

Pest Control Technical Note

Cockroaches

Cockroaches belong to the insect order Blattodea. There are about 3500 species of cockroach worldwide, only about 10 of which are considered major pests. The high pest status of cockroaches is due to their wide distribution, their close association with humans and their potential to carry disease. Pest species are ones that have become successful in exploiting the conditions provided by human dwellings.

Conditions that favour cockroach population explosions are those that provide abundant food, water and shelter. Cockroaches eat virtually any animal or vegetable material, including paper, fabric, leather, starches and grease particles.

Cockroaches are generally nocturnal. Active cockroaches observed during the day can indicate a large infestation. Cockroaches are gregarious (they congregate together), and frequently groom themselves. This latter habit is exploited by many insecticide preparations, such as dusts, as they contact the cockroach's feet or body and are then ingested during grooming. The faeces of some species of cockroach contains a pheromone. These cockroaches use faecal smears (faeces pressed or smeared onto surfaces) to mark feeding and aggregation sites.

Cockroach eggs are enclosed in a purse-shaped egg case, which may be carried, dropped or glued to a surface. When hatched, the nymphs congregate with adult cockroaches and mature after a number of moults. The number of nymphal moults, time taken for maturation and the adult lifespan depends on the species of cockroach.

Control Methods

Effective cockroach control relies on the education and co-operation of the residents of the infested building, and requires:

1. A thorough inspection of the infested area. A torch and often an agent such as a pyrethrin aerosol are required to flush cockroaches out of their harbourages. Sticky traps can be effective for long-term monitoring of populations.
2. Measures to reduce access to food, water and shelter, including:
 - Maintaining a high standard of hygiene to discourage population growth by cleaning up after food preparation, and ensuring

areas that accumulate food particles or grease (such as pet bowls, pantry shelves and around stoves) are cleaned regularly.

- Reducing water availability, for example by removing unnecessary containers of water and repairing leaky taps and pipes.
 - Storing food in cockroach-proof containers, and keeping garbage bins tightly closed.
 - Sealing cracks and crevices where possible.
3. Application of pesticides to areas that will target the insects, which may consist of any or a combination of:
 - Surface sprays applied to cracks, crevices and voids that may harbour cockroaches, and surfaces where cockroaches travel. Food-handling surfaces, or ones that will be frequently washed down must not be treated. Cupboards and pantries should be emptied before treatment.
 - Space sprays or ULV (ultra-low volume) machines to treat an entire indoor area. It should be noted that space sprays are unlikely to effectively penetrate harbourages and the trend is toward using fewer sprays and more dusts and baits.
 - Dusts used in areas that cannot be treated with wet sprays. Dusts can be applied to cracks and crevices, in electrical equipment, and in wall and roof voids. They should always be applied lightly and carefully to avoid the risk of humans contacting them.
 - Baits, which may be in the form of gels, pastes, particles or bait stations. Baits are becoming increasingly useful in cockroach control and the use of baits can offer safety advantages if, for example, treatment is required in commercial food-handling areas, schools or hospitals.

Chemicals must always be used according to label directions and it should be noted that the effectiveness of chemical control may be limited by poor hygiene.

4. Follow-up inspection and monitoring.

Major Pest Species

German cockroach (*Blattella germanica*)

German cockroaches are amber in colour, 12-15mm long when fully grown, and have two dark longitudinal stripes. They have wings that extend beyond the abdomen, but do not appear to fly. They are the most prolific breeder of the pest cockroaches; generally having three to four generations per year, with up to 40 offspring per generation, and taking as little as 40 days to develop from hatchling to adult. Adults often carry egg sacs.



B. germanica

German cockroaches will eat almost any organic material, ranging from crumbs to built-up grease. They can survive for up to a month without food, provided water is available.

German cockroaches congregate in warm, undisturbed areas of high humidity. Most infestations are found in kitchens. Cockroaches may be found under sinks, in and under cupboards and drawers, and associated with electrical appliances. They hide in cracks and crevices during the day and feed at night. Sightings in other areas of the house, e.g. bedrooms, may indicate a very large infestation. When inspecting for German cockroaches a torch should be used to search for live or dead cockroaches, faecal pellets (small, dried faecal particles), faecal smears, cast off skins and empty egg cases. A thorough treatment of all cracks and crevices, voids and surfaces on which cockroaches are likely to travel is required in infested areas.

German cockroaches are generally spread to new locations as stowaways in cardboard boxes or crates of food and drink. A few individuals can establish themselves in a new location and rapidly breed to huge numbers.

American cockroach (*Periplaneta americana*)

American cockroaches are the largest common pest species of cockroach, reaching 35-40 mm in length. They are reddish-brown in colour with a pale yellow border around the upper part of the thorax and pale legs. They have wings, and males can be distinguished from females as their wings extend beyond the tip of the abdomen. American cockroaches are capable of flying short distances in warm conditions.



P. americana
(male)

Females produce up to 50 large egg capsules in their lifetime, each containing 12 to 16 eggs. They usually carry these around for about 2 days, then drop them or glue them to surfaces close to food and water. Nymphal development takes 6-12 months and the adult lifespan is 6-12 months.

