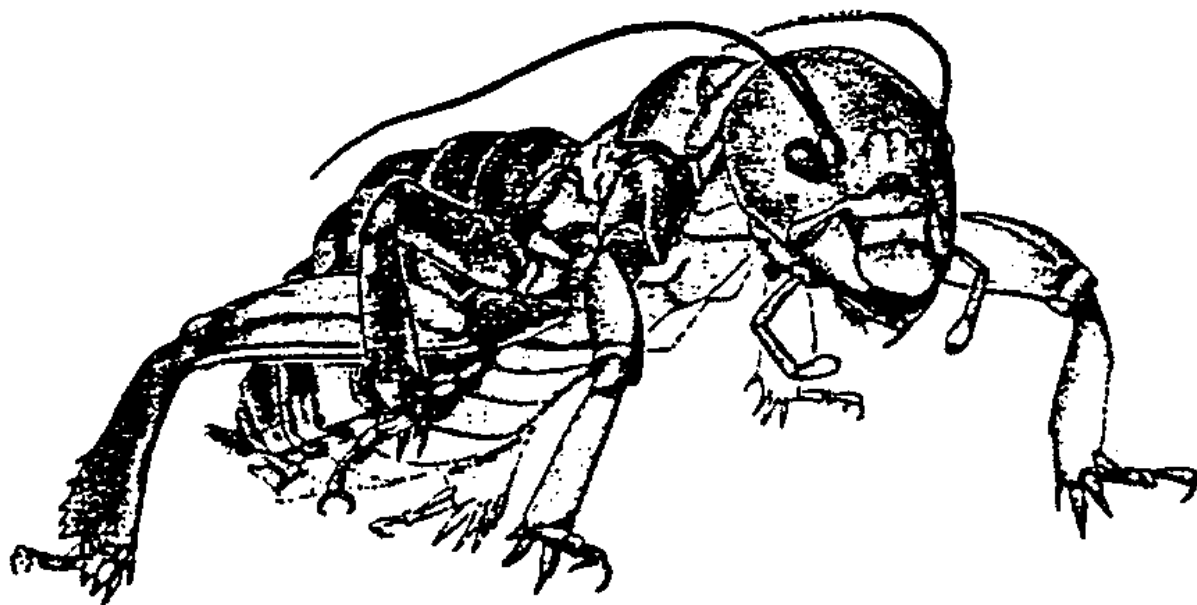


# Household Insects of the Rocky Mountain States

Bulletin 557A



January 1994

Colorado State University, University of Wyoming, Montana State University

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## FOREWORD

This publication provides information on the identification, general biology and management of insects associated with homes in the Rocky Mountain/High Plains region. Records from Colorado, Wyoming and Montana were used as primary reference for the species to include. Mention of more specific localities (e.g., extreme southwestern Colorado, Front Range) is provided when the insects show more restricted distribution.

Line drawings are provided to assist in identification. In addition, there are several lists based on habits (e.g., flying), size, and distribution in the home. These are found in tables and appendices throughout this manual.

Control strategies are the choice of the home dweller. Often simple practices can be effective, once the biology and habits of the insect are understood. Many of the insects found in homes are merely casual invaders that do not reproduce nor pose a threat to humans, stored food or furnishings. These may often originate from conditions that exist outside the dwelling. Other insects found in homes may be controlled by sanitation and household maintenance, such as altering potential breeding areas (e.g., leaky faucets, spilled food, effective screening). Insecticide use may be an option for some household pest species and general practices on timing and spot treatment are included in this manual. Specific insecticides are not generally included since pesticide registrations frequently change. Should you choose to use an insecticidal control in the home, always read and follow all label instructions, including precautionary statements. For highly specialized treatments, such as control of existing termite infestations, the services of a professional pest control operator are recommended.

As with the many other features of the environment, the insects associated with homes in the Rocky Mountain/High Plains region may be very different from those found in other parts of the country. We hope that the information provided in this manual can help the reader better understand the fascinating world of insects as well as have an increased ability to make informed choices on the management of insects in the home.

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## **Household Insects of the Rocky Mountain States**

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We also have drawn heavily from several sources for artwork, primarily existing Extension and USDA materials. Among those used most frequently was The Cooperative Extension Publication Venomous Arthropods of Arizona, USDA-ARS Handbook no. 500 Stored Grain Insects, USDA-ARS Miscellaneous Publication Number 1443, Insects and Mites: Techniques for Collection and Preservation, Washington State University Publication EB0671, Identification and Habits of Key Ant Pests of Washington (Workers and Winged Reproductives), the University of Nebraska Cooperative Extension Service 4-H Entomology Manual, and USDA Technical Bulletin 1326, House-infesting Ants of the Eastern United States. We particularly wish to thank Mike Kippenhan, Matt Leatherman, and Alice Minney for their original drawings.

## Household Insects of the Rocky Mountain States

### INTRODUCTION

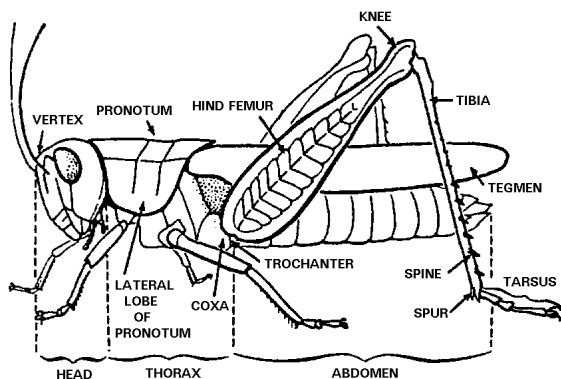
#### INSECTS AND INSECT RELATIVES

Essentially all the "bugs" encountered within homes in the Rocky Mountain region are members of the animal phylum Arthropoda, the arthropods ("jointed foot" animals). All arthropods possess the following combination of characteristics that can be used to distinguish them from other animals:

- a segmented body;
- jointed appendages;
- a skeleton on the outside of the body (exoskeleton) that is made of chitin;
- growth of young involves periodic shedding of the exoskeleton (molting).

Hexapoda, including the insects, is a distinct class among the arthropods that further possess a combination of characteristics unique to them. These are what separate adult insects from other common arthropods:

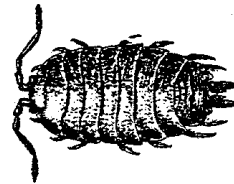
- three body regions (head, thorax, abdomen);
- three pairs of legs (all attached to the thorax);
- one pair of antennae;
- wings (usually) in the adult stage, typically two pairs.



Body parts of a typical insect, a grasshopper. Drawing by T.S. Sechrist.

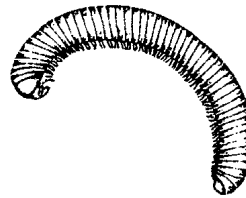
Characteristics of the other common arthropod groups (classes) are:

**Crustacea** (Crustaceans: Crayfish, Shrimp, Sowbugs, Pillbugs, etc.)



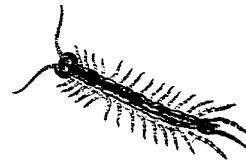
5 to 7 pairs of legs; two body regions (cephalothorax and abdomen); two pairs of antennae

**Diplopoda** (Diplopods: Millipedes)



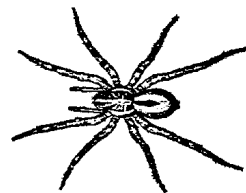
Elongate, usually rounded bodies; numerous body segments (typically around 50); on most segments there are two pairs of small legs

**Chilopoda** (Chilopods: Centipedes)



Elongate, flattened bodies; 14 to 20 body segments; on most segments there is one pair of legs

**Arachnida** (Arachnida: Spiders, Ticks, Mites, Scorpions, Daddylonglegs)



Four pairs of legs; two body regions (cephalothorax and abdomen); no antennae

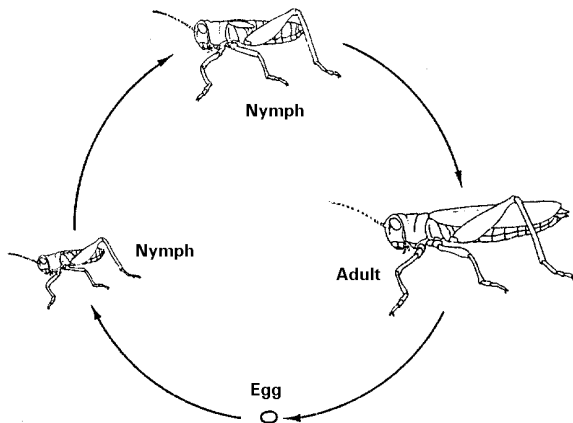
#### INSECT GROWTH

Almost all insects begin their development as eggs produced by the adult female. Although a few species, such as aphids, may also appear to give live birth, this occurs from the eggs hatching inside the mother.



## Household Insects of the Rocky Mountain States

After egg hatch, insects grow in a series of distinct stages. Each stage (instar) sheds (molts) its exoskeleton periodically after a period of growth. A new exoskeleton is produced during molting that is larger than the previous one. A few hours following a molt the new exoskeleton hardens and there is no further change in body size until the following molt. Body parts that remain soft, such as the thorax and abdomen of caterpillars, may expand to a limited extent during the course of an instar. All growth ceases following the final molt to the adult stage of the insect (e.g., a small ant will remain a small ant and is **not** a "baby" large ant).



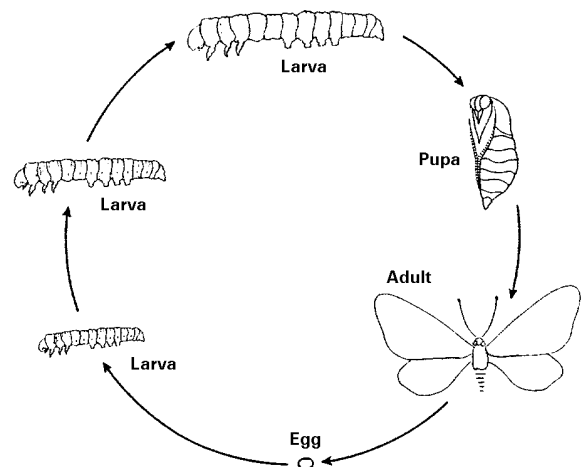
Simple metamorphosis of a grasshopper.

As insects develop there also are changes in form. These changes are called **metamorphosis**. The kinds of changes may vary among different insect groups, but two general types of development predominate--**simple metamorphosis** (hemimetabolous insects), and **complete metamorphosis** (holometabolous insects). Five of the more primitive orders undergo no distinct metamorphosis (ametabolous insects), including silverfish, firebrats, and springtails discussed in this publication.

Insects undergoing simple metamorphosis have three basic life stages -- **egg**, **nymph**, and **adult**. The nymphs typically pass through three to five instars (sometimes many more), molting between each. Nymphs and adults often live in the same habitat with the principal changes during metamorphosis

being body proportions, sexual maturity and the development of wings. Examples of insects that undergo simple metamorphosis include grasshoppers and crickets, earwigs, cockroaches, the "true" bugs (Hemiptera), aphids and related insects.

Insects that undergo complete metamorphosis pass through four basic life stages--the **egg**, **larva**, **pupa**, and **adult**. Caterpillars, maggots and grubs are typical examples of immature insect forms, the larvae. During the larval stage there may be three to seven instars, all of which usually feed. The pupal stage (e.g., cocoon, puparia, chrysalid), is a non-feeding stage that follows during which the insect changes to the adult form. Adults are usually winged and often differ from the larvae in a number of ways including type of legs, mouthparts and feeding habits. Insects with complete metamorphosis include butterflies and moths, beetles, flies, and lacewings.



Complete metamorphosis of a butterfly.

## Household Insects of the Rocky Mountain States

### Outline of the Insect Orders (based on classification scheme of Borror, Triplehorn and Johnson, 1989)

Order (common name)	Type of metamorphosis
Protura (proturans)	Primitive type with little change in features, other than size, between immature and mature stages
Collembola (springtails)*	Primitive type with little change in features, other than size, between immature and mature stages
Diplura (diplurans)	Primitive type with little change in features, other than size, between immature and mature stages
Microcoryphia (bristletails)	Primitive type with little change in features, other than size, between immature and mature stages
Thysanura (silverfish, firebrats)*	Primitive type with little change in features, other than size, between immature and mature stages
Orthoptera (grasshoppers, crickets)*	Simple
Grylloblattaria (rock crawlers)	Simple
Phasmida (walkingsticks)	Simple
Mantodea (mantids)	Simple
Blattaria (cockroaches)*	Simple
Isoptera (termites)*	Simple
Plecoptera (stoneflies)	A variation on simple metamorphosis with immature, aquatic forms
Dermaptera (earwigs)*	Simple
Embiidina (webspinners)	Simple
Psocoptera (psocids)*	Simple
Phthiraptera (lice)*	Simple
Zoraptera (zorapterans)	Simple
Hemiptera (true bugs)*	Simple
Homoptera (cicadas, hoppers, aphids, whiteflies, scale insects)*	Simple, but some species show some features that are intermediate with complete metamorphosis
Ephemeroptera (mayflies)	A variation on simple metamorphosis with immature, aquatic forms
Odonata (dragonflies and damselflies)	A variation on simple metamorphosis with immature, aquatic forms
Thysanoptera (thrips)	A variation on simple metamorphosis including nonfeeding stages prior to adult emergence
Neuroptera (alderflies, dobsonflies, lacewings, antlions)	Complete
Coleoptera (beetles)*	Complete
Strepsiptera (twisted-wing parasites)	Complete
Mecoptera (scorpionflies)	Complete
Siphonaptera (fleas)*	Complete
Diptera (flies, gnats, mosquitoes, etc.)*	Complete
Trichoptera (caddisflies)	Complete
Lepidoptera (butterflies, moths)*	Complete
Hymenoptera (sawflies, ichneumons, ants, wasps, and bees)*	Complete

\* Orders containing species that are commonly associated with homes in the region and subsequently discussed in this publication.

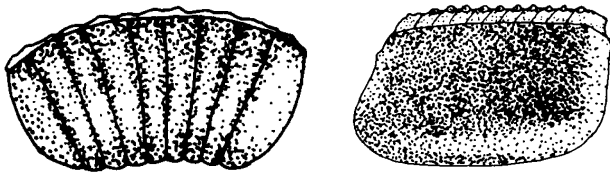
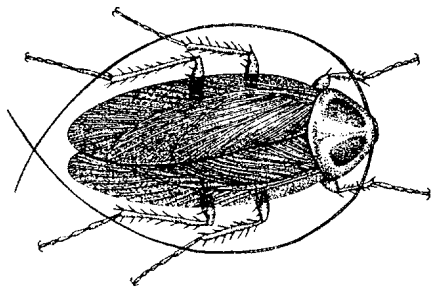
## Household Insects of the Rocky Mountain States

### COCKROACHES

When viewed from above, cockroaches are oval, flattened insects. They have long, hair-like antennae and a broad saddle-like plate (pronotum) that covers the head. Adult stages of most species have wings, with the front pair being thickened and leathery. The wings are folded over the back and are rarely seen extended beyond the margin of the thorax and abdomen. Normally they are very active and fast-moving.

Cockroaches go through simple metamorphosis with three basic stages to the life cycle: egg, nymph and adult. The

eggs are laid in a bean-like egg capsule, called an **ootheca**, that may contain several dozen eggs. These egg capsules often are dropped around food sources or glued to surfaces, although some cockroaches carry the capsule until the eggs are ready to hatch.



**Oothecae of cockroaches.** Ootheca of the brownbanded cockroach (left) and the American cockroach (right).

The immature stages are called nymphs. Several nymphal stages occur, each separated by a molt. The nymphs generally appear similar to the adult stage, but lack the wings and are smaller. Typically two to three months must pass to complete their life cycle. However this can be highly variable depending on factors such as temperature and moisture and the species of cockroach.

Cockroaches are among the oldest group of insects known, with fossils dating 200 million years. As a group the cockroaches have shown exceptional ability to adapt to and survive in a wide range of environments, including the dwellings of humans. Most of the pest species of cockroaches are capable of developing on a wide range of foodstuffs and their flattened body form allows them to move into most harbors. Cockroaches also have developed resistance to several commonly used insecticides.

Cockroaches can enter buildings in boxes and containers of all kinds. They also may enter around loose fitting doors and windows, through utility lines, and may travel through sewers. Once within a home, cockroaches tend to prefer warm, dark moist shelters and are often found near kitchens and bathrooms. Since cockroaches are nocturnal, they are rarely seen during the day.

Aside from importance as household nuisances, they may soil areas with their salivary secretions and excrement, leaving an unpleasant odor. Cockroaches and their shed skins also produce allergic reactions in many humans, particularly asthmatics. Because cockroaches have habits of feeding on filth, they are well-suited to mechanically contaminate food or utensils. Cockroaches are capable of spreading diseases such as dysentery, diarrhea and food poisoning.

Most cockroaches are tropical or sub-tropical in origin and possess generally innocuous habits. However, a few have developed into serious pests including several species of cockroaches that have been introduced into the Rocky Mountain region. Habits of the common pest cockroaches found in homes and buildings are summarized:

#### **German Cockroach (*Blattella germanica*)**

- \* German cockroaches are the most common and difficult species to control.
- \* Adults are pale brown to tan and approximately 1/2" to 5/8" long.

## Household Insects of the Rocky Mountain States



**A german cockroach.**

- \* Adults are fully winged and are distinguished by having two dark stripes that run lengthwise along the pronotum, behind the head.
- \* This species has the highest reproductive potential (number of eggs laid and shortest life cycle) of the house-infesting cockroaches.
- \* Females carry their egg capsule, protruding from their abdomen, until the eggs are ready to hatch. Females produce about four to eight capsules in their lifetime. Each capsule contains 30 to 48 eggs which hatch in about 28 days at room temperature. The eggs usually die if the mother is killed.
- \* Females live an average of 250 days.
- \* German cockroaches generally are found close to moisture and food (e.g., kitchens and other food areas, restrooms, around plumbing fixtures). Surveys should concentrate in cracks and crevices, under table tops, behind sinks, in cabinets, motor areas of refrigerators, in and around kitchen equipment, and similar sites.
- \* Infestations found scattered throughout the building, including non-food areas, indicate high populations. Scattering also occurs as cockroaches disperse following insecticide applications.

### **Brownbanded Cockroach (*Supella longipalpis*)**

- \* Brownbanded cockroaches are the smallest species of cockroach found in homes (3/8" to 1/2", with average size slightly smaller than the German cockroach).
- \* Brownbanded cockroaches vary from light tan to glossy dark brown in color. The adult stages are

marked with two transverse light-colored bands at the base of the wings.

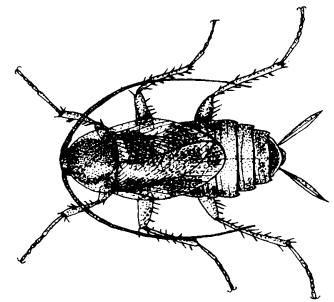
- \* Adult females may typically live about 200 days.

- \* Brownbanded cockroaches tend to scatter thoroughly through a building.

They prefer areas of higher temperature (80 degrees F or higher).

- \* Brownbanded cockroaches tend to occur more often in homes, apartments, hotels and hospital than in stores or restaurants.

- \* Brownbanded cockroaches usually glue their egg capsules to surfaces in dark areas such as cabinets, chairs, boxes, drawers, and high areas of a room. Because of this habit they are easily transported to new buildings. Females produce about 14 capsules during their lifetime, averaging 18 eggs in each capsule. Eggs hatch in 50 to 75 days.



**A brownbanded cockroach.**

### **American Cockroach (*Periplaneta americana*)**



**An American cockroach.**

- \* American cockroaches are the largest species commonly found in the region. Adults average about one and 3/4 inches in length, are reddish brown in color and have a light yellow or brown band around the edge of the pronotum.

## Household Insects of the Rocky Mountain States

- \* The egg capsules usually are dropped near food sources. A female may produce an egg capsule each week, laying 15 to 90 during her lifetime. Each egg capsule contains 14 to 16 eggs that typically hatch in 50 to 55 days. Under laboratory conditions adult females have lived for 14-15 months.

- \* American cockroaches prefer dark moist areas. Common habitats include: sewers, basements, boiler rooms, steam tunnels, and areas around plumbing fixtures. Garbage containers and other areas of refuse may be infested. American cockroaches are more commonly pests in hospitals, zoos, and institutional or industrial buildings than in homes.

- \* American cockroaches may occur outdoors during the warmer months.

### Oriental Cockroach (*Blatta orientalis*)



An oriental cockroach.

- \* Adults are approximately one inch long and dark brown or black in color.

- \* Wings of the oriental cockroach are short. Females only have small wing pads while males have wings that only cover about 3/4 of their abdomen.

- \* Females drop egg capsules in warm, sheltered areas near a food supply. Each female produces an

average of 8 egg capsules, each containing about 16 eggs. Under room temperature conditions, eggs hatch in about 60 days.

- \* Adult females may live about 180 days.

- \* Oriental cockroaches are almost always found around moist, dark sites. Common habitats include floor and storm drains, water meter boxes, around plumbing fixtures, moist crawl spaces, sewers, and around garbage.

- \* This species often is referred to as the "water bug".

- \* Oriental cockroaches may be found outdoors during the warmer months of the year.

- \* Oriental cockroaches are rather gregarious and "clusters" of them may be found in favorable habitats. They are seldom found high on walls, in high cupboards, or in the upper floors of buildings.

- \* Oriental cockroaches are not known to occur in the northern portions of the region.

### Surinam Cockroach (*Pycnoscelus surinamensis*)

The Surinam cockroach is very uncommonly found in the region, being even more sensitive to low humidity and temperature than



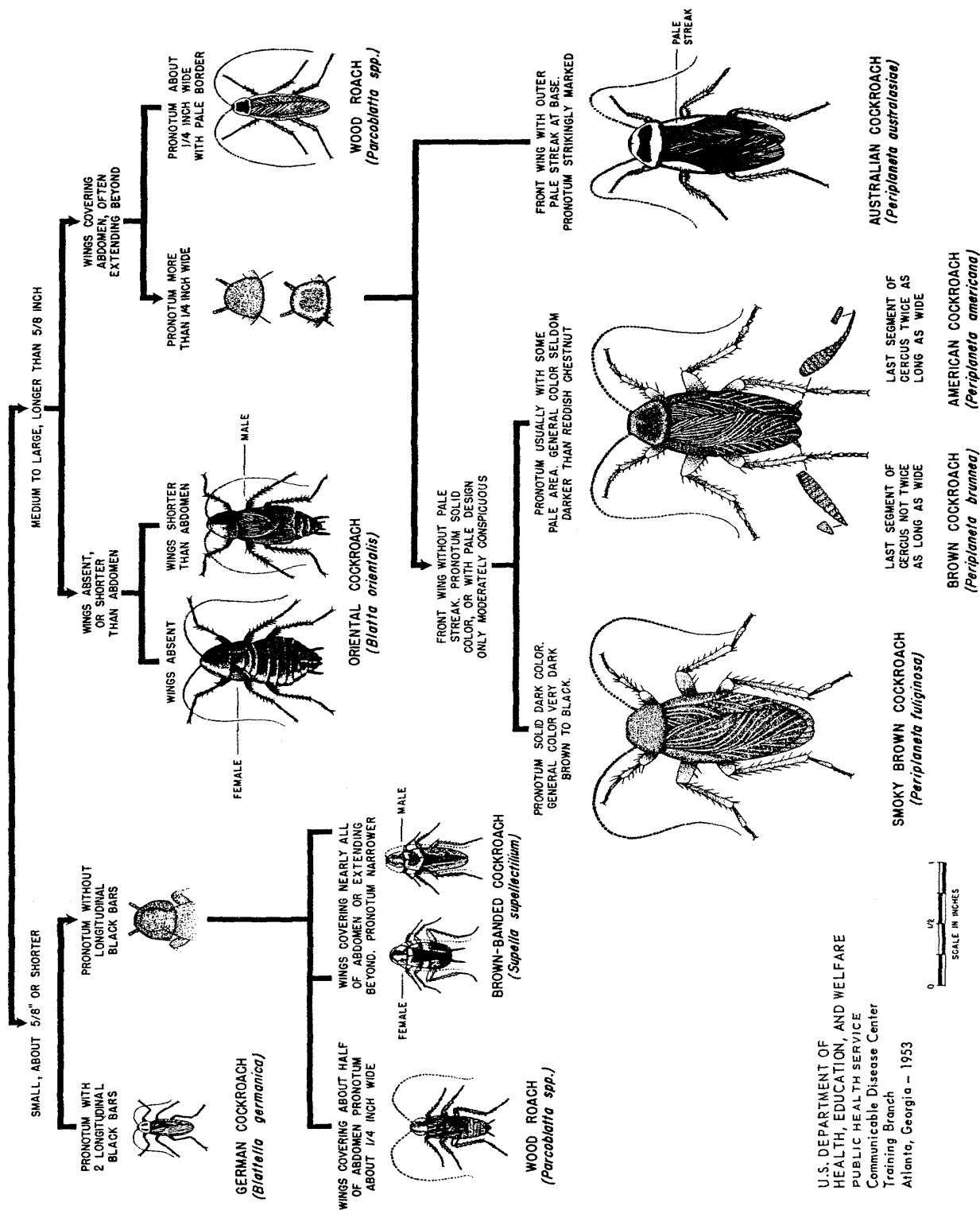
are the more serious pest species of cockroaches. A Surinam cockroach (male).

The Surinam cockroach is almost always associated with indoor plants and the soil and mulch around them. They are not a household pest but occasionally occur in large potted plants, atrium areas, and greenhouses.

# Household Insects of the Rocky Mountain States

## COCKROACHES: PICTORIAL KEY TO SOME COMMON SPECIES

Harry D. Pratt



## Household Insects of the Rocky Mountain States

### Cockroach Control

The control of cockroaches requires a great deal of care and planning, often involving the use of a professional pest control operator. Several steps and techniques are involved in effective control and these must be used in a coordinated manner. Cockroach control also usually requires changes in environmental conditions that contribute to infestations.

**Detection.** Thoroughly survey the site to determine the extent of the infestation and to identify the type of treatments that are required. Fundamental to this is determination of the cockroach species that is present. Since different cockroach species have differing habits, this will allow treatments to be better targeted.

Make a search of all suspected hiding places. Since cockroaches are rarely active during the day, this can be difficult. Cockroach droppings, which look like dark pepper, are often found near cracks and crevices and are indicators of activity in that harborage area. "Flushing" aerosols of pyrethrins can be used to irritate cockroaches and cause them to move out of hiding. (**Caution:** Use of such aerosols may cause scattering of cockroaches into new harborage sites.)

**Sticky traps** also can be useful to detect cockroach "hot spots". Several different types of traps exist and some also contain feeding attractants to lure certain cockroach species. Place these traps in areas where cockroach activity is suspected and check them after a few days. Traps should be located against corners or edges of cabinets, equipment or walls to be effective. Traps also can be used to assist in controlling cockroaches but are not an effective substitute for other control practices.

**Sanitation.** Sanitation is fundamental to cockroach control. Any methods that can be used to deny cockroaches the food, water, and shelter that they require will aid in control.

Keep food in tightly closed containers and not exposed. This includes spilled materials, garbage, food scraps remaining in sink areas, and pet foods.

Water is an important requirement for cockroaches. Eliminate dripping faucets, leaking pipes and other sources of moisture. Mops should be stored hanging and mop buckets should be kept empty in storage closets. Store bottles and cans to be recycled outdoors if possible.

It also is important to remove potential sources of reinfestation. Seal cracks, crevices and other openings. Caulk pipes and screen sewer drains. All materials



**Regular cleaning of food handling and storage areas is important in managing cockroaches.**

being moved into the building should be checked for evidence of cockroach infestation. Pay special attention to used furniture, appliances, and stereo equipment as cockroaches are frequently moved on these items.

**Chemical Control.** Several approaches to chemical control are possible. Regardless of the chemical or formulation chosen, applications made into regular hiding places will be most effective since they allow more contact. Chemical controls usually provide only temporary suppression, particularly when not combined with a vigorous sanitation effort.

Another potential limitation of insecticides is the development by many cockroaches of resistance to the chemicals. Many populations of German cockroaches are no longer susceptible to several insecticides that formerly were effective. Furthermore, cockroaches are repelled by several chemicals and will avoid treated surfaces.

Often, where no previous control has occurred, the initial treatments consists of a thorough "clean-up" or "clean-out" treatment. During this application, sprays



## Household Insects of the Rocky Mountain States

or dusts are applied thoroughly throughout the building. As a result of this treatment, there often is an immediate reduction in cockroach numbers. However, cockroaches are rarely eliminated by a single treatment since egg capsules are not killed. Also, some cockroaches may remain hidden in or migrate to untreated areas. For this reason, some follow-up treatments are usually required.

Most treatments involve sprays to provide a residual effect. These applications leave a residue on the treated surface that cockroaches pick up as they travel across it. The length of time that treatments remain effective vary depending on such factors as the concentration of chemical applied, choice of insecticide and its formulation, moisture and temperature, exposure to sunlight, and the application surface. Two or three weeks of residual activity is fairly typical for most cockroach insecticides. Insect growth regulators (IGRs), such as methoprene and fenoxycarb, are exceptions, often remaining effective for several months. These products do not usually kill cockroaches but do render them sterile.

Apply sprays to cockroach harborages with emphasis on cracks and crevices. There should be minimal application to exposed surfaces. If exposed surfaces are treated, use a low pressure spray. Avoid run-off or puddling and immediately wipe off excess spray. Do not apply oil-based sprays near open flames, to tile floors or onto plants. Water-based sprays should not be used near electrical outlets.

Several precautions should always be taken when making insecticide applications for cockroach control. Remove pets from the treatment area during application. Aquariums should be covered and aquarium pumps turned off. If sprays are to be applied to areas where food, cooking utensils, or dishes are stored, remove these items and cover prior to spraying. (**Note:** Few insecticides allow use around food handling or storage areas.) Furthermore, applications around these sites must usually be limited to cracks and crevices, avoiding exposed surfaces unless the label directions state otherwise. Treatments made near air ducts and ventilation

systems need to be done with extreme care to avoid air contamination. Never make applications directly into an air duct. Persons with respiratory problems, asthmatics, elderly persons, infants and young children should not be permitted in the treated area until it has been thoroughly ventilated.

Dust insecticides are able to penetrate cockroach hiding areas that sprays may not reach. They are also useful to use on very rough surfaces or on surfaces that would absorb liquid sprays. They may kill the insect by having the chemical penetrate the insect body or be ingested as the cockroach cleans its antennae and legs. When applied to dry locations, they also have a longer useful life than residual sprays.

Apply dusts as thin films, since heavy concentrations can repel cockroaches. The most commonly used dust, boric acid, may be applied in water which then dries and leaves a film of crystals. However, most other insecticidal dusts must remain dry to be effective.

Baits generally are long lasting and can be applied to areas that can't be treated with sprays or dusts. Baits include an attractant such as peanut butter or syrup in addition with a non-repellent type of insecticide, such as boric acid. Often baits may be placed inside small containers to help keep them away from pets and humans. To be effective, use baits in small amounts placed in many locations.

