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CONTROLLING COCKROACHES WITHOUT SYNTHETIC ORGANIC INSECTICIDES

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Cockroaches rank high on the homeowner's list of insect problems. The most widespread grievance against the roach is its mere presence in the home, as well as the implication of uncleanliness which accompanies a roach infestation. Roaches contaminate food with excrement and salivary secretions and leave an unpleasant odor. They are capable of carrying disease organisms, but the role roaches play in transmitting these organisms to man is unknown.

Many homeowners do not want to use synthetic organic insecticides to control cockroaches. Because of this, several methods of controlling cockroaches that do not involve synthetic insecticides have been devised.

Cockroach Description and Biology

Cockroaches generally have a flattened, oval shape, spiny legs and long, filamentous antennae. Color, depending on age and species, ranges from dark brown to reddish-brown, and from tan to black. Adults of some species are fully winged, while the wings of other species may be short, especially on the females.

Immature forms of all cockroaches resemble the adults except that they are smaller and have undeveloped wings. Young roaches develop rather slowly and are found in the same places as the adults.

All cockroaches are nocturnal; they hide in dark, damp places during the day and search for food at night. If disturbed, they run rapidly for shelter. Roaches are omnivorous and eat practically all foods consumed by man and domestic animals, as well as their waste products.

Roach eggs are deposited in groups of 12 or more in a bean-shaped, leathery capsule or egg case. Egg case color ranges from dark brown to reddish-brown. In some species the female drops or glues the case in out-of-the-way places soon after it is formed. The female German roach carries the case until the eggs are ready to hatch.

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Cockroach Species

Before starting control procedures, the homeowner should determine which cockroach species are present.

The most common is the large American cockroach (Figure 1). It is reddish-brown to brown in color, has a tan or light yellow band around the shield behind the head, and is 1½ inches long when mature. Outdoors it is found under the bark of trees, in leaf litter, rubbish piles, sewage systems, and in barns or other out-buildings. Inside the home, this roach commonly is found around the furnace and associated heating ducts. Egg cases are deposited in sheltered areas on or near the floor, usually close to a food source, and are concealed with debris.

The smokybrown is the other common large roach (Figure 2). It is 1½ inches long and the color is uniformly dark brown to black. It is primarily an outdoor species, and is most abundant in heavily wooded areas with substantial ground cover. It also can be found in firewood, lumber, trash piles and sewers. In the home this roach frequently is found in the attic or near fireplaces. Females prefer to attach their egg cases to cracks, depressions or corners of rough-textured surfaces like brick, concrete or wood. Egg cases also are deposited around window casements or behind draperies. Cases may be concealed or exposed and can be found anywhere from floor to ceiling.

The German cockroach is the most common small roach. The adult (Figure 3) is about ½ inch long and light brown in color with two black, lengthwise stripes on the shield behind the head. This roach lives indoors and usually is brought in with laundry, groceries or cartons. It also may immigrate from nearby infested dwellings. The German roach is a pest in kitchens, bathrooms and other areas where there are food, warmth and moisture. The female carries the egg capsule protruding from her abdomen for about a month, then drops it a day or two before the eggs are ready to hatch.

The brown-banded cockroach (Figure 4) varies in color from light tan to glossy dark brown, and when fully grown may be ⅝ inch long. The adult's

wings are marked with two light yellow, horizontal bands, one at the base of the wings and another near the middle of the body. This roach prefers starchy foods, and as a result of a low moisture requirement it is not restricted to the kitchen or bathroom but occurs throughout the home. This species prefers to hide in warm, elevated areas near the ceiling, behind wall decorations, shelving and electrical appliances. The female glues the egg capsule to ceilings, beneath furniture, and in closets or other dark places.

