



German Cockroach

Order: Blattaria

Family: Blattellidae

Species: *Blattella germanica* (Linnaeus)

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Size:

The German cockroach is a small cockroach, adults are approximately 5/8 inch long (15mm).

Color:

The adult cockroaches are light brown to gold in color. The pronotum (area directly behind the head) is marked by two dark longitudinal stripes. Immature cockroaches are dark brown to black but have a light colored band running down the middle of their backs.



Figure 1: Adult female with egg case

Description:

Adult German cockroaches have fully developed wings but rarely fly. The wings of the adult female cover the entire abdomen while the wings of the male are slightly shorter and do not cover the abdomen tip. Both the adult and immature female cockroach have a broad rounded abdomen. The male cockroach abdomen is narrow and pointed. The female cockroach has one pair of cerci, finger-like appendages, at the tip of the abdomen. The cerci are used to detect air currents in the cockroach's surroundings. The male cockroach has cerci, plus an additional set of appendages called styli. The styli are located between the cerci and are smaller and more delicate. The presence of styli is the easiest way to distinguish male cockroaches from

females. Sometimes adult male cockroaches can also be distinguished from females by color. The male cockroaches are generally more gold in appearance than the darker females. However, color can vary from one cockroach population to another. The German cockroach egg capsule is frequently seen attached to the adult female German cockroach. The egg case is a light tan color and less than 1/2 inch long. When immature cockroaches first emerge from the egg case they are extremely small and white. However, they soon darken and become small, wingless versions of the adults.

Habitat:

There are no "wild" populations of German cockroaches. They exist only in association with humans. Therefore, German cockroaches are the most common cockroach pest found in homes, restaurants, grocery stores, correctional facilities, schools, and other buildings where food is stored or prepared. German cockroaches are transported easily in clothing, bags, boxes, and other belongings, so incipient populations can begin quite readily in new locations. German cockroaches have strict moisture requirements so infestations generally develop in kitchen and bathroom areas. Cockroaches often take up residence in warm cracks

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and crevices that are within five feet of a water source. German cockroaches are only active during the evening hours. During the day, the cockroaches aggregate behind refrigerators, picture frames, and clocks or in cabinets, drawers, stoves, and dishwashers. German cockroaches spend about 75 percent of their time in these safe harborage areas. If cockroaches are seen aggregating in corners of the ceiling or other locations out in the open, it is a sign that the infestation has reached such a high level and that there are no secluded cockroach harborage areas available.

Life Cycle:

Unlike other cockroach species, the German female carries the egg case protruding from her abdomen until the embryos are ready to hatch. A female will produce a new egg case approximately every three weeks, with each egg case containing approximately 30 to 40 embryos. Adult female cockroaches live about 150 days and will produce four to eight egg cases during that time. Immature German cockroaches also develop very rapidly, usually becoming reproductive within 40 days. It is no surprise that German cockroaches produce more offspring and have more generations per year than any other cockroach. Therefore, it only takes a few individuals to cause a troublesome infestation.



Figure 2: From the left: German cockroach adult male, female, immature cockroaches (nymphs) and egg case
Photo from the University of Nebraska, used by permission.

Type of Damage:

German cockroaches are an aesthetic nuisance, and they produce copious amounts of fecal material. They can foul human and pet food with their feces and body parts and leave fecal spots on counter tops and wallpaper. German cockroaches will eat a variety of foods including cosmetics, paste, soap, and paper products. German cockroaches also have a very unpleasant characteristic odor. The odor is so prevalent that a pest con-

trol operator can often smell an infestation inside a building before he sees any cockroaches.

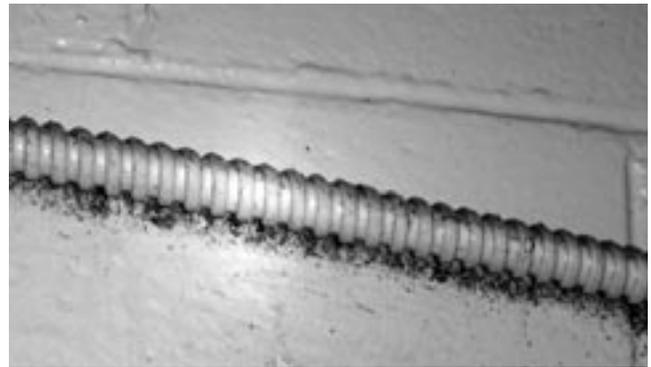


Figure 3: German cockroach fecal spots on kitchen wall



Figure 4: Cockroaches infesting a cupboard and contaminating dinner plates

Health Risk:

German cockroaches are known to carry disease organisms on their bodies and in their feces. They can transfer these organisms to surfaces and food that they crawl across while foraging. Because German cockroaches are active at night, they have been known to invade the ear canals and nostrils of sleeping children. However, the most significant health issue associated with German cockroach infestation is allergies. German cockroaches produce large numbers of allergens on their bodies and in their feces. These allergens can become air-borne and cause respiratory problems in children and the elderly. As a matter of fact, German cockroach infestations have been identified as the number one cause of asthma in inner-city children.