Effectiveness of baits is greatly dependent on the amount of competing food sources available. If sanitation efforts have not been thorough, there may be little effectiveness of baits. Baits, however, may not be effective if used immediately following a thorough cleaning because strong chemical odors, such as cleaning solvents, can be absorbed by the bait, reducing its attractiveness.



## Household Insects of the Rocky Mountain States

### ANTS IN THE HOME

Ants are very common throughout the Rocky Mountain region and tremendous numbers occur in the average yard. Most of the activities of these insects go unobserved and ants can be very useful for controlling some pest insects, destroying weed seeds, and in improving soils by their nest-building.

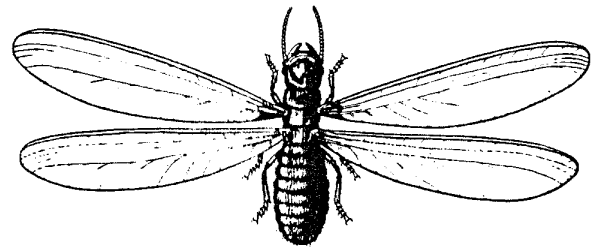
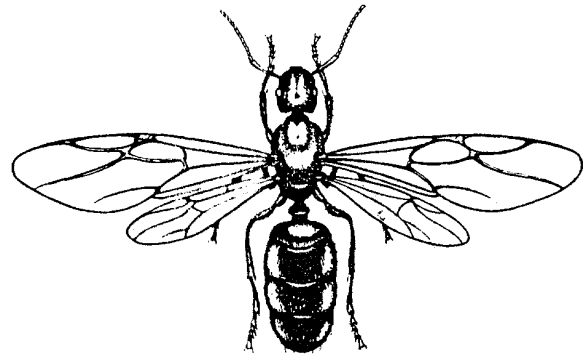
However, ants sometimes cause problems. Most common are nuisance ants foraging for food within homes. Ant nests may be located in areas where they are not wanted, such as playgrounds or lawn areas. A few ants, such as the pharaoh ant and carpenter ant, can nest indoors. Carpenter ants occasionally damage wood. Ants also are commonly associated with aphids and other honeydew producing insects. The ants collect and feed on the sweet sticky honeydew these insects excrete. In turn, the ants protect these pest insects from attack by ladybird beetles and other natural enemies.

#### Life History and Habits

Ants are social insects that live in a colony made of many specialized types of individual ants. Most ants in a colony are sterile females known as **workers**, which are wingless and do most of the food gathering, rearing of young, and colony defense. Eggs are produced by the large **queens** that have wings until after they have mated. Slightly smaller winged ants found in colonies are the **males**.

Ants are characterized by having a very narrow, pinched "waist", wings of unequal size, and antennae that are bent, or elbowed. They are sometimes confused with termites, particularly when swarms are produced. However, termites have a broad waist, wings of equal size, and antennae that are not elbowed and look like a string of small beads.

Eggs are laid in the colony by the queen ants. The pale, legless young (larvae) are fed by the worker ants, growing and molting over a period of a few weeks. They then pupate. The pupae do not feed and are immobile, soft and white. Pupae often are seen



A comparison between a winged ant (above) and a winged termite (below). Ants possess elbowed antennae, a "pinched" waist and have wings of uneven size. Wings of termites are equal in size, their antennae are beaded and they have a broad attachment between the thorax and abdomen.

when ant colonies are exposed by turning over a rock or log. The adult ants later emerge from the pupa.

New colonies are founded by mated queens. Mating occurs during periodic mating swarms when the winged males and queens emerge from the colony, where they have previously developed and remain until proper conditions favor emergence. Mating flights can occur throughout much of the year, but most often follow within a few days of a heavy rainstorm in spring or summer. Typically, mating swarms only last for one to three days, after which they end abruptly on their own. Swarming may be induced when a colony is under stress, such as following an insecticide application.

After mating, the queens seek a nest site and attempt to begin the colony. Very few are successful in this

## Household Insects of the Rocky Mountain States

attempt. Where nests are established, colony development is slow and nests are inconspicuous for several months, until a large population of worker ants is produced.

Ant nests usually are produced underground and colonies can contain tens of thousands of workers. The large carpenter ants tend to construct nests in wood, usually wood that is partially decayed. Relatively few ants in the region form a nest indoors, the pharaoh ant being an important exception.

Foraging by worker ants goes on constantly during the warmer months of the season. The workers lay down a chemical trail while foraging that helps direct other workers to foods. Ants feed on a wide variety of different foods. Sugary materials are preferred by most species. Seeds, grease or protein-rich foods make up the diet of other ants. Some ants feed on other insects, including pest species.

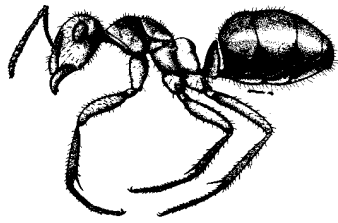
### Common Ants Found in and Around Homes

**Field ants (*Formica* species).** Among the most common ants found in homes and around buildings are field ants. These ants are of medium-size (1/10 to 1/4 inch) and range in color from dark brown or black to red or red and black.

They nest in loose soil and often are found around rocks and foundations.

They also may form large nests of piling mounds almost a foot in diameter of loose

soil at the surface. Although they do not nest indoors, the presence of nests immediately adjacent to or under homes can allow these ants to forage indoors during early spring, before other ants are active. Also, winged reproductive stages sometimes emerge indoors in homes where nests are adjacent to the foundation. Field ants feed on a wide variety of



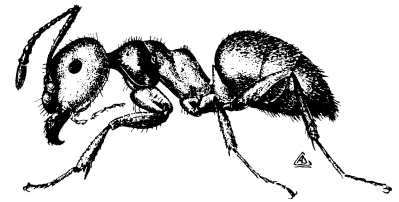
A field ant worker, indicating the notched thorax.

foods. They often collect honeydew and protect honeydew-producing insects (e.g., aphids, leafhoppers) from predation by other insects. However, field ants also feed on other insects, including pest species found on landscape plants and in lawns around the home.

Field ants do not have a "stinger". However, they can pinch thin areas of skin and secrete formic acid, that can produce short-lived pain. (**Note:** Effects of formic acid can be neutralized by applying a paste of baking soda to the sting area.)

**Cornfield ants (*Lasius* species).** Nests of the cornfield ants occur in fields and around homes.

Typically nesting sites in yards include brick or stone walls, cracks in the pavement, beneath rocks, and may also occur in openings around



A cornfield ant worker.

foundations. They do not nest in the house, but often forage inside in search of sweet materials. Cornfield ants are generally small (about 1/10 inch) and brown or black in color.

**Carpenter ants (*Camponotus* species).** Carpenter ants are the largest (1/4 to 4/10 inch) ants found in the region. Often they are black or dark brown, although some species are lighter colored and may have a red thorax. The thorax is distinctly rounded, without indentation and there is only one notch on constricted area between the abdomen and the thorax (petiole).



A carpenter ant worker.

The most distinctive habit of most carpenter ants is their nesting in wood. Galleries are excavated and the ants pile coarse sawdust near the nest openings. Often the sawdust is also mixed with insect

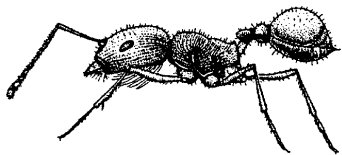
## Household Insects of the Rocky Mountain States

fragments. Unlike termites, carpenter ants do not eat wood and instead scavenge on dead insects, insect honeydew, and other materials.

Carpenter ants almost always nest in wood that has softened due to water and decay damage. Carpenter ants also may nest in hollow voids, such as walls or behind insulation as long as there is a nearby moisture source. Rarely, nests originating from damaged wood will later extend into sound wood, causing structural damage. Carpenter ants do not sting but can produce a mildly painful pinch from their jaws.

(**Note:** Winged stages of carpenter ants may also be confused with species of threadwaisted wasps. These latter insects prey on other insects but nest in cavities within firewood or other items and may emerge indoors. They are discussed in the section on nuisance invaders of homes.)

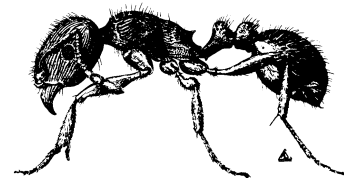
**Harvester ants (*Pogonomyrmex* species).** Nests of the harvester ants are very conspicuous since they often produce large mounds. The ants are fairly large (1/6 to 1/3 inch), and red or dark brown in color. Harvester ants clear vegetation from the area around the nest and produce conspicuous mounds. They are seed feeders and rarely enter homes. However, harvester ants can sting and produce a painful wound. Because the stinger is blunt, they cannot penetrate thicker areas of skin such as a toughened hand. Children generally are at higher risk of experiencing stings than are adults, since they have tender skin.



A harvester ant worker.

Mating swarms of harvester ants often concentrate near conspicuous features in the landscape. This may include buildings or chimneys of buildings. During these mating swarms winged ants may enter homes through the chimney or temporarily cover roofing. Although these swarms may be alarming, the ants do not survive long indoors without soil to construct their nests.

**Pavement ant (*Tetramorium caespitum*).** Nests of the pavement ants are common around foundations, under rocks, and in cracks of sidewalks and driveways. They are small ants (about 1/8 inch) with a dark body and pale colored legs and antennae. Characteristic to the species is a series of longitudinal grooves on the face of the ants.

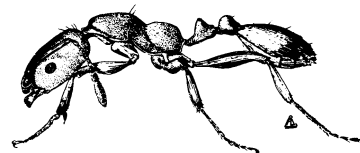


A pavement ant worker.

The pavement ant is apparently a fairly new pest species, having colonized the Rocky Mountain region since the 1960s. However, since then it has become the most common household infesting ant in the southern parts of the region, although it has not yet been recorded from Montana. Pavement ants forage on a wide variety of foods including grease, small seeds, and meats as well as sweets.

**Pharaoh ant (*Monomorium pharoanis*).** One of the most persistently annoying and difficult ants to control is the pharaoh ant. Pharaoh ant workers are very small (about 1/12 inch) and yellow or pale red. Unlike most other ants, pharaoh ants adapt well to nesting indoors and colonies may spread throughout a building. In addition, pharaoh ant colonies readily split into smaller colonies when disturbed.

Pharaoh ants have a wide food range that includes syrups, jellies, grease, cake, and pet foods. They are particularly serious pests in hospitals, dormitories and apartments.



A pharaoh ant worker.

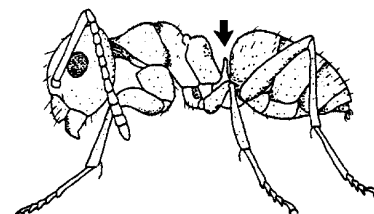
## Household Insects of the Rocky Mountain States

### Summary of characteristics of common ants infesting homes.

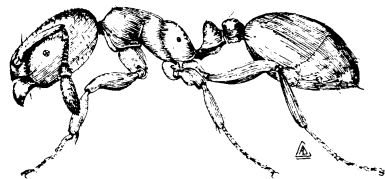
Ant species	Size of workers <sup>1</sup>	Color	No. of lumps on petiole <sup>2</sup>	Other features
Field ant	1/8 to 1/4 inch	Black, dark brown or dark red	1	
Cornfield ants	1/10 inch	Brown to dark brown	1	
Harvester ants	1/6 to 1/3 inch	Dark reddish or reddish-brown	2	Under the head are some long, beard-like hairs.
Carpenter ants	1/4 to 4/10 inch	Black or black and rusty red	1	The thorax in profile is rounded, without the indentations of most other species.
Pavement ant	1/10 to 1/8 inch	Light brown to black	2	Face with distinctive grooves. Very common.
Pharaoh ant	1/16 to 1/12 inch	Yellow to reddish	2	Antennal club with three segments and large, well-developed eyes. Easily confused with the thief ant. No sting.
Thief ant	1/16 inch	Light yellow to dark brown	2	Antennal club with two segments and small, vestigial compound eyes. Easily confused with the pharaoh ant. Sting is present.
Southern fire ant	1/16 to 1/4 inch	Yellowish or reddish with a darkened abdomen	2	

<sup>1</sup> Winged, reproductive stages are much larger than workers.

<sup>2</sup> The petiole is the constricted area connecting the thorax with the enlarged area of the abdomen.



**Thief ant (*Solenopsis molesta*).** Thief ants are very small (about 1/16 inch) and are easily confused with the pharaoh ant. They will nest indoors as well as outside, often living in the nest of larger ants. The foragers feed on a wide variety of foods including grease, sweets and meats. Thief ants nesting in the colony of another ant species also will kill and eat the larvae of the other ants.



A thief ant worker.

**Southern Fire Ant (*Solenopsis xyloni*).** The southern fire ant is found in the southern edge of the region covered in this publication. They typically nest under stones, debris or other cover but also may be found around house foundations. In these cases nuisance foraging workers or even occasional swarms of winged ants may be found indoors. Nests often are large and conspicuous, constructed in loose soil.



A southern fire ant worker.

## Household Insects of the Rocky Mountain States

Like many other members of the genus *Solenopsis*, the southern fire ant can produce a painful sting, although pustules do not arise at the sting site. The reaction is more severe in tender areas of skin. However, the southern fire ant rarely causes stinging problems and they are much less aggressive than is the notorious imported fire ant, which does not occur in the region.

The southern fire ant feeds on a wide variety of materials, particularly greasy materials and seeds. They are also known to damage small plants and will tend honeydew-producing insects such as aphids and scales.

### General Ant Control

Removing attractive foods is a very important part of any ant control program. Crumbs, grease, food scraps and other foods are sought by the foraging worker ants and they return to areas where these are found. Removing foods is also important when using ant baits since the goal is to concentrate ant feeding on the baits.

Most species of nuisance ants nest outdoors or in the soil beneath foundations and slabs. Perimeter treatments with residual sprays or granules applied around foundations can prevent many ants from foraging indoors. In serious infestations, primarily involving pavement ants, some interior treatment into cracks of concrete slab floors and cracks at floor/wall junctures may also be necessary.

For more permanent control, nests must be destroyed. Where nests can be located, dusts are usually more effective than sprays since the dusts are more readily tracked into the colony. Also, slow acting insecticides are most useful since they allow the forager to return the poison to the colony where it will be spread during communal feeding, killing queens and young. (**Note:** All use and sales of ant baits containing sodium arsenate, formerly the active ingredient in many ant baits, have been banned since 1989.)

Several brands of ant baits or ant traps are sold. Ant baits also can be easily made by mixing a small amount of boric acid into some food that the foraging ants feed on readily. (Boric acid is sold as a disinfectant in pharmacies as well as an insecticide in many cockroach powders such as Roach-Prufe<sup>®</sup>.) To prepare the bait first determine what the ants prefer, usually some sweet material (honey, jelly, etc.) or greasy material (e.g., peanut butter). Mixing mint apple jelly with some peanut butter is a commonly useful bait. Include boric acid in the bait at one to five percent concentration (approximately one teaspoon of boric acid per cup of the food bait) and place in areas where the ants will find it. If successful, the baits will kill the ants in about 10 days to two weeks.

**(Caution:** Although relatively non-toxic, use of boric acid or any bait must be done in a manner that prevents children and pets from contacting the bait and accidentally ingesting it. Place the bait in out-of-the-way areas and/or enclose it in "bait stations" such as straws. Boric acid is also highly toxic to plants and can act as a soil sterilant.)



**Homemade ant baits can be put into bait stations, such as soda straws. If carefully placed, this can reduce accidental exposure.**

Control of some ants, such as carpenter ants and pharaoh ants, requires more specialized treatment.

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### Food Preferences of Ants Found Around Homes.

**Field ants:** Honeydew, sweets, insects

**Cornfield ants:** Honeydew, sweets, oil, insects

**Carpenter ants:** Honeydew, sweets, insects

**Harvester ants:** Seeds, grain products

**Pavement ants:** Honeydew, sweets, oil, seeds, insects

**Pharaoh ants:** Sweets, protein, oil, insects

**Thief ants:** Sweets, protein, oil, seeds, insects

**Southern fire ants:** Honeydew, sweets, protein, oil, seeds, plants, insects

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## Household Insects of the Rocky Mountain States

### Control of Carpenter Ants

Effective control of carpenter ants requires finding the nest(s). Carpenter ants do not readily accept baits and residual treatments fail to kill colonies.

Carpenter ants usually nest outside the building, and only enter while foraging for food. Nests in buildings usually are associated with high moisture wood such as areas around plugged drain gutters, poorly fitted or damaged siding and flashing, wood shingle roofs, hollow porch posts and columns and leaking door and window frames. Wood in contact with soil, such as porches or stairs, also may provide nest areas.



Piles of shredded wood (containing insect fragments) or wood with the characteristic clean tunnels (not containing mud or

other debris that termites and other wood infesting insects produce) are common symptoms of carpenter ant nesting. Sound detection is sometimes useful in locating carpenter ant nests. An active colony at times produces a distinct, dry rustling sound which may be heard from outside the nest. Since carpenter ants are primarily active after dark, night inspections also may be useful for locating carpenter ants.

Basic control of carpenter ants indoors should involve: 1) elimination of high moisture conditions which provide wood conditions suitable for carpenter ant nesting; and 2) application of insecticides to nest and nest areas. However, carpenter ant control can be considerably more difficult. Often, carpenter ants nesting in a home are only a "satellite colony" and the main colony must be located and destroyed to allow long-term control.

Dust formulations of insecticides are particularly effective in treating nest galleries since they are picked up on the legs and body of the ants and

tracked into the nest more easily. If nests can be located, drilling can allow the insecticide to be placed directly into the colony, providing more effective control. Nest treatments may be used alone or in conjunction with sprays. However, spraying or dusting the infested area with residual insecticides without locating or treating the nest usually does not result in complete control.

Repair of badly damaged areas or control of existing nests can be achieved by replacing infested wood.

### Control of Pharaoh Ants

Pharaoh ants are unusually well suited to nesting indoors and most colonies are located within buildings rather than outdoors. They also are poorly controlled with residual sprays since irritating chemicals (including many cleaners and other solvents) may cause the nest to "bud" into separate colonies that disperse throughout the structure. They can be extremely difficult to control and the services of a professional pest control operator are often required.

Use of slow-acting baits has been most effective for pharaoh ant control. Sweet baits, particularly mint apple jelly, are readily accepted by foraging workers. However, pharaoh ants may later become saturated by the sweet baits and no longer accept them. Use of oily materials in combination with sweets (e.g., peanut butter and honey) often are effective for a longer period than are sweet baits. These hand-made baits need frequent, usually weekly, replacement. Also they must be placed and maintained carefully to insure their safe and effective use. Baiting should be concentrated in sites most frequently visited by pharaoh ants, such as around potted plants, around electrical outlets, near window sills, plumbing lines, or aquariums. Bait treatments are slow-acting and require several weeks to several months to kill the colony.

To improve bait acceptance, it is essential to remove other sources of food. Where other attractive foods remain, ants may not readily feed on the poisoned baits. Accumulations of dead insects around window

## Household Insects of the Rocky Mountain States

sills are a commonly overlooked food source of pharaoh ants.

Since the purpose of baiting is to get the ants to feed on the bait and return it to the colony, do not use residual insecticides inside the building. It also can be important to avoid use of volatile cleaners and solvents after baiting, since these can repel pharaoh ants. Cleaning activities should take place before baiting. Insecticides may be useful as perimeter treatments around the exterior of buildings during summer, when winged pharaoh ants disperse to new locations.

### SILVERFISH AND FIREBRATS

Silverfish and firebrats are flattened insects that are broad near the head and tapered toward the rear of the abdomen. They are wingless, covered with scales and have long slender antennae. Three long slender appendages from the rear of their body also are very distinctive.

Silverfish (*Lepisma saccharina*) are covered with silvery gray or tannish-gray scales. They prefer areas of some moisture and are usually found underneath boxes, boards, and other debris. Firebrats (*Thermobia domestica*) are more mottled in coloration. Firebrats prefer very warm areas and are usually found near heating units.



Silverfish.

Both silverfish and firebrats feed upon starchy and protein-rich materials. Natural fabrics and rayon, highly refined paper, glue and paste, books or linens are among the many food items used by these insects. They also may soil items by leaving yellowish stains.

**Control.** Consider environmental modifications for long-term control. Move boxes, furniture and other items that provide shelter to deny favored hiding areas. Increased circulation can help to decrease temperatures around heating pipes, making the site less favorable to firebrats. Silverfish, which are dependent on sources of moisture, can be limited by removing sources of water and decreasing humidity in a building.

Chemical control of silverfish and firebrats is somewhat similar to that used for cockroach control. Hiding areas should be thoroughly treated with sprays or dusts. Give attention to wall voids and attics where these insects frequently occur.

Traps can be used to supplement these other controls. One simple trap for silverfish is a small jar, such as used for baby food, that is cleaned and smooth on the inside. Cover the outside with masking tape, which will allow the silverfish to climb in the container. As they reach the rim, many will climb into the jar and be unable to subsequently escape. (The addition of bait does **not** improve capture by this method.) Alternatively, some silverfish can be captured in sticky traps such as are sold and used for control of cockroaches. Glue traps, used to control mice, also are effective for silverfish and firebrats.

## Household Insects of the Rocky Mountain States

### INSECTS INFESTING WOOL, FURS AND FEATHERS

#### Carpet (*Dermestid*) Beetles

Various species of carpet beetles (Dermestidae) are commonly found in homes throughout the region. Unlike cockroaches and many other household pests, carpet beetles commonly live and breed outdoors in the Rocky Mountain West. This allows them to easily invade homes by flying in from outdoor sources. As a result, almost all homes in the region have some carpet beetles present, although most often at non-damaging levels.

Carpet beetles are scavengers that feed on a wide range of plant and animal materials. However they

#### Carpet beetles found in Colorado-Wyoming homes; scientific name (common name, if any).

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##### Most common species found in homes:

*Anthrenus fuscus*

*Attagenus unicolor*

*Trogoderma sternale plagifer*

*Trogoderma variabile* (Warehouse beetle)

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##### Uncommon in homes, but may be present:

*Attagenus brunneus*

*Attagenus bicolor*

*Trogoderma glabrum*

*Trogoderma simplex*

*Trogoderma inclusum*

*Megatoma cylindrica*

*Novelsis horni*

*Thylodrias contractus* (The odd beetle)

*Dermestes lardarius* (The larder beetle)

*Dermestes maculatus* (Hide or leather beetle)

*Dermestes signatus*

*Megatoma kaliki*

*Anthrenus coloratus*

*Anthrenus scrophulariae* (Common carpet beetle)

*Anthrenus verbasci* (Varied carpet beetle)

*Anthrenus flavipes* (Furniture carpet beetle\*)

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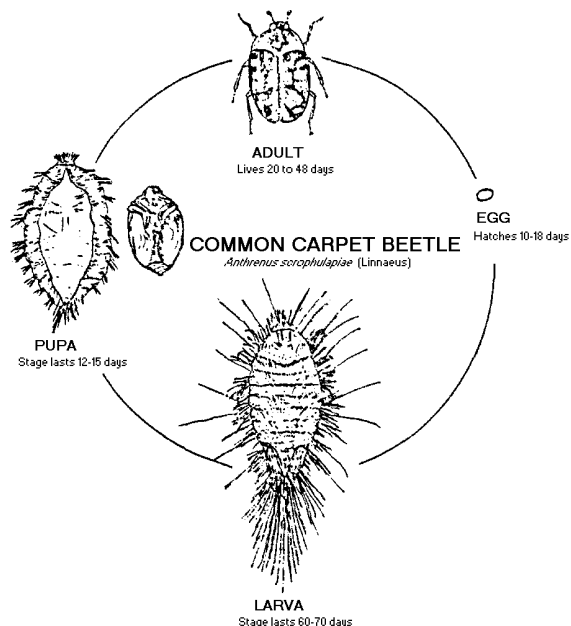
\* *A. flavipes* has been collected outdoors, but there are no regional records of it from homes.

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prefer animal-based products, such as wool and skins. Household lint (that may typically be composed of about 60 to 80 percent shed skin flakes and hair), dead insects, nests of birds or rodents, or small animals that have died in the vicinity of the home are common materials on which large numbers of carpet beetles may breed.

A great many species of carpet beetles occur, both outdoors and indoors. However, the species listed in the above table are those recorded as having been collected from within homes in the region.

Carpet beetles lay eggs around the foods used by developing larvae. Carpet beetle larvae are distinctive. They are light brown in color and have an elongate, tapering shape. Also, carpet beetle larvae are rather bristly, often with long hairs protruding from the hind end. (**Note:** The duff millipede, associated with pine forest areas along the foothills of the Front Range, resemble and are commonly confused with small carpet beetle larvae.)



#### Life cycle of the common carpet beetle.

Carpet beetles are fairly slow to develop and may require several months or even a year to develop to



## Household Insects of the Rocky Mountain States

the adult stage, particularly when using a cereal diet. Some species, such as various *Anthrenus* species, seem to have well-synchronized life cycles, with adults usually emerging in homes in early to mid-spring.

Carpet beetles are most damaging to items such as woolen fabrics, stuffed animals and furs. They are far more common than are clothes moths, another major group of fabric pests. Residual populations also may breed on debris that collects in or under furniture, around the edge of carpets, or in cracks and crevices. The name "carpet beetle" is based on their former importance as a pest of woolen carpets. Carpeting of synthetic fabrics is not susceptible to these beetles.

Infestations of carpet beetles in pantries are much less common than occur with species such as the flour beetles or sawtoothed grain beetle. Carpet beetles also develop much more slowly on cereal products than on materials of animal origin. However, since carpet beetles are highly mobile, infestations may regularly reoccur in pantry areas.

**Control.** Detection of carpet beetle breeding areas is the first step towards their management. Carefully examine materials most likely to be infested for the presence of the insects or for the shed skins of the larvae.



Adult and larva black carpet beetles.

Discard heavily infested materials, if possible. Alternatively, treat in some manner to kill the insects. For small items, deep freezing is possible since the insects should be killed within three to four days of exposure to deep freezing (less than 0 degrees F). High temperature treatment is even more reliable at disinfecting insects, if the material can tolerate being heated. Essentially all insects will be killed by exposure to 130 degrees F for twenty minutes or

more, although it frequently takes much longer for heat to penetrate to the interior of many infested items.

Fumigation may be necessary for some items. Paradichlorobenzene (PDB) "moth crystals" confined in areas with carpet beetles can be used to kill adult and larval stages in non-food products, such as woolen sweaters. Large items, such as furniture, may need to be removed to a fumigation chamber for professional treatment.

A thorough clean-up of the area also is important for carpet beetle control. Household lint, pet hair, collections of dead insects around window sills, and other debris can be an important food source for carpet beetles. If very large populations of carpet beetles suddenly occur, also look into areas where wild animals may have nested or where birds or rodents died in the vicinity of the home.

Sprays may be used to improve control of carpet beetles, and chlorpyrifos (Dursban) is the most commonly sold household insecticide used for this purpose. However, typical carpet beetle populations in homes do not pose a serious threat to furnishings and often can be adequately controlled with non-chemical methods.

### Clothes Moths

Infestations of clothes moths are infrequent in the Rocky Mountain region, with far more fabric injuries caused by carpet beetles. Presently, most problems originate from purchase of infested items from countries where clothes moths remain a common pest, such as Mexico, Central America, and southeast Asia. The webbing clothes moth, *Tineola bisselliella*, is the species that is usually found in the region.

Adult clothes moths are small (about 1/4 inch in length) and yellow or buff-colored. They are easily distinguished from the far more common household moth, Indian meal moth, by not having a distinctive dark band along the end of the wing.

## Household Insects of the Rocky Mountain States

Larvae of the clothes moths develop by feeding on woolen fabrics and furs. Webbing may be produced by the caterpillars as they feed, and one species weaves the silk into a case in which it lives. In a warm building, several generations may be produced during a year.

Occasional house-infesting moths that are in the same family as the clothes moths (Tineidae), are found within the genus *Amydria*. These are somewhat larger in size and develop as scavengers, rather than as direct pests of woolens. Piled organic debris, such as leaf litter around building foundations, and accumulated pet hair in heating ducts may provide breeding sites for these moths.



A clothes moth larva and adult. Photograph courtesy of USDA-Cooperative Extension.

**Control.** Female moths rarely fly until they have laid most of their eggs, so only killing the flying moths is an ineffective control approach.

Treat items known to be infested, and susceptible items stored nearby, in a way that will kill the eggs and larvae. Dry cleaning or storage with paradichlorobenzene (PDB) moth crystals can kill all stages of the clothes moth.

Proper storage is very helpful in preventing clothes moth infestations. Use tight fitting containers to store susceptible clothing, although the young caterpillars can penetrate fairly small openings. Cold storage also can prevent or retard infestations. Cedar chests, widely perceived as effective for clothes moth control, provide very little control, except as a form of tight-fitting container.

## Household Insects of the Rocky Mountain States

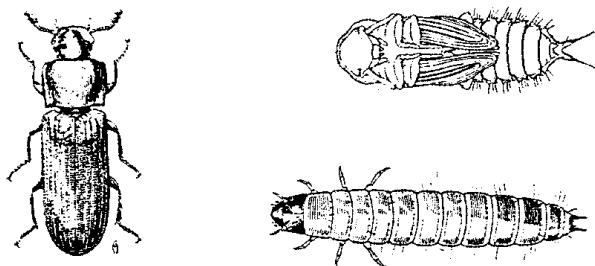
### INSECT PESTS OF HOME-STORED FOODS

Several insects commonly infest home-stored foods such as grains, flour, nuts, spices, packaged herbs and dried fruit. If infestations are prolonged, the foods may be seriously damaged and need to be discarded. Furthermore, many people will discard food products that are even lightly infested by insects. Stored products insects typically pose little health hazard, although some species can produce gastric irritation or allergic reactions.

Indian meal moths, flour beetles, and sawtoothed grain beetles are particularly common in homes, and are found throughout most of the world. Some insects that infest food, such as carpet beetles, can enter homes through natural migrations. Most often, insects are moved into homes on foods already infested during storage or transportation.

#### Flour beetles

Flour is most commonly infested by either of two closely related beetles, the confused flour beetle and red flour beetle (*Tribolium* species). Small pieces of cracked grains may also be sources of flour beetle infestation.



Adult, pupa and larva of the confused flour beetle, a common "bran bug". Size of adult beetle approximately 1/8 inch.

The adult flour beetles are reddish-brown in color and less than 1/8 inch in length. They are sometimes called "bran bugs" since they are so common in milling operations. Adults of the red flour beetle are strong fliers; the confused flour beetle does not fly.

Immature stages are pale-colored and worm-like. On close inspection, a pair of pointed forks can be seen on the hind body segment. Development of the immature stage typically takes one to two months and adults lay eggs over a period of five to eight months. Both adult and immature stages feed on flour.

A closely related species is the black flour beetle, *Tribolium audax*. Adult beetles are similar in size and shape to flour beetles but are very dark colored. They are scavengers of plant debris that are most often found in association with logs.

#### Sawtoothed Grain Beetle

The sawtoothed grain beetle (*Oryzaephilus surinamensis*) is the most common beetle found infesting household food items. It can develop in flour, but most infestations occur in processed grain products such as breakfast cereals, oatmeal, corn meal and pasta. Dried fruit and chocolate also may be infested.



A sawtoothed grain beetle. Note the serrations behind the head of the beetle. Size, approximately 1/10 inch.