The oriental cockroach (Figure 5) is glossy black, 1 to 1½ inches long when mature and flightless. It feeds on a wide range of decaying organic matter and is considered the filthiest of domestic roaches. Near the home, this insect lives in cool, moist areas such as beneath leaves and yard debris, in plant composting materials, or beneath porches without foundations. This roach readily invades households through sewer and drain pipes, cracked foundations, ventilators and under doors. Once inside, oriental roaches are found most often under refrigerators, washing machines and sinks. The female usually deposits the egg capsule in debris or food in a sheltered place.

The brown cockroach (Figure 6) is 1 to 1¼ inches long and glossy reddish-brown. It resembles the American roach somewhat. This roach is found outdoors in trees, piles of firewood or beneath garbage cans. It commonly invades homes near woody areas, and inside is most often found in the kitchen. Egg cases are attached to walls and ceilings.

Cockroach Control Measures

Sanitation. Sanitary measures are very important in cockroach control. Proper sanitation, both indoors and outdoors, effectively limits roach populations.

Roaches can be discouraged from entering the home by sealing cracks in foundations and outside walls. The seal or caulking around air conditioning units, windows, doors and other openings into the home should be checked to insure there are no cracks through which roaches might enter.

Garbage should be stored in tightly covered containers kept on easily cleaned racks, platforms or slabs, and should be disposed of frequently. Excess refuse should be stored in roach-proof boxes or bags and disposed of as soon as possible.

Paper, cardboard, lumber, stacks of firewood and other debris near the home provide excellent refuges for several roach species. Elimination of yard trash and storage of firewood in areas not adjacent to the home or garage will minimize the chances of roach invasion from these potential hiding places.

Indoors, all possible hiding and breeding areas should be eliminated. Cracks and holes in floors,

walls and ceilings should be repaired, and openings around plumbing fixtures, furnace flues, electrical outlets, between window sills and walls and along baseboards or ceiling molding should be sealed with appropriate materials. Areas where egg cases might be deposited should be inspected regularly. Any cases found should be removed and crushed or burned.

Good housekeeping and thorough cleaning are essential in controlling cockroaches. Unwashed dishes and kitchen utensils and uncovered food should not be left overnight. All spilled liquids should be mopped up. Cupboards, shelves and bins where small amounts of food can accumulate should be cleaned periodically. Dry pet food should be kept in roach-proof containers and never stored in or near the kitchen. The pet's feeding dish and area should be washed daily.

Trapping. Cockroaches can be trapped both inside and outside the home. Outdoor trapping near areas where roaches are found can reduce roach populations and limit the number of roaches entering the home. Indoor trapping can hold in check indoor-breeding species such as the German and brown-banded cockroaches, and may practically eliminate outdoor species such as the American and smokybrown from the home.

A properly prepared and positioned trap may catch up to 50 adult or nymphal roaches per day, although the number trapped will vary according to the total roach population and the season. For example, primarily outdoor species are much less active during winter, and the number trapped during this time will be reduced.

Experiments show that trapping can be an effective method of roach control. In one case, 20 smokybrown and about 50 German roaches were removed from the kitchen of a home in a week using only three traps. During the subsequent year no other smokybrown roaches were seen, and while German roaches were seen, their numbers were kept low by continued trapping.

In a second home, more than 250 smokybrown roaches were captured in 15 traps over a 4-week period. Trap catches were high during the first 10 days, and then steadily declined as the roaches were trapped out. Prior to the trapping roaches were seen every day, but the homeowner reported seeing only two roaches within 4 months after trapping ended.

Cockroach trap construction is a simple matter, and the materials are readily available in the home. Smear a thin layer of petroleum jelly around the inside lip of a pint jar to a width of about 2 inches. Place the trap upright, with appropriate bait inside, in an area frequented by roaches. Apple and potato are excellent bait for American, smokybrown and brown-banded roaches, while German