Control Methods:

Prevention (Non-Chemical):

- 1. Exclusion:** Inspect bags, boxes, cartons, etc. for German cockroach evidence before they are brought into a building. Cockroach evidence includes, feces, body parts, or live cockroaches. If evidence is found, do not allow the container in the building until it is emptied and all its contents inspected. Use expandable foam or caulk to block pipe chases and conduit access where cockroaches can move between one location and another inside a building. Seal cracks and crevices where practical to eliminate cockroach harborages.
- 2. Sanitation:** Sanitation is a critical step in German cockroach control. Eliminate as many moisture sources as possible. Fix leaking pipes, store recyclables (cans and bottles) outside the structure, insulate pipes to prevent condensation, and do not leave water standing in the sink. Eliminate all cockroach food sources. Clean up spilled pet food every day. Use a vacuum attachment to remove fallen crumbs from behind the stove and between cabinets. Avoid leaving unwashed dishes on counter tops and keep food in tightly sealed containers. Rinse cans and bottles before putting them in the trash. Remove clutter. Cockroaches can use boxes, bags, paper goods, old clothes, and magazines as places to hide. Eliminating cockroach harborage areas will make the environment much less conducive to cockroach infestation.
- 3. Monitoring:** Sticky traps are used to detect and monitor cockroach infestations. Traps such as the Roach Motel can be placed at many locations throughout a structure. The traps should be left in place at least 24 hours so they are present when the cockroaches are most active, at night. Cockroaches caught in monitoring traps can let you know that there is a developing infestation in the structure. If an infestation already exists, the monitors can give clues as to where the population is located. For example, finding several cockroaches in a single trap indicates that cockroaches are harboring near that trap location. Although sticky traps can detect cockroach populations, they cannot control them. They simply will not catch enough cockroaches to impact the population. However, traps are a useful tool for identifying locations that need to be treated with baits or insect growth regulators. See below.

Treatment (Chemical):

- 1. Baits:** Cockroach baits consist of a toxicant (active ingredient) formulated with a food source. They can be packaged as dusts, pastes, gels, or bait stations. Dust baits are applied into cracks and crevices with a bulb duster or as an aerosol. Pastes and gels are usually purchased in a syringe, which can be used alone or inserted into a bait gun for more precise application. The active ingredients found in baits include: hydramethylnon (Combat, Maxforce; Siege), fipronil (Combat, Maxforce), abamectin (Avert), and imidacloprid (Pre-empt).



Figure 5: Treating a computer with a bait gun

- 2. Insect Growth Regulators (IGRs):** IGRs are available only to licensed professionals and are not available in stores for homeowners. These compounds do not kill cockroaches. Instead they disrupt the normal development of immature cockroaches making them functionally sterile as adults. The cockroach population then dies of attrition. Because of the slow-acting nature of IGRs, they are frequently used in combination with baits for faster control. IGRs are available in spray formulations or point-source dispensers (the IGR is released on filter paper contained in a permeable plastic station and then transmigrates throughout the infested area). Hydroprene (Gentrol Point Source) and pryiproifen (Nylar, spray formulation) are two of the leading IGR products for cockroach control.

3. Inorganic Dusts: These dusts are normally applied for indoor cockroach control with a squeeze-bulb duster, which puffs the dust into cracks and crevices. Examples of these dusts are silica aerogel and boric acid. Silica aerogel is a finely ground silica (similar to glass) that adheres to the cuticle of the cockroach and absorbs the protective wax covering. This dehydrates the cockroach and eventually kills it. Boric acid is a stomach poison that also adheres to the cockroach when it walks across the dust. The cockroach will then ingest the dust while grooming itself.

Interesting Fact:

Without food or water, German cockroach adults may die in two weeks, but the female German cockroaches can live up to a month on only water.

References:

Cornwell, P. B. 1968. *The Cockroach, Vol. 1*. Hutchinson & Co. New York. 391 pp.

Rust, M.K., Owens, J. M., and Reiersen, D. A. 1995. *Understanding and Controlling the German Cockroach*. Oxford University Press. New York. 430 pp.



Figure 6: German cockroaches aggregating in the open, a sign of high infestation.