

# Cockroaches: Recognition and Control



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**B**ased on the fossil record, cockroaches are among some of the oldest surviving insects. They are considered to be one of the most successful animals on Earth. However, most humans consider cockroaches to be nuisance pests, especially when they invade human structures. They can be found anywhere within a home, since they can squeeze into very tight spaces. Cockroaches have chewing mouthparts and are omnivorous, so they will feed on all foods consumed by humans and animals and even on waste materials.

Most humans feel anxiety at the mere sight of a cockroach. These insects can contaminate food and food preparation surfaces with pathogens carried on their bodies and legs. These pathogens can cause food poisoning, diarrhea and wound infections. Cockroaches also leave an unpleasant odor on surfaces they have touched. Food fouled by this characteristic odor, secreted mainly by American, German and Oriental cockroaches, is unfit for human consumption, with odors usually remaining even after food is cooked or processed. Also, evidence suggests that feces and cast skins of cockroaches left behind in infested buildings are important allergen triggers for asthma and respiratory problems, especially in children.

## Cockroach Biology and Behavior

Cockroaches have flattened oval bodies, and their heads are concealed from above by a pronotum or shield. Cockroaches have long, spiny running legs and filamentous antennae. Their color ranges from dark-brown to reddish-brown and from tan to black. Cockroaches usually have wings, but these may be very small in some species. In general, females have shorter wings than do males.

Most cockroach species are nocturnal; they hide in damp, dark places during the day and search for food at night. Cockroaches visible during the day usually indicate a severe infestation. Cockroaches congregate near sources of heat and moisture, which accelerate their growth and reproductive rates.

The cockroach lifecycle consists of three stages: egg, nymph and adult. After mating, females produce 12 or more eggs in a bean-shaped capsule (ootheca). Egg-capsule color varies from tan to dark-brown to reddish-brown, depending upon species. A female cockroach deposits her egg capsule in a secluded spot or carries it in her abdomen until the eggs begin to hatch. After eggs hatch, immature cockroaches (nymphs) emerge. Nymphs are smaller than adult cockroaches and have undeveloped wings. However, nymphs live in the same locations as adults and feed on the same food resources.

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### German Cockroach: *Blattella germanica*

Because they are so common and have high reproductive rates, German cockroaches are one of the most important structure-infesting cockroaches. Adults are 1/2- to 5/8-inch in length and are light-brown with two longitudinal stripes



Figure 1. German cockroach adult.

on the pronotum (see Fig. 1). Both males and females have wings extending to the end of their abdomens, but they do not fly. Nymphs have two distinct, dark stripes extending longitudinally down the entire back.

German cockroach offspring have a better chance of surviving

than do many other cockroach species, since the females carry their egg capsules until the eggs are ready to hatch. This type of cockroach also completes its lifecycle faster than do many other cockroach species, resulting in a faster rate of reproduction.

German cockroaches are mainly indoor pests, since they cannot tolerate cold temperatures. They commonly are found in homes, apartments, restaurants, supermarkets, hospitals, and other buildings where food is stored, prepared or served. Because they are so small, they are easily introduced into structures. This type of cockroach gains entry into structures concealed in groceries or luggage or by migrating from other infested structures.

German cockroaches sometimes are confused with field cockroaches (*Blattella vaga*). However, the field cockroach has a dark face and a dark median line on the front of its head between its eyes, lives outdoors and can fly. The field cockroach is found in southeast Texas, far-west Texas, Arizona and California.

### American Cockroach: *Periplaneta americana*

American cockroaches are native to Africa but have spread throughout the United States through commerce. These cockroaches, also known as waterbugs or palmetto bugs, are the largest and one of the most common cockroaches in Texas. They reach 1 1/2 to 2 inches long and are reddish-brown (see Fig. 2). They also



Figure 2. American cockroach adult.

have tan to light-yellow bands outlining the shield behind the head. Both male and female American cockroaches can fly.

Females produce egg cases and carry them protruding from the tip of their abdomens for about 2 days. Females then conceal the egg cases in sheltered

areas or near the floor, next to a food source. Young nymphs are grayish-brown, but after the first few molts, they become more reddish-brown.

