

# INSECT MANAGEMENT

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# INSECT MANAGEMENT

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## Learning Objectives

- Understand the definition of insecticide
- Understand the advantages and disadvantages of choosing chemical insect control
- Understand the preharvest interval when using an insecticide
- Understand how to use mechanical practices for insect control
- Understand how to introduce biological insects to your garden
- Understand how to practice good gardening techniques
- Understand why plant quarantines are enforced
- Understand how to include all types of management within an integrated insect control program
- Understand specific insect pests and when to apply an insect control method

## Terms and Definitions

**insecticide.** A chemical used to control, repel, suppress, or kill insects.

**preharvest interval.** The amount of time that must elapse (legally) after application of pesticide before harvest takes place.

## Why Worry About Insect Control?

- The average insect population per square mile is estimated to be equal to the world human population.
- Destruction of crops by insects in the United States ranges from \$4–\$15 billion annually.
- Forest insects destroy more useful timber than do forest fires.
- Termites consume about \$100 million worth of wood structures annually.

# Methods of Insect Control Available to Homeowners

## MECHANICAL INSECT CONTROL

Can be used on all insect pests.

Manual removal of insects and eggs from infested plants.

- **Two-block method.** Place the insect on one block (wood or stone) and strike with second block. Repeat as needed.
- **Soap and water spray** (or water alone). Sometimes helpful for control of aphids and similar insects.
- **Light traps.** Be careful not to use lights that may attract insects to your garden.

### Advantages

Extremely selective; can be slightly to extremely effective, depending upon the species of insect and the crop.

### Disadvantages

Time consuming. Many insect species can fly away or drop to the ground and therefore escape control efforts.

## CHEMICAL INSECT CONTROL

Specific insecticides control only certain insect species. It is important to know the target species and the crop affected before selecting an insecticide.

It is particularly important to apply the insecticide properly. This includes carefully measuring the chemical, carefully diluting the solution with the correct amount of water, and taking care not to apply too much or too little spray.

Apply insecticides only to plant species listed on the product's label. Failure to follow label directions may result in damage to desirable plants or create unhealthy residues in foods.

Always determine the safe preharvest interval for a crop you plan to spray with a given insecticide. This information can be found in one of two written formats on pesticide labels:

- Written out on a pesticide label. For example, Ortho Sevin 5 Dust states that the product should not be applied to cole crops (several vegetables in the mustard family) within three days of harvest.

- Written as a number between parentheses immediately after the crop listing on the label. For example, Lilly Miller Fruit and Berry Insect Spray has the listing Apples (7), indicating a preharvest interval for apples of seven days.

Always read and follow label directions carefully.

### Advantages

Good to excellent control of insect pests; a minimum of labor is required.

### Disadvantages

Special application equipment needed; spray programs are often rather inflexible regarding harvest times; beneficial insects often are killed.

## BIOLOGICAL INSECT CONTROL

Use of beneficial insects can be difficult to assess for the homeowner. Many insects are offered for sale (particularly ladybugs, lacewings, and praying mantis), but success with these introduced predators is often inconsistent. Also, these insects may have to be reintroduced each year in order to maintain a garden's population after winterkill or migration.

It is a good idea to be able to identify beneficial insect species in all their growth stages, so as to prevent their unintentional destruction as pests.

### Advantages

No labor is involved; after the initial release, the population can be self-perpetuating. You can establish biological control, as the predator will target only the pest. For example, *Bacillus thuringiensis* is useful for caterpillars.

### Disadvantages

Only selected insect species will be controlled; control may often be cyclical or incomplete.

## CULTURAL INSECT CONTROL

For homeowners, the most important cultural control is to maintain good plant health with proper care through an effective water and nutrition system. A healthy plant is better able to withstand insect infestations.

Crop rotation breaks plant/insect pest relationships. By varying the location of crops within a garden (when possible) or by not growing certain crop types for a number of years, certain insect pest populations can be drastically reduced.

Highly organic soils provide attractive habitat for many soil insects. In addition, insecticides are more rapidly broken down in these soils.

