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COCKROACHES and Their Control

LEAFLET No. 144.
Pointers on Getting Rid of Roaches

1. Keep the kitchen or premises clean. Sanitation is important.
2. Use a 2-percent chlordane spray for best results.
3. Find out where the roaches hide and develop. Apply the insecticide to those places.
4. The manner of applying an insecticide is as important as what you use.
5. Prevent contamination of food and utensils when applying insecticides.

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COCKROACHES AND THEIR CONTROL

Prepared by the Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration

Cockroaches are troublesome pests throughout the United States. Not only are they annoying, but when abundant they may also be destructive. Roaches, sometimes called water bugs, destroy food and damage fabrics, book bindings, and other materials. By polluting foods over which they run, they spread filth and may carry diseases. Managers of apartment houses and business establishments pay large sums for pest-control services. Thousands of dollars are spent annually for insecticides, equipment, and services to fight roaches in homes.

The American cockroach: A, View from above; B, view from beneath. Enlarged one-fourth.

KINDS OF ROACHES

There are over 2,000 kinds of roaches in the world, mainly in the tropics. About 55 kinds are found in the United States, and nearly all of them live outdoors. Some of the woods roaches may occasionally enter homes. They may fly to lights on a warm summer evening or may be brought in on firewood. These species cannot develop indoors, however, and soon they either leave or die. There are four kinds of roaches commonly found in buildings.
The American cockroach is the largest of the domestic roaches. Adult females may be 1 1/2 to 2 inches long, including the wings. The color may vary from reddish brown to dark brown.

The oriental cockroach is known in some localities as the black beetle or shad roach. It is black or dark brown, more sluggish than the other kinds found in buildings, and prefers very damp places. Adult females may be 1 to 1 1/4 inches long, and have only traces of wings. Adult males are a little smaller and have short wings that do not reach the end of the body.

The German cockroach is the most common and is sometimes called the croton bug. Adult females are never more than five-eighths of an inch long. The adults are light brown, and are marked on the back between the head and the wings with two longitudinal black stripes. The wings are of a uniform light-brown color. The young are often dark-colored, sometimes almost black, and have two black stripes on the fore part of the body.

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1 *Periplaneta americana* (L.)
2 *Blatta orientalis* L.
3 *Blattella germanica* (L.)
The brown-banded roach\textsuperscript{4} is sometimes called the tropical cockroach. It was accidentally introduced in Gulf coast cities, and is becoming common elsewhere in the United States. It is slightly smaller than the German cockroach and a little brighter in color. The brown-

\textsuperscript{4}Supella supellectilium (Serv.).
HOW ROACHES DEVELOP

The female roach lays her eggs in a leathery capsule which she forms at the end of her body. The German cockroach carries the egg capsule for about a month and drops it a day or so before the eggs are ready to hatch. An average of 30 nymphs hatch from a capsule, although some capsules may contain as many as 48 eggs. The other kinds of roaches found in homes carry their egg capsules only a day or two and then glue them to some object in a protected place. These capsules generally produce from 12 to 14 nymphs, after an incubation period of 2 or 3 months.

All roaches are very small when first hatched. The broad and flattened shape of the young makes them easily recognized as roaches. Wings do not develop until the roaches reach maturity.

When food, temperature, and moisture are unfavorable, roaches develop rather slowly, but live a long time. In the home conditions are not usually ideal for the most rapid growth. The German and brown-banded cockroaches may have two or three generations a year, but the other kinds require about a year to become mature. When conditions are more favorable, the roaches may develop two or three times as fast. Roaches in all stages of development may be present at the same time.

ROACHY ODOR

The offensive, sickening odor associated with roaches is due largely to an oily liquid secreted by their scent glands. Food may be ruined by it. Dishes over which roaches run, although apparently clean, may give off the odor when warmed unless they are thoroughly washed with hot water and soap. The ink-like liquid and pellets of excrement also contribute to this nauseating odor.