American cockroaches prefer to feed on decaying organic matter, but will eat most other organic foods, including paper and clothing (particularly if soiled). Their desire for fermented liquids, such as beer, is very strong. They will often travel for food, but adults with a water source can survive for 2-3 months without food.

American cockroaches usually congregate in warm, moist, dark locations. They prefer coastal areas, but are a widespread pest, living indoors in cool regions, and outdoors in warm regions. Buildings commonly infested include hospitals, bakeries, food stores, factories and houses. They tend not to infest dwelling areas in buildings, but rather the roof, wall and subfloor areas, and in and around sewers, grease traps and rubbish dumps.

Australian cockroach (*Periplaneta australasiae*)

These are darkish-brown cockroaches, about 35 mm long with yellow markings on the upper part of the thorax and on the fore margins of the forewings. Females produce up to 20 egg cases, each containing up to 24 eggs. Development takes 6-12 months and adults live for 4-8 months.



P. australasiae

Australian cockroaches are most commonly found in warm sub-tropical to tropical environments and usually live outside in greenhouses, in and around shrubs and trees, around woodpiles and under bark or leaf litter in gardens. They sometimes come indoors and will inhabit subfloor, wall and roof voids. They prefer food of plant origin, becoming a pest when they enter homes and eat holes in clothing and books.

Because Australian cockroaches are usually found outdoors, applications of insecticides to foundation plantings, woodpiles and mulch may be required. Residual barrier sprays can substantially reduce Australian cockroach populations around houses. Dusting sewage lines and roof and wall voids is an effective method of control if Australian cockroaches are infesting these areas. Baits and other formulations better suited for damp locations can provide control in cellars and greenhouses.

Smokybrown cockroach (*Periplaneta fuliginosa*)

Smokybrown cockroaches are about 30 mm long, a shiny dark brown-black and fully winged. Egg cases contain up to 26 eggs and are dropped or glued to surfaces. When hatched, nymphs take 6-12 months to develop to adulthood. Adults live for 6-12 months, during which time females produce up to 17 egg cases.

*P. fuliginosa*

Smokybrown cockroaches are susceptible to losing moisture through their cuticle, and so are usually found in damp, dark, poorly ventilated environments. They rarely infest the dwelling parts of buildings, and are instead found in sheds, wall and roof voids, subfloors, mulched areas, and in and around grease traps and drains. They prefer food of plant origin, and are therefore often a pest in greenhouses, nurseries and gardens. They can fly short distances in warm weather, and are often attracted to lights at night.

Brownbanded cockroach (*Supella longipalpa*)

Brownbanded cockroaches are small (10-15 mm) and pale glossy brown with very pale bands across the thorax and abdomen. These bands may appear irregular or broken, but are usually quite apparent on nymphs and females. Nymphs and females are broad when viewed from above, while the male is slender. The male's wings extend beyond the abdomen but the female's wings are smaller, exposing the abdomen. Nymphs have underdeveloped wings. Females produce up to 13 yellow to reddish brown egg cases, which may contain up to 18 eggs. They are usually carried around for 1-2 days before being glued to surfaces. Development from nymph to adult takes only 2-4 months and adults usually live for 3-6 months.

Brownbanded cockroaches tend to be an indoor pest. They like to feed on starchy materials such as book sizing and wallpaper paste, but have also been known to eat non-food items such as nylon stockings. They hide in warm areas near the ceiling, behind wall decorations and loose wallpaper, in piles of paper in cabinets, beneath or inside upholstered furniture, and in electrical appliances such as stereos, and toasters. Activity may be scattered throughout the building, making control difficult.

*S. longipalpa*
(female)

These cockroaches may leave tiny, dark droppings and cast skins on cabinets and shelves. They are commonly transported in furniture, luggage, and other items in houses and can develop into annoying infestations during warm, humid conditions. It is not unusual to see them during the day. They are active and may fly in warm conditions, or if disturbed.

When locating these insects, look for faecal smears, cast skins, alive or dead individuals and egg cases glued to places in higher and drier areas than other cockroaches normally occupy. Brownbanded cockroach control often requires extensive treatment throughout an entire building, with particular attention to furniture, cupboards, bookshelves and other such harbourages.

Oriental cockroach (*Blatta orientalis*)

Oriental cockroaches are of medium size (20-25 mm long) and are uniformly dark brown to black. Male wings cover most of the abdomen, female wings are reduced, and nymphs have no wings. These cockroaches generally do not fly. The female may produce up to 14 egg cases in her lifetime, each containing up to 16 eggs. She carries her egg case around for about one day before gluing it to a surface. Nymphal development may take 6-18 months and adults live for 3-6 months.

*B. orientalis*
(female)

Oriental cockroaches prefer cool climates and are often found outdoors under leaf litter and bark, in damp subfloors and around drainage systems. They are relatively sluggish and are usually located at or below ground level in buildings where they eat a range of decaying organic matter. Starches and books may also be attacked.

Inspections for these cockroaches should concentrate in areas of high humidity and cool temperatures. Cellars, crawl spaces, and around plumbing in kitchens and bathrooms should be inspected for faecal smears, live or dead cockroaches and egg cases.

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