Companion crops are often used to repel insect pests or to attract them away from crops. Don't rely on these methods without constant observation. If they do not work, be prepared to spray, plow, dig up, etc.

- Repellent crops are specific as to which plants they protect and which insects they affect. For example, marigolds are useful in repelling cutworms. At best they can be marginally effective; at worst, they will attract unwanted insects to your garden.

## NOTE

Marigolds often attract leaf miner butterflies.

- Trap crops can quickly become overrun with insects. For example, nasturtiums can attract cabbage aphids away from cole crops. If aphids are not controlled on the trap crop, they will eventually move to the crop you are trying to protect.

Weed and volunteer crop control prevents them from becoming an alternative food for insects, particularly before crop emergence. Weed residues can also harbor insect pests.

Sanitation in your lawn and garden area is very important, as many insects are attracted to, and overwinter in, plant debris or trimmings. Nonproducing vegetable plants should be removed or turned under as soon as possible after harvest to deny insect pests a "free lunch" or an overwintering site. Clear away planks, cardboard boxes, and overgrown areas; these provide an excellent habitat for pests such as slugs, sow bugs, and earwigs.

Resistant crop varieties are sometimes available to the homeowner, although most resistance involves plant diseases and not insects.

Using transplants or adjusting seeding dates to avoid emergence of the plant during peak insect populations may help reduce damage.

### **Advantages**

Often simple to perform; often accomplished through other good gardening techniques.

### **Disadvantages**

Generally incomplete.

## REGULATORY INSECT CONTROL (QUARANTINES)

Generally, quarantines take two forms:

1. **No movement of the host crop allowed out of an area.** This method keeps the insect more localized where control programs can be implemented more effectively.
2. **No movement of the possibly contaminated host crop is allowed into a "clean" area.** This keeps the insect out of an area where infestations could be disastrous.

Under quarantine laws, government agencies may be allowed to use a part of chemical control under emergency use guidelines.

### **Advantages**

By requiring a control effort, the spread of certain pestiferous insects can be slowed, once infestation is identified.

### **Disadvantages**

Laws must be enforced to do any good and geographical situations may limit control.

## INTEGRATED INSECT CONTROL

The best insect control plans start with the simpler methods, then progress to include aspects from all types of control. For example, a control program for the cabbage maggot may begin with transplants. This approach allows older, more vigorous seedlings to escape infestation.

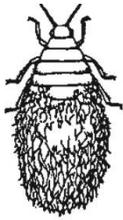
Transplanting is followed by the destruction of plants immediately upon harvest of cole crops. Quick destruction after harvest prevents maggots from completing their life cycle.

If cabbage maggots continue to be troublesome, placement of Lorsban or Diazinon granules around transplants may be attempted. This method prevents infestation of roots.

If maggots still remain a problem, it may be necessary to stop growing cole crops for a season or two or to only grow them every other year. Allowing the field to lie fallow, or switching to another sort of crop, may reduce the population of cabbage maggots in the garden.

# Specific Pests

## ORNAMENTAL PESTS



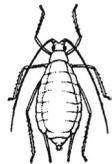
### **Balsam Woolly Adelgid**

Appear as white, woolly masses on limbs and trunks of all firs. All active stages have sucking mouthparts and cause damage. Spray timing is important. Spray to ensure adequate control. Sprays may stunt or kill trees. Organic phosphate aphid pesticides do not adequately control adelgids.



### **Spruce Aphids**

These aphids are dull green with sucking mouthparts. All active stages damage spruce trees and the damage is frequently very serious. For example, they can cause severe needle drop. Spray in February or late winter.



### **Cooley Spruce Gall Adelgid**

Appear as white, cottony masses on firs. They have sucking mouthparts and all stages cause damage. They tend to alternate between spruces and Douglas fir. They cause galling on spruces and yellowing and needle distortion on both types of trees. Organic phosphate aphid pesticides do not adequately control adelgids. Treat spruce as the new growth is unfolding in the spring. Treat Douglas fir in early spring.