The adult beetle is about 1/10 inch in length, similar in size to the flour beetle. It is elongate in general body shape, flattened and distinctively marked with a series of saw-like projections along the sides of the thorax. However, because of their small size, some magnification may be needed to detect these

## Household Insects of the Rocky Mountain States

Common insects found infesting foods within homes in the Rocky Mountain-High Plains Region.

Type of food	Commonly associated insects	Occasional, less common species
<b>Flour</b>	Flour beetles	Sawtoothed grain beetle
<b>Oatmeal, coarsely ground meals</b>	Sawtoothed grain beetle, Indian meal moth	Flour beetles, Carpet beetles, Merchant grain beetle, Spider beetle, Rusty grain beetle, Dark mealworm
<b>Prepared cereal products</b>	Indian meal moth, Sawtoothed grain beetle	Carpet beetles, Drugstore beetle, Merchant grain beetle, Cigarette beetle
<b>Herbs, spices</b>	Indian meal moth	Carpet beetles, Drugstore beetle, Cigarette beetle
<b>Nuts, seeds, dried fruit</b>	Indian meal moth	Carpet beetles, Cigarette beetle, Drugstore beetle
<b>Whole grains</b>	Lesser grain borer, Indian meal moth	Rusty grain beetle (molds), Sawtoothed grain beetle (cracked kernels)

characteristics. Sawtoothed grain beetles have wings, but have never been observed to fly.

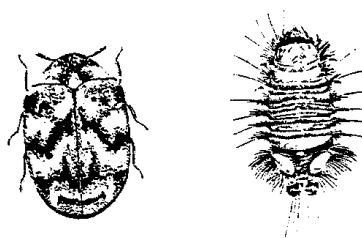
Eggs are laid in crevices in or near the food supply. The larvae are yellowish-white with a dark head, and worm-like in shape. Larvae feed on the same foods as do the adult stages. Under optimal conditions they can complete a generation in less than two months. Adult beetles may live for a year or more.

A closely related beetle, the merchant grain beetle (*Oryzaephilus mercator*), less commonly occurs in stored foods. It most commonly feeds on oilseed products, such as nuts.

### Carpet Beetles

Several species of carpet beetles (Dermestidae) occur in the Rocky Mountain region, both indoors and outdoors. They have extremely diverse feeding habits but prefer high-protein materials of animal origin, such as wool and skins. House-hold lint or small animals that die in the vicinity of the home are common materials on which large numbers of carpet beetles may breed.

Infestations of carpet beetles in pantries are less common than with flour or sawtoothed grain beetles. Carpet beetles are relatively slow to develop, requiring about a year for a generation on cereal products. However, since the insects are highly mobile, infestations may reoccur annually.



Typical carpet beetle adult and larva.

Carpet beetles are much more common as pests of woolens, furs and other materials of animal origin.

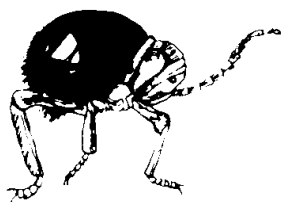
They are far more common, and more damaging, to fabrics than are

clothes moths in the region. They also breed, often at low and relatively non-damaging numbers, on household lint and other debris such as dead insects.

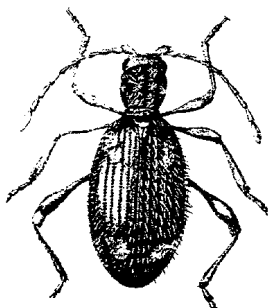
## Household Insects of the Rocky Mountain States

### Spider beetles

Spider beetles (Ptinidae) are a relatively rare pest of stored food, feeding primarily on fungi. Spider beetles are larger than the other common stored products beetles and many species appear similar in general shape to a spider. However the three pairs of legs easily distinguishes them from eight-legged spiders.



Whitemarked spider beetle (above); American spider beetle (right).



Spider beetles can potentially infest a wide variety of animal or vegetable products. They are most commonly associated with grains, although feathers, wool, dried meat and other products can be eaten. However, most foods that are attacked are stored under conditions of high moisture where fungal growth also is favored.

Eggs of the spider beetles are white and may be conspicuously laid about the food products. The larvae are C-shaped small, white grubs. Pupation often occurs in small cavities that they chew out of wood or other soft materials.

### Drugstore Beetle

The drugstore beetle (*Stegobium paniceum*) is an infrequent pest of home-stored food in the region, although a widespread pest throughout North America. Feeding habits are very broad and can include grains, dry pet food, flour and condiments. Like its close relatives the furniture beetles, the drugstore beetle may bore through wood or books.

Adult drugstore beetles are about 1/10 inch long and generally brown. They can be differentiated from the carpet beetles by having the angle of the head projecting sharply downward, when viewed from the side. Females lay individual eggs near the foods used by the developing larvae. Larval development subsequently takes from four to 12 months to complete, depending on temperature.



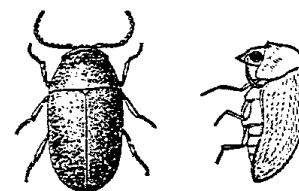
Drugstore beetle. Actual size about 1/10 inch.

Control of drugstore beetles is similar to that for carpet beetles. Infested items should be discarded or heat/cold-treated to kill the insects. Sanitation efforts should be made to clean up materials that may be used as food. Food that is susceptible to the insect should be used rapidly and stored in a refrigerator or a tight fitting container so as to prevent reinfestation. However, adults of this insect can easily burrow through cardboard, making it more difficult to exclude.

### Cigarette Beetle

The cigarette beetle (*Lasioderma serricorne*) is occasionally found in the region. It feeds on pet foods, cereals, spices, dried fruits and nuts, preserved animal products, dried floral arrangements and other materials.

Cigarette beetles are similar in size and appearance to the drugstore beetles, being about 1/8 inch long, brown and generally oval-shaped. Control methods are similar to



Cigarette beetle.

those for drugstore beetle: locate and destroy breeding sources and/or use heat/cold treatments to destroy eggs, larvae and adults. Food storage areas should be thoroughly cleaned to eliminate food for surviving beetles.

## Household Insects of the Rocky Mountain States

### The Dark Meal Worm

The dark meal worm (*Tenebrio obscurus*) sometimes infests food storage areas. The insects are primarily scavengers and prefer to feed on decaying grain or milled cereals that are damp or in poor condition.



Adult of a mealworm.

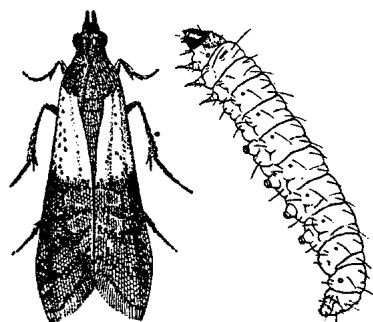
The dark meal worm is one of the largest insects associated with stored foods. A close relative of the common meal worm raised and sold in pet

stores, the adults are about 1/2 inch to 5/8 in length and dark-brown or black in color with nocturnal habits. The larvae are yellow-brown and worm-like, found in the food storage area except when they wander in search of sites for pupating. Pupation may involve tunneling of cells into soft wood or other materials and structural damage by this tunneling has been reported in chicken coops, a common site of infestation. Meal worms are slow to develop and probably only have a single generation per year.

Control primarily involves clean-up of conditions that produce favorable breeding sites.

### Indian Meal Moth

The Indian meal moth (*Plodia interpunctella*) is an extremely common insect found infesting food products in regional homes. Coarse grain products (e.g., oatmeal, grits), nuts, seeds, dried pet foods, candy bars, spices, dried fruits or vegetables are suitable materials



Indian meal moth, adult (left) and larva (right).

for Indian meal moth development. However, flour is rarely infested.

The adult stage of the Indian meal moth is about one-half inch in length, generally gray in color with bronzy wing tips. The moth is the most common small moth found flying in homes, and is most commonly observed in early fall. Feeding damage is done by the larvae ('worms') that are usually light colored (pale yellow to pink) with a dark head. When feeding, the larvae produce webbing that is mixed with food particles and droppings.

After feeding is complete, the larvae often disperse, sometimes for several yards, in search of sites to pupate. The presence of pale caterpillars around the home is almost always Indian meal moth. Larval dispersal usually occurs in late September and October.

Indian meal moth occurs throughout the United States and most household infestations originate from the inadvertent purchase of infested products. Although probably uncommon, localized outdoor flights of the moths also may occur during warmer months, producing some new infestations in homes.

Eggs are laid by the adult moths near suitable food, such as along cracks or folds of packages. The newly hatched larvae are very small and capable of penetrating into loosely closed packaging. Upon reaching a suitable food, they begin to feed. Development can be rapid under favorable conditions and the larvae ultimately reach a length of about one-half inch. Pupation then occurs, after which the adult moths emerge. Adult female moths are capable of laying 200 to 400 eggs during their lifetime of several weeks. Complete development of the Indian meal moth varies due to temperature and food. For example, under average household temperatures a generation might be completed in as little as four months if feeding on a diet of bran, but will take almost twice as long on raisins.



## Household Insects of the Rocky Mountain States

### Insects Infesting Whole Grains

Several species of beetles can infest whole (unmilled) grains and beans. Among the more common of these "direct pests" is the lesser grain borer, that develops by tunneling kernels of wheat and other small grains. Other types of beetles, notably the seed weevils or bruchids, infest seeds of corn, rice, beans, or other items. Although their occurrence in homes is infrequent, these insects can cause serious losses to bulk storages of grains. They also produce grain particles that allow other insects, such as grain beetle, to establish in a food storage area.

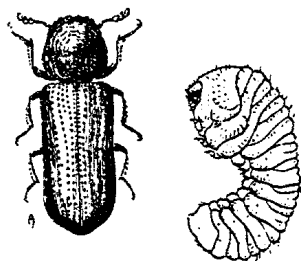
### Control of insects infesting stored foods

When insects are detected in food products, try to identify all sources of infestation within the home. Check all susceptible food items in cupboards, paying particular attention to items that have not been used for a long period of time. Also check areas of spilled foods, including sites that may not be obvious, such as under refrigerators and stoves.

Knowing the identity of the insect will help you focus your search. If flour beetles are present, only finely milled materials need to be surveyed. Sawtoothed grain beetles may infest a somewhat wider range of food, including oatmeal and coarsely milled food.

Problems with Indian meal moth require that surveys also include storages of pet food or bird seed as well as any ornamental items involving the use of grains or dried fruits and vegetables. Carpet beetles most typically are established in woolens, furs, and household lint.

The physical presence of the insects is the most obvious means to detect areas of infestation. Also look for old cast skins left by flour and carpet



Lesser grain borer adult (right) and larva (left). Larvae feed within grain.

beetles. The presence of webbing is an easy means of detecting items infested by Indian meal moth.

Discard items infested by insects that live within the food (carpet beetles, flour beetles, or Indian meal moth) or temperature treat in a manner to kill the insect. Cold treatment can involve putting infested items in deep freeze for a few days. Effectiveness of this treatment is improved by alternating freezing treatments with a periodic rewarming to room temperatures. High temperature treatments involve oven heating at around 130-140 degrees F for 20 minutes. (Longer intervals are needed if treated items are bulky, requiring longer periods to raise internal temperatures.) Injury to the food is possible with excessively high temperature treatments.

Heat or cold treated objects are capable of being reinfested so keep them in the refrigerator or store in tight fitting containers until household infestations are eliminated. Adult Indian meal moths and flour beetles deprived of food might live three to five weeks. Carpet beetle and cockroach infestations typically take much longer to eradicate.

Since insects also can develop on spilled food, thoroughly clean areas where food was stored by vacuuming or sweeping all spilled food. The thoroughness of the cleaning is important primarily to eliminate food for surviving insects to feed on. The nature of the cleaning agent (soapy water, bleach, etc.) is less important than the permanent elimination of the food.

As a routine precaution, treat materials suspected of having insects by freezing after purchase. Use food products soon after purchase to prevent infestations from being established from insects brought in on the food.

Use of insecticides within the pantry area is not generally recommended and will normally give little additional control in the absence of sanitation. Some household formulations of insecticides are labelled for use as **crack and crevice** treatments near food storage areas. However, **never apply insecticides in**

## Household Insects of the Rocky Mountain States

**a manner that allows direct contact with food, food preparation surfaces or food utensils.** Wash all surfaces that may contact food and/or cover with shelf paper after residual insecticide applications are made.

Because of the diverse feeding habits and mobility of such pests as cockroaches and carpet beetles, control efforts must involve a larger area of the home than with species that are largely restricted to pantry items.

**Always read and follow all label directions when using pesticides!** This is particularly important when

direct treatments are made around foodstuffs or food handling areas. Only products that are specifically labelled for use around food storage areas may be used to control stored products insect pests.

### Where Do They Come From?

The insects that infest stored foods move into homes in a variety of ways. Many cannot survive outdoors or don't move very far on their own. These insects are most often moved into homes on infested materials. Other insects occur outdoors throughout the region and move indoors by crawling or flying during warmer seasons.

### Probable sources of insects infesting stored foods.

Insect	Probable sources
<b>Carpet beetles</b>	Many of the carpet beetles found in homes are also common outdoor insects and can reinfest homes easily during the warm months of the year. Some carpet beetles also are moved in stored foods, or materials of animal origin such as fur, feathers and wool.
<b>Indian meal moth</b>	Indian meal moth is a common inhabitant of warehouses, grain elevators and other food storages. Although the moth could fly during the warm months and infest homes, presumably most infestations result from acquisition of infested items.
<b>Flour beetles</b>	Infestations may originate from infested food items brought into the home or from dispersal of winged adults (red flour beetle).
<b>Sawtoothed Grain beetle</b>	Since sawtoothed grain beetles grain beetle do not fly, infestations originate from infested items brought into the home.
<b>Lesser grain borer</b>	Lesser grain borer is the most common insect found in regional storages of small grain. The adult beetles can fly and presumably could infest homes located near grain storages during these flights. However, it is far more likely that infestations originate from purchase of infested grain.
<b>Flies</b>	Flies found within homes can come from a wide variety of breeding areas and the adult stage can fly long distances. Fly problems almost invariably originate from breeding areas outside the home, and adult stages move indoors to feed.
<b>Cockroaches</b>	The most common cockroaches found in homes (German, brownbanded) are almost entirely limited to domestic life and cannot colonize homes through natural dispersal. Instead, egg capsules or other stages are introduced through human movement of infested items. During summer, the less common American cockroach and Oriental cockroach can make short distance movements outdoors that could allow spread to other buildings. Also, Oriental cockroaches can travel through sewers and water systems. However, even with these cockroach species, most problems probably originate from human movements of infested items.



## Household Insects of the Rocky Mountain States

### WOOD DESTROYING INSECTS

#### Termites

Termites are generally broken down into two groups, the subterranean termites (*Reticulitermes* species) and the drywood termites (*Incisitermes* species).

Subterranean termites nest underground and create tunnels through the soil as they forage for sources of wood or other foods. Drywood termites feed and nest within wood, occurring as problems in items such as utility poles, large pieces of wooden furniture, or in beams of attics.

Within the High Plains-Rocky Mountain region, subterranean termites predominate, with drywood termites known from only a small area in along the Colorado/Utah border.



Subterranean termite workers.

Infestations of subterranean termites are less frequent than in many regions of the United States. However, serious problems do occur in some localities. The establishment and spread of the eastern subterranean termite in the region has also contributed to increased problems. Higher humidities around buildings, related to landscaping practices also have caused termite problems to become more important.

Termites belong to the insect order Isoptera ("equal wings"). Although often called 'white ants', they differ in several important characteristics from true ants (Order: Hymenoptera). A summary of differences in the form of ants and termites appears in the table on the next page.

All termites feed on materials rich in cellulose, such as wood or paper. In some species, these are digested by the termite with the aid of specialized protozoans that are a permanent part of the digestive tract of all healthy termites. Other termites can produce enzymes that break down cellulose. Since termites actually feed on wood, rather than living within it as do

carpenter ants, they do not produce any sawdust as do the other wood boring insects. Badly damaged wood may have the interior sapwood completely riddled, although the exterior remains intact and may appear to be sound.

#### Subterranean Termites of the Region

The **arid land subterranean termite**, *Reticulitermes tibialis*, is a native insect found throughout the lower elevations (below 7000 feet) of the region. It also is common in grassland and shrubland areas, where it feeds upon materials such as dried cattle manure, discarded wood, and brush. Despite its widespread distribution, damage to wooden structures by this species is relatively rare. Subsoil conditions, local sources of humidity and other local factors appear to be important determinants of where attacks occur.

Flights of the reproductive stages of arid-land subterranean termites are most frequently observed on one of the first warm days of late winter or early spring. Indoors, they emerge as early as mid-February. Less commonly, fall flights also occur.

The **eastern subterranean termite**, *Reticulitermes flavipes*, is a more destructive species of termite. It is the common termite of the northeastern United States and has expanded its range into eastern Colorado and possibly Wyoming. Although less common than the arid land subterranean termite, it is more often found causing damage to man-made structures. The eastern subterranean termite is less tolerant of dry conditions than is the native arid land subterranean termite. However, the increased moisture associated with irrigated landscaping or from poor drainage around buildings allows it to adapt to conditions in some settings.

Swarming of eastern subterranean termites usually takes place in April or May, although they may occur much earlier indoors. Several swarms may issue from the same colony with the earlier swarms usually the largest. Males and females come out in equal numbers.

## Household Insects of the Rocky Mountain States

### Summary of differences in appearance of ants and termites.

Characteristic	Ants	Termites
Antennae	Distinctly elbowed	Not elbowed, appears composed of a series of beads
'Waist' (attachment of abdomen and thorax)	Pinched	No distinct constriction
Wings of reproductive stages (wings/males, queens)	Hind wings smaller than forewings	Wings of equal size
Coloration of reproductive stages	Variable, from orange-brown to black	Generally black with some light markings on legs in some species
Coloration of workers	Variable, from orange-brown to black	Pale, cream colored

### Differences in wood damage and other features associated with wood boring insects.

Insect	Damage characteristics
Carpenter Ants	Nest building produces shredded wood fibers of a coarse sawdust consistency that are pushed out of the nest entrance. Nests follow grain of wood and galleries often appear polished.
Subterranean Termites	No sawdust produced since the termites eat the wood. Galleries in wood are often caked with mud in many spots. Mud shelter tubes may be present on concrete foundations or wood surfaces. Spring wood is eaten, leaving growth rings intact.
Drywood Termites	Produce regularly formed, often hexagonal, pellets that sometimes are found in small piles. Galleries of nest are highly polished.
Powderpost Beetles	Produce very fine sawdust, similar to face powder. The sawdust easily falls out of the tiny holes the powderpost beetles produce. Most tunneling occurs in sapwood. Exit holes are round and small (1/32 to 1/16-inch diameter). Hardwoods only are attacked.
Furniture Beetles	Produce a pelleted, gritty frass that usually remain within the tunnels of the wood. Exit holes are round and small (1/16 to 1/8-inch diameter.)
Roundheaded borers	Most produce a coarse, fibery sawdust. Most sawdust remains packed in the tunnels, although some species will push it out of openings. Exit holes are nearly round.
Flatheaded borers	Tunnels are packed tightly with fine, powdery sawdust. Tunneling is concentrated in the area under bark. Exit holes are oval.
Horntails	Tunnels in wood are packed with a coarse sawdust frass. Exit holes are fairly large (about 1/4-inch diameter) and round.

Uncommon species of subterranean termites that also are known to occur in Colorado include *Reticulitermes virginicus* and *Reticulitermes hageni*. Within the

region, both appear to be restricted to the extreme southeastern part of Colorado. Habits of these species are generally similar to other subterranean termites.

## Household Insects of the Rocky Mountain States

### Key to the winged stages of subterranean termites found in Colorado, Wyoming, and Montana.

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1a. Winged stage yellow-brown to brown .....	Reticulitermes hageni
1b. Winged stage brownish-black to black .....	2
2a. Winged stage very black; upper leg (tibia) black to sooty .....	Reticulitermes tibialis
2b. Winged stage brownish-black to black; tibia pale yellow, almost colorless .....	3
3a. Wings almost colorless except in the fore-area; wings less than 1/4 inch long .....	Reticulitermes virginicus
3b. Wings faintly to clearly grayish or brownish; forewing usually distinctly darker than hindwing; wings usually more than 1/4 inch long .....	Reticulitermes flavipes

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### Drywood Termites

Drywood termites (*Incisitermes* species) nest and feed in dry, sound wood. They can be extremely damaging and are serious pests in the southwestern United States. Fortunately, infestations in the region are very rare, with known problems limited to northwestern Colorado and adjacent areas of Utah. Drywood termite injury is most common in furniture, utility poles, and a variety of dry wood products.

Because their individual colonies are small, drywood termites generally take longer to produce severe structural damage to homes than subterranean termites. However, since they do not have to maintain the colony underground, colonies can be more spread out and difficult to control.

In size, drywood termites are generally larger than subterranean termites. The primary physical difference between the two insects is their wings. Drywood termites are characterized by having distinct longitudinal veins with many cross-veins along the front of the wing.

### Life History of Termites

Termites are social insects, like bees and ants. They live within colonies containing different types (castes) of termites. Only a few of the eggs that are laid develop into individuals that can reproduce, the **reproductives** (queens, kings). The bulk of the colony consists of sterile female **workers** that devote themselves to foraging for food and caring for the reproductive forms and immature termites. **Soldiers**, a

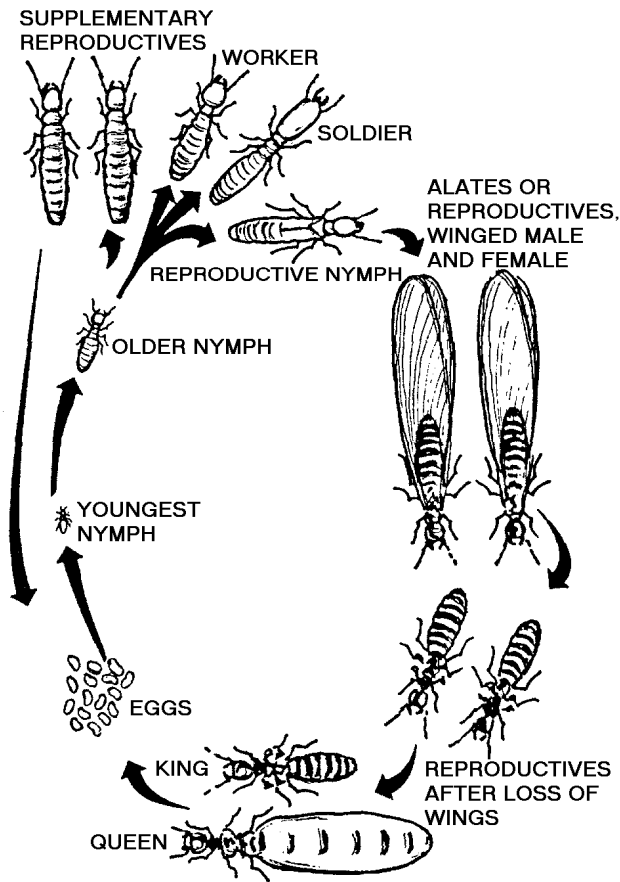
special caste of sterile females, primarily are involved in defending the colony from ants and other invaders. The soldiers have massive heads with greatly enlarged mandibles used in defense of the colony.

Termites have a simple type of metamorphosis. The queen lays eggs that hatch into immature nymphs. These young termites generally look like adult stages but are smaller and lack special features such as wings or enlarged mandibles.

Most termites rely on microscopic protozoa in their hind guts to break down cellulose for food. Termites obtain the protozoa by sharing food with other individuals in the colony. Every time a termite molts, the lining of the hind gut is shed along with the protozoa and they must be reacquired from other termites. (Some species of termites produce their own enzymes, cellulases, that can break down cellulose.) Soil fungi, as well as plant cellulose, can sustain developing termites.

Workers and soldiers are very sensitive to drying and thus avoid light and arid conditions. The winged reproductives, that leave the colony during swarms, are the members of the colony most likely to be seen by the homeowner. Termites may swarm at several times during the season but in this region most are observed from late February through early April. As a general rule termites swarm within ten days following the first warm rains of the year. Not all colonies will swarm every year, but swarms emerging indoors indicate a probable infestation within the home.

## Household Insects of the Rocky Mountain States



Generalized life history of subterranean termites.

Both male and female reproductives are in the swarm. They are more darkly colored than the pale, colorless workers. After the dispersal flight, the termites fall to the ground, later breaking off their wings. A male and female (future queen) will then search out a crack or crevice in the soil or near wood. They then begin to excavate a nest in the soil. Essentially all nesting by subterranean termites occurs in the ground, although nesting directly in structures is possible if extremely high humidity conditions occur.

The pair then mate and the first eggs are laid. Usually six to twelve eggs comprise the first batch of eggs. The queens, males and females live together for life unless some accident occurs. Once these worker-nymphs hatch, they begin to eat fungi and cellulose

products, expanding the size of the colony area by their activities. With the assistance of the workers, the queen will lay increasingly larger numbers of eggs. Later, the colony size may increase at even a faster rate if secondary reproductives are produced that also lay eggs. However, colony growth is rather slow compared to other social insects and it takes at least two to three years for a newly established colony to become large enough to begin to damage structural wood.

Subterranean termites can enter the home in many ways. Any wood in contact with the soil, such as wood supports passing through concrete slabs or siding that touches the soil, are excellent means for termite movement into structures. Cracks in concrete foundations and open voids in concrete block foundations are also hidden avenues of entry.

Termite colonies can be very long lived. Supplemental queens can be produced by the colony when the original queen dies or stops reproducing, allowing the colony to survive almost indefinitely. Probably most colonies die out when ants, the primary natural enemy of termites, discover and destroy the colony.

### Detection of Subterranean Termites

Subterranean termites remain hidden within the wood or other materials on which they feed. Those actually doing the feeding seldom are seen. The presence of winged termites emerging from the ground in or near the house does not necessarily mean the house is infested. However, it is a good reason to check further. Termites working in homes or other buildings usually come from colonies already established in the soil. Perhaps the termites in a colony beneath the house or in the soil nearby have been feeding on scrap lumber, roots or tree stumps left in the ground when the house was built.

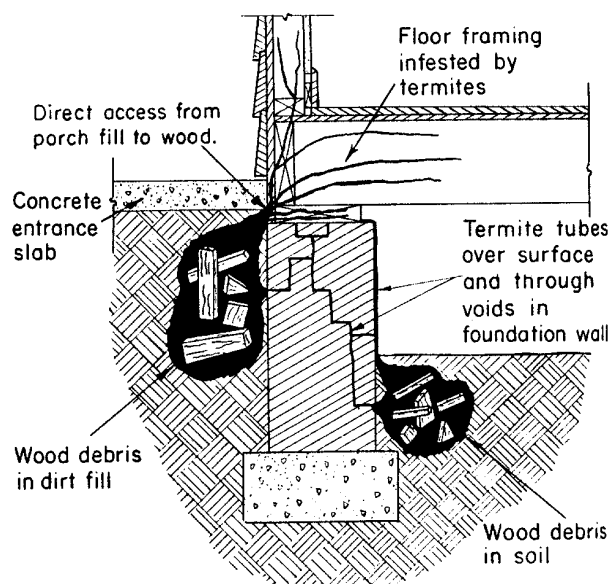
Other signs of infestation can be the presence of slightly flattened, earthen shelter tubes that termites build over the surface of foundations to reach wood. This habit is particularly common with the eastern subterranean termites, being much less observed

## Household Insects of the Rocky Mountain States

among the native, arid-land subterranean termites. These mud tubes are usually about 1/4 inch wide. Since termites are very sensitive to drying conditions, mud tubes are built to maintain high humidity throughout the colony.

Subterranean termite feeding follows the grain of the wood and only the soft spring wood is attacked. They construct galleries in wood containing sand and soil particles that are used as a form of plaster. Subterranean termites do not push wood particles or pellets (fecal material) to the outside of tunnels (a habit of wood boring beetles and carpenter ants), instead consuming it as food.

Damaged wood often is not noticed and the exterior surface usually must be removed to see the damage. However, galleries can be detected by tapping the wood every few inches with the handle of a screwdriver. Damaged wood sounds hollow and the screwdriver may even break through into the galleries. An ice pick also can be used to probe wood suspected of being damaged by termites. Elevated moisture in termite tunnels may cause blistering of paint on the surface of infested wood.



**Termite colonies can originate on wood debris in the soil and then later move to nearby buildings.**

When termite damaged wood is discovered in a home, the question often arises whether the injury is new or old. This can be difficult to determine. Obviously the presence of living termites is a positive diagnosis of an existing problem. In the absence of this, it might be useful to probe small holes in wood that has termite tunneling. If the holes are small and the wood has not been seriously disturbed during the inspection, the termites may return within a few days to seal the small holes with mud and debris to keep humidity high in the wood. Evidence of recent sealing of these holes is another positive indicator of an active termite infestation. However, if large holes are made or if the condition of the wood is not favorable to termites because of dryness or some other factor, termites may just abandon that piece of wood while still actively foraging elsewhere in the home.

Often the question arises of whether damage that is discovered is "old" injury from a colony that has died out or merely occurs in wood that has been abandoned for some reason while the colony is currently foraging in some other part of the structure. This determination is almost impossible to make. In most cases where termite injury is discovered it is probably best to assume the colony is still active, unless there have been significant changes made that may have eliminated foraging termites from the building (e.g., structural changes, grading changes, insecticide treatment).

### Detection of Drywood Termites

The first evidence of drywood termite infestations usually are piles of fecal pellets. They vary in color from light gray to very dark brown, depending on the wood being consumed. The pellets are hard, elongated and less than 1/25 inch in length, with rounded ends and six flattened or concavely depressed sides. Pellets produced by dry-wood termites may superficially resemble those produced by anobiid and bostrichid beetles.

There generally is very little external evidence of drywood termite infestations. Exterior openings are

## Household Insects of the Rocky Mountain States

closed with a secretion and pellets as soon as their use is completed. Drywood termites tend to work just under the surface of wood, leaving a very thin veneer-like layer. Probing with a sharp instrument or pounding the surface may reveal hidden damage.

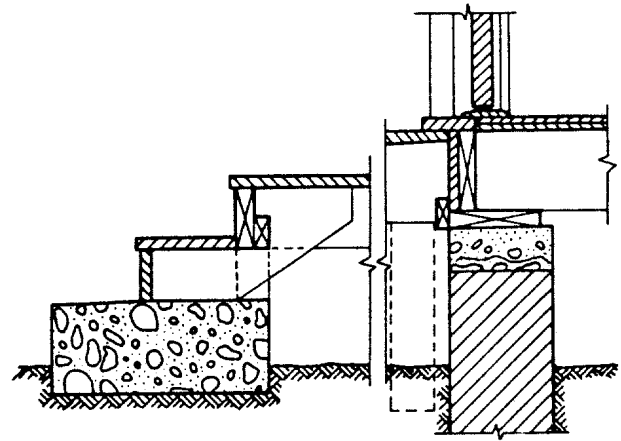
### Control of Subterranean Termites

Control of subterranean termites is complex. Preventive practices can limit chances of termite attack. After infestations occur in existing buildings, chemical treatments often are needed. These create a barrier of termiticide-treated soil through which they cannot pass without lethal contact. However, chemical control of termites infestations is complex and often requires use of Restricted Use, specialty pesticides. Professional assistance in application is almost always desirable, although expensive.

