

AGRICULTURAL GUIDE

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Insect
Control

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Cockroaches

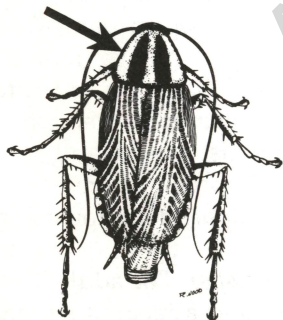
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College of Agriculture

Cockroaches are generally the most common and troublesome pests found in homes. Urban homes are more frequently infested than rural homes. Roaches or their egg cases (ootheca) are easily transported in grocery sacks, boxes, animal feed sacks and other similar containers.

Cockroaches are flat, quick moving insects that are most active at night and avoid light. They hide in

cracks and crevices or between rough unpainted surfaces, which afford a dark cover during the day. Egg cases are produced within the female's abdomen and maybe deposited anywhere the roach goes. Roaches have the ability to rapidly reproduce and adapt to a variety of conditions.

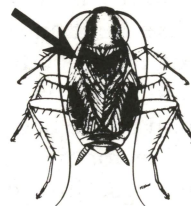
The roaches' diet consists of a wide variety of foods that contain sugars, starches, proteins or their



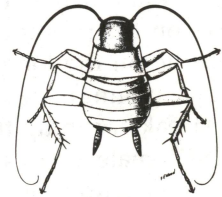
German adult female
(carrying egg case)



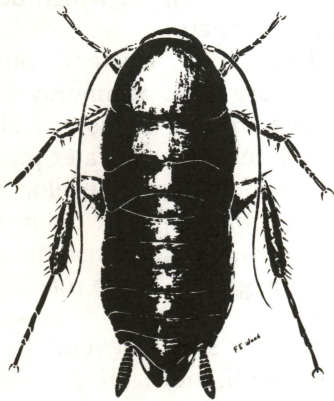
German nymph



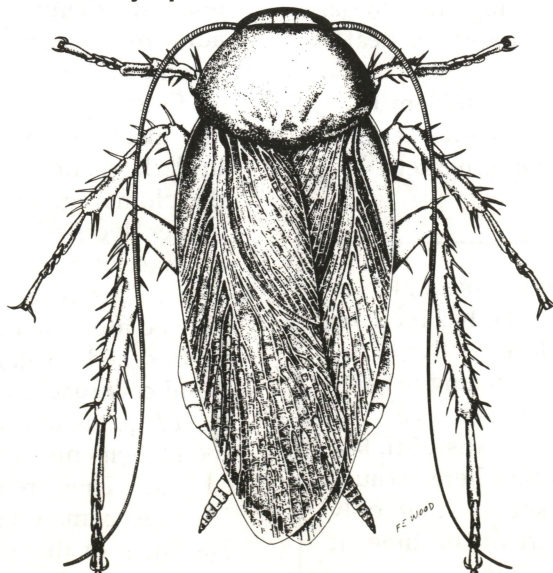
Brown-banded
adult female



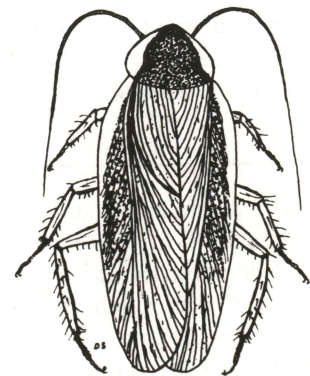
Brown-banded
nymph



Oriental nymph



American adult female



Woods adult male

These drawings are about twice actual size.

combinations. Favorite foods vary with the species of roach, but in general they feed on garbage, food scraps, stored foods, hair, paper, dead animals and dry plant materials.

Cockroaches can carry organisms that cause dysentery, food poisoning and diarrhea from garbage cans, sewers and hospitals to food used for human consumption. Bacteria contained in spoiled food may be eaten by the roaches and distributed in fecal droppings. These droppings contaminate both food and cooking utensils. Roaches present in high numbers produce a very objectionable odor.

Common species of roaches

The four most common cockroaches infesting homes are the German, brown-banded, American and Oriental species. The two found most often in homes are the German and brown-banded. These two species are smaller than the American or Oriental roaches. American and Oriental roaches are more common pests of industrial buildings, business places and apartment complexes. Wood roaches (several species), which normally develop outside, may occasionally infest homes.

German cockroach (*Blattella germanica*). The German cockroach is tan or brown in color and about $\frac{3}{4}$ -inch long. The adult roach is winged and has two dark streaks on the prothorax (shield-like front end). The streaks lie on the longitudinal axis of the body. The nymphs (young) are wingless and have two wide dark streaks running the full length of the body.