### **Rose Aphid**

Many species of aphids attack the rose, particularly when there is new growth. They cause **chlorosis** (yellowing green tissue) and they may produce a toxin that kills leaf tissue. Rose aphids excrete honeydew and cause sooty molds. Some people hose plants periodically, but hosing may lead to other problems such as diseases. Check any chemicals suggested for treatment. Some may adversely affect the plant.



### **Root Weevil**

May be 1/4-1/2 inch long. They can be black, brown, or gray. They have chewing mouthparts. Root weevils often

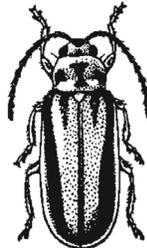


attack ornamentals, such as azaleas and rhododendrons, and many garden groups. The white larvae are C-shaped. When the larvae feed on the roots, the plant becomes spindly. Feeding allows entry by root rots. Larvae may also girdle crowns, particularly in containerized plants. Adults appear in June and feed until September. Their effect is less serious. They tend to notch leaves. Though they rarely kill the plant, the result is unsightly. They usually feed at night. Root weevils' fall migrations into homes may cause some owners alarm, but their purpose is hibernation. Spray for adults at regular intervals starting in late June.



### **Elm Leaf Beetle**

Characterized by black and yellow stripes on wing covers of the adults and bodies of the larvae. They generally appear April through August. These beetles live through two generations and may overwinter in homes. They have chewing mouthparts. Both larvae and adults cause damage to elms. The adults chew small holes in leaves, while the larvae skeletonize leaves. They can cause complete defoliation.



## NOTE

Destroy if found.

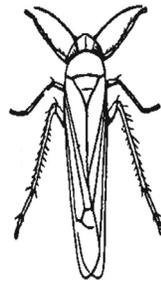
### **Leafhopper**

Small torpedo-shaped insects with wings held roof-like over the body. Found in a variety of colors. Leafhoppers are active jumpers. They attack a variety of ornamentals, fruit trees, and garden plants and may be found throughout the growing season. They have sucking mouthparts and feed on the undersides of leaves, which causes white speckling on leaves (hopperburn). Leafhoppers can transmit virus diseases.



### **Cotoneaster Webworm**

Small, dark-brown to black caterpillars are the damaging stage. They have chewing mouthparts and hide in dense webs. They tend to skeletonize cotoneaster leaves and can kill or severely damage plants.





### **Fall Webworm**

Adults are pure white moths, though they occasionally have a few black spots. The larvae are yellowish brown with long, whitish hairs arising from orange and black bumps. They can be identified quickly because they form unsightly tents enclosing entire branches. The chewing mouthparts are damaging. Webworms tend to cause problems only as larvae and primarily for ornamentals and fruit trees. The larvae are present from midsummer to fall. Treatment is a problem, because if you remove and burn the branch and the tent, you may destroy the symmetry of the shrub or tree.



### **Juniper Webworm**

The larvae are light brown with dark brown stripes on the back; they grow to a length of ½ inch. The larval stage is the most damaging. Larvae have chewing mouthparts and they tend to attack junipers and red cedar. They feed in early spring. Webworms can be identified easily because they web the foliage together. Mechanically destroy the larvae when possible.

### **Mourning Cloak Butterfly**

Larvae are large and black with orange spots on their spiny backs. The larval stage is the most damaging. Larvae attack willow, elm, and poplar. They are foliage feeders with chewing mouthparts. These caterpillars are gregarious feeders and are easily controlled by clipping twigs with groups of caterpillars. Simply burn the clippings. Spraying is not necessary if the problem is caught early enough.

### **Tent Caterpillars**

The larvae are rather attractive, dark, fuzzy caterpillars. The forest tent caterpillar has diamond- or keyhole-shaped spots in a row along the back. The western tent caterpillar is yellow with blue lines. Tent caterpillars congregate in small tents during the day. The larval stage is the damaging stage, seriously defoliating trees of many kinds. Larvae have chewing mouthparts. Tent caterpillars are troublesome in early spring

and into summer. Sometimes you can deal with them by clipping tents and by burning. Forest tent caterpillars overwinter as eggs in bands around twigs. Destroy these by crushing them. Or you can spray in early spring; later they may be tough to kill with chemicals.