American cockroaches prefer sites with high humidity. They commonly live outdoors under the bark of trees or in leaf litter and in barns. Sewers also provide an excellent habitat, allowing these cockroaches to spread throughout campuses and major cities. Adults and nymphs can move through main sewer pipes and enter kitchens or bathrooms through drainage pipes. Once indoors, these roaches live in areas close to furnaces or heating ducts.

### Oriental Cockroach: *Blatta orientalis*

Oriental cockroaches are native to the Middle East; however, they have become distributed throughout much of the U.S. Adults are 1- to 1 1/4- inches long and are dark-brown. The female's abdomen is broader than the male's, causing it to drag the ground as the insect moves. Males have short wings covering 75% of the abdomen; however, females have small wings that barely touch the first abdominal segment. Neither sex can fly. Nymphs are wingless and darker colored than adults, but they are shaped much the same.

Unlike other house-infesting species, oriental cockroaches generally have a seasonal development cycle, with more adults in late spring or early fall, then decreasing populations by late summer or early fall.

Oriental cockroaches can survive outdoors in a wide range of habitats, but they prefer areas with high humidity. They live in cool, moist places, such as beneath leaves, under porches and in plant compost, basements, cellars

and crawl spaces. They usually invade homes through cracks in the foundation, along sewer pipes or under doors. These cockroaches cannot climb slick surfaces, so they usually live under refrigerators, sinks and washing machines.

### Smokybrown Cockroach: *Periplaneta fuliginosa*

Smokybrown cockroaches are native to temperate regions of Asia but are also found in the southeastern U.S. Smokybrown cockroaches are smaller than American cockroaches, ranging from 1<sup>1</sup>/<sub>4</sub>- to 1<sup>1</sup>/<sub>2</sub>- inches long. They are dark- brown to black, and their wings extend well beyond the abdomen in both sexes (see Fig. 3.). Their antennae are as long as or longer than their bodies.



Figure 3. Smokybrown cockroach adult.



Figure 4. Smokybrown cockroach nymph.

The female carries her egg capsule for 1 to 2 days before depositing it. Egg capsules are usually attached to cracks, depressions or corners of brick or concrete. As nymphs develop, they change color. Younger nymphs are identified by two clear bands on the body and by their white-tipped antennae (see Fig. 4), while older nymphs are uniformly reddish-brown.

Smokybrown cockroaches require high humidity for survival. They live primarily outdoors, in wooded areas that provide shade and moisture. They also seek harborage in protected areas around homes (including tree holes and mulch) and in buildings and attics. Stacks of lumber and firewood, sewer-access openings and trash piles can contribute to smokybrown cockroach infestations. Once they invade structures, smokybrown cockroaches most commonly live in attics or near fireplaces. A leaky roof can provide moisture that attracts these cockroaches.

## Management

### General Management Considerations

It is easier to prevent cockroach problems than to control infestations once they have become established. Using insecticides alone is not always successful in controlling these insects. Eliminating sources of food, water and harborage on which cockroaches rely makes control tactics more effective. Attention to good sanitation, use of non-chemical control tactics and exclusion are important for keeping your home cockroach free.

**Inspection.** Before taking steps to control cockroaches, you need to identify problem areas, so first conduct a quick home inspection. German cockroaches are most likely to reside indoors around kitchens and bathrooms. Check under sinks and in cupboards, closets, cracks and crevices that provide dark hiding places near food or water. Also, check warm spots or areas near food. Look for cracks with tiny black specks (droppings) that indicate cockroach hiding spots.

For outdoor species like American, smokybrown and oriental cockroaches, look in dark, moist areas close to decaying organic food sources, such as in overgrown ground-cover or flower beds and around trees, wood piles or compost piles. Also, check for leaking roofs, inspect water-meter boxes, and look at sewer lines near your home, especially those with manhole covers, all of which are favored harborage-sites for these cockroaches.

Cockroach sticky traps are useful inspection tools. Traps typically consist of a piece of cardboard covered with sticky adhesive. Cockroaches enter traps and get stuck on the adhesive. Traps help identify areas with cockroach infestations and track the effectiveness of control efforts.