The female carries the egg case for nearly the entire incubation period of the eggs. Just before hatching the case is usually dropped in a secluded area. About 30 nymphs hatch from each case. Hatching occurs most commonly in the kitchen, under or around sinks, appliances, cupboards and baseboards. Generally, these roaches bunch together in large numbers in cracks and crevices in areas of heat and high humidity.

German roaches also become a problem in food service areas and equipment in commercial establishments such as restaurants and supermarkets.

The **Asian cockroach** (*Blattella asahinai*), which was recently discovered in Florida, has received a lot of publicity. It is such a close relative of the German cockroach that it is indistinguishable from the German by the untrained eye. The Asian cockroach does not occur in Missouri. It is doubtful that it will become a pest here because it is basically an outdoors species that only happens to invade homes part of the time. It could not survive our cold winters.

Brown-banded cockroach (*Supella longipalpa*). The brown-banded roach resembles the German roach but is slightly smaller (about $\frac{1}{2}$ -inch long) and the prothorax is mottled reddish-brown. In addition, there is a cross band of light yellow at the base of the wings and another about $\frac{1}{16}$ -inch farther back. The yellow bands are separated by a dark reddish-brown band. The wings of the male roach extend past the tip of the abdomen; those of the female are shorter than the abdomen.

The female deposits the egg case shortly after it is completely formed. The brown-banded is not as prolific as the German roach; only 13 to 15 nymphs hatch from each case.

Brown-banded roaches can develop at any location within a building. This roach is often found in high places such as behind picture frames, clocks and other objects on walls, or underneath tables, chairs, cupboards and cabinets. They are also found in radios, television sets, closets, lamps and furniture in dining rooms, bedrooms and living rooms. Generally, brown-banded roaches do not congregate.

American cockroach (*Periplaneta americana*). The American cockroach is the largest of the roaches that infest dwellings. It is about $1\frac{1}{2}$ inches long, reddish-brown and has fully developed wings in the adult stage. The shiny, reddish-brown nymphs are wingless.

Although this roach can develop in damp basements of the home, it is most frequently found in restaurants, grocery stores and bakeries and other businesses where food is prepared or stored. It frequently inhabits steam tunnels, sewers and storm gutters. Severe infestations can occur where there is easy access to garbage in large apartment houses and other commercial dwellings.

Oriental cockroach (*Blatta orientalis*). The adult Oriental roach is about 1 inch long and appears very dark brown or black in color. The adult females are wingless and, therefore, look a lot like the nymphs. The adult male has relatively short wings, which do not extend to the tip of the abdomen.

Oriental roaches develop in "clusters" outside and inside the house but are most commonly found in dark, damp basements around drains or leaks in the plumbing. They can freely ascend water pipes to higher floors of apartment houses and develop there in large numbers around faulty pipes or other moist areas. This roach is gregarious and large numbers may be found living in one group. These roaches are often called "water bugs."

Wood cockroaches (*Parcoblatta* spp.). Several species of this genus are found in Missouri. They normally spend their entire lives outdoors, particularly in wooded areas. They are often found in stacks of firewood. The most common species is *Parcoblatta pennsylvanica*. The male of this species has well developed wings and is about 1 inch long by $\frac{3}{8}$ -inch wide. It is dark brown with narrow light tan bands running from

Specific places you can find German and brown-banded cockroaches in dwellings.

1. Around, behind, underneath kitchen sinks and drainboards.
2. In cracks around, underneath, behind, inside cabinets, cupboards, inside drawers and chests of drawers, especially the upper corners.
3. Around pipes or conduits where they go through a wall, ceiling or are fastened close to a wall.
4. Underneath and behind refrigerators, freezers or other appliances where there are motors that generate heat.
5. Behind window frames and curtains.
6. Behind door frames, door hinges and door locks.
7. Behind loose baseboards and molding strips.
8. Underneath tables, chairs and stools.
9. In radios, television sets, telephones, home computers, electric clocks, electric switches and behind switch boxes.
10. Behind mirrors, pictures, loose wallpaper, cracks in plaster and broken tiles.
11. In pantries, closets, bookcases, book shelves and books.
12. Around mops, brooms and cleaning closets.
13. Near hot water radiator systems.
14. Laundry baskets.
15. In boxes of canned or other boxed merchandise.

16. Potato sacks.
17. Grocery boxes.
18. Moist basements.
19. Wall voids.
20. Garbage cans and refuse compactors.
21. Couches and beds.
22. Bathrooms
23. Beer or soft drink cases or cartons

Specific places you can find American cockroaches in dwellings.

The American cockroach is frequently a pest of industrial buildings. When this roach infests a home it can normally be found in damp areas of the basement near the baseboards.

Specific places you can find Oriental cockroaches in dwellings.

1. Bathrooms.
2. Floor drains.
3. Under, around or behind kitchen or bathroom sinks.
4. Garbage containers and refuse compactors.

Specific places to find Oriental and American roaches outside dwellings during the summer months.