### **Birch Leaf Miner**

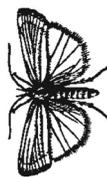
Only the larvae of the birch leaf miner are damaging. They mine and blotch the leaves of birch trees. They have chewing mouthparts. To deal with them, spray just after the leaves unfold in the spring. There are two generations. The second is in mid-July, but if you do a good control job on the first, the second will need only a minor use of spray to control.



### **Scales**

Scales are small, with a soft or hard coat surrounding the insect. The covering takes on various forms from hardened armor to soft, cottony masses. They often promote sooty molds and all active stages are damaging to many plants. They have sucking mouthparts and are stationary (sedentary) feeders. They kill plants or plant parts. In order to treat, find out what scale is present and at what time the active crawling stage is present. Spraying with an insecticide will be effective at that stage. Oil and sulfur dormant sprays are usually the most effective.

## **LAWN PESTS**



### **Lawn Moths**

Damage may be mistaken for thatch or fungus problems. The larval stage is the most damaging. Lawn moths have chewing mouthparts.



### **Earthworms, Night Crawlers**

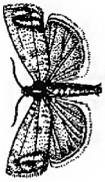
These are not insects, but annelids. They are normally considered to be beneficial; however, in certain instances, intense earthworm activity leads to castings being thrown up on the surface, leaving an unsightly lawn.

## **HOUSEPLANT PESTS**

See chapter 24, section Insect Pests.

## TREE FRUIT PESTS

### **Codling Moth**



The larvae have chewing mouthparts and bore into fruit. Apples and pears are the main hosts. The larval stage is the most damaging. It is extremely important to time sprays properly. Use recommended materials about 10 days after full petal fall and repeat as necessary, depending on materials used and local recommendations.



### **Aphid (Woolly Apple Aphid)**

These reddish aphids are covered by white woolly wax. They have sucking mouthparts. All active stages are damaging. They are bark feeders and their damage interferes with the growth of the tree, often killing a young tree. They also attack roots. Their attacks cause the most serious injury in apple trees, but occasionally they are problems for pear trees.



### **Aphid (Not Woolly Species)**

They have sucking mouthparts and all active stages cause damage. They include the green peach, plum, rosy apple, and green apple aphids. A toxin in the saliva causes various plant reactions: leaf curl, leaf cupping, stunting, lumpy fruit, etc.



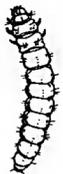
### **Apple-and-Thorn Skeletonizer**

The larval stage is the damaging stage; the larva has chewing mouthparts and skeletonizes leaves. The adult stage is a moth.



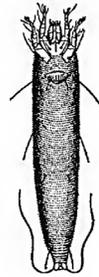
### **Fruit Leaf Rollers**

The larval stage is the most damaging. Larvae are usually shiny green with a black or brown head. They have chewing mouthparts and feed on the fruit and the leaves of many ornamentals and fruit trees. They tend to bind leaves together with a webbing to form a hiding place.



### **Blister Mite**

Blister mites are arachnids, not insects. They have chewing mouth-parts. The only evidence of their presence is the circular blisters within which these tiny microscopic mites reside. They may become so numerous



as to cover an entire tree. Young shoots suffer the most. Blister mites cause malformation of pear fruit; they also attack apple and cotoneaster trees. The blistered surfaces later turn into scab-like areas. They are best controlled during the delayed-dormant period (February or March).

### **Pear Psylla**

Related to aphids and leafhoppers, pear psylla have sucking mouthparts. Feeding is done by all active stages. The pear psylla secretes honeydew, which may kill leaf tissue and which russets fruit. A sooty mold develops in honeydew and blackens affected tissue, which leads to "pear decline." Other problems from psylla include reduced vigor, fruit loss, poor fruit set, and occasionally the death of the tree.