**Prevention.** The principal food of termites is cellulose obtained from wood and other plant tissues. Termites, therefore, feed on wooden portions of buildings, utility poles, fence posts or any other wood product. They also damage paper, fiberboard and various types of fabrics derived from cotton and other plants. Although many non-cellulose materials, including plastics and sheetrock, may be penetrated and damaged by termites they do not serve as food.

Cutting off wood/soil "ground contact" is the main principle in subterranean termite prevention and control. In many instances, simple structural modification may be all that is necessary to achieve effective control.

Ventilation openings in foundation walls beneath buildings with crawl spaces should be large enough and properly located to prevent dead-air pockets from forming. These pockets are conducive to humid conditions that favor termite activity. Openings within ten feet of the corners of buildings usually give the best cross ventilation. Openings need not be placed on the front side of a building, provided they can be arranged to prevent unventilated areas. Size and number of openings needed to improve ventilation are determined by soil moisture, atmospheric humidity



**Construction design eliminating wood-to-soil contact is extremely important in preventing termite problems in homes.**

and air movement. Where the soil below the structure is very moist a barrier, such as visqueen, can reduce the moisture content of the wood in the building.

Some termite problems are related to poor drainage conditions around the building foundation. Poor grading or improper watering can cause soils around building foundations to stay moist, which favor termites. Correction of these problems can greatly limit termite movement into homes.

Use of chemically treated wood is an additional safeguard against damage from termites and decay. For maximum protection, the wood should be pressure-impregnated with an approved chemical by a standard process. Vacuum treatment gives adequate protection where conditions are less severe. Brush, spray or short-period soak treatments give limited protection to wood above ground.

Slow-growing heartwood of some native wood species is quite resistant to termites, but it is not immune nor is it as resistant as pressure-treated wood. The following kinds and grades of lumber are considered the most resistant to native termites:

- \* foundation-grade California redwood;
- \* all-heart southern tidewater red cypress;
- \* very pitchy southern pine-"lightwood";

## Household Insects of the Rocky Mountain States

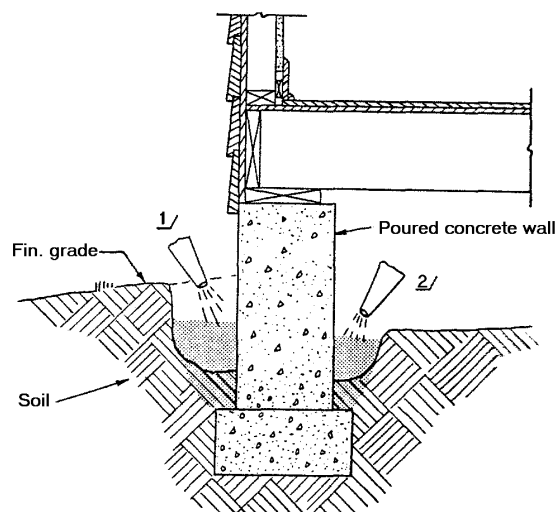
- \* heartwood of eastern red cedar (less resistant than the above).

Resistance of these woods to termites and other insects declines with time as essential oils in the wood dissipate.

Subterranean termites also may be excluded by use of a termite sand during home construction. This involves use of sands of a particular size through which the termites cannot construct tunnels. This sand is placed as a barrier under the building. For certain subterranean termites, sand with particles ranging in size so that not more than 5 percent will be retained in a 10-mesh screen and not more than 5 percent will pass through a 16-mesh screen can form an impenetrable barrier. Although the use of termite sands for protection has not been demonstrated in the region, it has been used successfully in other states for control of the eastern subterranean termite and Formosan termite.

Consider sanitation and structural control measures first, not only for prevention but also to control existing infestations. These measures include:

1. Remove all wood, including form boards and other debris that contain cellulose, from underneath and adjacent to buildings with a crawl space.
2. Remove soil from contact with any wood of the building. Where possible, remove all soil within 12 inches of floor joists. Establish new grades to provide good drainage.
3. Replace heavily damaged wood with sound material or masonry. Substitute metal or masonry where wood is in contact with the soil.
4. Remove other wooden units, such as trellises, that connect the ground with woodwork on building exterior.
5. Fill voids, cracks or expansion joints in concrete or masonry with either cement grout, roofing-grade coal-tar pitch or rubberoid bituminous sealers.
6. Provide adequate drainage. Moisture correction may range from repair of drainage downspouts, eaves and leaky garden hose outlets to grade improvements or installation of tile drains.

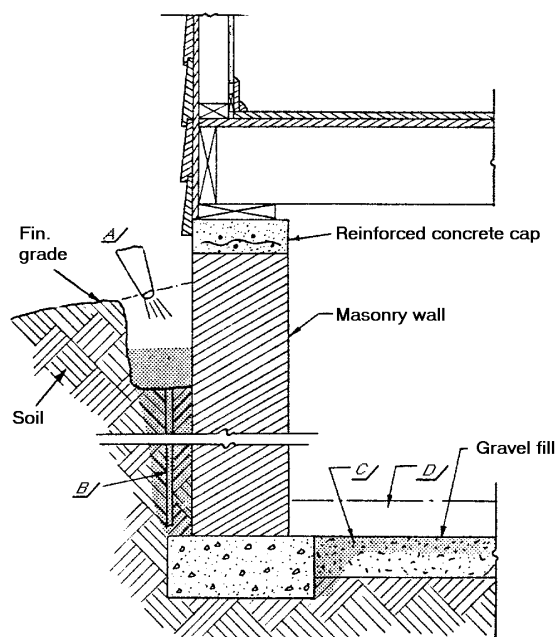


**Areas that are chemically treated for termite control in homes of crawl-space construction.**

**Chemical Treatment.** Subterranean termite attacks on structures may be disrupted and prevented by establishing a barrier of pesticide-treated soil through which they cannot pass. Pesticide application techniques currently used in termite control include low pressure spray application, trenching, rodding and sub-slab injection. Skill in using these techniques, a knowledge of the relationships of construction, soil, texture, soil compaction, grade conditions, water table, location and type of domestic water supplies, biology and behavior of the termite species, suspected location of the termite colony and the severity of infestation are important factors in the safe and effective use of a pesticide for termite control. **Control of termites is complex and generally requires professional application.**

Low-pressure spray application of pesticides is generally used when the pesticide is applied to the soil surface such as in overall treatment of the area beneath a slab (pre-construction). General surface treatment to soil in crawl spaces after construction is not permitted with most termiticides.

## Household Insects of the Rocky Mountain States



Areas that are chemically treated for termite control in homes with a full basement. This includes areas around footings beneath the floor.

**Trenching** involves excavation of soil in an area 6-inches wide adjacent to and around all piers and pipes and along both the inside and outside of foundation walls. For a poured concrete foundation, a trench three to six inches deep may be adequate, whereas trenching around brick and hollow block masonry foundations should be at least twelve inches deep. Apply the pesticide in the trench and to the backfill in the manner described on the pesticide product label.

**Rodding** involves the use of rods usually made of 1/2-inch diameter pipe about 4 feet in length and equipped with a handle and shut-off valve. The other end of the rod is fitted with a tip with holes so that pesticide flows out in different directions. Pesticide flow begun after the tip of the rod is forced into the soil aids in the passage of the rod. High pressure is not necessary - 10 to 15 psi often gives better soil coverage than does higher pressure. Frequency of rodding varies with soil conditions. (Usually about every 12 inches, but sometimes as close as six inches in clay and more spread out to as much as 18 to 20

inches in sand). Rods are placed vertically about 6 inches from the wall, never further than 12 inches, using four-way or directional tip.

Sub-slab injection involves the use of a special tool, the sub-slab injector, inserted through holes drilled in the concrete slab to introduce the pesticide into the soil beneath the slab. In using the sub-slab injector, holes are drilled through the concrete slab along cracks and basement walls, taking care to avoid drilling into electrical conduits, utility pipes, ducts, and plumbing. These precautions are particularly important in structures that have heating ducts under or within the foundation slab, or in older homes that may have developed cracks in the ductwork, which could allow the pesticide to contaminate the home.

### Wood Boring Beetles

There are a number of beetles that occasionally damage wood in homes. These include the true powderpost beetles, false powderpost beetles, and furniture beetles. Beetles also commonly are found in homes as they emerge from firewood. (See the section on insects associated with firewood.)

#### Powderpost Beetles

The true powderpost beetles (Lyctidae) are a group of beetles that infest hardwoods only. Large-pored wood, such as ash and red oak are most commonly infested. Hardwood baseboards, oak beams, tool handles, gunstocks, and hardwood furniture are typical places where infestations may be found. New wood (less than 10 years old) is more commonly infested than is older wood.

The adults are attracted to light after emergence from infested wood and collect at window sills. The adult beetles are long, thin and flat. They are reddish-brown to black and can be mistaken for flour



**Powderpost beetle exit holes. Often fine powder is pushed from the wood.**



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beetles, a common insects found infesting flour in pantries. The head is visible from the dorsal (top) view. The larval burrows follow the grain of the wood and do not branch. They occur in the sapwood only. The exit holes resemble "shot holes" about one to two millimeters in diameter and are made by the adult beetle.

**Life History and Damage.** Damage to wood by the powderpost is distinctive. A common indicator of an infestation is the small holes made in the wood when adult beetles emerge. Also the sawdust frass (excrement) produced by these wood boring beetles is extremely fine and powdery. This fine face powder-like sawdust is the most distinctive evidence of powderpost beetle infestation. It piles underneath existing exit holes and falls easily from the feeding channels when a piece of wood is tapped in an upside down position. Piles of this sawdust frass often accumulate at the base of infested wood. Other types of wood boring beetles, carpenter ants, and drywood termites leave pellets or a coarse, stringy material or may pack their excrement tightly into the channel. (See the table on differences in wood damage associated with wood boring insects.

The immature stages (larvae) of the wood-boring beetles are almost entirely responsible for wood injury. Powderpost beetle larvae feed upon the starch-rich sapwood and tunnel through it extensively. Damage is limited to large-pored hardwoods, such as oak and ash. Also, bamboo can be infested by powderpost beetles. However, softwoods, such as pine and Douglas-fir, are not attacked.

Eggs of the powderpost beetles usually are laid in the exposed pores at the ends of cut wood. Some eggs also are laid within cracks in the wood or at the mouth of old exit holes.

Upon hatching, the larvae tunnel through the sapwood, rarely forming branches across the wood. Development of these wood borer larvae requires as little as three to four months under favorable conditions, but often takes a year or more. While within the wood, there may be little or no external

evidence of infestation. After the larvae have finished feeding, they tunnel close to the wood surface to pupate. The adult beetles later emerge from the wood to mate, lay eggs, and continue the infestation.

Outdoor populations of powderpost and furniture beetles are extremely rare in the region. Essentially all household infestations instead originate from infested lumber or furniture from eastern states where the insects are far more common.

**Control.** Infestations of powderpost beetles are slow to develop and progress. Also, infestations often die out on their own without intervention as the wood dries. Drying of wood below ten percent moisture may also prevent beetles from developing or greatly retard development. Consequently there is rarely need for haste in treatment in the arid West.

Wood can be made unsuitable for egg laying by finishing it with paint, polyurethane, shellac, or other coverings. Particular attention should be given to covering the ends of wood where most egg laying occurs in exposed pores. This treatment does not kill larvae within wood but can prevent subsequent reinfestations. However, emerging beetles also create new openings in the wood and these openings also have to be covered. Consequently, reapplication of the finish may be necessary to maintain protection.

Wood that is already infested can be removed and replaced or treated in a manner that prevents reinfestation. Certain formulations of insecticides containing chlorpyrifos (Dursban) are registered for this purpose. More recently, boron-containing wood treatments (e.g., Bora-Care<sup>R</sup>, Tim-Bor<sup>R</sup>) have been marketed that reportedly can kill larvae within wood. The application can be made either as a coarse spray or brushed onto the wood. However, both these treatments are only available to professional pest control applicators. Effectiveness of the treatments for larval control is reduced in wood that exceeds one-inch diameter and in wood that is finished. Valuable items that are difficult to treat with insecticides may need to be professionally fumigated for control.

## Household Insects of the Rocky Mountain States

Alternatively, several hours exposure to high temperatures (above 130 degrees F) can also kill larvae in infested wood. However, these heat treatments often are not desirable since they can warp the wood and damage finishes. In areas of extreme cold winter temperatures or where there is access to deep freezers, treat infested items by exposure of the wood to below 0 degrees F for several weeks. Abrupt exposure of the infested materials from alternating warm conditions to cool conditions is important in effectiveness of cold treatments.

### False Powderpost Beetles (Bostrichids)

The false powderpost beetles (Bostrichidae) are a diverse group that varies in size, color and other characteristics. Typically the false powderpost beetles are cylindrical in shape with their heads tucked under their thorax so that the head is not readily observable from the dorsal (top) view.

Normally bostrichid beetles produce stringy sawdust-like frass that is packed tightly into the larval channels. Tunnels in the wood often go across the grain. The adult beetle bores to the outside leaving an exit hole larger than that of the powderpost beetle. Typical items infested are picture frames, bamboo, hardwood furniture and some kinds of panelling. Usually these items were purchased and brought into the house with the undetected beetle infestation. The increased temperature inside of the house causes the beetles to become active.

### Furniture (Anobiid) Beetles

Furniture beetles (Anobiidae) are less commonly found in homes than powderpost or false powder-post beetles. Typically they are found attacking soft wood products. The larva is white with black jaws. They produce frass that consists of small, blunt-ended pellets.

Furniture beetles develop slowly in wood. One to three years are required to complete development of a generation.

Damage and habits of furniture beetles is similar in many ways to that of powderpost beetles. Damage is caused by the immature larvae that tunnel in the sapwood. Adult beetles that emerge from the wood produce small exit holes similar in size to that of powderpost beetles. Furniture beetles are relatively uncommon in the Rocky Mountain region, and are favored by more humid conditions than what normally occur.

Control of furniture beetles is similar to that for powderpost beetles. Furniture beetles are even more sensitive to drying than powderpost beetles; they are limited to damp, poorly ventilated areas. By correcting moisture conditions, infestations normally die out under regional conditions.

### Wood Borers

Large wood boring beetles may occur in firewood, houselogs, or recently felled timber turned into structural timbers. Several roundheaded borers (larvae of longhorned beetles, Cerambycidae) and flatheaded borer (larvae of metallic wood borers, Buprestidae) are native to the region and commonly infest firewood or felled logs. (See page 80 for discussion of firewood insects.)



**A pine sawyer, a common wood boring beetle associated with pine logs. Photograph courtesy of Dave Leatherman.**

Wood borers often produce large amounts of stringy sawdust that they may push out of tunnels to form piles. Chewing may be

quite noticeable and annoying. In addition, adult stages of the insects are quite conspicuous and may cause concern when they emerge. Several wasps that attack the beetle larvae also may emerge from borer infested wood. (**Note:** These wasps **do not sting** people.)

## Household Insects of the Rocky Mountain States

The wood borers found in the region only can re-infest (successfully lay eggs and reproduce) in wood with the bark intact and that is not well dried. Larvae occurring in wood, however, may live for one to four years. Under rare conditions, larvae have been found developing within logs used in cabin construction ten years after the logs were cut. However, the logs become increasingly poor hosts for the beetles as they dry.

Wood borers are primarily an annoyance problem. Very little structural damage occurs to wood products from these insects, although the sawdust they may force out of their tunnels can be conspicuous.

**Control.** Problems with wood borers in structures are almost always self-limiting, dying out without intervention after the generation completes its life cycle.

Use of well-dried, or pressure treated wood can kill existing borers within wood. Wood without intact bark is not susceptible to future attack.

Never store firewood in living areas for extended periods. Indoor storage allows favorable conditions for wood borers to complete development and emerge within the house. Although they do not threaten serious injury, they typically cause concern. Most indoor beetles can be avoided by storing firewood outdoors.

### Bees and Wasps Associated with Wood

#### Horntails

Horntails (Siricidae) are large insects that develop as borers in wood. The adult stage is a type of non-stinging wasp, but the females have a prominent hornlike 'tail' that is used for inserting eggs into wood. The larval stage grubs develop by tunneling and feeding on wood.

Adult horntails are most often found in homes after they have emerged from firewood, usually pine logs. Horntails also are sometimes brought in on lumber



A typical horntail, adult female.

used in house construction. Since horntails can require two to three years to develop, sporadic emergence of horntails in a new home may occur during the first couple of years. However, horntails cannot reinfest milled wood so their emergence signals the end of an infestation. Since they are rarely very abundant in lumber, serious structural damage is very rare to lumber.

#### Leafcutter Bees

Several species of leafcutter bees (Megachilidae) are native to the Rocky Mountain region. Although very important in pollination of wild-flowers, they occasionally damage plants and structures through their nesting activities.

Leafcutter bees rear their young in small cells lined with leaf fragments. The leaves are cut from living plants, in a characteristic semicircular pattern, and sometimes plants can be severely defoliated. Ash, lilac, rose, and various *Prunus* are among the plants particularly favored by nest building leafcutter bees. The leaves are fashioned in a form resembling a small cigar and packed with pollen on which the developing bees feed.

The nests of leafcutter bees are formed in existing cavities of plants or are excavated from softened wood and plant pith. Water damaged wood or wood containing large channels, such as #2 grade plywood, are commonly used for nests by leafcutter bees. Flickers and other woodpeckers may subsequently

## Household Insects of the Rocky Mountain States



**A leafcutter bee cutting a leaf section for use in nest cell construction.**

damage infested wood as they dig out and feed on the developing insects.

Leafcutter bees are solitary bees that do not produce a colony, although they occasionally nest close together. They are not aggressive and rarely sting. Furthermore the pain of their sting is quite mild in comparison to honeybees or yellowjacket wasps.

**Control.** Leafcutter bees cause little or no structural damage to wood. In most cases when structural wood is affected, their presence indicates a preexisting problem with rot, often associated with water damage. Problems in these instances can be eliminated by correcting the water problem and replacing damaged wood.

Occasionally, indirect problems occur to structures when large numbers of bees are nesting, such as sometimes occurs in plywood siding. This can attract woodpeckers that feed on the bees and in the process damage the siding. It is very difficult to adequately seal such wood so that leafcutter bees will no longer nest in the channels. Siding sometimes needs to be replaced in order to eliminate this problem.

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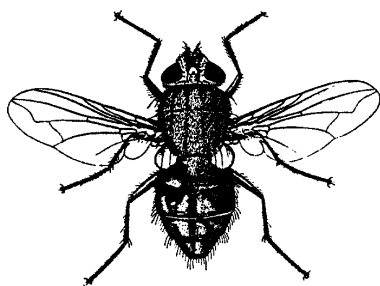
### FLIES AND GNATS

Several species of flies commonly enter homes and can create serious nuisance problems. Some flies also can be important in the transmission of diseases. For example, flies that develop in manure and garbage, such as house flies, face flies and blow flies, are commonly contaminated with disease-causing bacteria, including those associated with food poisoning.

The winged, adult stage of flies is most commonly observed. Flies feed on liquids that are usually sponged with their mouthparts. Immature stages of flies are pale, legless maggots. After becoming full grown, maggots often wander from the breeding site in search of a place to pupate. Many flies can complete development (egg-larva-pupa-adult) in an extremely short period, as little as seven to 14 days, and numerous generations are produced during a typical season.

Although flies are most often a nuisance during the warm season, some flies can be problems as they overwinter in buildings. Indoor overwintering most commonly occurs with cluster flies and face flies.

**Cluster flies** (*Pollenia pseudorudis*, *Pollenia rudis*) are the most common and annoying flies found within homes during the cool seasons. They can be particularly serious pests of office buildings, often concentrating in upper stories. Piles of dead cluster flies also are commonly encountered when returning to mountain vacation homes that are unoccupied during the months when the flies emerge.



A cluster fly, the most common fly found indoors during winter and spring. It develops as a parasite of earthworms.

Cluster flies are slightly larger than houseflies and a dark gray color. When at rest they fold their wings over each other, in contrast to other common household flies that have wings more extended. As cluster flies move about or emerge from hiding areas in a building, they are semi-dormant and fly sluggishly or crawl. Within protective harborages, such as behind walls, they spend much of the winter massed in clusters.

Other habits of cluster flies are very different from other common domestic flies. Immature stages develop as parasites of earthworms (*Allobophora* species). Eggs are laid in the soil and the maggots enter and feed within the earthworms. Cluster flies do not feed on garbage or animal manure and do not reproduce indoors.

Several generations are produced during the warmer seasons. In late summer, sometimes beginning as early as mid-August, cluster flies seek overwintering shelter. In the afternoon they fly to buildings and rest on sun-exposed areas. As the sun sets, the flies creep upwards, ultimately moving to upper stories. They then seek out cracks and other openings into the building. Once inside the building the cluster flies may occur in large aggregations. Movement into buildings can occur until heavy frosts kill outdoor flies.

During warm days in late fall and early spring the flies become active, at which time they are most commonly encountered. New flies may continue to emerge over a period of several weeks and give the appearance they are reproducing. However, no additional flies are in a home other than those that entered the previous fall. In spring, the cluster flies ultimately either leave the building or, if trapped, die in it.

Because cluster flies breed in earthworms, control of breeding sites is not possible. Furthermore, flies sometimes migrate for miles during search for winter shelter.

## Household Insects of the Rocky Mountain States

Cluster flies are best managed in many buildings by excluding the flies prior to periods when they enter buildings in late summer. Caulking, screening and other efforts to seal the building (particularly along the south and west sides) can prevent the flies from gaining entry into many buildings. However, complete sealing of the building often is difficult or impossible to achieve.

In some situations, exterior walls can be sprayed with insecticides to further reduce indoor movements of cluster flies. Apply these sprays when migrations first start in late summer and reapply if moderate fall weather allows for an extended period of fly activity. Permethrin and cypermethrin have been shown effective for this application. These insecticides are only registered for use by trained professional applicators; homeowner formulations effective for cluster fly control do not exist.

Attempts to control cluster flies after they have moved indoors are usually of little effect. Although some of the flies may occur in large aggregations within wall voids and other sites, many disperse throughout the building. It is very difficult to locate and successfully treat all harborage areas of the flies.

**Blow flies** (*Calliphora* spp., *Phormia* spp., *Phaenicia* spp.) are fairly large, often metallic green, blue or black flies found throughout the region. They tend to be far more common than the house fly and are sometimes called the "house flies of the West".

Blow flies breed most commonly on decaying carcasses and the droppings of dogs and other pets. Garbage also is a food source for the maggots. Occasionally blow fly maggots are found in homes, having



A blow fly.

wandered from the carcass of a dead rodent or bird that was trapped within or near the home. Adult blow flies also may be attracted to gas leaks.

Blow fly problems in homes are best managed by limiting breeding sources around the home.

**House flies** (*Musca domestica*) by reputation are the best known of the house-infesting flies but occur less frequently in the region than do several other species found around homes. House flies generally are gray in color, with the thorax marked with broad dark stripes. Most often there is some yellow coloring along the sides, differentiating them from the face flies.



The life stages of a house fly.

The activities of house flies bring them commonly in contact with humans and the larvae almost always develop in man-made sources of food. These include garbage, animal waste, culled fruits and vegetables, and spilled animal feed. Houseflies also are commonly associated with contained livestock operation, particularly late in the summer. The adult flies feed on a wide range of liquid waste. They also feed on solid foods, such as sugar, by regurgitating and liquefying the food. Because of these habits, houseflies can pose serious health threats by mechanically transmitting disease organisms.

During mild winters, house flies may fly and breed continuously, as temperatures permit.



## Household Insects of the Rocky Mountain States

**Face flies** (*Musca autumnalis*) are closely related to house flies. Although similar in appearance, their habits differ greatly from house flies. Face flies often are more common than house flies during the early summer.

Face flies pass the winter as adults, often seeking shelter in upper stories of buildings such as attics, steeples, and little used upper rooms. They sometimes become active for brief periods during warm, sunny winter days. In spring the flies break their dormancy and females lay eggs in fresh cattle manure less than one-day old.

Adult face flies may feed on many types of fluids. They often are attracted to the eyes, nose and mouth of cattle and have been implicated in transmitting pinkeye disease to cattle.

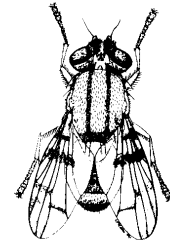
**Little house flies** (*Fannia* species) are smaller than the house and face flies but similar in overall appearance. Indoors they fly for long periods, rarely resting.



A little house fly, *Fannia* species. Photograph courtesy of USDA Cooperative Extension.

The adult flies lay eggs in decaying organic matter, particularly manure, on which the maggot-stage larvae feed. Chicken houses are one of the more common sites where high populations of little house flies develop.

**Picture-winged flies** (particularly the species *Ceroxys latiusculus*) commonly enter homes, apparently to seek winter shelter. They almost are always found in low numbers, but can continue to emerge indoors over a period of several weeks in spring. Controls are rarely, if ever, required for these insects. Efforts to exclude other nuisance insects in the fall should similarly limit wintering flies in a home.



A picture-winged fly. Drawing by Mike Kippenhan.

**Fungus gnats** (*Bradysia* species) are small, dark colored flies that most often are observed collecting around windows, usually during fall and winter. Adult flies also may be seen hopping across the soil surface of houseplants.

Fungus gnats also commonly occur outdoors where they breed in mushrooms and other decaying plant materials. Indoors, fungus gnats infest potting mixes used for houseplants.

High organic matter plant mixtures, or use of organic fertilizers such as fish emulsion, can encourage fungus gnat development. Over-watering, a common problem during fall and winter, also encourages fungus gnats by increasing fungus development.



A dark-winged fungus gnat. Size of these minute flies is about 1/10 inch. Photograph courtesy of Oregon State University.

Fungus gnats can reproduce throughout the year within containers of growing houseplants. Although they cause little, if any, damage to houseplants they may become a nuisance. Primary efforts at control should be to limit the soil conditions in house plants that are favorable to the developing gnats. To some extent, this can be achieved by reducing watering to allow the soil to dry, which inhibits the growth of soil fungi. Changing the potting mix during repotting to a mixture of lower organic matter also may reduce fungus gnat breeding sites.

Adult fungus gnats can be killed with several houseplant sprays containing pyrethrins or

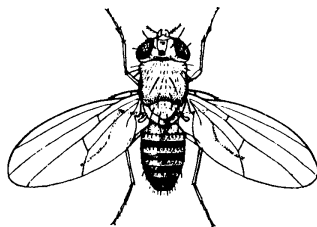
## Household Insects of the Rocky Mountain States

pyrethroids (tetramethrin, allethrin, resmethrin, etc.). All of these have very short residual action. Since the adult flies only live a few days normally and new adults can emerge daily these sprays need to be repeated every few days for at least two weeks before populations are reduced.

**Vinegar flies**, also known as pomace or fruit flies (*Drosophila* species), are among the smallest flies found in homes, typically about 1/16 inch. They usually are a light brown color and may be marked with bright red eyes. Most often they are found hovering around overripe fruit or fermenting materials such as leftover beer or soft drinks remaining in opened containers. Populations tend to be greatest in late summer and early fall, as they infest ripened fruit (including tomatoes) during the harvest season and can build high populations outdoors. Vinegar flies can also develop in moist areas where food particles have collected and later ferment.

Developing vinegar flies feed primarily on the yeasts and other microorganisms associated with fermentation. The adult flies are highly attracted to odors produced by fermentation and females lay masses of small eggs near suitable food. The young maggots feed for about five or six days before becoming full-grown, at which time they migrate to drier areas to pupate. The adults emerge in a couple of days with the entire life cycle being repeated every ten to fourteen days.

Basic to vinegar fly control is elimination of all breeding sites. Overripe fruit, fermenting liquids in the bottom of bottles, garbage, and damp areas with fermenting food particles are all common breeding sites for vinegar flies. To control, thoroughly clean these areas.

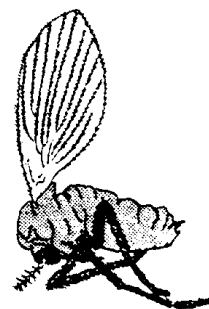


**Vinegar flies are associated with fermenting materials. Actual size, about 1/16 inch.**

Once breeding sites are eliminated, remaining adults can be trapped. One simple trap is a jar baited with ripe banana with a top funnel to keep the flies in the jar. Adult fruit flies also can be killed with sprays of insecticides that contain pyrethrins. (Products containing this insecticide that allow use in food handling or storage sites also require that food be removed or covered. All food preparation surfaces and utensils must also be covered or washed after the treatment.)

**Drain flies** (*Psychoda* species), also known as moth flies or sewer flies, are occasional problems in homes. The adult flies are small and hairy, somewhat similar to a tiny moth in appearance. They are weak fliers (similar to fungus gnats) that typically seem to make jerky jumping motions.

Developing drain flies feed on fungi, algae, or other microorganisms. In homes the most common breeding site is the slime layer that often grows in drains or sewers. Seepage areas from leaking drains can also produce an excellent breeding environment for these flies. Drain flies can also develop on the algae that sometimes develops when standing water is allowed to persist around house plants. Although the adult drain flies usually live only a few days (unless a carbohydrate source, such as nectar, is available) adults can continue to emerge from an infested drain, producing a continuous infestation of the flies in a home.



**A drain or moth fly.**

Fly sprays and 'pest-strips' provide only temporary control of the emerged adults. Permanent control of drain flies requires that breeding sites be eliminated. Clearing clogged drain traps or leaking pipes is usually what is required to control most infestations. This can be done by thoroughly scraping pipes clean of the bacterial slime, a process that often involves repeated effort.



## Household Insects of the Rocky Mountain States

**Humpbacked flies** (Phoridae) are small, brownish-yellow to black gnat-like flies. One species, *Megaselia scalaris*, sometimes becomes a nuisance problem in buildings. Adults are usually observed running on tables, walls, and windows in a quick, jerky



A humpbacked fly.

fashion. The larvae develop in moist, decaying organic matter. Outbreaks often result from seepage into soil from broken sewer lines which provides favorable breeding conditions. In these sites control requires repair of the sewer line and removal of contaminated soil.

### General Principles of Fly Control

**Sanitation** practices that remove breeding areas are fundamental to control of filth breeding flies such as house flies and blow flies. Regularly remove or tightly cover garbage. Clean spilled animal feed and manure. However, face flies which typically develop on cattle manure in pasture lands, and cluster flies (earthworm parasites) often are difficult or impossible to control by breeding area management.

Where nuisance problems with fungus gnats occur, give attention to correcting conditions of the breeding area. Allow the soil to dry more thoroughly between waterings and eliminate decomposing plant materials to reduce the amount of fungi on which fungus gnats breed. Similarly, fruit flies are best controlled by removing breeding sources. Discard overripe fruit and cleaning bottles and cans prior to storage for recycling to eliminate common breeding sites.

**Screening** and other exclusion techniques can be a very important management tool for several types of indoor fly problems. Caulk or cover all openings into homes to prevent flies from entering. Efforts to exclude flies must be accomplished prior to the period when they enter buildings. For example, cluster flies typically enter buildings during late August and September, while people most often observe them in fall or early spring.

Use **insecticides** for fly control only as a supplement to other controls. Some problems exist with insecticide-resistant flies and many fly populations are now difficult to control with insecticides.