1. In grass in the yards.
2. Around buildings, under leaves and shrubs.
3. Cracks where steps or porch join the foundation.
4. Crawl space under house.
5. Under siding next to ground.

each side of the prothorax down the front half of the outer margins of the wings. The females have very short, non-functional wings. The males are attracted to lights and may enter houses due to the attraction. They generally do not become a persistent problem in homes because the females rarely enter.

Control methods

The first step is sanitation. Cockroaches eat a wide variety of foods; any food scraps or crumbs encourage their development. Infrequently emptied garbage cans with ill-fitting lids, kitchen waste baskets, accumulations of pop bottles and places where water is available all contribute to high roach populations and difficulty of control. Correct such situations. Caulking of openings to the outside and between units in multifamily buildings is an aid to control.

This does not mean, however, that roaches will not infest homes where proper sanitation is practiced. Seldom, if ever, can all the small crumbs or pieces of food be cleaned up. This type of situation will support the annoying population of cockroaches found in most homes.

Sticky traps. Several brands of cockroach traps use

the principle of a sticky surface to trap the roaches. These are effective in monitoring and in reducing a population. They will never eliminate an infestation, however.

Chemical controls. Chemical control methods may vary with the different kinds of roaches. Different species infest different areas in the home, and two or more species may be in the same building. Therefore, knowing which species you have and their favorite hiding places is important.

The brown-banded roach is difficult to control because it infests obscure places; any corner or piece of furniture can harbor roaches or egg cases. On the other hand, the German roach, although more localized, builds up in terrific numbers and is sometimes resistant to certain insecticides that control other roaches.

Crack and crevice treatment. In this remedy, small amounts of insecticide are applied into cracks and crevices in which insects hide or through which they may enter the building. Such openings may occur at expansion joints, between different elements of construction and between equipment and floors. Additionally, small voids attractive to roaches may include cracks in cabinets, closets, electrical appliances, con-

Table 1. Insecticides for cockroach control

Insecticide	Application concentration			Remarks
	spray	dust	bait	
acephate (Orthene)	0.5%-1.0%			For use only by PCOs.
bendiocarb (Ficam)	0.25%	1%		Spray formulation for use only by PCOs. Resistance found in some German cockroach populations.
boric acid		99%		
chlorpyrifos (Dursban)	0.5%	1%	0.5%	
cypermethrin (Cynoff, Demon)	0.1%-0.2%			For use only by PCOs.
diazinon	0.5%			
fenvalerate (Pyrid)	0.1-0.2%			For use only by PCOs.
hydroprene (Gencor)	0.13-0.6%			Affects only the growing stage causing it to become a sterile adult. Best when used with a conventional insecticide.
propetamphos (Safrotin)	0.5%-1.0%	1%		Spray application formulation for use only by PCOs.
propoxur (Baygon)	1.0%		2%	
pyrethrins	0.5-2%			Good flushing action. Of limited value alone. Usually formulated with another active ingredient.
resmethrin	0.5%-3%			

duits and equipment legs. Professional pest control operators have application equipment designed for crack and crevice treatment. Many ready-to-use insecticides are now equipped with a crack and crevice application device.

Spot sprays. By definition, a spot is an area of 2 square feet or less. Apply insecticides by spraying or "painting" the areas where roaches walk while foraging for food. Large areas, such as the entire floor or wall, should not be treated. With a knowledge of the habits of various species of roaches discussed here, you can treat strategic places, and insecticidal residue will kill the roaches upon contact.

When cabinets or cupboards are to be treated, remove food and utensils and wash the shelves with a cleansing solution before applying the insecticide. After the shelves are treated, allow them to dry. Cover with fresh shelf paper before replacing articles.

Baits. Baits are granular materials that should be lightly scattered under appliances, sinks and other areas inaccessible to children and pets. One thorough treatment will usually protect the home for two or three months or longer.

Use insecticides wisely and safely. Because roaches are often associated with food preparation

areas, **do not** contaminate utensils or food with the spray. Be careful that surfaces on which foods are prepared or served are **not** sprayed. Wash all utensils and food preparation surfaces within a food preparation area following any insecticide application.

- Apply only where needed or justified.
 - Use care when handling, mixing or applying insecticides.
 - Keep insecticides in original containers complete with labels.
 - Keep insecticides out of reach of children and **do not** allow children or pets near treated surfaces until dry.
 - **Read, understand and follow** directions on the label and heed all precautions.
 - Carefully and properly dispose of unused portions of diluted sprays and empty insecticide containers.
 - **Do not** contaminate food, water dishes or utensils.
- PCOs. Many cockroach infestations are best handled by a pest control operator (PCO). These licensed professionals have been trained and have the experience that is often needed to obtain good control. They also have access to some of the better cockroach insecticides that are not available across the counter.

See "Remarks" section of Table 1.

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