprestidae, commonly referred to as the flatheaded borer or metallic wood-boring beetle. The first three body segments behind the head of larvae are flattened and enlarged, thus the name “flatheaded.” The golden buprestid (*Buprestis aurulenta*), is the most commonly observed species in this group. The adult beetle is iridescent, gold and green in color, and about 0.5 inch (12 mm) long.

While their tunnels can be fairly large, flatheaded borers pose little threat to structures since they do not re-infest. Larvae mining in certain wood products may require a long period to develop, and so it may *appear* that an infestation is recurring. There are documented accounts of beetles emerging from wood products, including furniture and lumber used in construction of houses, in which eggs had been deposited at least 15 to 20 years earlier. Most larval mining in houses, and all mining in finished products, is due to infestation prior to manufacture. Kiln-drying kills all stages of the insect in wood. Emergence holes can be repaired, but chemical control is not needed.

Roundheaded borer

Cerambycidae

Adult cerambycid beetles vary in size and color and are identified most readily by their extremely long antennae, which often are longer than the body. Larvae are white, long, slender, and usually legless. Roundheaded borers attack recently cut trees or timbers from which bark has not been removed. Improperly edged lumber, with pieces of bark still attached, may be targeted. In lumber piles, the larvae tunnel from board to board causing heavy damage. Stressed, recently dead, or dying trees are often attacked.

Injury caused by roundheaded borers is characterized by borings that have mixed fibrous and powdery material. The tunnels tend to lie within the annual rings, but this is not always the case. Adult beetles make circular exit holes and these are often the first evidence of an infestation.

Most cerambycids infesting structural timbers in the PNW complete their life cycle in 2 to 3 years and do not re-infest. Chemical control is unnecessary because once the adult beetles emerge, they fly away to more suitable host material found outside of structures.

True powderpost beetle

Lyctidae

The lyctids, or true powderpost beetles, feed predominantly on starch in hardwoods, such as oak, maple, or ash, although they also infest bamboo (a grass). Hardwood flooring, cabinets, trim, plywood, and wooden articles, such as furniture, tool handles, and crates, are commonly infested. Tropical woods from Central and South America, left in storage in the southeastern United States prior to manufacture and distribution, often are attacked by lyctids. These infested products are then distributed to many parts of the country for construction in buildings.

Lyctids generally have a 1-year life cycle. Adult beetles are small, 0.06 to 0.13 inch in length, and red, brown, or black in color. Eggs are laid in pores of hardwoods, and larvae mature over 8 to 10 months. Lyctid damage can be recognized by the powdery frass (much like talcum powder), produced while larvae are feeding, or the circular, pinhead-sized exit

holes adults create in order to emerge. To be certain that lyctids, and not some other type of wood infesting pest, are present, consult a licensed pest management professional or your local extension office.

Lyctids have become cosmopolitan in distribution due to the movement of commerce throughout the world. Species found in the PNW include the brown lyctus beetle (*Lyctus brunneus*), the western lyctus beetle (*Lyctus cavicollis*), and the southern lyctus beetle (*Lyctus planicollis*). Control usually necessitates the removal of infested wood or, in certain extreme cases, tent fumigation. To eliminate existing populations, small wooden items can be placed in a walk-in freezer, at or below 0°F, for several days. Sealing all wood surfaces with varnish, shellac, or paint will prevent egg deposition by female powderpost beetles.

Wood-infesting pests—Termite

Termites are among the most important structural insect pests in the PNW, rivaled only in certain areas by carpenter ants. They feed on wood, paper, cardboard, and other cellulose-containing material. Experts have estimated that termites cause as much property damage each year in the U.S. as fire (over \$5 billion according to the National Pest Management Association).

There are two common species of termites in the PNW: the western subterranean termite (*Reticulitermes hesperus*) and the Pacific dampwood termite (*Zootermopsis angusticollis*). A third species, the drywood termite (*Incisitermes minor*), has been found occasionally but there is no evidence that it has become established. The drywood termite occurs in furniture or lumber imported from southern states. The western subterranean termite is more common east of the Cascade Mountains, whereas the dampwood termite is more prevalent in western Washington and Oregon.

Western subterranean termite

Reticulitermes hesperus

Western subterranean termites are quite small. The reproductive form is approximately 0.38 inch in length, including wings. They are dark brown to black with brownish-gray wings. The worker caste is creamy-white, about 0.18 inch, long and resembles a grain of rice. They nest within cellulose material buried in soil, often inside stumps or logs that may be 10 to 20 feet or more below the surface.

Structure-infesting subterranean termites return to their soil nest to exchange food with colony members and to obtain water. Because damp wood is not essential for attack, any wooden structure is a potential site of invasion. Cement slab foundations are no deterrent since joints between slab and foundation walls, frost cracks, and areas around plumbing provide easy access to wood.

Termites gain entry to structures around porches and through steps, supporting posts, and sills that are close to or in contact with the soil. Occasionally they construct shelter tubes (“mud tubes”) over concrete foundations to reach wood from the soil beneath.

Management—chemical and bait controls

Infestations of subterranean termites rarely go away on their own. Therefore, the services of a knowledgeable, licensed pest management professional should be obtained. Pesticide treatments for subterranean termites are intended to establish a chemical barrier between a subsoil nest and the house. However, newer bait treatments are designed to attract termites to bait stations containing a toxicant. Other pesticides do not kill upon contact but rather, allow termites to return to their nest and spread toxicant among colony members. Subterranean termite treatments can be complicated and very expensive, and should be left to the professional.

Management—biological

Entomophagous (“insect-eating”) nematodes are sold for termite control. The concept is attractive, and there are many situations in which a biological answer is preferred over chemical insecticides. However, while these tiny worms have been effective in the laboratory under controlled conditions, they have not worked under real-world conditions. Factors such as soil moisture, nematode placement and persistence, and termite defensive mechanisms have been proposed as reasons for failures. Therefore, **using nematodes for termite control is not recommended**. Nematodes are not registered by the EPA, and, as a result, the protections afforded by registration are lacking.

Dampwood termite

Zootermopsis angusticollis

The Pacific dampwood termite is the largest termite species found in the PNW. Reproductive forms may exceed 1 inch in length, including the wings. Dampwood termites require wet or damp wood to infest and establish a colony. Wet wood may result from wood-soil contact, leaky plumbing, leaky roofs or gutters, and faulty grades on porches and patios. Wood decay fungus is often found in conjunction with this termite. Dampwood termites also attack wood that has become wet from condensation in poorly ventilated crawl spaces.

In most cases, management can be achieved by removing materials prone to infestation (wood scraps, construction forms), replacing structurally unsound wood, improving ventilation, and eliminating moisture problems. If the water issue is not corrected, the infestation will continue and damage from wood decay fungi then becomes problematic. Chemical applications alone will not eradicate this pest and should be discouraged.

Wood-infesting pests—Wasp

Wood-boring wasp (“horntail”)

Siricidae

Adult female wasps are large and thick-waisted, with a hornlike ovipositor at the end of the abdomen. They sometimes emerge from recently milled dimension lumber in newly constructed homes. Emerging wasps damage walls (sheetrock, plaster, wallpaper, etc.) but do not re-infest.

Larvae mine in Douglas-fir, true firs, pine, and other conifers. Fire-killed trees are most frequently attacked, though windblown or insect-damaged trees are also susceptible.

Plug emergence holes and repair the surface. Since horntails will not re-infest other parts of the structure, chemical control is unnecessary.