

# Community IPM

## The German Cockroach: America's #1 Cockroach Pest

German cockroaches are one of the most common insect pests found in urban areas throughout the world, and are the number one cockroach pest species worldwide. They are well-adapted to human environments, even enjoying similar humidity and temperature levels as us. Integrated Pest Management techniques can be used to exclude and eliminate this pest from our homes, schools, restaurants, ships and greenhouses.

### Did you know... ?

- **Ancient Animals:** Scientists have found cockroach fossils that date as far back as 300 million years, making cockroaches about 300 times older than humans. The largest fossil, from Ohio, measures nearly 3.5 inches long!
- **By the Numbers:** Roughly 3,500 species of cockroach are identified worldwide, with 70 of those species reported from the United States.
- **Size Matters:** *Megaloblatta longipennis* from Peru, Ecuador and Panama is considered one of the world's largest winged cockroaches: one specimen measured 3.8 inches long and had a wing span of approximately eight inches. The Giant Burrowing Cockroach (*Macropanesthia rhinoceros*) from Australia is the world's heaviest cockroaches, weighing up to 1.2 oz (35 g).
- **What's in a Name?** Despite its name, the German cockroach, *Blattella germanica*, probably originated in Africa. In the 375 years since its original description as a species, it has had 23 different scientific names.
- **Codependents:** German cockroaches depend on humans for their survival. There are no known populations of this species that exist in the wild!

### Identification

Several pest species of cockroach can be found indoors, and many more non-pest species are found in nature. Both nymphs and adults of the German cockroach have two longitudinal stripes near the head. Adults are approximately half an inch long and have a pale brown or straw color to their wings and body. Nymphs tend to have darker bodies and are wingless. German cockroaches are about the same size and shape of brownbanded cockroaches, but are found in different habitats. Brownbanded cockroaches prefer dry areas throughout



German cockroach adult: *Blattella germanica*.  
Photo: G. Alpert.



The egg case or ootheca contains about 40 eggs.  
Photo: G. Alpert.

a home, while German cockroaches are typically associated with moisture in bathrooms and kitchens. Female German cockroaches may be identified by the presence of an egg case, or ootheca, extruded from her abdomen.

## Biology

There are many reasons the German cockroach is the number one cockroach pest. They have a high reproductive rate and a rapid lifecycle. In fact, compared to other cockroach species, German cockroaches might produce more than twice the number of offspring per egg case, and nymphs mature to reproductive adults faster. In addition, maternal care leads to a higher reproductive success rate. Whereas other cockroach species deposit eggs cases soon after they are produced; German cockroach females carry the ootheca until one or two days before the eggs hatch.

German cockroaches, like other species, exhibit aggregation behavior that is stimulated by pheromones in feces. They choose warm harborage areas, often tight spaces, which offer protection to the cockroaches. Although any material will do, cockroaches prefer to harbor in structures made of wood, paper/cardboard, or inside electrical equipment. Because cockroaches are most active at night, fecal stains can be used to identify harborage areas during the day, and appear as pepper-like spots. Individual cockroaches observed during the day could indicate a heavy infestation, a recent introduction from an outside source, or a recent pesticide application elsewhere in the building. Cockroach adults that appear to have twisted wings suggest that they have been treated with an insect growth regulator, a non-toxic type of insecticide.

## Management

The first step in a cockroach management program is proper identification of the pest. Pest species differ in their requirements for food and habitat. Knowing which species of cockroach is present will guide your management actions for short-term corrective actions to reduce pest populations, and long-term preventative measures to avoid future problems. For German cockroaches, short-term population reduction can be achieved with the use of baiting systems and trapping.

However, before a management program can be implemented, an inspection is needed to identify cockroach harborage areas. Cockroaches prefer to hide in tight spaces, including cracks approximately  $\frac{1}{4}$  of an inch wide. German cockroaches in particular like to harbor in high moisture areas near food, such as bathrooms and kitchens. In these areas, they can be found behind electrical plates, inside water coolers, under wall moldings, behind walls, inside wallpaper tears or tile cracks, and in plumbing and pipe chases. Once harborage areas have been identified, control measures can be more strategically employed.

In general, baiting systems have several advantages over traditional pesticide applications. Baits are typically semi-solid or solid products that confine active ingredients to small placements, therefore reducing overuse of pesticides. In the case of cockroach



German cockroach nymph caught on sticky survey trap. Photo: G. Alpert.

control programs, a small amount of bait can have a significant impact due to a phenomenon known as horizontal transfer. This occurs when cockroaches share a lethal dose of a pesticide with another individual through oral or fecal secretions. Baits do not work instantly, and some time may be needed before the effect of this transfer is realized and population numbers decrease. Note: bait avoidance can occur when pesticide sprays are used in baiting systems. This is because sprayed pesticides contaminate the bait. Additionally, rotating products to switch active ingredient and modes of action is an important step in reducing insect resistance to pesticides. Most guidelines recommend a change in active ingredients at three month intervals.

The number of cockroaches present in an area can be assessed with glue traps, and this will determine the amount of bait needed in a control program. In addition, glue traps are an effective population reduction method that helps track pest movements. Comparing trap counts between areas can be used to identify the source of an infestation, and the orientation of trapped cockroaches can suggest the direction of movement.

When using baits, it is important to exclude cockroaches from other food sources to avoid bait competition. Sanitation and good housekeeping practices are important tools in cockroach management. Removing clutter, such as stored paper bags, cardboard boxes and items on top of the refrigerator, reduces potential harborage areas for cockroaches. Cleaning crumbs or spills from drawers, toasters, and under kitchen appliances removes cockroach food sources.

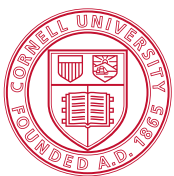
Additional control measures for cockroaches include the use of temperature extremes. Similar to treatments used for bed bugs, raising room temperatures to 140 °F for several hours can control cockroach populations. For heat sensitive items, such as museum artifacts, cold storage (below freezing for 24 hours) is sometimes used. Desiccant powders and dusts are effective in cockroach control, and are applied behind walls, into wall voids or similar protected spaces. Be certain to read all product labels before making a pesticide application.

## *Myths and Hoaxes in the Control of Cockroaches*

Public concern over pesticide safety has spawned several cockroach control products. Unfortunately, there is little scientific evidence to support the success of these devices. Be wary of the following control devices:

- 1. Ultrasonic Devices:** cockroaches are not repelled by ultrasonic sounds. However, these devices do have the potential to disturb dogs and other animals that can hear in this range.
- 2. Electromagnetic Devices:** cockroaches are not repelled by these products, which may actually increase activity levels of other insects.
- 3. Expensive Electric Traps:** A bigger price tag does not imply better value. Devices that cost up to \$300 can be less effective than a glue board, which costs less than a dollar.

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