### **Pear Slug**

A relative of the sawfly bee group, several species of the pear slug are known. The larvae are covered with a slimy material, making them sluglike in appearance. The larval stage is the most damaging. Pear slugs have chewing mouthparts that skeletonize the leaves. Pears, cherries, and roses are hosts commonly attacked by the pear slug or one of its relatives.



### **Cherry Fruit Fly**

The larval stage is the most damaging; the larvae have rasping mouthparts. The adult is a small picture-winged fly. Eggs are laid in fruit starting when the fruit changes to pink or yellow (depending upon the variety). The larvae proceed to feed internally. Breathing holes in fruit point out the presence of the maggots.



### **Walnut Husk Fly**

The larval stage is the most damaging. Larvae attack mainly walnuts, but occasionally attack late peach varieties. The adult is a picture-winged fly. In walnut trees the damage to the husk results in the staining of shells and, at times, the darkening of the kernels. Bitter, shriveled kernels may occur.





### **Peach Tree Borer**

The adult is a clear-winged moth. The larvae are damaging to peaches, nectarines, and plums. Larvae have chewing mouthparts. Their injuries are recognized by jellylike gum mixed with dirt and small pellets of frass excreted by the borers at ground level. This damage can seriously injure a tree or even kill it. Heavily infested trees are so devitalized that the leaves turn yellow in a manner similar to nitrogen deficiency.



### **Peach Twig Borer**

The adult is a small, gray moth. The damaging larvae are light- to dark-reddish brown with a black head and yellow-white, ringlike segments around the abdomen. Larvae have chewing mouthparts. They attack developing twigs and burrow down the tender shoots, causing them to wilt and die. Later broods attack fruits. The oriental fruit moth causes similar damage, but is not as widespread in Idaho.



## **GARDEN PESTS**

### **Cutworms**

The adult is a miller moth. The larvae have chewing mouthparts and are the most damaging stage for garden produce. Many kinds of cutworms exist and damage all kinds of plants. Control with chemicals when they are young. The more mature cutworms are difficult to control with chemicals. If cutworms have been a problem, vigorous disking or rototilling in the spring, before planting, will help destroy them. Also avoid persistent weed patches as this is a good source of cutworms.



### **Wireworms**

Have rather hard, shiny, golden colored, elongated larvae. The adult stage is a click beetle. The larval stage is the most damaging. Wireworms have chewing mouthparts. They are a soil pest; their feeding stunts crops. They may kill the plant or cause produce to be inedible. Potatoes and bulb crops are particularly hard hit by this pest; however, corn and other crops may be damaged.



### **Garden Symphylan (Insect Relative)**

These are soil pests with chewing mouthparts; they tend to attack underground parts of all vegetables, small fruits, and many flowers. All stages of the garden symphylan are damaging; infestations are sporadic. Control of this pest is difficult for the home gardener. When the attack is severe, plants wilt and die.



### **Earwigs**

Often merely a nuisance, though all active stages cause damage. Earwigs have chewing mouthparts and attack many sorts of plants. They can be scavengers or predators also. The best control methods are various dusts. Apply dust recommended in your area to soil surfaces when you first notice the problem. Repeat if necessary.



### **Flea Beetles**

There are several species of flea beetles, all of which have chewing mouthparts. Both the larvae and the adults cause damage. The adults attack leaves of many vegetables. The larvae attack roots and tubers. The adults are very tiny beetles and, like fleas, are good jumpers. Use chemical control if necessary.



### **Aphid**

All active stages cause damage. The peach aphid is one of the most important aphids. It affects not only peaches but also potatoes. It is a vector of the potato leaf roll virus, which discolors tubers. The asparagus aphid is also becoming important.



### **Pea Leaf Weevil**

The adult is the damaging stage. The larvae feed on root nodules of peas. Pea leaf weevils have chewing mouthparts. While peas are the preferred host, this weevil will attack other plants such as beans.