Spot treatments with insecticides applied to areas of high fly activity are most efficient. For example, flies that tend to rest in dark corners can be controlled by applications to these areas. Cluster flies are controlled by treatments applied to upper stories of building exteriors immediately prior to periods when flies move indoors for wintering.

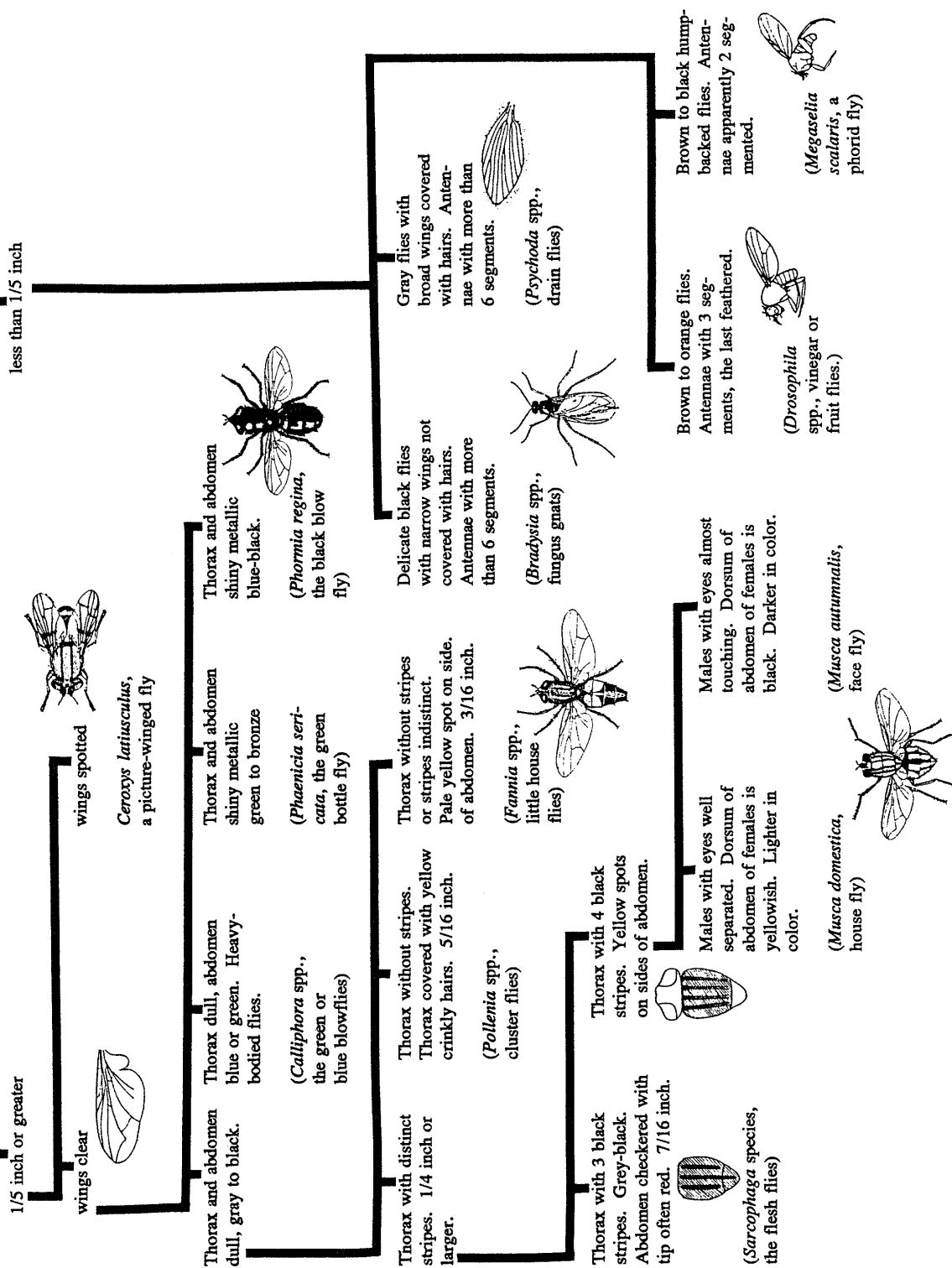
Where fungus gnats are a problem, insecticides can supplement the cultural control of reduced watering. Use of houseplant aerosols, applied at frequent (two to three day) intervals for three to four weeks, should eliminate most of the adult fungus gnats.

"Fly strips" containing the insecticide vapona (dichlorvos or DDVP) also are used for fly control. These products slowly release the insecticide as a vapor providing long term control. However, vapona is a highly toxic insecticide. Label directions prohibit use of these products in areas where food is handled or stored, in rooms where children or sick people rest, or other areas where prolonged contact is likely. The registration of these pest-strips has been under review due to these health concerns.

Several types of **traps** for flies also are available and can supplement other controls. Fly paper and electrocution light traps can kill flies. However traps are only effective in areas where exclusion and sanitation efforts have already reduced the fly populations to low numbers.

Various food-based traps are also offered for sale. These often contain a protein bait, sometimes with the addition of a pheromone (sex attractant) used by flies. As with other traps, these can supplement other controls, such as sanitation and exclusion.

# KEY TO COMMON FLIES FOUND IN HOMES IN THE ROCKY MOUNTAIN STATES



## Household Insects of the Rocky Mountain States

### Summary of techniques useful for control of flies in and around homes.

Common name	Scientific Name	Controls
Blow flies	Calliphoridae ( <i>Calliphora</i> species, <i>Phormia regina</i> , <i>Phaenicia</i> species)	Tightly seal garbage containers and remove animal manure (particularly dog) manure from areas around the home during summer. Use fly paper or fly traps. Vapona "pest-strips" can be used in some areas (not food handling/storage or sleeping areas).
House fly	<i>Musca domestica</i>	Tightly seal garbage containers. Screen windows in summer. Use fly paper or traps to attract and capture flies. Vapona "pest-strips" can be used in some areas (but not food handling/ storage or sleeping areas).
Face fly	<i>Musca autumnalis</i>	Seal homes in late summer prior to periods when flies enter to overwinter. Try to limit sources of cattle manure in pastures, particularly in late summer. Treatment with insecticides of exterior walls around openings can further limit movement into homes during late summer. Vapona "fly-strips" in attic areas can kill some of the overwintering flies.
Little house fly	<i>Fannia</i> species	Limit breeding sources from around the home, such as decaying vegetable materials and, particularly, manures. Keep window and door screens intact.
Cluster flies	<i>Pollenia pseudorudis</i> <i>Pollenia rudis</i>	Seal the home (particularly upper stories of south and west sides) prior to periods when flies enter in late August and September. Exterior treatment of house walls with effective insecticides can further limit entrance. Vapona "fly-strips" in attic areas can kill some of the overwintering flies.
Picture-winged flies	Otitidae ( <i>Ceroxys latiusculus</i> )	Picture-winged flies are harmless, minor nuisance pests that overwinter in homes. Control is rarely, if ever, needed. They move into homes during late summer and fall; preventive practices that restrict other flies from entering homes will help control this fly.
Fungus gnats	<i>Bradysia</i> species	Reduce watering of house plants to allow increased drying and limit development of fungi in the soil on which larval stages feed. Discard rotting bulbs or parts of houseplants that decay. Apply houseplant insecticides to the plants and soil surface at frequent (two to four day) intervals for two to three weeks to kill a generation of adult insects.
Fruit flies or vinegar flies	<i>Drosophila</i> species	Remove sources of breeding that include overripe fruit, fermenting materials (e.g., stale beer or soft drinks).
Drain flies	<i>Psychoda</i> species	Correct problems with plumbing that produce conditions favorable to fly breeding. Drain flies, which develop on the gelatin-like coating that can form in drains and pipes, are often eliminated by correcting problems in plumbing. In particular, cracks or leaks that allow seepage may provide breeding sources for these flies.

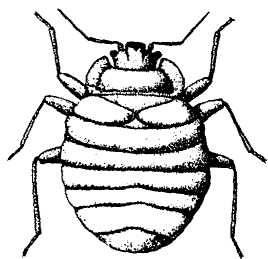
## Household Insects of the Rocky Mountain States

### BITING OR STINGING PESTS

#### Bat Bugs and Bed Bugs

The human bed bug (*Cimex lectularius*) and its relatives form a small group of bloodsucking insects (family Cimicidae). Although the bed bug is the best known species of this group, most problems occur with the closely related bat bugs (*Cimex pilosellus* and *Cimex adjunctus*). Swallow bugs (*Oeciacus vicarius*) can be serious problems where swallow nests are attached to dwellings (see following). Poultry bugs (*Haematosiphon inodorus*), associated with poultry houses, are also occasionally encountered.

Bat and bed bugs are characterized by a short broad head, broadly attached to the prothorax and an oval body. The body as a whole is broad and flat, enabling the bugs to crawl between narrow crevices. The adults are about 1/4 to 3/8-inch long, brown and wingless. After taking a blood meal, they become bloated and may change enough in size, shape and color to make them look like an entirely different insect. The immature stages (nymphs) resemble the adults in shape, but are yellow-white in color.



A bed bug. The closely related, and more common, bat bug can be distinguished by long hairs on the thorax. Drawing courtesy of R.L. Smith.

The adult female deposits eggs in cracks, crevices, behind woodwork and similar locations. Eggs hatch in six to 17 days and the newly hatched nymphs will feed as soon as food is available. Environmental factors and food availability will cause variation in developmental rates. Complete development of bed and bat bugs average one and a half months. Adults can then live for a year or more.

The bite of these bugs often is painless, but a toxic saliva injected during feeding will later cause severe itching and a large inflamed area often called a weal.

Individuals may vary widely in sensitivity to these bites. This bite can be distinguished from a flea bite by the absence of a red surrounding halo and the presence of a red central area within the inflamed area. Bat bugs and bed bugs have not been demonstrated to transmit any human diseases.

Populations of bat bugs found in homes primarily develop on bats, birds, or small mammals that have nested in or near the building. When the animal hosts leave or die, the bat bugs invade living areas through cracks and crevices. Typically, bat bug infestations originate from animal populations established in attics. Bed bugs, that can develop on humans, are primarily moved from one location to the next via infested furniture and bedding. Bed bugs and bat bugs also may come from other infested homes by way of water pipes, gutters, through windows, along walls, etc. Migrations may occur if a house is vacated and their food supply is cut off.

**Control of bat bugs and bed bugs.** Where bat bugs are a problem, treat the original site of infestation (roosting areas). A total release aerosol ('bomb') of pyrethrins or 'pest-strip' in the attic can reduce populations in these areas. Insecticidal controls should also include residual sprays directed at cracks and crevices, areas around light fixtures, and any other place the bat bugs may have used to migrate from the attic.

Exclusion and removal of bats and other hosts of the insects in the home also should be made to more permanently remove sources of bat bugs. This last step should be coordinated with insecticide treatments, since an increased movement of bat bugs into the living area may occur after removal of the animals.

Follow up bat bug and bed bug control with a thorough examination of hiding places of the insects. Check any place offering darkness and protection (such as areas behind base boards, under loose rugs or wallpaper, in mattresses, etc.). Also, examine folds in chairs, beds, couches, or areas behind loose wall paper. Spray insecticides in areas used by the insects for hiding.

# Household Insects of the Rocky Mountain States

## KEY TO BED BUGS AND THEIR RELATIVES (FAMILY CIMICIDAE) FOUND IN THE ROCKY MOUNTAIN REGION

Wings reduced;  
body broadly oval,  
flattened



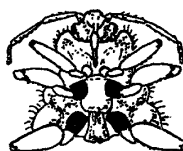
**BED BUGS:**  
**FAMILY CIMICIDAE**

middle and hind coxae (shaded),  
nearly touching; beak  
reaching second coxa



**POULTRY BUG**  
*Haematosiphon inodorus*

middle and hind coxae (shaded),  
widely separated; beak  
not reaching 2nd coxa



third and fourth antennal  
segments equal in length;  
body hairs long



**SWALLOW BUG**  
*Oeciacus vicarius*

fourth antennal segment  
shorter than third



fringe hairs on pronotum  
shorter than width of eye



wing pads narrow  
at inner margin



**BED BUG**  
*Cimex lectularius*

fringe hairs on pronotum  
longer than or equal  
to width of eye



wing pads broad  
at inner margin



**BAT BUG**  
*Cimex pilosellus*

## Household Insects of the Rocky Mountain States

### Swallow Bugs

Swallow bugs are a member of the bed bug family that is closely associated with nesting swallows. In natural settings, cliff swallows are the most common host for swallow bugs, but they also feed on barn swallows. Nesting barn swallows under the eaves or other areas of the home allow large numbers of swallow bugs to develop and these may move indoors and bite humans. Severe problems with swallow bugs are particularly common at higher elevations.

Reaction to swallow bug bites is typically painful, and these can be a much more serious nuisance than bat and bed bugs. Swallow bugs also are sometimes associated with transmission of at least one strain (Fort Morgan strain) of equine encephalitis.

Swallow bugs breed freely all summer in swallow nests. In early autumn, when bird migration occurs, the swallow bugs scatter and invade human dwellings. They also increase their activity in spring, coinciding with the return of the swallow hosts. During the long period when swallows are not present, they can survive without food, remaining semi-dormant for much of the winter.

**Control of swallow bugs.** Federal and state laws protect swallows and their nests. These laws specifically prohibit disturbance of active nests. However nests can be removed before the birds resume nesting in late spring and new nesting can be deterred by screening.

Nest areas on a home also can be treated with insecticide, after the nests are removed. However, since some insecticides (e.g., diazinon, chlorpyrifos) are highly toxic to birds, do not apply to areas that are currently visited by swallows.

### Masked Hunter

The masked hunter (*Reduvius personatus*) may commonly enter homes, garages, or outbuildings to prey on other insects. Bed bugs and bat bugs are

especially common prey for the masked hunter, but it will feed on many insects.

The insect gets its name because of an unusual habit of the immature stage (nymphs). They cover themselves with dust and other debris, and appear as 'walking dust balls'. The adult stage does not share this habit. It is dark brown or black, winged and may fly.



**The masked hunter adult. Photograph by Frank Peairs.**

The masked hunter can inflict a painful bite described as similar to a bee sting. Bites are uncommon but can occur when the insects are handled unsuspectingly or sometimes when adults fly and land



**A masked hunter nymph, covered with sawdust and lint.**

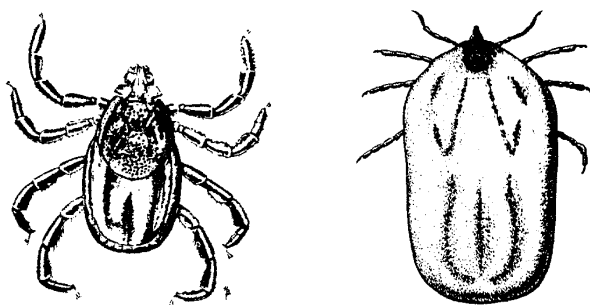
on a human. However, the masked hunter is not known to transmit human diseases, as do the related 'kissing bugs'. (Within the region, the kissing bugs, *Triatoma* species, are rarely found in Colorado, restricted to the southwestern counties. There are no records of diseases being transmitted by these insects in Colorado, Wyoming, or Montana.)

Masked hunters rarely occur in sufficient numbers to warrant control. Populations may be reduced by cleaning out normally undisturbed corners of garages, closets and other areas where the insects develop. Control of insects on which they prey also will reduce masked hunter numbers. Since the masked hunter is fairly mobile and may occur in several locations, insecticides are not likely to provide much control. This insect also commonly occurs outdoors and sometimes is attracted to lights.

## Household Insects of the Rocky Mountain States

### Brown Dog Tick

Brown dog tick (*Rhipicephalus sanguineus*) is the most common tick found indoors. Unlike the more common "wood ticks" (*Dermacentor species*), which are commonly encountered in hiking, the brown dog tick is capable of reproducing indoors, provided that dogs are present. Humans are infrequently bitten by this species.



**Brown dog tick. Adult female, left; engorged and ready to lay eggs, right. Illustration of engorged tick courtesy of R.L. Smith.**

The brown dog tick is a subtropical and tropical tick that cannot survive outdoor winter conditions of the region. Most infestations originate by direct contacts with infested dogs or during warmer months when dogs travel through areas previously frequented by an infested dog. Kennels also are an important location of brown dog tick spread.

The egg stage of the brown dog tick occurs within a large mass usually numbering several hundred eggs. Eggs hatch in about two weeks and the small, six-legged "seed ticks" move about to find dogs or rodents on which to feed. After feeding on the blood of the host animal for a few days, the young ticks drop off and hide in cracks or similar protected areas, usually near where the dog commonly rests. They then shed their skin (molt), appearing as a slightly larger eight-legged form. Another feeding cycle is then completed and the third, adult stage appears.

Adult brown dog ticks typically feed between the toes, near the ears, or around the anus of the dog. During this final blood feeding, the tick may remain

attached for one to five weeks. After becoming fully engorged, they drop from the dog. At this time the ticks may be almost 1/3-inch in size and bloated. The full-grown ticks often show a strong tendency to climb and often are found climbing walls or hidden in cracks of ceilings and kennel roofs.

The entire life cycle of the brown dog tick may be completed in as little as two months under favorable conditions. When temperatures are cool or the ticks are unable to find a host for feeding, the life cycle may extend as long as a year.

**Control.** Brown dog tick control can be a difficult and long-term project. Ticks may be found on the animal or in cracks and crevices around areas visited and commonly used by the dog. It is very useful if cracks and crevices in dog houses or other areas are sealed to make them "tick-proof".

If the animal is to remain in the infested area, some careful use of insecticides will be required to kill ticks on the animal and in locations where the ticks hide. Several products are registered for use as pet shampoos, sprays, or dips to kill ticks present on the animal. It is usually desirable to get the assistance of a veterinarian for prescription of materials used on pets since some breeds are particularly susceptible to certain insecticide products. Insecticides used on dogs almost invariably mention that they are not to be used on puppies, convalescing or sick dogs, and nursing mother dogs.

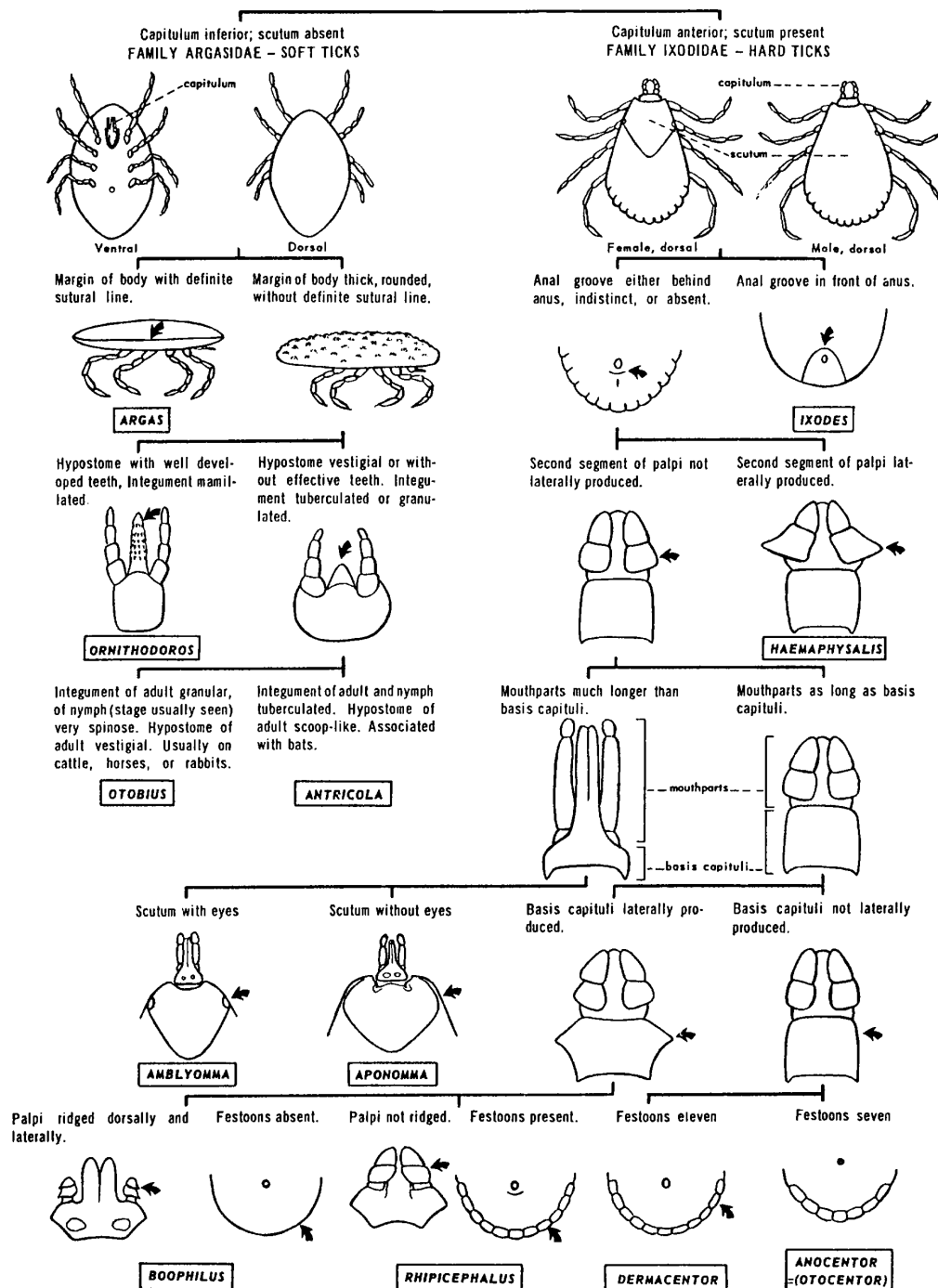
Give attention also to the areas used by the ticks when molting or laying eggs. Often these are located near the area where the dog usually rests. Directed insecticide applications to these areas with residual insecticide sprays can be effective for this use.

Removal of dogs from infested homes will eventually cause infestations to die out. However, ticks can survive for six to eight months without feeding and reinfestations are possible at any time during this period if susceptible host animals are present.

# Household Insects of the Rocky Mountain States

## TICKS: KEY TO GENERA IN UNITED STATES

Harry D. Pratt



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia - 1961

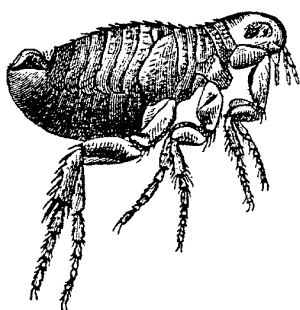


## Household Insects of the Rocky Mountain States

### Fleas

Pets, skunks, and various rodents sometimes develop infestations of fleas, which bite and feed on blood. Fortunately, problems in the arid West are far less frequent than in more humid areas of the country and most are of short duration. However, a more serious concern in some areas of Colorado is the ability of fleas to transmit bubonic plague. Bubonic plague is associated with fleas infesting rodents, such as ground squirrels, rock squirrels, and prairie dogs.

Most fleas found in homes are associated with wild animals that nest in or around the home. When the animal leaves, the fleas scatter in search of new hosts and may bite people. For example the human



An adult human flea.

flea (*Pulex irritans*), is commonly associated with skunks and occurs in homes when nesting skunks abandon their dens. *Orchopeas* species of fleas are associated with squirrels, often entering homes temporarily when carried on dogs.

Flea bites to humans appear as itchy, red spots usually surrounded by a red halo. Bites often occur in clusters, particularly at edges of tight-fitting clothing. Some individuals are extremely sensitive to flea bites, while others are fairly immune and may react little. Humans are not a favored host of fleas and most bites occur when the fleas are starved.

Adult fleas are small (1/13 to 1/18 inch) dark reddish-brown insects, flattened along the sides of the body. They are wingless, but can jump several inches. It is the adult stage that bites and feeds on blood. (A diagnostic clue as to the presence of fleas is clusters of small dark spots on bedding, which may be the excrement produced by fleas.)

Flea eggs are laid most commonly around areas frequently used by pets. As eggs hatch a worm-like larva stage emerges that feeds on the feces from the adult fleas. Several months are required for the larvae to reach the adult stage, with low humidity greatly prolonging development.



A flea larva. Drawing courtesy of R.L. Smith.

**Control.** Direct flea control measures at all stages of the fleas life cycle. Where cat fleas are present and developing on pets, control egg and larval stages by washing pet blankets, bedding and thoroughly vacuuming on a regular basis. For further larval control, apply insecticides to carpets, cracks and crevices around areas where the pet resides. Among the more effective treatments are newer insecticides which affect flea growth (insect growth regulators), such as methoprene (Precor<sup>®</sup>) or fenoxycarb.

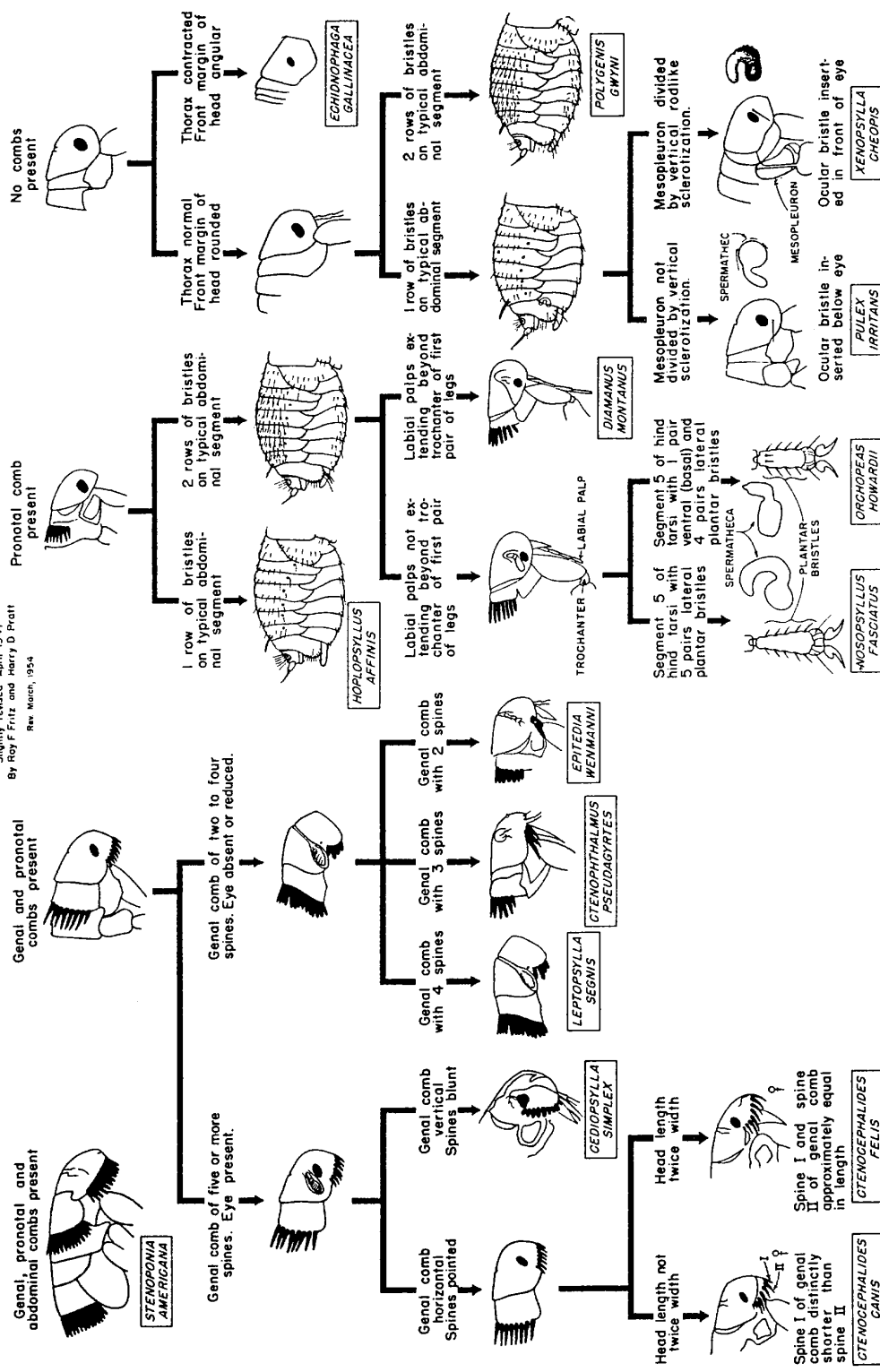
Adult fleas on the pets can be controlled by use of shampoos, flea powders and/or flea/tick collars. However, insecticide resistant strains of fleas occur that may not be easily controlled.

Most times, flea infestations in homes relate to the presence of nesting wild animals around the home. When the animals leave, fleas move indoors in search of new hosts--including humans. These infestations die out on their own since the fleas reproduce poorly without the nesting animal host. However, they can be very annoying for several weeks. The use of contact insecticides to kill the adults can relieve some of these problems. If the location of the abandoned animal nest is known, treat the nest site to prevent fleas from migrating to living areas.

Rodents, such as ground squirrels and rock squirrels, that have died suddenly may indicate plague outbreaks. Report suspected plague incidents to state or local public health officials. In areas where wild rodents harbor fleas that carry the plague disease organism, control involves dusting of rodent burrows.

**FLEAS: PICTORIAL KEY TO SPECIES FOUND ON DOMESTIC RATS IN SOUTHERN UNITED STATES**

Slightly revised April 1947  
by Roy F Fritz and Harry D Pratt  
Rev. March, 1954

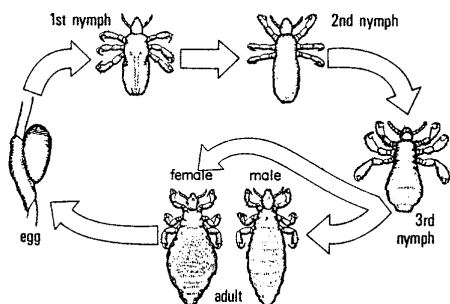


U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

## Household Insects of the Rocky Mountain States

### Head Lice

Head lice (*Pediculus humanus capitus*) are insects solely adapted to life on the head of humans. They are very closely related to--and morphologically indistinguishable from--the more notorious body louse (*Pediculus humanus humanus*) or "cootie". The latter is well-known because of its association with the transmission of typhus, but fortunately is now fairly rare in the region, largely restricted to populations that are unable to regularly change and launder clothing. Head lice, on the other hand, remain a common pest. For example, a 1976 survey estimated that six million school children in the United States had head lice.



#### Life cycle of the head louse.

Head lice feed on human blood. Their bites are painless, but the saliva causes irritation in about eight to 10 hours. A sensitization reaction often develops as an infestation continues, which varies, depending on the individual, from an intense itching to small reddish spots that are little noticed. Secondary infection from scratching bites is likely the primary cause for irritation, rather than the insect bite itself.

Head lice are almost exclusively transmitted among children by direct contact during play. Some transmission can also occur through shared items, such as combs or hats, although this is generally considered much less important in spread of lice. Lice and their eggs (known as nits) survive poorly in temperatures below 75 degrees F. Lice also need to feed regularly, typically every few hours. They will die if starved for two days.

There are several approaches to head lice control, with most lice control plans coordinated by health workers in schools. One of the oldest methods of head lice control is the use of 'nit combs'. These are very fine toothed combs that can remove the eggs attached to the hairs, much finer than are standard combs. Nit combs are available at many pharmacies under such trade names as Derbac<sup>R</sup> and Innomed<sup>R</sup>.