AIDS IN PREVENTING INFESTATIONS

One way to help prevent roaches from becoming established in a home is to watch carefully all baskets, bags, or boxes of food and laundry brought into the house. Roaches hide in such things. Kill these stray roaches and trade at roach-free stores.

All cracks about pipes passing through floors or walls, as well as cracks leading to spaces behind baseboards and door frames, should be filled with putty or plastic wood, particularly if roaches are coming in from adjoining apartments, or from outside.

Some housewives feel disgraced when they find roaches in their homes. The disgrace is not in finding them, but in allowing them to remain. Dirt and filth help the roaches to develop in large numbers, and make it more difficult for an insecticide to be effective. Sometimes a thorough cleaning would be more effective than an application of insecticide. Sanitation is very important in roach control, especially where food is being handled or processed.
ROACH HABITS AS RELATED TO CONTROL

Roaches hide during the day in sheltered, dark places, where they sometimes congregate in large masses. They come out and forage at night. If disturbed, they run rapidly for shelter and disappear through openings to their hiding places. To control roaches satisfactorily, you must locate the hiding places and treat them thoroughly. One way to find them is to enter a dark room quietly, snap on the lights, and watch where the roaches run. You may find them around the kitchen sink and drainboard; in the cracks around or underneath cupboards and cabinets or inside them, especially in the upper corners; behind drawers; around pipes or conduits, where they pass along the wall or go through it; behind window or door frames; behind loose baseboards or molding strips; inside the compartment containing the motor of mechanical refrigerators; on the under side of tables and chairs; and in the bathroom.

Different kinds of roaches have different habits and have to be treated accordingly. The German and brown-banded roaches usually live and develop in the immediate areas where they are troublesome. The places described in the preceding paragraph are favorite haunts of the German roach, which is the kind most commonly found in homes. The brown-banded roach is also found in such places, and in addition, may be scattered all over the house instead of being restricted to the kitchen and bathroom. It inhabits high places in the room more than the German roach does. It may be in the upper parts of cabinets; on shelves in closets or bookcases; behind mirrors; and in upholstered furniture, radio cabinets, desks, dressers, magazine racks, or sewing-machine cabinets. The brown-banded roach is sometimes difficult to control. Because it lives all over the house, the application of an insecticide must be more extensive and more thorough than for the control of other roaches.

The American and oriental roaches are frequently found foraging on the first floor of buildings, but they seldom develop there. They prefer damp, warm places, and usually develop in basements, store-rooms, steam tunnels, and similar locations. Insecticides applied in the living portion of the house will kill the roaches that come there, but others will continue to appear. To control them satisfactorily you must treat the source of the infestation. These roaches cannot survive outdoors during the cold winters of the Northern States. They may develop outdoors during the summer, however, and in warmer sections of the country the year round. Then they may constantly enter houses, especially those of loose construction.

Infested apartments and row houses may also provide a constant source of infestation in adjoining premises. You can control these roaches fairly easily with the new insecticides, which have a long-lasting effect.

When you treat your home, you kill the roaches present and leave a deposit of insecticide on the treated surfaces. It will not keep roaches out, but if it has been applied in the proper places, roaches will come in contact with it when they do enter and will be killed. This prevents an infestation from becoming established. A single treatment should give protection for several weeks, and longer when there is little opportunity for reinfestation. You must apply these residual
insecticides thoroughly to all secluded places and cracks so that, no matter where a roach tries to hide, it will come in contact with the residue. Sometimes it is difficult or impossible to treat all the hiding places. Therefore, you should also treat exposed surfaces. When the roaches come out at night in search of food and water, they will then have to walk over a treated surface. Roaches are not killed immediately by contact with insecticide deposits, but will die within a few hours after sufficient exposure to them.

Roaches are fairly easy to control in most homes. In many commercial establishments control may be more difficult. If you continue to have trouble after following the suggestions given, you may wish to call in a good pest-control operator. The better operators have the equipment and training necessary to do a good job. They also have the background of experience required to discover and deal with unusual or complicated conditions.