### **Colorado Potato Beetle**

Although mainly a pest of potatoes, Colorado potato beetles can feed on tomato, eggplant, and nightshade weeds when potatoes aren't available. Both the larvae and the adults are damaging. These beetles have chewing mouthparts.





### Asparagus Beetle

Rather small beetles with chewing mouthparts, asparagus beetles are steel blue in color with reddish margins and a few yellowish spots on wing covers. Larvae and adults damage young shoots, but they are chiefly a pest of mature plants, which may be completely defoliated.

#### NOTE

The spotted asparagus beetle is somewhat elongated and red orange with black spots.



### Carrot Rust Fly

The larvae have rasping mouthparts. The larval stage is the damaging one. The adult is a small, nondescript fly, while the larvae are small maggots that burrow into the crowns or roots of carrots, parsnips, and certain weeds. Only highly organic or humus soils harbor this insect. Remove carrots as soon as possible, since the damage will increase if they are left in the ground. A Diazinon application will reduce, but not eliminate, the carrot rust fly. However, mid-late June plantings tend to reduce damage.



### Onion Maggot

The adult is a fly. The larval stage is the most damaging. Larvae cause damage with their rasping mouthparts and create problems similar to those caused by the cabbage maggot, except that onion maggots attack only onions, garlic, and shallots.



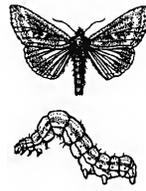
### Cabbage Maggot

The adult is a fly. The larval stage is the most damaging. The larvae are small, whitish maggots with rasping mouthparts; they bore into the roots and stems of cabbage, broccoli, cauliflower, brussel sprouts, and kale, often killing them. The fleshy roots of radish and turnips may be riddled with holes. Control consists of Diazinon or chlorpyrifos (Dursban) treatments at the time of transplant or planting.



#### NOTE

Be careful. Highly organic or humus soils tend to tie up insecticides such as Diazinon and Dursban.



### Cabbage Looper

The adult is a moth. The larvae have chewing mouthparts. They attack many cruciferous plants, as well as fruits, weeds, and ornamentals. They are defoliators.

## HOUSEHOLD PESTS

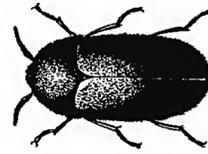
### Stored Products

Many pests go after stored products. They include the carpet beetle, cigarette beetle or drugstore beetle, Indian meal moth, sawtooth grain beetle, and cockroach. Sanitation is the best control.

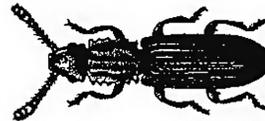
Locate the pest sources and clean them out thoroughly. Destroy infested material or heat to 140°F. Vacuum infested drawers and cupboards.

Spray with pyrethrum in and around possible hiding places, but not on or around food.

Maintain a regular spring cleaning program.



CARPET BEETLE



SAW-TOOTHED GRAIN BEETLE



INDIAN MEAL MOTH



COCKROACH

## Structural Pests

**Termites.** These pests are ant-like, but they do not have constricted waists. They usually attack only damp or rotting wood and are an indication of an already existing problem. It is important to treat these pests properly. When carpenter ant or subterranean termite infestations are apparent, it would be wise to contact a reputable PCO (exterminator) to kill these damp wood termites.

**Ants.** The most common ant pests are carpenter ants.

## Nuisance Pests

**Flies.** Flies are common, especially in the summer and the fall. Tight seals around windows and screen doors help. It also helps to maintain general cleanliness, as fly larvae can breed in any kind of refuse. Keep garbage containers clean. Pyrethrum sprays will kill the adults.