Because of their fine teeth, it is usually much easier to use the nit comb when the hair is wet after a shampoo. Furthermore, shampooing can help with control of head lice. Lice are sensitive to high temperatures and a shampoo that is as hot as can be tolerated comfortably may help kill adult and nymph stages. Also, soaps that are manufactured from oils such as coconut and olive tend to be insecticidal. Shampooing with soap will not kill egg stages, however. Rubber gloves should be worn while inspecting or treating the scalp to prevent eggs from lodging under the fingernails from where they may be transferred.



A louse egg, also known as a "nit".

During outbreaks, various chemical controls are usually used. Several lotions are available by prescription including Kwell<sup>R</sup> (a 1 percent solution of lindane), Ovide<sup>R</sup> (a malathion-based lotion), and Nix<sup>R</sup> (a permethrin-based lotion). A variety of over-the-counter treatments also are available, which contain pyrethrins (usually with piperonyl butoxide as a synergist).

Hot water laundering or drying at high temperatures can quickly disinfest bedding, clothing, towels and other fabrics. Usually an exposure of 135 degrees F for ten to fifteen minutes is sufficient. Collect items that an individual uses that are likely to collect hair (hats, scarves, etc.) and store them in separate areas from those of others to avoid transferring lice. Keep in mind that although school children are most commonly infested, other family members can serve as head lice hosts and allow reinfestation. Treat all members of the family during outbreaks.

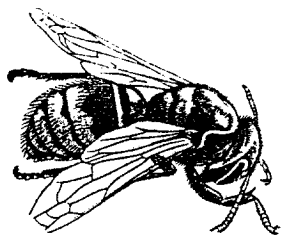
## Household Insects of the Rocky Mountain States

### Wasps and Bees

Many different wasps and bees occur in the region, with the great majority having highly beneficial habits. Bees, such as the honeybee and leafcutter bee, are essential to the pollination of many crops and native plants. Most wasps are predators of pest insects, feeding insects to their developing young.

Problems with wasps and bees occur when nests are located near high traffic areas or in buildings. Also, late summer foraging by yellowjacket wasps can be a serious nuisance problem for outdoor restaurants and other areas where food is served outdoors. Also, wasps may enter homes and buildings during autumn in search of overwintering shelter.

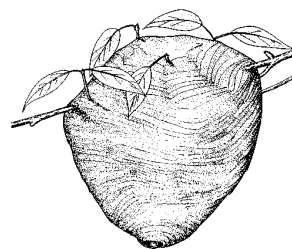
**Yellowjackets/Hornets (Social wasps).** Almost all of the serious stinging and nuisance problems with 'bees' actually involve the **social wasps**--primarily the yellowjackets (*Vespula* species) and hornets (*Dolichovespula* species). (See table below for a summary of differences between honeybees and yellowjackets.) These insects annually produce new colonies that are constructed of paper. Those produced by yellow jackets are usually made underground or in wall voids. Hornets make large aerial nests in trees or large shrubs.



A hornet.

Fertilized females winter in protected areas, including homes, and begin to construct nests in spring. As the season progresses more worker wasps are present to help with colony development and nests rapidly increase in size. By late summer, each colony may have hundreds of wasps. At this time, the colony starts to break up with many of the large females leaving. Following several hard frosts the nests are completely abandoned. Nests are not reused the following year.

Social wasps feed their young protein-rich foods, primarily insects, meat and dead animals. Late in the season, food preferences of some species of yellowjackets switch to include more sugary materials and they are attracted to soft drinks, syrup and other materials. During this period they can be extremely annoying and persistent pests.



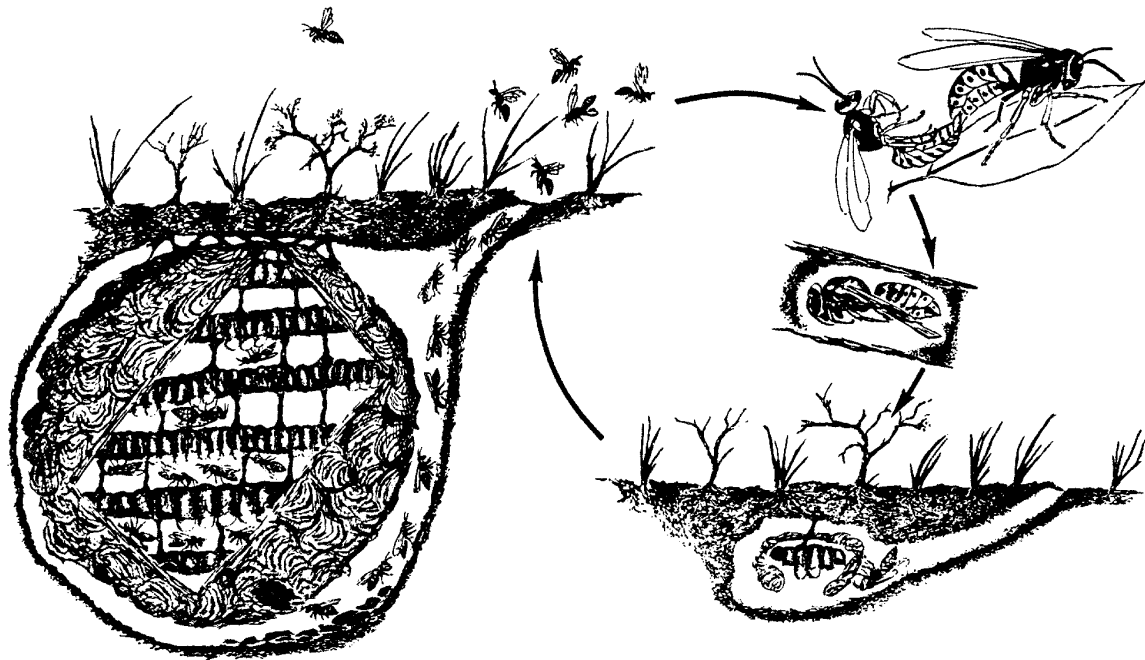
Typical paper nest of a hornet or aerial yellowjacket.

**Wasp control.** Destruction of wasp colonies can be fairly easy if the nest can be located. Species that produce aerial nests are often very easily detected. However, the more pestiferous yellowjackets typically nest below ground or in wall voids with only a small external opening.

Wasps using aerial nests are best controlled with directed sprays forced into the opening. Often it is best to combine a fast acting 'knockdown' insecticide (e.g. pyrethrins, resmethrin) with a more persistent insecticide, and many commercial "Wasp and Hornet" sprays contain this combination. Insecticide dusts are usually most effective for ground nesting yellowjackets, since these treatments are more readily tracked into the colony. Alternatively, liquid treatments that can be poured into the colony may be used. (**Never** use gasoline for this treatment since it poses an extreme fire hazard and can cause long-term contamination of soil and water.) Wasp colonies often are not completely killed for at least one week after application. Developing wasps remain in rearing cells and continue to emerge for several days. **Do not** block colony entrances until nests are destroyed, since yellowjacket wasps may chew new entrances. (**Note:** Wasp nests can be safely collected in late fall or winter. They are not reused the following year.)

It is safest to control wasps very early in the morning or in the evening when their activity is reduced. Light-colored clothing and protective clothing is recommended to avoid stings.

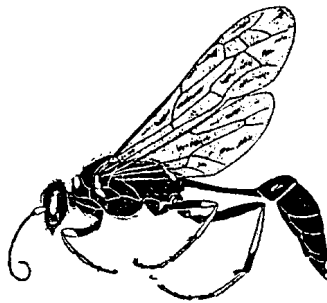
## Household Insects of the Rocky Mountain States



Life cycle of a typical yellowjacket wasp. Males and sexual females (queens) are produced late in the season (upper right). The mated female (middle right) spends the winter in an inactive state in sheltered areas and begins to make a colony (lower right) in the spring. Colonies are made underground or in hollow sites such as wall voids. The colony increases in size (left) during the season, and is abandoned in fall. From USDA Agriculture Handbook 552, *The Yellowjackets of America North of Mexico*.

In many cases, it is best to wait out wasp infestations. Since colonies are abandoned at the end of the season, problems can be resolved without treatment if the colony is not causing too much of a nuisance problem.

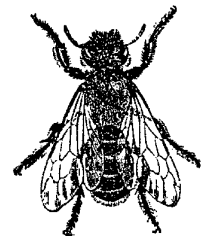
**Solitary Wasps (Hunting Wasps).** Several kinds of wasps do not produce a social colony, instead individually rear their young in nests they construct of mud or dig in the ground. These wasps are hunting wasps that collect spiders, cicadas, caterpillars and other prey for their young. Many are highly beneficial.



A hunting wasp.

Although the solitary wasps sometimes appear rather fearsome, they rarely sting and their sting is less painful than the social wasps. If necessary, colonies of mud nesting species can be controlled simply by pulling down nests. Ground nesting can be deterred by disturbing the soil. In areas where nesting is frequent and a cause for concern, residual insecticide sprays can kill nesting wasps. Sometimes colonies may be killed by drenching the soil at night with soapy water.

**Honeybees.** Unlike the social wasps, honeybees (*Apis mellifera*) form a permanent colony. Nests are constructed of wax and most colonies are maintained by beekeepers. (See table below for a summary of differences between honeybees and yellowjackets.) Honeybees collect nectar and pollen, which they use to feed their young



A honeybee.

## Household Insects of the Rocky Mountain States

### Differences between yellowjackets (a social wasp) and honeybees (a social bee).

Characteristic	Yellowjacket	Honeybee
Nest construction material	Paper, produced from ground wood pulp.	Wax, produced from nectar.
Nest location	Usually underground, some nest in cavities above ground. Two related species of hornets produce aerial nests.	Almost all are in hives maintained by beekeepers. Sometimes escaped wild bees will nest in above-ground cavities, including hollow trees or wall voids of buildings.
Stinging	Stinger is not barbed, can sting repeatedly.	Stinger is barbed and is pulled out during the act of stinging; individuals can only sting once and die after the stinger is removed.
Life of the colony	Colonies are produced annually, becoming largest in late summer. Colonies are abandoned in fall. New colonies start by a single queen in spring.	Colonies are perennial, with new colonies started by absconded swarms.
Feeding habits	Will feed on insects and other protein-rich foods when rearing young. Generally scavengers and often seek sweet foods later in the season.	Nectar and pollen are the primary foods. They will occasionally feed on other sweet materials such as soft drinks and honeydew.
General appearance	Most are marked with yellow and black bands. Not hairy.	Most are marked orange-yellow with black bands. Very hairy.

and to produce honey and beeswax. Honeybees also may collect water to cool the hive and plant sap to help seal cracks.

Periodically, overcrowded colonies form swarms that leave the hive. The swarms rest temporarily on a tree or shrub as scout bees search for a nesting cavity. Although the swarms are striking, the bees are non-aggressive at this time. Most beekeepers are willing to collect honeybees in a swarm. County Cooperative Extension offices often have lists of local beekeepers that may be willing to remove swarms.

Most problems with honeybees occur when swarming bees find a building wall void and construct nests in buildings. These nests can sometimes get to be very large over the course of several years and their removal difficult. Although colonies can be easy to kill with insecticides, the wax, honeybee and other hive debris remain behind. The wax can melt with high temperatures and old colonies attract rodents or insect pests. As a result, the old colony must be removed, which requires tearing out parts of the wall.

The exception to this would be if the colony can be exterminated promptly after its establishment.

Honeybees also can be nuisance problems at sites where sweet materials are being dispensed, such as syrups used in soft drinks or snow cones. To limit the nuisance problems, move the location of these sites or bait the colony with attractive syrup at a point closer to the hive.

**Bumblebees.** Bumblebees (*Bombus* species) share some habits with both honeybees and yellowjackets. They produce an annual colony with the overwintering stage being a fertilized female (queen). As spring tem-



A bumblebee worker foraging at a flower.

## Household Insects of the Rocky Mountain States

peratures warm, the female bees emerge and seek nesting sites. Rodent burrows in the ground are the most common nest site, but almost any small cavity may be suitable. During the establishment of the colony, the female conducts all of the colony work (e.g., foraging for nectar and pollen, construction of wax cells, laying eggs, rearing young).

Within a few weeks after colony initiation, the first worker bees emerge and begin assisting with colony maintenance. These first workers are quite small in size due to a reduced diet. The colony continues to increase in size throughout the summer. Towards the end of the season, fully-developed females are produced that will be queens the following year. Some male bumblebees also are produced that mate with the queens. By early fall, the colony dies out.

Bumblebees are important in the pollination of many native plants. However, they can and will sting, usually when defending the nest. If nests are located in areas where stinging is likely, nests can be destroyed by spraying or dusting the nest entrance. This is best done at night.

**Ground Nesting Bees.** In localized areas, problems occur with ground nesting bees. These are solitary bees that individually rear their young within cells that they dig underground. Several groups of bees may share this habit, including sweat bees (Halictidae), andrenid bees (Andrenidae) and digger bees (Anthophorinae). Certain sites with a sunny exposure, proper soil type and cover are highly preferred as nesting areas. Although the bees construct individual cells, hundreds of bees may nest at such a site in close proximity, giving the appearance of a colony.

The solitary bees are non-aggressive and rarely sting. They are best controlled by somehow changing the surface of the nesting site. Repeatedly drenching the area often will soon force the bees to locate new nest sites. Use of such techniques as sodding, covering with straw or other organic materials will allow a permanent solution to problem nesting in a yard.

## Household Insects of the Rocky Mountain States

### SPIDERS AND OTHER ARACHNIDS

#### Spiders

Spiders are in a group of animals classified as arachnids. They are not insects, instead being more closely related to mites and ticks. Spiders are characterized by having eight legs and two distinct body regions (cephalothorax, abdomen).

All spiders feed only on insects and other small arthropods. Their activities are highly beneficial since they help control many pest species in yards and in and around homes. Unfortunately, there is widespread, and largely unfounded, fear of spiders. Spider fears also exist because a few poisonous species occur, notably the widow spiders.

Scores of spider species are found in the region. They begin life as eggs, laid in egg sacs that are bound by silk. These egg sacks may be guarded or even carried by the female. The young spiders (spiderlings) emerge from the eggs and scatter. Many spiders disperse by "ballooning". This occurs by spiders producing silken threads that are caught by the wind. Although they do not have wings, spiderlings have been known to be carried hundreds of miles on wind currents.

Spiders feed and develop over a period of several months. During this period they molt several times before becoming full grown. Many common spiders have one generation per year and become full-grown in late summer. However, habits vary and mating and egg-laying can occur during almost anytime during the year, depending on the species.

All spiders can produce silk. Many of the more conspicuous species use silk to help construct webs used to capture prey. Many other spiders do not produce a web, instead they hunt their prey. These hunting (or ambush) spiders use their silk only for building egg sacs or retreats.

Spiders eat live prey such as insects and other small arthropods. The prey is immobilized by a venom that

the spider injects through fangs. Spiders may survive for several weeks or even months without food. Most species of spiders found in homes are attracted to water sources. Areas around water pipes, floor drains, and plumbing fixtures, and air conditioners are common areas infested by spiders in a home. However, other species of spiders prefer warm, dry undisturbed sites and can be found in subfloor air vents or upper corners of rooms. Most spiders found indoors hide either in cracks, in darkened areas, or in silken retreats they build.

Movements of spiders into homes greatly accelerate after cool weather occurs in early fall. Also, male spiders (identifiable by their large knob-like palps at the head) of most species are often highly mobile and range widely while searching for mates. Most spiders that migrate into homes fail to survive for long in homes, but periodically that can be very numerous.

Although some of the larger spiders bite, few pose any threat to humans. The venom of most spiders is not very toxic to humans and smaller spiders have mouthparts that cannot break the skin. Also, spiders are not usually aggressive and only bite when accidentally handled or trapped.

Two groups of poisonous spiders do occur in the region, the widow spiders and (very rarely) the brown recluse. The habits of these species and symptoms of their bites should be recognized.

#### Common Household Spiders

**Wolf spiders** (Lycosidae) are fairly large hunting spiders that often cause alarm because of their appearance. Most are gray or brown and fast moving. Many spe-



A large wolf spider.



## Household Insects of the Rocky Mountain States

cies exist and most are approximately one-half inch in length. However, some wolf spiders (*Lycosa* species, *Geolycosa* species), may reach a size of one to one and one-half inches.

During late summer, peak populations of adult wolf spiders are present and males are highly migratory at this time, commonly entering homes. (Male spiders are often easily identified by their prominent palps, sex organs attached near the mouthparts.) Later, both sexes may migrate indoors, seeking the protection of the home during cool weather.

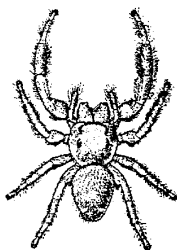
They hide in cracks and do not produce webbing, hunting their prey at night.



Male wolf spiders can often be distinguished by the presence of large palps near the mouth. These are the sex organs used for mating.

Females can sometimes be found carrying their young on their back for several weeks. Larger species of wolf spiders can produce a mildly painful bite, but symptoms are of short duration.

**Jumping spiders** (Salticidae) are brightly colored, active spiders. Their bodies are often densely covered with colored hairs and some may appear iridescent. They have a stout body and large eyes. They are active during the day and may jump or move sideways with ease. They rarely reproduce in homes and most occur as late season invaders of buildings after frosts.



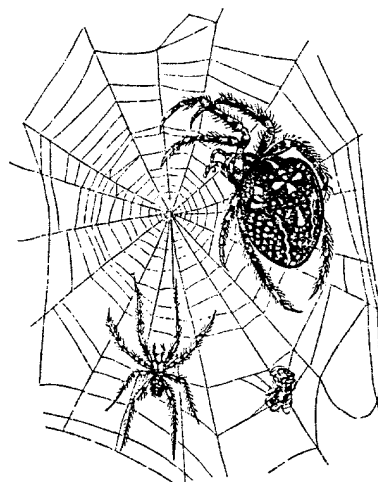
A jumping spider.

**Orb weavers** (Araneidae) produce large characteristic webs that have radiating threads from a central point. Although they rarely enter homes, nests are often constructed outside windows or doors and the spiders attract attention because of their size and the



The "cat-face" or "monkey-face" spider, *Araneus gemma*, is a harmless species that commonly makes webs around doorways and windows.

conspicuous web. For example, the banded garden spider (*Argiope trifasciata*) can make a web over one foot in diameter. The "cat-face" or "monkey-face" spider (*Araneus gemma*) is common species that nests in window corners or under eaves and may have a body the diameter of a quarter when full-grown.



Orb-weaving spiders, such as the common garden spiders, produce very characteristic, patterned webs.

**Funnel weavers or funnel-web spiders** (Agelenidae) are medium-sized spiders varying from 1/8 to 3/4 inch. Their funnel-shaped webs are easily seen in lawns or around undisturbed corners of buildings in late summer. Funnel weavers may also inhabit corners of cellars, bathrooms, or outbuildings and commonly are encountered trapped in sinks or bathtubs.

## Household Insects of the Rocky Mountain States

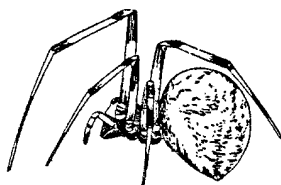


A funnel web spider.

Funnel weaver spiders often can be seen at the mouth of the funnel, waiting for prey. Egg sacs often are laid in a cocoon that remains attached to the web. Funnel web spiders are one of the most common spiders found within homes, and often are mistaken for brown recluse or wolf spiders. However, most are non-aggressive and are harmless to humans.

One large species of funnel-web spider, *Tegenaria agrestis*, has been associated with human bites and can cause a wound reaction similar to that caused by brown recluse. This species is sometimes called the "aggressive house spider" or "hobo spider", although it is not a particularly aggressive biter. These spiders are generally gray, about one to one and 3/4 inches when full-grown, and live in a large funnel-shaped web on the ground. Although this species has not yet been positively identified from Colorado or Wyoming, it has been found in Utah and Montana and is spreading eastward in its range from areas in the Pacific northwest where it was introduced.

**Cobweb spiders or combfooted spiders** (Theridiidae) are very common in homes and many are well-adapted to survival indoors if adequate prey are present. These are small to medium sized spiders that typically are found hanging upside down from irregular webs in corners of rooms and other darkened areas. When prey is tangled in the web they throw anchoring silk strands over it. They do not completely wrap the prey, as do the orb weavers. Although almost all cobweb weavers



A house spider.

are harmless, the widow spiders (e.g., black widow) also belong to this family.

**Sac spiders** (Clubionidae) found in homes are wandering spiders that do not produce a permanent web. They lack any easily recognized characteristics and may be confused with wolf spiders, funnel-web spiders or the brown recluse. Most are gray or pale brown and have prominent jaws. They are active primarily at night. Some species, notably those in the genus *Chiracanthium*, will bite and can cause a serious wound.

**Daddylonglegs spiders** (Pholcidae) are very long-legged spiders. Unlike the true daddylonglegs (Order: Opiliones) the daddylonglegs spiders produce a web. Webs are constructed in dark corners and the spiders have the unusual habit of sometimes bouncing and shaking the web when they are disturbed. Daddylonglegs spiders (like the true daddylonglegs) are harmless to humans.

### Poisonous species of spiders

The **widow spiders** (*Latrodectus* species) are common species throughout the Rocky Mountain region, occurring to elevations of 8,000 feet. The black widow, *L. mactans*, predominates in the eastern areas while *L. hesperus* is more common west of the Continental Divide. Widows produce a loose web and prefers to inhabit dark undisturbed areas. Typical locations of widows around a yard include shrubbery, log piles, crawl spaces, areas under porches, in garages, and around piled debris.

All bites to humans occur from the female, often as she is guarding her egg sack. The full-grown female is about one-half inch long and shiny black or dark brown. She has a spherical abdomen. Most widows also have orange-red markings on the underside of the abdomen, sometimes appearing as an hourglass. However, these markings may be reduced and even absent among the widow species found in the region.

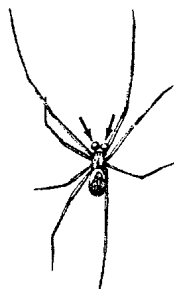
The venom of the female widow spider is a nerve poison that produces distinctive symptoms. Often the

## Household Insects of the Rocky Mountain States



A female widow spider. Photograph courtesy of USDA-Cooperative Extension.

original bite is not very painful, but it may be followed by a burning sensation, local swelling, and redness. Pain may become intense in one to three hours and last up to 48 hours. Cramping of the legs, arms and chest may follow. The abdominal muscles become rigid in many cases.



A male black widow. Drawing courtesy of R.L. Smith

Widow spider bites should receive prompt medical attention. Although fatalities are very rare, symptoms are painful. Antisera are available and injections of calcium gluconate can help relieve symptoms. Whenever possible, try to bring the spider to the doctor to confirm the diagnosis and assist with proper treatment.

The **brown recluse spider** is a very uncommon species in the region. It is not adapted to the region and the few confirmed specimens have all been related to recent introduction from other states. It is more of a warm temperature species than the widow spiders and reproducing populations are doubtful to occur anywhere in the region, with the possible exception of extreme southeastern Colorado. They are



A brown recluse, a poisonous species that is only incidentally found in the region.

frequently confused with the wolf spiders and funnel weavers.

The brown recluse also is called the fiddleback spider because of its distinctive fiddle pattern on the cephalothorax. Brown recluse spiders are yellowish-brown to dark brown in general color. On close inspection a useful diagnostic characteristic is the presence of



The cephalothorax of a brown recluse spider showing the three pairs of eyes and the characteristic violin-shaped pattern. Drawing courtesy of R.L. Smith.

three pairs of eyes, arranged in a semi-circular pattern. (Most spiders have four pairs of eyes.) Brown recluse spiders produce a loose, irregular web in undisturbed areas. Unlike the widow spiders, this spider also may leave the web to hunt prey.

## Household Insects of the Rocky Mountain States

Some characteristics of spider families commonly found in homes in the Rocky Mountain region.

Common name	Scientific name	Web (if any) and type <sup>1</sup>	Typical eye pattern <sup>2</sup>	Miscellaneous features
Wolf spiders <sup>3</sup>	Lycosidae	No web produced	4 pairs; central pair very prominent	Generally hairy and dark or gray. Active spiders with large prominent jaws. The females may be discovered carrying their egg sack; they also carry their newly hatched young for a period.
Jumping spiders	Salticidae	No web produced	4 pairs; 2 large pairs in front of the head with other pairs much smaller.	Often brightly colored and extremely active. Capable jumpers. Large prominent eyes and good vision.
Crab spiders	Thomisidae	No web produced	4 pairs; eyes are of moderate size or small.	The front two pairs of legs are longer than the hind pairs. Most species have a very rounded abdomen. Often found on plants but rarely indoors.
Orb weavers	Araneidae	Very characteristic patterned web, often of geometric design	4 pairs; generally small and scattered around head	Many species get quite large. Most are generally round in body form. Rarely found indoors, but may occur around doors and windows. Common species include the garden spiders and the "cat-face" spider.
Funnel weavers <sup>3</sup>	Agelenidae	Dense web with a distinct funnel shape.	4 pairs of moderate size; directed towards the front	Usually brownish. The abdomen is often pointed and a pair of spinnerets may be easily observed on the hind end.
Cobweb spiders, Combfooted spiders	Theridiidae	Irregularly formed, sticky web usually spun in dark corners.	4 pairs of small to moderate size with side pairs that often are fused.	Generally have a smooth, rounded abdomen. Includes the common house spiders as well as the widow spiders.
Sac spiders <sup>3</sup>	Clubionidae	No web is produced, though they may make a silken resting mat.	4 pairs of small to moderate size, often arranged in an elliptical pattern	Abdomen is often elongate with a pair of prominent spinnerets on hind end. Generally light gray or light brown color, although one common genus has a red-brown cephalothorax.
Daddylonglegs spiders	Pholcidae	Loose web constructed in dark corners	3 pairs, sometimes 4 pairs. Often arranged in 2 groups of 3 along side of the head. Small central pair may be present.	These spiders have very long legs. When disturbed they often bounce vigorously on the web.

<sup>1</sup> Web-spinning species may not always be found within the web. This is particularly true for adult males, which wander between webs in search of mates. Males are characterized by a pair of prominent palps along the side of the head.

<sup>2</sup> Eye patterns may vary within families. This figure is to be a general guide and may not be suitable for positive identification. Spiders that actively roam and hunt generally have more prominent eyes than do web spinning groups that trap their prey.

<sup>3</sup> These are the families that are most commonly mistaken for brown recluse spiders, an extremely uncommon family of poisonous spiders within the Colorado Wyoming region. Brown recluse spiders have three pairs of small eyes, the eyes arranged at either side of the head and along the lower front of the head.



## Household Insects of the Rocky Mountain States

Brown recluse spiders are shy and secretive. Most bites occur when a person is putting on clothing (such as winter coats or boots in storage) in which the spider is hiding.

The amount of venom injected by the spider and the sensitivity of the person can affect the seriousness of the bites. Victims may have no reaction at first or may immediately feel a stinging sensation. Intense pain may last two to eight hours. A small blister forms at the bite and a large area around the bite becomes red and swollen.

Tissue around the bite may become infected and slough away. Wounds are slow to heal and may become ulcerated. Serious scarring has resulted from some cases of brown recluse bites.

**It must be stated that brown recluse bites are misdiagnosed commonly by medical doctors, contributing greatly to fears of brown recluse in the region.** Symptoms similar to those caused by brown recluse bites can occur from a variety of other, non-spider bite causes, including allergies or viral infections (see following table).

### Some non-Arthropod medical entities mimicking *Loxosceles* envenomation:

Bed sore	Lyell's Syndrome
Chronic Herpes Simplex	Lymphatomoid Papulosa
Diabetic ulcer	Periarteritis Nodosa
Erythema Chronicum Migrans	Poison Ivy
Erythema Multiforme	Poison Oak
Erythema Nodosum	Pupura Fulminans
Gonococcal Arthritic Dermatitis	Pyoderma Gangrenosum
Infected Herpes Simplex	Sporothrichosis
Keratin-mediated response to a Fungus	Stevens-Johnson Syndrome
	Warfarin Poisoning

Since it is possible that other, unidentified spider species found in the region may also cause poisonous reactions, it is very useful to collect spiders that have caused bites that produce significant symptoms. These should be sent to a specialist trained in the identification of species of medical importance.

## Sun Spiders

Sun spiders (also known as wind scorpions or solpugids) are a group of arachnids distinct from the true spiders. Sun spiders are yellowish-brown and larger than most spiders. They are most easily marked by their long pair of pedipalps on the sides of the head that superficially appear as a fifth pair of legs. Sun spiders also have a pair of greatly enlarged jaws.



A sun spider or "wind scorpion".

Sun spiders are common in much of the region, excluding higher elevation areas. They are active hunters of other arthropods and usually feed at night, hiding under rocks and debris during the day.

Occasionally, sun spiders enter homes, particularly during midsummer. Because of their large size and aggressive appearance they typically cause alarm. However, they very seldom bite, unless handled or crushed inadvertently. The bite can be painful but the pain is not very persistent.

Discourage sun spider movements into homes by keeping shelter materials (rocks, debris, etc.) away from the foundation. Foundation perimeter applications of insecticides can further improve control. However, sun spider abundance in homes usually is very low with most incidents involving isolated sun spiders.

## Household Insects of the Rocky Mountain States

### Scorpions

Scorpions are a distinctive and well-recognized group of arachnids. They are most easily distinguished by their lobster-like appearance, but particularly by their fleshy "tail" that terminates in a bulbous sac and prominent stinger. The larger front pincers (a modified mouthpart) are used to capture and hold prey while feeding. The stinger is used to subdue prey and for defense.



**A scorpion (*Vaejovis* species). Scorpions can be locally common in the region but most are fairly small. No highly poisonous species occur.**

Scorpions are locally abundant within the Rocky Mountain region and tend to be more common in more southern areas. They are most commonly encountered while working around rocks or debris, hiding areas for scorpions during the day. Rarely, scorpions may enter homes. Entrance into homes occurs most often in newly developed areas less than three years old. Often, migrations into homes follow heavy summer rains.

Scorpions found within the region can produce a painful sting when handled or accidentally disturbed. Fortunately, local species are not considered highly poisonous. The notorious Durango scorpion is restricted to Mexico and the only dangerously poisonous scorpion native to the United States, the bark scorpion, is found in areas south of Colorado.

Scorpions have a life cycle of two to five years. They do not lay eggs; the female bears live young seven to 12 months after mating. A female may produce litters of about 14 to as many as 100 and the young are carried on the back of the mother until they have molted. Immature scorpions then leave the mother and become mature in about one year.

Scorpions spend the daytime under cover or in burrows in the ground. At night they emerge to defend their territory and to feed. Since scorpions have poor eyesight, they do not stalk their prey and instead lie in wait for ambush. Insects, spiders, millipedes and small vertebrates are common scorpion prey.

**Control.** During dry weather, scorpions are attracted to moisture. Because of this habit, they may be trapped by spreading wet burlap bags and collecting the scorpions during the day. Scorpions also can be discouraged from areas around homes by removing potential cover around homes, such as stones, lumber, and other debris. Sealing entrances into homes also can exclude scorpions.