Place traps along paths cockroaches may use to travel to and from feeding and hiding areas. Traps should be placed touching walls and in corners with both ends unobstructed. For active infestations, relocate traps if no cockroaches are caught after two or three nights.

**Sanitation.** Sanitation is extremely important for successful cockroach management. Do not leave unwashed dishes, used kitchen utensils or food out overnight. Promptly clean countertops and spilled liquids. Regularly clean hard-to-reach areas where food may be spilled, such as

beneath and behind cabinets, furniture, stoves and refrigerators. Store food in tightly sealed containers. Where cockroaches are a problem, kitchen waste and excess refuse should be kept in cockroach-proof containers and disposed of every night. Dry pet food should be stored in tight containers away from the kitchen and separate from other foods. If pets are fed indoors, left-over food should not be allowed to remain overnight in their feeding dishes.

Outdoors, garbage cans, racks, platforms or slabs should be cleaned regularly. Roof gutters should be kept free of debris to prevent moisture accumulation in eaves and attics. Leaky water faucets or pipes inside and outside a home should be fixed. Debris such as bricks, lumber or firewood stacked near a house should be removed to eliminate cockroach harborage.

**Exclusion.** Keep cockroaches out of a home by sealing as many cracks in the foundation and exterior walls as possible. Weather-stripping around doors and windows should be kept in good repair. Pipe penetrations into a home should be sealed with caulk or expanding foam. Caulking around counters, cabinets and plumbing fixtures helps reduce cockroach infestations these areas.

## Chemical Control

**Insecticides.** Many effective insecticides are available for consumer use in controlling cockroaches. Pesticides vary in how they are formulated, how they are applied, how long they last, and how they kill. Most insecticides sold to consumers for cockroach control have low toxicity to humans when used as directed. Information about toxicity can be obtained from the product label; from a Material Safety Data Sheet available on the Internet or from the manufacturer; or from information provided by Cooperative Extension agents. Use pesticides after applying sanitation and other preventive measures listed above.

**Baits.** Baits are among the most effective insecticides for control of cockroaches in homes. The most common bait formulations sold to consumers come in ready-to-use plastic bait stations or tubes containing gel baits.

Baits consist of food mixed with an insecticide and give best results in buildings with few

alternative food sources. Always use the number of bait containers needed to effectively treat the area where cockroaches are to be controlled. Place baits next to suspected cockroach harborage areas. Examine bait containers frequently to ensure that they remain fresh and that bait is not depleted.

Baits can be used in combination with sprays or dusts, but care should be taken to avoid contaminating bait stations with other insecticides or with household chemicals. Do not spray close to bait stations, because baits work most effectively when cockroaches can feed freely, then return to their harborages to die.

**Dusts.** Some insecticides are sold in dust form. Dusts are useful because they can be distributed into inaccessible void areas that are difficult to treat with other forms of insecticides. Dusts also can be transferred easily from one treated insect to another during contact in harborages.

Do not apply dusts in the open or on countertops or shelves where they can be picked up by humans or where they can contact food utensils. Apply dusts lightly, so that they are barely visible. Heavy dust deposits prove ineffective because cockroaches avoid them.

Boric acid is one of the most common dusts used for cockroach control; boric acid is toxic to cockroaches when they ingest it during grooming. Boric acid has a low toxicity on human skin but can be toxic if large quantities are ingested.

**Sprays.** Insecticide sprays for cockroaches typically are sold in aerosol cans, but such sprays also are available in pump dispensers or as concentrates to mix with water. Sprays generally are easy to apply and can provide fast control. Direct sprays into cracks and crevices where cockroaches hide. Exposed surfaces, especially those used to prepare foods, usually should not be treated with sprays.

Aerosol “bombs” or foggers generally are not effective against cockroaches hiding in cracks or crevices. Use sprays rather than “bomb” applications for better results. Using more foggers than recommended near open flames (such as pilot lights, gas stoves and furnaces) creates fire or explosion hazards.

**Insecticide Safety.** It is the duty of every pesticide user to **read product label instructions and follow them carefully.** Cockroach

insecticides can be considered effective only if label directions are followed. Failure to follow insecticide label directions is illegal. Such failure includes using too much product, using it in a manner not specifically described on the label, and failing to wear proper protective clothing specified in label directions.

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