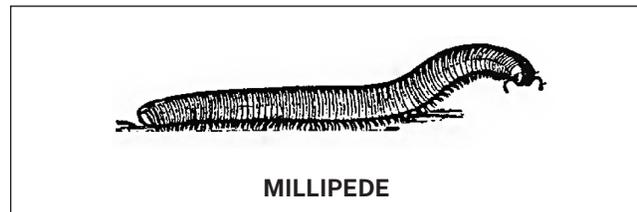
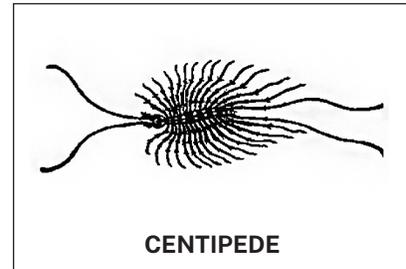
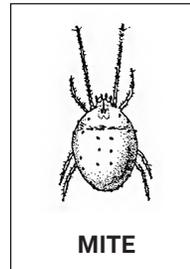
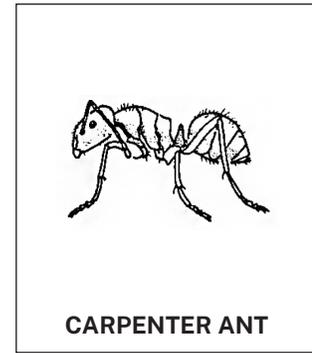
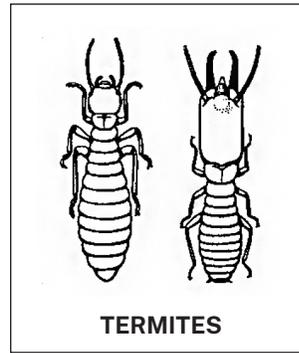
**Mites.** Many mite species, including the clover mite, enter homes in large numbers, causing the inhabitants great alarm. Some scavenging mites, such as grain mites, can get into stored foods. House dust mites can be a source of allergies.

**Centipedes and Millipedes.** Though centipedes are normally beneficial, these elongated, multilegged insect relatives often enter homes and cause annoyance. Centipedes can inflict painful bites, while millipedes can become pests in greenhouses.

**Other.** Careful caulking, screening, and patching will prevent many problems with wasps, bats, and other home invaders. Many true bugs such as box-elder bug, sage bug, grass bug, and others will invade homes and other structures in the late summer and fall. While they're capable of biting, the true bugs normally are considered nuisance pests. Several beetles are also invaders and become severe nuisance pests. Control is difficult; sweeping or vacuuming is normally recommended. These include grass weevils, root weevils, and the elm leaf beetle (overwinters in large numbers in attics).

## SPIDERS

Most spiders are harmless. The black widow is the most dangerous spider in the Northwest. (The brown recluse spider has not been found in Idaho.) The hobo or "aggressive" house spider is common and can cause skin sloughing.



Spiders can become numerous in the fall as they seek out overwintering spots. Be sure to seal up basement entries (holes, cracks).

## Further Reading

### BOOKS

Berry, R.E. 1978. *Insects and Mites of Economic Importance in the Northwest*. Corvallis, OR: Oregon State University Bookstores.

Smith, M., and A.C. Carr. 1988. *Rodale's Garden Insect, Disease and Weed Identification Guide*. Rodale Press.

### BOOKLETS AND PAMPHLETS

#### University of Idaho Extension

CIS 1133 *Management of White Pine Weevil in Spruce*

CIS 1147 *Tuxedo Bug: A New Home-Invading Insect in Idaho*

CIS 1155 *Boxelder Bug: Nuisance Management for Homeowners*

- CIS 1169 *Homeowner Guide to Pillbugs and Sowbugs*
- CIS 1170 *Homeowner Guide to Centipedes and Millipedes*
- CIS 1221 *Hobo Spiders in Idaho*
- CIS 1223 *Managing Elm Seed Bugs around Your Home*
- PNW 624 *Identification and Habits of Key Ant Pests in the Pacific Northwest*
- PNW 729 *Pantry Pest Guide: Common Insect Culprits in Homes and Kitchens of the Pacific Northwest*

### **Washington State University**

- EB0818E *Carpenter Ants: Their Biology and Control*
- EB0970E *Root Weevil Control on Rhododendrons*
- EB1206E *European Earwig Prevention and Control*
- EB1380E *Bronze Birch Borer*
- FS020E *Snailcase Bagworm*

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## **Acknowledgment**

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