Scorpions fluoresce brightly at night when exposed to ultraviolet (UV or black) lighting. They may be spotted easily for capture from several yards away using this technique.

Outdoor applications of residual insecticides can increase scorpion control. Direct applications to harborage areas, such as stone piles. It is not necessary to treat grass lawns. Exterior foundation treatments also can help provide additional control.

### House Dust Mites

House dust mites (*Dermatophagoides* species) feed on bacteria associated with skin flakes and are common in homes in many areas of the eastern United States. They do not bite but can induce allergies in susceptible individuals. The feces of dust mites and their cast skins are the primary allergenic material.

House dust mites are very infrequent in the western United States. Since they are dependent on high humidity, above about 60 percent, the arid conditions of the region usually prevent the mites from becoming established. Populations of dust mites that are found are almost entirely restricted to bedroom or resting areas, where skin flakes are in highest concentration. Furthermore, continuous running of humidifiers often also is an important contributor to dust mite survival.

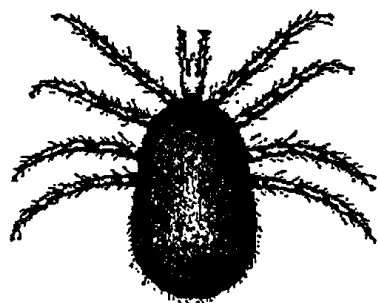
## Household Insects of the Rocky Mountain States

Reducing the humidity is the most effective way to limit populations of house dust mites and is all that is needed in almost any home in the western United States. Vacuuming areas around bedding or other areas where skin flakes are commonly shed also can help control mites and allergic reactions. (Dusting is not recommended since it can make airborne the allergenic mite feces.) Where dust mites occur on bedding where humidifiers must be run, encasement of the mattress or pillows in plastic can limit problems. Although some pesticides can likely kill house dust mites, their value for control has not been proven.

### Bird Mites

Mites are commonly associated parasites of birds (*Dermanyssus* species, *Ornithonyssus* species) including house sparrows, starlings, pigeons and chickens. The mites are active at night and feed on the blood of the birds. At times, they have become serious pests of chicken houses. During the day, the mites hide in cracks and crevices where they lay their eggs.

Bird mites can bite humans and often will invade homes after nesting birds have left. Outbreaks that affect humans usually are short-lived, typically



A bird mite.

lasting only a couple of weeks, but can be very irritating. However, some bird mites can survive months of starvation, lengthening the period when humans may be bitten.

Prevention of bird mite problems can involve prevention of bird nesting on buildings, particularly adjacent to bedrooms. Federal laws protect migratory birds so removing occupied nests should not be practiced. (However, these laws do not protect starlings, house sparrows, or pigeons.)

Use of residual household insecticides around cracks and crevices can kill many bird mites and prevent migration indoors. Because the mites are well-protected during the day, fogger treatments are not likely to be effective.

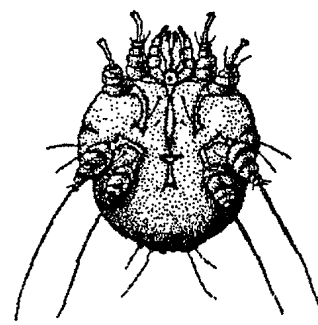
Less commonly, related species of mites in the genus *Ornithonyssus* may move indoors and cause bites. These mites are typically associated with rodents as well as birds.

### Mites Associated with Other Animals

Mites in the genus *Cheyletiella* sometimes infest and feed on mammals such as cats, dogs and rabbits. On these animal hosts, they can cause a mange-like condition, resulting from their feeding on the blood. People who then handle these animals may have some of the mites transferred to them. The mites may then bite humans, usually resulting in temporary itching. Humans are a poor host for these mites and the problem usually ends a few days after discontinuing contact with the infested animals.

Detection of these mites is best done by examining the animals. Dogs sometimes show a mange-like reaction to infestations with *Cheyletiella* mites although there may not be obvious signs of infestation on either dogs or cats. By brushing the animal over a paper the mites can be collected for examination. Treating the animals to control the mites is the best long-term control.

Mange mites (*Sarcoptes* spp.) also may sometimes bite humans when high populations occur on dogs or other pets. These mites will stay on the host animal unless extremely numerous and cannot survive for long off the host. Treatment of



A scabies, or mange mite, *Sarcoptes* species.

## Household Insects of the Rocky Mountain States

the infested animal is the most important means of controlling these mites.

Since mange mites burrow into the skin most insecticides used on pets are ineffective. Treatment usually requires consultation with a veterinarian and ivermectin is currently one of the more effective applications. A pyrethrin fogger may help to more rapidly kill out residual mite populations in heavily infested rooms.

### NUISANCE HOUSEHOLD INVADERS

Several insects and other arthropods periodically move into homes, usually seeking shelter or areas of higher humidity. Invasions of this type typically are self-limiting--the insects either move out when favorable conditions return or die within the home

without reproducing. However a few, such as crickets and book lice can survive if special conditions occur (leaking water, etc.). These nuisance household invaders can be significant nuisance pests, although they are essentially harmless to household furnishings and do not bite.

As a general rule, nuisance invaders are best handled by preventive measures. Seal the home prior to indoor migrations to prevent many problems. Sometimes these efforts are improved by use of insecticides applied around the exterior foundation (if the insects crawl) or around potential openings, such as borders of windows and cracks.

#### Typical Occurrence of Seasonal Pests That Tend to be Observed Periodically in Homes.

<b>January</b> Fungus gnats Carpet beetles Stink bugs Threadwaisted wasps	<b>April</b> Clover mites Millipedes Elm leaf beetles Boxelder bugs Firewood borers Carpet beetles Cluster flies Picture-winged flies Miller moths	<b>July</b> Strawberry root weevil Bird mites Ants (swarms) False chinch bugs Sun spiders Blowflies Darkling beetles Ground beetles	<b>October</b> Indian meal moth Fruit flies Yellowjackets Conifer seed bugs Spiders Cluster flies Boxelder bugs Elm leaf beetles Crickets
<b>February</b> Fungus gnats Cluster flies Carpet beetles Clover mites Firewood borers Stink bugs Termites (swarms) Threadwaisted wasps Millipedes	<b>May</b> Miller moths Elm leaf beetles Swallow bugs Boxelder bugs	<b>August</b> Strawberry root weevil Fleas Ants (swarms) False chinch bugs Sun spiders Blowflies Darkling beetles Ground beetles	<b>November</b> Cluster flies Conifer seed bugs Carpet beetles Leafminer moths
<b>March</b> Fungus gnats Cluster flies Picture-winged flies Firewood borers Carpet beetles Clover mites Elm leaf beetles Termites (swarms) Millipedes Leafminer moths	<b>June</b> Miller moths Sun spiders Ants (swarms) False chinch bugs Strawberry root weevil Bird mites Darkling ("Stink") beetles	<b>September</b> Boxelder bugs Indian meal moth Fleas Conifer seed bugs Millipedes Crickets Spiders Yellowjackets	<b>December</b> Fungus gnats Carpet beetles



## Household Insects of the Rocky Mountain States

### Millipedes

Millipedes are a common arthropod found around yards and gardens. The common species (*Allajulus londinensis*) is dark brown, worm-like and 3/4 to one inch in length when full-grown. (A typical description is 'little brown worms'.) On close inspection, they have numerous small legs. Millipedes tightly curl when at rest or when they die.



A millipede.

Millipedes feed on decaying plant materials and thrive in moist areas, such as lawns. Occasionally they move into homes, sometimes in very large numbers. However, the aridity of homes almost always kills the millipedes within a day or two. After dying, the hardened, curled body of the millipede may persist for a long period.

Millipede movements into homes typically occur during spring or fall, often shortly after a period of rainfall. Cool weather in fall also may accelerate movements indoors. The presence of significant numbers of millipedes indoors indicates high populations in surrounding lawn areas.

Reduce household migrations by eliminating sheltering debris around the foundation and sealing openings. Some insecticides can be used as perimeter treatments around the foundation exterior or applied to breeding areas in the lawn. However, since most millipede migrations are normally of short duration, preventive applications of pesticides rarely provide additional benefit.

### Duff Millipedes

One of the more unusual arthropods that periodically invade homes is the duff millipede (*Polyxenus lagrus*). It is an extremely small species (about 1/10 inch) and differs in appearance from the more common millipedes found in lawns. Duff millipedes are far less elongated in general form, have only 13 pairs of legs, and are covered with fine hairs. A long pair of hair-like structures (setae) also protrude from the hind end. Superficially, duff millipedes are similar to young carpet beetle larvae and are often misidentified.

Duff millipedes are most often found in association with pine forests. They occur as occasional nuisance pests in fairly restricted areas along the foothills of Front Range Colorado and Wyoming. Duff millipedes are capable climbers (unusual for millipedes) and are attracted to moisture. As a result, large numbers may periodically enter homes or become attracted to outdoor water sources, such as hot tubs.



A duff millipede.

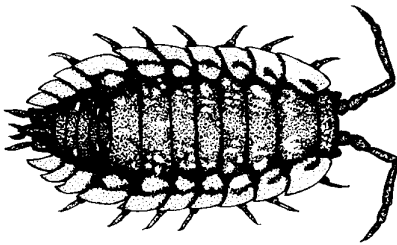
Duff millipedes normally inhabit leaf/needle litter and feed on algae. They also may climb trees to feed on decayed bark. They do not feed nor reproduce within a home. Typically, the arid conditions of a home will cause most to die within a few days, although the old exoskeletons remain intact.

To manage duff millipedes, seal access areas of the home and removing attractive sources of moisture.

## Household Insects of the Rocky Mountain States

### Sowbugs and Pillbugs

Sowbugs (*Porcellio* species) and pillbugs (*Armadillium vulgare*) are the only crustaceans that have adapted to life on land. They were introduced into North America but now thrive in yards throughout the region. Part of this success is due to their protective covering of overlapping plates. In addition, the pillbugs (commonly called 'roly-polys') can completely curl up into a tight ball.



A sowbug. Drawing by Tom Weissling.

Sowbugs and pillbugs feed on soft, usually decaying plant matter. Occasionally they damage seedlings in the garden, but this is uncommon.

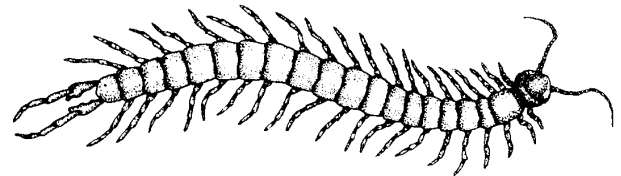
Although adapted to land, sowbugs and pillbugs seek out moist locations and will not survive for long in the typical aridity of regional homes. However, they commonly migrate into homes from the yard and may survive for some time in more humid basement areas. Migrations are most common during periods of cool, wet weather.

Sowbugs and pillbugs generally do not require control, since they do not survive or reproduce within buildings. If nuisance problems persist, insecticide treatments around exterior building foundations and areas used for cover by sowbugs and pillbugs may reduce migrations. However, most insecticides work very slowly to kill sowbugs.

### Centipedes

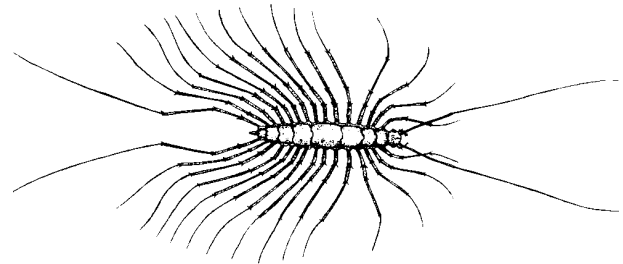
Centipedes are arthropods that are marked by having a single pair of legs per body segment. They are general flattened and elongate in form. Centipedes

are fast moving predators of insects and other arthropods. They rarely invade homes, primarily remaining outdoors under cover during the day. Occasionally, individuals of the large (four to six inches) desert centipedes (*Scolopendra heros*) are found indoors and cause alarm. However, like most centipedes, the desert centipede has shy habits and avoids light. Although it is capable of producing a very painful bite, this is extremely uncommon and only occurs when they are accidentally crushed or handled. Household invasions of centipedes are self-limiting since they do not reproduce nor survive long in most homes.



A giant desert centipede.

An exception is the **house centipede** (*Scutigera coleoptrata*), a species that seems to be more adept at colonizing homes. Legs of the house centipede are very long and it can crawl and climb fast. House centipedes can sometimes survive in low numbers in many homes as long as live prey (insects, spiders, etc.) are available in the home. They prefer more moist conditions than are normally found in dwellings and spend most time in higher humidity areas such as cellars or around bathrooms. Although house centipede bites have been recorded, it is very non-aggressive. Bites are reportedly similar to a bee sting.



A house centipede. Drawing by Tom Weissling.

## Household Insects of the Rocky Mountain States

Centipede movements into homes can be reduced by removing sheltering debris from around homes and by use of perimeter pesticide applications around building foundations.

Control of the house centipede is rarely, if ever, needed since this species is so infrequent. Decreasing moisture sources, such as leaking pipes, and improving ventilation to lower humidity will often eliminate house centipede habitat in homes.

### Springtails

Springtails are small insects that are extremely common inhabitants of soils. They feed on decaying organic matter and help with the recycling of nutrients in the natural ecosystem. They are harmless to humans. Springtails are best identified by their small size (about 1/20 inch) and jumping habit.

Under rare circumstances springtails may enter homes or be found massing on outside walls. These invasions are often very short-lived and the springtails either disperse back to the soil or die in the aridity of the home. (Springtails are also sometimes observed in



A typical springtail, greatly enlarged.

tremendous numbers on top of snow in late winter and spring. This "snow flea" phenomenon, sometimes described as "jumping dirt", occurs when high populations move up through cracks around plants during snow melt periods.)

One condition during which springtails may persist in a home involves their role as occasional houseplant associates. Springtails may reproduce in house plant soils, becoming most noticeable immediately after watering when they may rise to the surface and jump. Presence in house plant soils is considered a minor nuisance problem and not a threat to the plant.

### Arthropods associated with houseplants.

Associated with soil	Feeding on plants*
Fungus gnats	Scales
Drain flies (rare)	Whiteflies
Surinam cockroach (rare)	Spider mites
Springtails	Aphids
Threadwaisted wasp	Mealybugs

\* Not covered in this publication.

### Army Cutworm--The 'Miller' Moth

The most common nuisance moth in eastern Colorado and Wyoming is the army cutworm (*Euxoa auxiliaris*), often known as the 'miller'. Army cutworm moths can be extremely annoying during late spring as they enter homes, cars and buildings. Damage also may be caused by their spotting of draperies, windows and walls. Dead moths, when trapped in a home, often are used as food by carpet beetles, and thus contribute to later outbreaks of these insects. Although this insect is found throughout the region, nuisance problems with the moths appear limited to areas east of the Front Range.



A 'miller moth', adult of the army cutworm. Wing patterns can be highly variable.

The life cycle of the army cutworm is unusual. The caterpillar stage is a common cutworm that may damage alfalfa, winter wheat and some garden crops in early spring. After they have completed feeding they pupate and later transform to the familiar adult moth. The moths then spend the remainder of spring

## Household Insects of the Rocky Mountain States



**The caterpillar stage of the army cutworm.**

and much of the summer feeding on nectar and seeking cool and shaded shelters. This latter habit results in the moths migrating to follow spring blooming, ultimately ending at higher elevations where they occur from late June through August. At the end of the summer, the moths make a return migration to the lower elevations, when they lay eggs in fields and weedy areas. The eggs hatch and the army cutworm spends the winter as a small caterpillar. There is only one generation per year.

Although the army cutworm does not reproduce indoors, large numbers of moths may be found around the home as new moths migrate to the area. They can travel distances of several hundred miles and tend to linger in areas where there is an abundance of nectar-rich flowers and cool cover (e.g., evergreens). Peak populations along the Front Range of Colorado are typically found between late May and late June, although local conditions, such as temperature and the presence of blooming plants, greatly affect how rapidly migrations progress through an area. Return migrations in late summer are much smaller and rarely cause significant nuisance problems.

**Control.** Insecticides work poorly for control of 'miller moths', generally killing only a few moths and providing little or no residual activity for later migrating moths. As such, they have no place in miller moth control.

Some preventive steps can be taken to minimize problems. Gaps around doors and windows should be sealed during the periods when flights are greatest. Reduce evening lighting since that can concentrate moths in an area.

For long-term control, landscaping changes might be useful. Certain plants are highly favored by the moths either for nectar or shelter. These include cotoneaster hedges, Russian olive, spirea, and dense conifers. Limiting these plants near the home may reduce the time moths spend in the vicinity.

Moths in the home can be individually vacuumed. Moths also can be trapped by suspending a light over a container of soapy water. Furthermore, moths can be irritated to erratic flight by certain noises, such as the jingling of keys, which can cause them to become more rapidly trapped in the water.

Problems with the moths naturally end as the migration flights finally pass through the area. However, this may require several weeks.

### Leafminer moths

Several species of tiny (less than 1/4-inch) moths develop as leafminers, feeding between the upper and lower leaf surfaces of plants. Occasionally, some species of leafminer moths enter homes, and can occur in significant numbers. This phenomenon is particularly common at higher elevations, involving leafminer moths that produce mines in willow, aspen and/or poplars.

Perhaps the most common nuisance invader of homes is the aspen leafminer, *Phyllocnistis populiella*. This species overwinters in the adult stage, seeking sheltered locations during this period, including homes. During the growing season, the caterpillar stage makes winding leaf mines just under the surface of aspen and poplar leaves. Tentiform leafminers in the genus *Phyllonorycter* also may occur in homes.



**Leafminer moths. Some species enter homes in fall at higher elevations in the region.**



## Household Insects of the Rocky Mountain States

The leafminer moths are harmless as household pests. They cannot feed nor reproduce indoors, and eventually move out. Their primary importance is that they may be confused with more important household pests, such as the Indian meal moth.

### Darkling Beetles ("Stink" or "Skunk" Beetles)

Darkling beetles in the genus *Eleodes* are very common insects in the western United States, often seen crawling across roads. Occasionally they enter homes and cause nuisance problems.



A darkling beetle, also known as a "stink", "skunk", or "circus" beetle.

Some species of darkling beetles are fairly large in size (approximately one inch) and most are torpedo shaped and dark brown or black in color. Darkling beetles have several unusual habits. When disturbed, they do a "headstand". If they continue to be bothered, they can emit a smelly liquid that may be irritating to skin. Because of this habit they sometimes are called 'stink beetles', 'skunk beetles', or 'circus beetles'.

Dozens of species of *Eleodes* darkling beetles are found throughout the arid areas of the western United States. At night and on overcast days, the adult beetles become active, feeding on various native shrubs. Often times mating pairs may be seen, with the male beetle riding atop the female for days. During the day the beetles hide under rocks and debris. Eggs are laid in patches of moist soil. Larvae

are scavengers that feed on decaying plant and animal materials.

The darkling beetles are extremely resistant to insecticides and have even survived for hours confined in cyanide killing jars. They are best kept out of homes by sealing exterior openings around the foundation of the home.

### Elm Leaf Beetle

Elm leaf beetles (*Xanthogaleruca luteola*) are very common pests of elm trees, particularly Siberian elm. Larvae ("grubs") are mottled with black or dark brown and feed on elm leaves. Damage to the leaves is characteristic, called skeletonizing, since they typically feed between the larger leaf veins on the leaf underside. Adult beetles also feed on the leaves, usually chewing small holes. Typically, there are two to three generations of the beetle during a growing season.



A mass of overwintered elm leaf beetles, exposed in a wood pile.

In late summer, adult beetles begin to move to overwintering shelters. Houses, sheds, log piles, and other areas are common overwintering sites. Elm leaf beetles which use homes for shelter often migrate into the living space where they are a nuisance.

As with most overwintering insects, activity is largely suspended during the coldest months. As temperatures warm during the spring, increasing numbers become active and emerge from over-wintering sites. However, the entire period spent in homes involves

## Household Insects of the Rocky Mountain States

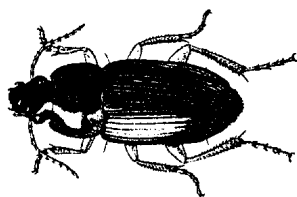
non-feeding stages which do not reproduce. Infestations detected during spring are related to the numbers of beetles which moved into the dwelling for hibernation during the fall.

Limit indoor infestations of elm leaf beetles by controlling developing beetles on nearby elm trees during the growing season. Seal homes in late summer and use insecticides around exterior openings to further reduce indoor migrations.

### Ground Beetles

Ground beetles (Family Carabidae) are one of the most readily recognized and beneficial groups of insects. They are commonly observed outdoors under logs or debris running quickly for cover when disturbed. Hundreds of species occur, in a wide range of sizes (1/8 to 1 inch) and colors (black, brown, metallic green, etc.).

Ground beetles are predators of other insects, such as cutworms and other pests which occur in or on the soil. However, ground beetles may invade homes through windows, doors, or cracks around the foundation. This is particularly common following rains or during other high moisture periods that force them to move. In addition, some ground beetles, such as species of *Harpalus*, are highly attracted to lights at night and may aggregate around lit buildings. Ground beetles are harmless and will not bite humans nor feed on household materials.



A ground beetle in the genus *Harpalus*.

### Root Weevils

Adult root weevils (*Otiorhynchus* species) are a common nuisance invader of buildings particularly during late June, July, and early August. Furthermore, problems are most common at higher elevations. Although root weevils do not damage household furnishings, they can be abundant and persist for several

months. They appear to be attracted to moisture and often can be found around sinks and bathtubs.

Several species of root weevils can be found in homes, most commonly the strawberry root weevil. Larval stages of these insects feed on the roots of a wide range of plants including berries, Douglas-fir, and many ornamental shrubs. One root weevil species, the black vine weevil, is a serious pest of several landscape plants such as *Euonymus* and *Taxus*.



Strawberry root weevil (left) and rough strawberry root weevil (right).

Adult root weevils can be very difficult to control with insecticides. If attempted, make applications around the exterior foundation walls during early summer when root weevils first move into homes. Reapply this treatment to maintain coverage throughout the two to three month period of migration into homes.

Improved sealing of cracks and other entrances into the home is the best long-term approach to limiting invasions of root weevils into homes.

Occasionally other weevils enter homes. For example, around the Denver Metro area, the black vine weevil occurs both as a damaging pest of several landscape plants and as an occasional invader of homes. The alfalfa weevil, a pest of alfalfa in the region, also sometimes winters in homes.

## Household Insects of the Rocky Mountain States

### Foreign Grain Beetle

The foreign grain beetle (*Ahasverus advena*) is a small, reddish-brown beetle similar to the common flour beetles. Foreign grain beetle is commonly associated with damp and moldy grains. In homes, it is most frequently encountered in bathrooms of newer homes, due to the relatively high moisture conditions at this site. Foreign grain beetles, sometimes known as "plaster beetles" feed on molds.



A foreign grain beetle.

Controls of foreign grain beetle are rarely, if ever, needed. Reduction of humidity usually will cause infestations to die out in a building.

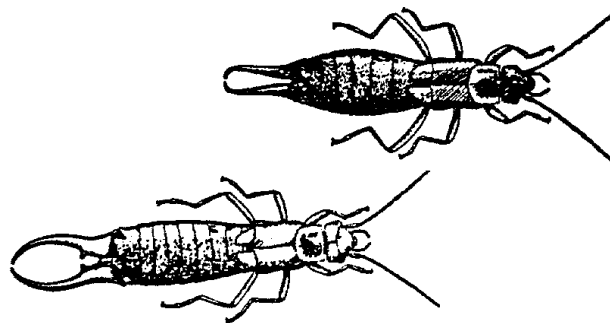
### Household Insects Commonly Associated with Bathrooms and High Humidity Sites in Homes.

Cockroaches	Foreign grain beetle
Psocids (Book lice)	Horsehair worms
Springtails	Duff millipedes
Millipedes	Sowbugs and Pillbugs
Termites	
Carpenter ants (water damaged wood)	

### Earwigs

Earwigs are common in gardens but infrequent invaders of homes, although they can be locally abundant. Nocturnal feeders, earwigs seek dark, tight areas for daytime shelter. This often forces them into cracks and crevices around homes where they may enter living areas.

Earwigs are general feeders. Occasionally, tender plant parts are fed upon and they can damage certain flowers such as dahlias and roses. However, earwigs mostly feed upon small, soft-bodied insects, such as aphids.



European earwigs. The males (below) have more bowed pincers than the females (above).

Reducing the amount of sheltering debris around the foundation area is important in limiting earwig movements into homes. Residual insecticide sprays applied around the building foundation also can help to reduce indoor earwig populations. Most problems with earwigs in homes occurs during mid-late summer.

The earwig most commonly found in the region is the European earwig (*Forficula auricularia*). This is an introduced species which first entered the region during the early 1950's.

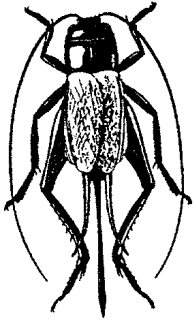
### Crickets

Crickets can be found throughout the region, but tend to occur more frequently as household pests west of the Rockies. Fabrics and paper are occasionally fed on by some species, but cricket populations are rarely large enough to cause serious damage. However, their bizarre appearance and chirping "songs" (produced by rubbing the outer wings) can make them very annoying in some situations.

Cricket invasions into homes occur as a result of outdoor populations moving inside in search of shelter or water. Favorable cricket habitat around the foundation (plant debris, tall grass, mulch) can contribute to the severity of cricket invasions, which usually occur in autumn. Crickets may also move into homes while attracted to evening lights or while in search of moisture.

## Household Insects of the Rocky Mountain States

The most familiar crickets to invade homes are the common black field crickets (*Gryllus* species). These can be found outdoors around homes and gardens, particularly during late summer. They feed on a variety



A field cricket.

of plant material and are sometimes minor pests of garden plants. Their occurrence in homes usually occurs late in the season when cool temperatures force them to seek the shelter of homes. Once indoors they may do some feeding on fabrics and leather items but this is usually minor. They cannot reproduce within a home and adults eventually die out.

**Camel crickets** (*Ceuthophilus* species) are the species most adaptable to homes and are widespread.

However, they do not chirp and are active almost exclusively in darkened areas so they often are not observed. Camel crickets may reproduce in some basements where floor



A camel cricket.

cracks and other suitable sites allow eggs to be inserted. However, they are rarely abundant enough to become more than a minor nuisance problem.

A related group of crickets are the robust camel crickets (*Udeopsylla* spp.,

*Daihinia* spp.).

These may reach an inch or more in length and are generally dark brown. Robust camel crickets are relatively uncommon but

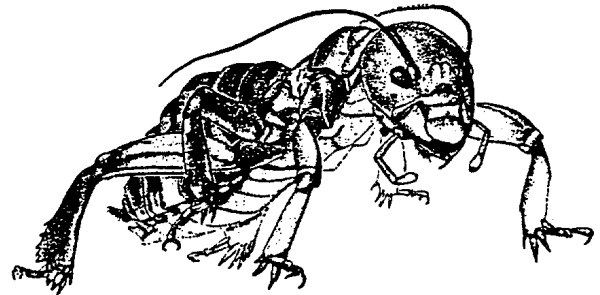


A robust camel cricket.

are locally abundant in some areas of the region.

They are most commonly found in homes that have been recently built in native grassland or shrubland areas.

Perhaps the most unusual crickets that can occur in regional homes are the Jerusalem crickets (*Stenopelmatus* species). These can get quite large, almost two inches in length, and have conspicuous patterned coloration. Jerusalem crickets are predators of insects and their occurrence in homes results when they accidentally wander indoors during night time foraging. They are uncommon throughout the region, being most abundant in southeastern Colorado and western Wyoming and Colorado.



A Jerusalem cricket. Drawing by Mike Kippenhan.

**Control.** Household invasions of crickets result from outdoor populations crawling indoors. As a result, they are best controlled by preventive measures applied outdoors. Debris, loose rocks and other cover used by crickets should be limited around homes where cricket problems are chronic. Perimeter treatments of insecticides around the exterior building foundation also are useful for cricket control.

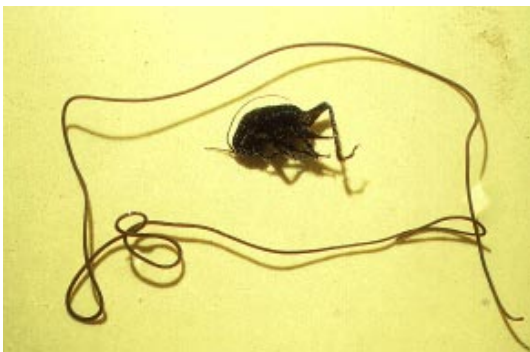
Crickets within the home may be captured using sticky boards placed along the edges of walls and other sites where crickets most commonly crawl. Several household insecticides, applied to cracks and crevices where crickets hide may also help provide control. Most cricket infestations die out on their own after one or two months; the insects cannot normally reproduce within the home.



## Household Insects of the Rocky Mountain States

### Horsehair Worms

Many insects are attacked and killed by various "worms" that feed internally in the insect host. Several common species of these parasitic worms are quite large, some reaching several inches in length. Their conspicuous and unusual appearance often draw attention, and sometimes concern. However, although related to some parasites of mammals such as pinworms, the horse-hair worms which attack insects are harmless to humans and household pets.



A horsehair worm and cricket host.

Horsehair worms are a type of animal technically known as a nematomorph. Commonly encountered species in the Rocky Mountain region are generally dark brown in color and can reach sizes of several inches in length. They are not tapered, but blunt at both ends.

Little is known about the life history of horsehair worms. Small immature stages are thought to be capable of penetrating the body wall of susceptible insects and related arthropods. Crickets, beetles and other large insects are common hosts. The developing worms grow while feeding on the blood of the infected insect, ultimately killing it. Full-grown stages of the horsehair worm always emerge from the insect near water or following heavy rains. As a result, horsehair worms may be found within homes around toilets, sinks, bathtubs and similar sites. It is the newly emerged horsehair worm, which has just killed its insect host, that is the stage that is almost always observed.

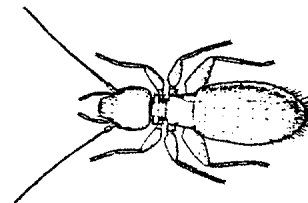
**Nematodes** (roundworms) are a very common group of animals with diverse feeding habits. Some nematodes are plant pests and a few are even medically important, such as the ringworm and pinworm. However, many nematodes are beneficial organisms that attack and kill a variety of insect pests. Most nematodes are almost microscopic in size.

One common species of nematode, *Mermis nigrescens*, is unusually large, up to five inches when fully extended. This nematode develops within grasshoppers and can be of minor importance in controlling these common insect pests. *M. nigrescens* is extremely thin and a pale color.

Following rains or periods of high moisture, the adult nematodes may be seen crawling upon grasses and other vegetation. This is where most people observe them. The adult nematodes at this time are laying eggs. Susceptible grasshoppers that eat these eggs become infested as the young nematodes hatch and invade the body cavity of the infected grasshopper. The nematodes continue to feed and develop within the grasshopper, ultimately killing it. The fully-fed nematodes then penetrate the body wall of the grasshopper and drop to the soil where they complete their development.