**PREFERRED INSECTICIDES**

Many different preparations are sold for roach control. The most satisfactory ones are discussed in this section.

**Chlordane**

Chlordane is one of the most effective insecticides now available for roach control. It is a new insecticide with residual properties. Chlordane should be used as a 2-percent spray or a 5-percent powder. When it is applied as a residual spray, the oil or water base evaporates and leaves an invisible film, which remains effective on the treated surface for several weeks and continues to kill roaches that walk over it. The liquid spray is the form most commonly used. It can be obtained as an oil solution or a water emulsion. You can also buy a 50-percent chlordane emulsion concentrate, which should be mixed, 1 part with 24 parts of water, to make a 2-percent spray. Although the emulsion has a milky-white appearance, the spray will not stain surfaces that would not be harmed by water.

**DDT**

DDT insecticides applied thoroughly are also effective against all kinds of domestic roaches, but less so than chlordane. Some satisfactory roach insecticides contain both chlordane and DDT. Liquid sprays should contain 5 percent of DDT and powders should contain 10 percent. The 5-percent DDT spray is readily available as an oil solution. Emulsion concentrates are also available, to be diluted with water before being used. The residue from a DDT solution or emulsion is in the form of numerous tiny crystals that are almost invisible on most surfaces. The residue remains effective from several weeks to several months.

**Pyrethrum**

In situations where other insecticides might create a hazard to humans, pets, or food, pyrethrum insecticides may be used for safe and effective roach control. Pyrethrum was formerly applied directly as a contact insecticide for immediate effect, but it is not always possible
to hit all roaches. Since pyrethrum loses its effectiveness rather rapidly it was necessary to repeat the applications frequently. Several chemicals, such as piperonyl butoxide and \( n \)-propyl isome, are added to pyrethrum to make it more effective and more stable, so that the spray residue will remain toxic for a longer time. Such pyrethrum combinations can be purchased in both liquid and powder form. Small amounts of pyrethrum are sometimes added to other insecticides to provide rapid knock-down and quick kill at the time of application.

**Sodium Fluoride**

Sodium fluoride has been used as a roach insecticide for years. It is not quite so effective as some of the newer materials. It is used as a powder, either undiluted or with an inert dust added. A mixture should contain not less than 50 percent of sodium fluoride.

**APPLYING ROACH INSECTICIDES**

Before applying a roach insecticide read carefully the section of this leaflet, *Roach Habits as Related to Control*, page 4.

The proper application of any insecticide is fully as important as the choice of the insecticide to use.

For use in the home a liquid insecticide is often more suitable than a powder. It can be sprayed into cracks, and other hiding places. It can also be applied on exposed surfaces where the roaches will crawl over the residue when they come out of hiding. A liquid spray should be used on vertical surfaces and on the underside of objects, where a dust would not adhere or would leave an undesirable visible deposit. The liquid can be applied with an ordinary household plunger-type insect sprayer. If large areas are to be treated, compressed-air sprayers, power sprayers, or other special equipment can be used. The sprayer should deliver a fairly coarse mist, which will wet the surface being treated. If the mist is too fine, it will float away in the air. Apply just enough spray to moisten surfaces thoroughly, but not so much that the liquid begins to run or drip.

Placing a band of roach powder on the floor around the edges of a room, leaving it a day or two, and then cleaning it up, may kill many of the roaches, but it is not an adequate treatment. Many roaches may be able to go from their hiding places to sources of food and water without crossing the band of powder, or they may be actually repelled by the powder.

A powder insecticide can be effective against roaches if it is properly applied with a puff duster of the bulb, plunger, or bellows type. Blow the powder into hiding places or onto surfaces where roaches run. A light, uniform film is sufficient. Repeat when excessive moisture causes the powder to cake and become useless.