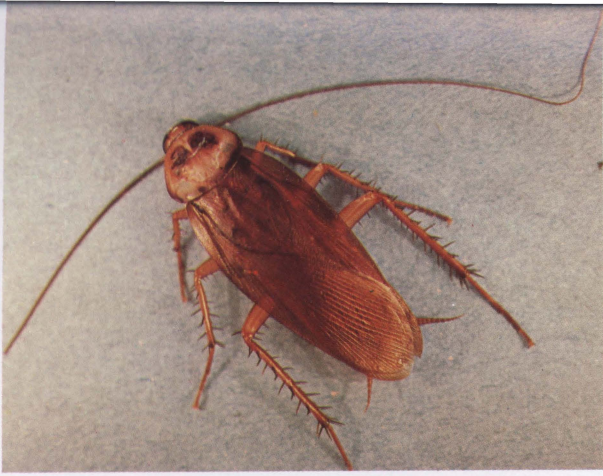


Fig. 1. American Cockroach, **Periplaneta americana**



Fig. 2. Smokybrown Cockroach, **Periplaneta fuliginosa**



Fig. 3. German Cockroach, **Blattella germanica**



Fig. 4. Brown-banded Cockroach, **Supella longipalpa**



Fig. 5. Oriental Cockroach, **Blatta orientalis**



Fig. 6. Brown Cockroach, **Periplaneta brunnea**

roaches prefer banana peel. The number of traps used will depend on the severity of the infestation.

Roaches will enter the jar to eat the bait but will be unable to climb out over the petroleum jelly barrier. Once trapped, the roaches may be destroyed by dropping them into a pail of hot, soapy water.

Inorganic Insecticides. Boric acid powder and silica aerogel dust are inorganic insecticides which can be used to control roach infestations in the home. Both are relatively inexpensive, low in toxicity to humans and pets, and retain their killing power long after the initial application. In addition, roaches have not developed resistance to these chemicals. Their only disadvantage is that they are rather slow-acting, and often require a week or more to reduce roach numbers. For best results, the insecticides should be applied to cockroach hiding places and runways. These areas may be located by entering darkened rooms with a flashlight and observing where the roaches flee. If desired, professional pest control operators can apply these materials.

Boric acid powder acts primarily as a stomach poison. It is picked up on the roach's body and swallowed when the insect cleans itself. Unlike other insecticidal dusts, boric acid is not recognized as a poison by the roaches, and thus they don't avoid it. Boric acid powder can be purchased at most drug stores and used in several ways. The powder alone can be applied liberally to infested areas. In exposed areas, avoid leaving heavy trails of powder, or more than half a teaspoon in any one place. Boric acid powder may be mixed with powdered sugar or milk and placed in containers for direct consumption by roaches. The powder also may be dissolved in water and mopped on the floor, using 1 cup of boric acid for each gallon of water. A teaspoon of baking soda should be added

to the water if the powder does not dissolve readily. The water should be warm enough to completely dissolve the boric acid, but boiling water will decrease the chemical's effectiveness. When the solution dries, an invisible film of boric acid crystals is left on the floor. Roaches crawling on a treated floor pick up a lethal dose of boric acid within a week. For heavily infested areas both mopping and dusting methods should be used.

CAUTION: Gloves should be worn when handling the powder, and care should be taken to prevent inhaling it during application. Boric acid should be kept in airtight, properly labeled containers out of the reach of children and pets. The powder should not be applied to plants, soil that contains plants or any place where air currents may carry it to plantings, as they will be severely burned or killed. Boric acid, either dry or in solution, should not be used outdoors or where it might be carried outdoors.

Silica aerogel dust absorbs the waterproof layer of wax on the roach's body and causes death by dehydration. A visible film of dust should be applied with a squeeze bulb or plunger duster to suspected roach hiding places, since body contact with the chemical is necessary for control. Silica aerogel is particularly effective in controlling roaches in attics, wall voids or any closed space. A disadvantage of this chemical is that roaches learn to avoid treated areas. Also, the dust cannot be used in damp areas since its effectiveness is decreased if it becomes wet.

Cockroach control need not be equated with total eradication by chemicals. Instead, control efforts should be directed toward reducing roach populations to unobjectionable levels. Proper and routine use of the methods described in this brochure will help to accomplish this goal safely and inexpensively.

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