### Booklice/Psocids

Psocids or booklice are small, pale-colored insects that are found outdoors feeding on molds under bark, in piled grass clippings, on damp wood and in similar locations. Occasionally they also may enter homes and occur as nuisance pests, particularly *Liposcelis* species.



A book louse.

## Household Insects of the Rocky Mountain States

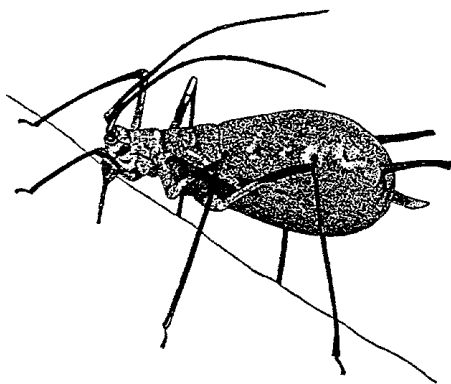
Since psocids require high humidity and feed on molds, almost all household infestations are located in warm, dark, moist areas. Bathrooms are the most common site of infestations, but leaking pipes also can provide suitable conditions. Newer homes may be more likely to be infested since higher humidity conditions generally occur for a few months after construction.

Psocids can become very abundant and annoying. However, they rarely cause much damage to stored products. Control of psocids should involve methods of eliminating moisture sources by improving ventilation and repairing leaks.

### Giant Willow Aphids

Giant willow aphids (*Tuberolachnus salignus*) are large purple-black aphids that develop on the stems and branches of willow trees. They often get abundant in early fall and can cause nuisance problems related to their production of sticky honeydew.

Giant willow aphids also may migrate or be blown off the trees. As a result they sometimes collect in noticeable numbers on building



**Giant Willow aphid.**

walls, porch decks and other areas. Although they cannot reproduce nor survive long off the willow host, the aphids can leave a dark stain if crushed.

### Leafhoppers

Occasionally, leafhoppers will mass on sides of homes and may enter them in nuisance numbers. One of the most common leafhoppers in the region is

*Cuerna septrionalis*. This brightly patterned species develops by feeding on the sap of a wide range of native shrubs and other plants. Very high populations sometimes develop that may move to rest and sun on surfaces of nearby homes. This occurs most commonly on homes surrounded by large areas of native vegetation. These and other species of leafhoppers also may be attracted by artificial lights of buildings.



**A colony of *Cuerna septrionalis*, a common leafhopper on native vegetation that sometimes is found within homes.**

### Hackberry psyllids

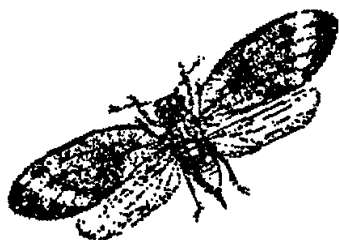
Various species of psyllids develop as gall makers on hackberry trees. The two most common species are the hackberry nipplegall psyllid (*Pachypsylla celtidismamma*) and the hackberry blistergall psyllid (*P. celtidisvesicula*). The former produces large, conspicuous swellings on the leaf surface; the latter, small raised humps. Both species develop within the galls, emerging as winged adults in early fall. The hackberry psyllids overwinter in the adult stage and may enter nearby buildings for winter shelter. This habit of nuisance movements indoors is particularly common with *P. celtidisvesicula*, a species that is also small enough to penetrate most screens.



**Blistergalls on a hackberry leaf produced by a psyllid.**

In the region, nuisance problems with hackberry psyllids are infrequent. Control, if needed, is best done by treating the insects on hackberry before galls are initiated in spring. Alternatively, hackberry trees can

## Household Insects of the Rocky Mountain States



Hackberry psyllid, adult.

be removed for more permanent control. Simple vacuuming of psyllids already in a home is usually the only appropriate control for indoor infestations. The psyllids do not reproduce, feed or bite while indoors.

### Boxelder Bugs

Boxelder bugs (*Boseia trivittata*) often become serious nuisance pests as they move into homes for shelter during fall. Problems are most severe along south and west sides of a home since the bugs tend to move into cracks and crevices in these sun-warmed areas.



Adult boxelder bug.

Adult boxelder bugs are about one half-inch long, dark brown or black with conspicuous red markings. Immature boxelder bugs are smaller and a solid bright

red color. Only the adults are capable of overwintering successfully.

The boxelder bug develops during the warm months on seeds and other plant materials. The first generation usually feeds on seeds produced by boxelder or occa-



Boxelder bug nymph or "red bug".

sionally other maples or ash. Boxelder bugs sometimes feed on ground cover plants and some other plants but cause little damage. They also eat dead insects.

Developing boxelder seeds produced on female boxelder trees are the primary food of the second generation. Eggs may be produced into September and the nymphs feed for several weeks. If cold weather comes before the nymphs have completed development, they die. During fall, the boxelder bugs seek shelter for winter and are particularly attracted to surfaces that are warmed by direct sun and retain heat. Homes often are ideal in this regard and may attract adult bugs from several hundred yards.

Severity of boxelder bugs as nuisance pests is correlated with the amount of maple and boxelder seeds available to support the insects, proximity of female (seed-bearing) boxelder trees, and length of the growing season.

Within a home, boxelder bugs are in a semi-dormant state. They cannot reproduce and do not feed on household items. Bites of humans are rare but occasionally occur. Boxelder bugs can stain drapery.

**Control.** Control of boxelder bugs, like all nuisance invaders, involves methods to prevent them from entering the home in the first place. Seal openings (particularly along sun-exposed sides of the building) in early fall before the boxelder bugs move to shelter following frosts.

Spot treatments with insecticides applied around the outside of windows and other entry cracks can further increase control, although boxelder bugs are not very susceptible to most general use insecticides. Masses of bugs found on the outside walls during warm days also can be killed by directly spraying laundry detergent/water mixtures on the insects.

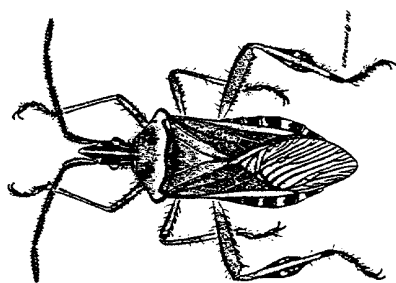
Indoors, boxelder bugs do not reproduce. However, they continue to emerge from winter cover for an extended period during spring, giving the appearance that they are increasing in number. By late May, all

## Household Insects of the Rocky Mountain States

have left winter shelters and moved outside, or have died.

### Conifer Seed Bugs/Leaffooted Bugs

Conifer seed bugs (*Leptoglossus* species), known also as leaffooted bugs due to their enlarged hind legs, feed on seeds of a variety of plants, including dogwood and pines. These insects are most common around areas of coniferous forest.



Conifer seed bug. Drawing by Mike Kippenhan.

Similar to the boxelder bug, conifer seed bugs often migrate into homes during early fall in search of overwintering shelter. Although they do not occur in large aggrega-

tions, their large size and appearance can cause alarm. They do have a slight odor, however, they do not bite nor reproduce indoors.

Controls are not recommended. Sealing homes in late summer before conifer seed bugs enter the house may reduce invasions.

### False Chinch Bugs

False chinch bugs (*Nysius* species) sometimes develop large populations on weeds and garden plants during late spring. They occasionally cause damage to mustards and other crop plants, but often are present with relatively little associated plant injury, despite very high populations. However, during outbreaks masses of false chinch bugs may enter homes.

Although serious household infestations are uncommon and usually of short duration, false chinch bugs can be a severe nuisance pest during outbreaks. Some incidental biting also may occur. By sealing homes and making exterior treatments with insecticides

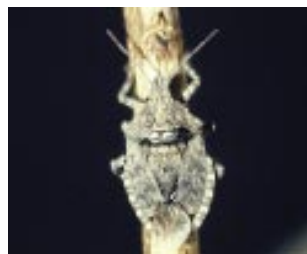
around openings indoor migrations may be slowed, although false chinch bugs are fairly immune to insecticides. Household infestations are best controlled by vacuuming.



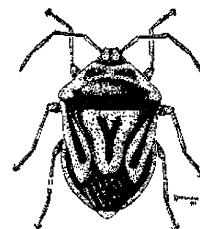
Masses of false chinch bugs.

### Stink Bugs

Several types of stink bugs commonly enter homes to overwinter or are found within woodpiles in late spring. Most commonly observed is the twospotted stink bug (*Perillus bioculatus*) that has prominent spot and U-shape markings. During the summer, this insect is an important predator of pest insects such as Colorado potato beetle and elm leaf beetle.



A rough stink bug.



A twospotted stink bug.

Also common indoors in the winter are the rough stink bugs in the genus *Brochymena*. These brown or gray-colored insects are well-camouflaged against tree bark and often hide in wood piles during the winter. Rough gray stink bugs are seed feeders on trees during the warm season. None of the stink bugs found within homes reproduce indoors nor cause harm. Controls are not recommended.

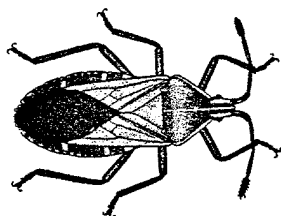
### Squash Bugs

The squash bug (*Anasa tristis*) is a serious pest of "hard" squashes and pumpkins in parts of the region, notably the Arkansas Valley and Grand Valley areas



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of Colorado. At the end of the season, adult squash bugs scatter from the plantings to seek winter shelter under debris and other cover. At this time they may enter homes or areas around the building foundation. They may be found commonly in homes in fall and again in late winter or early spring as they stir from winter dormancy, prior to migrations back to squash family plants. Squash bugs do have scent glands and can produce a disagreeable odor.



An adult squash bug.

Squash bugs are extremely resistant to insecticides and insecticidal controls are not recommended. Moving plantings of cultivated squash and eliminating wild squash from around the buildings should reduce the local numbers of squash bugs that become a nuisance in homes during the dormant season.

### Clover Mites

Clover mites (*Bryobia praetiosa*) are small red-green mites that move to homes from surrounding areas of lawn and other vegetation. Unlike most other species of spider mites, that damage plants during summer, the clover mite is a "cool season" spider mite.

Infestations of clover mites usually are confined to the sun-exposed (south, west) sides of buildings and are most severe during late winter and early spring. Clover mite 'hot spots' also occur around other upright objects such as trees and shrubs.

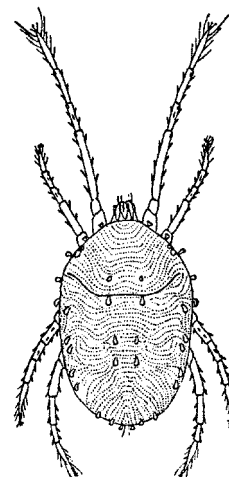
During these periods, clover mites use walls as sites for egg-laying and may seek shelter in building cracks. At this time many of the mites may inadvertently enter living areas. They are often described as "walking dust specks". When crushed, they leave a rusty stain.

Clover mites feed on lawn grasses and many other plants, including clover. Damaged leaves have characteristic meandering scars caused by the feeding

mite. When abundant, clover mites also seriously damage lawns during early spring. However, mites found indoors rarely, if ever, feed on house-plants and do not cause injury.

Since clover mites do not readily cross loose, clean, cultivated soil, a wide (at least three foot), unplanted border around the building can help prevent indoor migrations. Perimeter treatments of miticides on or along the foundation walls can further help control clover mite migrations.

Vacuum, rather than sweep out, mites that are already within a home to avoid crushing them and leaving stains.



A clover mite, greatly enlarged.

### Threadwaisted Wasps

Among the species of hunting wasps are various threadwaisted wasps that sometimes occur in homes. These are moderately large, black wasps with a distinct narrow 'waist'. They somewhat resemble winged ants.

Many of these wasps form nests in preexisting tunnels within wood. Others tunnel in soil with one species (*Pseneo punctatus*) commonly nesting in the soil cracks of potted plants.

Household infestations of this species are associated with potted plants brought indoors. Normally they remain dormant through the winter,



*Pseneo punctatus*, a typical threadwaisted wasp that often nests in clay pots.

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but if nests are brought indoors, the extra warmth causes the insects to emerge prematurely.

The threadwaisted wasps are harmless and will not reproduce indoors. Under natural conditions they reproduce by provisioning the nests with small insects, on which the young wasps feed and develop. Remove potted plants or wood in which nests may occur to eliminate the nuisance emergence of these insects indoors.

### Insect Diapause

Insects have adapted many techniques to survive periods when the environment is unfavorable. For example, under normal conditions, most insects can be killed by exposure to freezing temperature and harsh winter conditions are among the hurdles that insects face surviving in the Rocky Mountain region. Furthermore, food often is unavailable for long periods during the colder months.

One of the ways that many insects survive unfavorable environmental conditions is through their ability to **diapause**. Diapause is a type of dormant state that the insects enter prior to the time when conditions become unfavorable. During this time the insects stop reproducing, and become inactive. Generally they do not even feed, instead using stored energy reserves. During diapause, the habits of the insects are geared to conserving their energy until the time when environmental conditions improve.

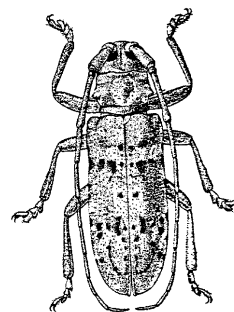
Most insects undergo diapause as a means to survive the rigors of winter. However, others (such as the army cutworm or 'miller' moth) diapause during summer. Onset of diapause is usually triggered by the length of the day, with different insects keyed to a different day length cue. Once in diapause, the insect remains until the proper signal allows diapause to be terminated. A minimal chilling period or critical day length are common signals used by insects to break the diapause state.

## INSECTS ASSOCIATED WITH FIREWOOD

Hundreds of species of insects potentially can inhabit the wood of our native and ornamental trees. Sometimes these insects are inadvertently introduced into homes with firewood.

The subsequent occurrence of the insects in the home sometimes is disconcerting, particularly since many are somewhat bizarre in appearance. However, none of the common firewood insects pose a threat to household furnishings and their presence is merely that of a transient nuisance. Common insects that emerge from firewood include:

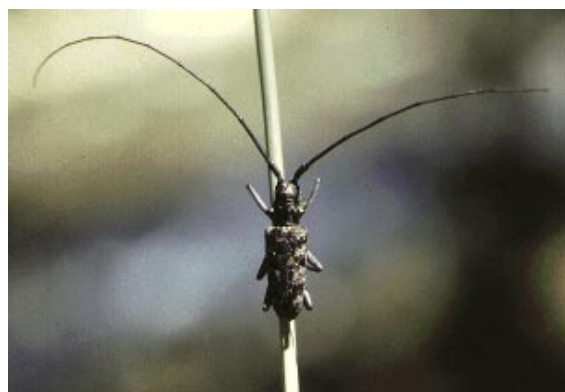
### Longhorned beetles



A typical longhorned beetle, adult stage of the roundheaded borer.

Longhorned beetles (Cerambycidae), the adult stage of the roundheaded borer, can be quite striking insects. Typical species in firewood are about 3/4 inch, generally gray, with very long, prominent antennae. Some species can get even larger, as long as two inches. The larvae, which only occur within wood, can make audible chewing noises in logs and may push out stringy sawdust from openings. Pine sawyers (*Monochamus* species) and the various *Neoclytus* species (redheaded ash borer, banded ash borer, etc.) are often the most common insects that are found emerging in homes from firewood.

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Longhorned beetle, adult stage of the pine sawyer (*Monochamus* species).

### Metallic wood borers

Metallic wood borers (Buprestidae) are the adult stage of what are known as flatheaded borers. Larvae of these insects tunnel under the bark, making meandering trails that they pack tightly with the waste sawdust. Adult beetles are rather bullet-shaped and have a metallic luster. Typical species are about 3/8 inch but some may be almost one inch long.



The golden buprestid, a species of metallic wood borer.

### Parasitic wasps

Among the natural enemies of wood boring beetles are various wasps that develop on the immature beetles in the wood. If wood contains parasitized beetle larvae, the wasps often will emerge. Many of these wasps are brightly colored and may possess a rather fearsome looking 'stinger' (ovipositor) used for laying eggs. Despite their rather forbidding appearance, they are harmless to humans.

### Bark beetles

Bark beetles (Scolytidae), such as the mountain pine beetle and engraver beetles, can occur in tremendous numbers in recently killed logs. In extreme cases,

thousands have emerged from logs only a couple of feet in length, and they may fly to windows in a home. Bark beetles are small, typically only about 1/8 inch, dark beetles with a stubby body.



Adults of the mountain pine beetle, a common inhabitant of pine firewood.

The common insects in firewood will not recycle in logs and cannot damage household items. Infestations die out on their own as the insects starve. However, nuisance problems with firewood insects are easily preventable. Most important, always store firewood outdoors until needed. Outdoor storage will greatly slow insect development during the winter and limit the opportunity of insects to emerge within the home. The occasional insects which do manage to emerge indoors can easily be handled by vacuuming as they appear. Insecticides are not recommended for control of firewood insects, nor do legal treatments exist for use on stored firewood.

## STEPS TO PROPERLY USE INSECTICIDES WITHIN A HOME

1. First consider all alternative control methods (sanitation, improved storage, freezing, etc.) before using insecticides. While using insecticides, integrate their use with the appropriate non-chemical methods.
2. Read and follow all label directions.
3. Purchase materials that will be effective.
4. Purchase only amounts needed to avoid waste.
5. Apply the pesticide in an effective manner, while minimizing amounts that will be needed.
6. Take all precautions indicated in label directions.
7. Store pesticides properly to protect from children and pets.
8. Dispose of containers properly, according to the specific directions on the label.

## Household Insects of the Rocky Mountain States

### Appendix I. Insects that May be Found Flying within Homes

Winged (reproductive stage) ants  
Winged (reproductive stage) termites  
Indian meal moth  
Clothes moth  
Miller moths  
Leafminer  
Carpet beetles  
Horntail wasp  
Blow flies  
House flies  
Face flies  
Cluster flies  
Picture-winged flies  
Fungus gnats  
Drain flies  
Fruit or vinegar flies  
Humpbacked flies (phorids)  
Yellowjackets/Hornets  
Threadwaisted wasps  
Parasitic wasps  
Masked hunter  
Boxelder bugs  
Leaffooted bugs  
False chinch bugs  
Elm leaf beetles  
Longhorned beetles  
Metallic wood borers  
Bark beetles

### Appendix II. Household Insects, Organized by Size (reference page numbers in text)

#### Minute (Less than 1/12 inch)

Pharaoh ant  
Thief ant  
Clover mite  
Bird mites  
Springtails  
Anthrenus spp. carpet beetles  
Carpet beetle larvae (most)  
Psocids/Booklice  
Drain flies (some)  
Humpbacked flies  
Fleas (some)  
Hackberry psyllids  
Duff millipedes

#### Tiny (Between 1/12 and 1/8 inch long)

Cornfield ants  
Pavement ants (workers)  
Southern fire ant (worker)  
Carpet beetles (most)  
Carpet beetle larvae (some)  
Flour beetles  
Sawtoothed grain beetle  
Merchant grain beetle  
Lesser grain borer  
Powderpost beetles  
Anobiid beetles  
Spider beetles (some)  
Foreign grain beetle  
Bark beetles (some)  
Drugstore beetle  
Bat bugs/Bed bugs (nymphs)  
Little house flies  
Drain flies (some)  
Fungus gnats  
Brown dog tick (unengorged)  
Fleas (most)



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### **Small** (Between 1/8 and 3/8 inch long)

Field ants (workers and winged stage)  
Carpenter ants (most workers)  
Harvester ants  
Pavement ants (winged stages)  
Silverfish/firebrats  
Bat bugs/Bed bugs (adults)  
False chinch bugs  
Swallow bugs  
Termites (winged stages and workers)  
Clothes moths  
Indian meal moth  
Spider beetles (some)  
Strawberry root weevil  
Bark beetles (most)  
Elm leaf beetle  
Cluster flies  
Face flies  
House flies  
Blow flies  
Picture-winged flies

### **Mid-sized** (Between 3/8 and 5/8 inch long)

German cockroach  
Brownbanded cockroach  
Carpenter ants (some workers)  
Carpenter ants (winged)  
Ground beetles  
Longhorned beetles (most)  
Metallic wood borers  
Dark mealworm  
Boxelder bugs  
Leaffooted bugs (some)  
Stink bugs (some)  
European earwig  
Brown dog tick (engorged)  
Yellowjacket wasps (most)  
Parasitic wasps  
Sun spiders (some)  
Scorpions (some)  
Sowbugs/Pillbugs  
Field crickets (most)  
Camel crickets (some)

### **Large** (Over 5/8 inch long)

American cockroach  
Oriental cockroach  
'Miller' moths  
Darkling/Stink beetles  
Longhorned beetles (some)  
Horntails  
Leaffooted bugs (some)  
Stink bugs (some)  
Yellowjacket wasps (queens)  
Sun spiders (most)  
Scorpions (most)  
Millipedes  
House centipede  
Giant desert centipede  
Field cricket (some)  
Camel cricket (most)  
Jerusalem cricket  
Horsehair worms

## APPENDIX III

### INVISIBLE ITCHES: Insect and Non-Insect Causes

Michael F. Potter  
Department of Entomology  
University of Kentucky

(Modification of original are outside quotations)

"Once in awhile, nearly everyone experience the irritation of an unexpected itch or the sensation of something crawling over the skin. Other times, the irritation may feel more like an insect bite. These reactions can become so annoying for some people that they are forced to seek professional help. Even though actual pests may not have been observed, the irritation is often attributed to 'bugs', and an insecticide is applied in the hope that the problem will be resolved. Unfortunately, pesticides seldom work in these situations and may even cause irritation and additional health problems.

"It is important to recognize that there are many potential causes of itching and irritation other than pests. Allergies, cosmetics, medications, and environmental contaminants all can produce reactions similar to insect bites. While this makes the experience no less real or unpleasant for the affected individual, it underscores the importance of keeping an open mind to the possibility of non-insect causes of such reactions. Much like a detective, one should attempt to rule out all potential sources of irritation through the process of elimination. This publication will help you to determine if the irritation a person is experiencing is due to pests or to other (non-insect) causes.

#### Sources of Irritation

"Itches and real or perceived bites of unknown origin can usually be attributed to one of four general sources; 1) obscure biting arthropods (e.g., insects or mites), 2) personal use product, 3) environmental factors, or 4) health-related conditions. Specific agents most often implicated are summarized in Table 1 and discussed in detail below.

#### Obscure Biting Arthropods

"In some cases, insects or minute biting mites prove to be the source of irritation. Although these pests are quite small, most are visible upon close examination. The location and appearance of bites or welts on the body is another key consideration in determining if pests are causing the irritation as well as which species is involved."

Fleas usually bite people around the ankles, producing a small, red, hardened, and slightly raised welt. Although the arid climate suppresses flea problems in Colorado outbreaks in homes sometimes occur, most often associated with wild animals (e.g., foxes, skunks, squirrels) nesting around the home. Only the adult fleas bite, which are fast-moving, reddish-brown insects that jump when disturbed.

Lice may also cause intense itching and irritation. Infestations of the head louse are essentially restricted to the scalp; the crab louse is usually found in the pubic area. Lice are tiny, grayish-white insects but are visible under close inspection. Because lice cannot survive away from a host animal, treatment of the premises will provide little, if any, additional control.

Bat bugs, bed bugs and swallow bugs are fairly common insects in Colorado homes that can bite. Bat bugs typically breed in nests of birds or rodents in attics or other areas of the home and move into the living area when populations are high or the animal host has abandoned the home. Swallow bugs are associated with nests of swallows and most actively bite humans in spring as migrating birds return or later in the season after nests are abandoned again.

## Household Insects of the Rocky Mountain States

Bed bugs are rare in Colorado but can breed and develop well on the blood of humans.

Mites are very tiny arthropods that occasionally infest structures and bite people. In most cases the infestation can be traced to birds nesting in an attic or on a window ledge, etc. When the birds die or abandon the nest, thousands of mites may migrate indoors and bite people. Mites sometimes are transferred from pets that suffer infestations. (Note: By far the most common mite in homes is the clover mite, a common household invader in late winter and spring that feeds on plant juices and does not bite humans.)

"Mosquitoes, ticks, and a limited number of other arthropods may also bite people, but these pests are usually large enough to be seen at the time the irritation is felt. The vast majority of insects and related pests encountered in homes and buildings cannot bite people; yet, they are often blamed for itching or irritation caused by other factors. Pests in question can be identified by placing the specimen in a vial and taking it for identification by an expert.

"If a person believes that insects too small to be seen are crawling over their skin, strips of clear cellophane tape may be patted over the affected area as the 'crawling' sensation is occurring. Most small biting arthropods move slowly and will be picked up by the tape if present. Tape samples should be attached to a white index card and labeled to indicate from where they were collected.

### Household Products

"There are literally hundreds of non-insect agents capable of causing itching and irritation. Household products are involved far more often than are pests and may cause skin reactions similar to insect bites. Products most often implicated include phosphate detergents, soaps, cosmetics, ammonia-based cleaning agents, hair products, medications, printing inks (especially from multi-form carbonless carbon paper), and certain types of clothing, particularly those that contain fire retardants. If a connection can be made between irritation and exposure to one of these poten-

tial irritants, avoiding further exposure may correct the problem. A dermatologist can usually confirm that a product, rather than a pest, is causing the irritation.

### Environmental Factors

"When two or more individuals experience irritation in the absence of pests, the cause is likely to be environmental conditions or contaminants dispersed in the air. The irritant(s) may be either physical or chemical in nature.

**"Physical irritants:** The most common physical irritants are tiny fragments of paper, fabric, or insulation. When these fibers contact the skin, they can produce symptoms ranging from a 'crawling sensation' to intense itching accompanied by a rash, welts, or open sores. If fibers or fragments are involved, the irritation is usually generalized, occurring over the exposed areas of the body such as arms, legs, neck, and head.

"Irritation produced by paper fragments is especially common in offices where large quantities of paper are processed daily. Continuous-feed paper from computers and multi-page forms generate large amounts of fragments, resulting in accumulations on desktops and other surfaces. Newly installed or badly worn synthetic carpet, drapes, or upholstery also shed fibers that can irritate skin.

"Other potential sources of irritation are insulation fibers released into the air by heating/cooling systems in need of repair and sound-deadening fibers embedded into drop-ceiling tiles. These latter sources are especially suspect if there have been problems with the air-handling system or recent repair work on the ceiling.

"Irritation is aggravated by static electricity which increases the attraction of the tiny charged fibers to exposed skin. Low humidity, electronic equipment, and nylon (e.g., from carpeting, upholstery, or women's stockings) all increase levels of static electricity and the potential for problems from

## Household Insects of the Rocky Mountain States

fragments or fibers. Static electricity may also cause body hair to move, giving the impression of insects crawling over the skin.

"If fibers or fragments are suspected of causing the reactions, floors, rugs, work surfaces, and furniture should be thoroughly and routinely vacuumed, and desktops and tables wiped down with a damp cloth. Static-reducing measures should also be considered such as raising the humidity level of the air and installing static-resistant mats and pads under chairs and electronic equipment in offices. Anti-static sprays can be used to treat seat cushion and nylon stockings.

"Dry air alone can cause irritation, producing a condition known as 'winter itch'. As skin loses moisture, itching results. A similar reaction can occur from changes in temperature; these tend to make skin more sensitive. A skin moisturizer is often helpful in these situations.

**"Airborne chemical irritants:** Indoor air pollution can be a serious problem in modern office building and other energy-efficient structures where air is re-circulated over and over. Indoor air pollution can also be a problem in homes. As the concentration of chemical contaminants into the air increases, people may experience dizziness, headaches, and eye, nose, or throat irritation. Certain air-borne contaminants can also produce rashes and skin irritation similar to insect bites. Chemical contaminants most often responsible for these reactions include ammonia-based cleaning agents, formaldehyde emitted from wall and floor coverings, tobacco smoke, and solvents and resins contained in paints, glues, and adhesives.

"Reactions to air-borne chemicals most often occur in buildings with inadequate ventilation, especially those that are new or have been refurbished with new paint or wall or floor coverings. If indoor air pollutants rather than insects are suspected, you may wish to consult an industrial hygienist who is equipped to monitor ventilation levels and the presence of allergy-producing contaminants. Companies specializing in environmental health monitoring have listings in the telephone directories of most metropolitan areas.

## Health-related Conditions

"Health-related conditions may be responsible for irritation mistakenly attributed to insects. Itching and skin irritation are common during pregnancy (especially during the last trimester) and may also occur in conjunction with diabetes, liver, kidney, and thyroid disease, and herpes zoster (shingles). Food allergies are another common cause of itching and irritation.

"One's emotional state can likewise induce skin reactions that can be mistaken for insect bites. Stress and conflict at work or home can produce itching and irritation. The itching response can be induced in other individuals simply by the 'power of suggestion'; i.e., when one person in a group feels and itch or bite and begins to talk about it, others also feel the urge to scratch as well (a condition known as Bell's syndrome).

"Delusory parasitosis is a more serious emotional disorder characterized by an irrational fear that living organisms are infesting a person's body. Cases of delusory parasitosis often have similar symptoms and patterns of behavior. Patients typically report 'bugs' invading their ears, nose, eyes, and other areas of their body. The 'creatures' frequently disappear and reappear and change colors while being observed. Specimens brought in for identification usually consist of bits of dead skin, hair, lint, and miscellaneous debris. The skin of the individual is often severely irritated from desperate scratching, excessive bathing, and application of ointments. While these occurrences may seem bizarre to persons who are not affected, they are frighteningly real to the patient. Delusory parasitosis as well as other suspected emotional or medical conditions should be brought to the attention of a dermatologist or other physician.

## Finding a Solution

"There is no easy way to pinpoint the cause of so-called 'invisible' itches. The most important consideration in determining if pests are involved is whether anyone has actually seen or captured any 'bugs' as the itching or irritation is occurring. As noted earlier,

## Household Insects of the Rocky Mountain States

most insects and mites which bite humans can be seen without magnification if you look carefully. Pesticides should not be applied unless there is actual evidence that pests are the cause of irritation.

"Most often, pests will not be involved and relief from irritation will lie outside the realm of pest control. Approaching these problems in a rational and methodical manner will increase the chances of finding other likely sources of irritation...."

**Table 1. Principal Causes of Itches and Bites of Unknown Origin**

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### Obscure Biting Arthropods

- \* Mites (e.g., bird, mites associated with pets)
- \* Lice
- \* Fleas
- \* Biting midges
- \* Ticks
- \* Batbugs, bedbugs, swallow bugs

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### Household Products

- \* detergents (especially phosphate-based)
- \* soaps
- \* cosmetics/hair products
- \* ammonia-based cleaners
- \* medications
- \* printing inks (e.g., carbonless)
- \* clothing (especially fire retardant)

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### Environmental Factors

#### *A. Physical irritants*

- \* paper, fabric, or insulation fibers
- \* low humidity
- \* seasonal changes in temperature
- \* static electricity

#### *B. Chemical irritants*

- \* formaldehyde (e.g., from particle board, wall and floor coverings)
- \* ammonia
- \* solvents/resins associated with paints and adhesives
- \* tobacco smoke
- \* volatiles from asphalt and tar installation

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### Health-related Conditions

- \* pregnancy
  - \* communicable diseases (e.g., chicken pox, measles)
  - \* stress
  - \* diabetes, liver, or kidney disorders
  - \* food allergies
  - \* insect phobias
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