When roaches are abundant, difficult to control, or firmly established in a building of loose construction, use both a powder and a residual spray for quicker and more satisfactory results. Apply the spray on vertical surfaces, in exposed places, and on the under surface of objects. Blow the powder into cracks and crevices, or underneath and behind objects, where it would be difficult or impossible to apply a spray.
When treating cupboards and pantries, it is best to take everything from the shelves and remove drawers. Food and utensils cannot become contaminated if this is done. Then spray or dust the interiors. Allow the spray to dry, or clean up excess powder, before replacing the articles. Clean the surfaces of shelves or cover them with paper before replacing the food, dishes, or utensils. If the drawers are cleaned thoroughly, it will not be necessary to spray inside them, but it will help to spray the sides, back, and under surface.

Caution: Most roach insecticides are poisonous to man and animals. They can be used safely, however, if a few simple precautions are observed. Keep them out of the reach of children and pets. Do not contaminate food, dishes, or utensils while applying insecticides. Do not use oil sprays in places where they could be ignited, particularly by open flames or electric sparks. Avoid unnecessary exposure when using sprays or dusts, especially those containing chlordane or DDT. During prolonged handling it may be desirable to use a respirator. Do not use chlordane to treat an entire room; restrict its use to places where the roaches hide or crawl. When you have finished applying insecticides, clean the spray equipment and wash all exposed parts of the body with soap and water.

OTHER METHODS OF CONTROL

In addition to the control measures that have been discussed, several others are sometimes employed. Some effective measures cannot be used in certain situations. Others may not be completely effective but may be utilized under special conditions to provide at least a fair degree of control. Some of these measures will be discussed briefly.

Aerosols

Most aerosol dispensers, or bombs, for home use contain DDT and pyrethrum. Aerosols may be helpful in controlling roaches if you use them liberally and direct them into hiding places. You will need to use more of the aerosol for roaches than is necessary to kill flies or mosquitoes. These high dosages may be irritating, and are not considered desirable unless people and pets stay out of the treated room for about an hour after the aerosol has been applied.

Aerosols have limited penetrating power, but small amounts may reach some roaches in partially protected places and cause them to run out into the open, where they may be exposed to enough insecticide to kill them. Better results will be obtained if all openings are closed to prevent the escape of roaches from the room being treated.

An aerosol has little or no lasting, or residual, effect. Repeated heavy applications are required. A single application of a residual spray or dust will give better results against a well-established infestation or in premises subject to constant reinfestation.

Several types of electrically operated machines on the market are designed to produce a fine spray, part or all of which may be an aerosol. The spray is produced in various ways—by compressed air, by steam, or by mechanical means. Some of these sprayers may be adjusted or will produce enough large spray particles to wet surfaces and provide a residual application of insecticide.
Fumigation

A roach infestation can be destroyed immediately by fumigation. However, this method has several limitations. Loosely constructed buildings cannot be fumigated because the fumigant gas escapes too rapidly. It is an expensive operation and premises within congested or commercial areas are likely to become reinfested in a short time. Moreover, in such areas fumigation is especially dangerous. It is restricted in some localities and should be done only by a professional pest-control operator. Fumigation is seldom used for roach control now that effective residual insecticides have become available.

Boric Acid and Borax

Finely powdered boric acid or borax can be used to combat roaches. They are less poisonous to man than are some other insecticides, but also less effective and very slow acting against roaches. These materials are sometimes mixed with ingredients attractive to roaches and compressed into tablets to be used as bait. The powders or bait tablets may give satisfactory results when used in offices or other places where there is little food for roaches.

Phosphorus Paste

Phosphorus paste can be used against all the domestic roaches except the German cockroach. It is especially effective in very damp climates. The paste should be spread on small pieces of cardboard, which can then be rolled into cylinders with the paste inside and fastened with a rubber band or string. The cylinders should be placed where children and pets cannot reach them, where they will not be seen, and where things will not be soiled or contaminated with the paste. When brown-banded roaches are present, insert the cylinders behind books, place them on closet shelves and in framework of upholstered furniture, or tack them to the back of cabinet drawers.