

Best Practice Cockroach Control.

**SMART
GUIDE**



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The Chemical Company

The Modern Cockroach Challenge

Cockroaches are pervasive, elusive and prolific. They are associated with numerous pathogenic organisms, a source of human allergens and invariably suggestive of poor hygiene. As such, their presence anywhere food is stored, processed or served is unacceptable.

Controlling cockroaches in these environments, however, can prove challenging. They travel easily on deliveries, reproduce rapidly and prefer to live inside difficult to access cracks and crevices.

These challenges are compounded by control methods involving inadequate inspection, insufficient co-operation between multiple building occupants and over-reliance on single products or application methods.

The fact that even control levels of over 90% may be insufficient to prevent a relatively rapid resurgence of problems makes these challenges particularly significant.



Understanding Cockroach Behaviour

Although very effective at adapting to different conditions, cockroaches need four key resources to survive and thrive – food, water, warmth and shelter. They naturally cluster together where these are available in close proximity.

The German cockroaches that are the primary problem across Europe require particular warmth, so live almost exclusively indoors. The larger Oriental cockroaches are equally at home outside.

Although Oriental cockroaches forage over longer distances than their German counterparts, neither generally travel more than a few feet from the cracks, crevices and voids in which they cluster to forage for food and water.

Both species actively seek darkness, with most individuals spending the majority of their lives in their protected harbourages, only emerging to forage.

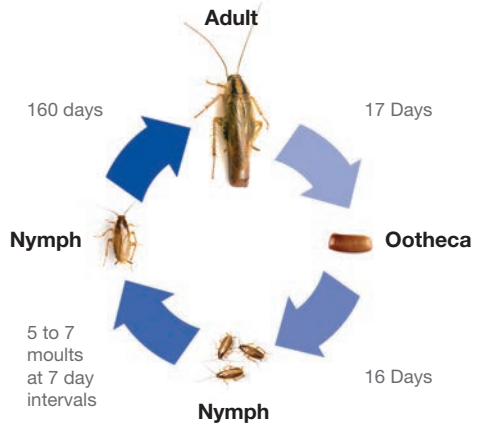
They show a preference for high energy foods and are deterred from feeding by oiliness, mould or spoilage.

While male cockroaches forage actively on most days, females typically spend 75% of their lives not foraging and can survive for nearly 45 days without food providing they have access to water. Young nymphs also forage relatively little.


Foraging occurs almost exclusively at night and is deterred by human activity. Individuals in larger populations are more active and less discerning in their appetites than those in smaller populations as they have to compete more vigorously for food.

Since cockroaches are considered incapable of detecting odours over more than a few centimetres, success in locating food appears to be related to chance encounters optimised by regular routes of foraging activity based on experience. With a good supply of food and water in close proximity to their harbourage, individuals may never come into contact with bait just a few feet away.

A life cycle of approximately 170 days under favourable conditions and capsules of 30-40 eggs produced every 2-3 weeks, means German cockroach populations can increase massively in a very short time despite relatively high levels of control.



Cockroach Population Dynamics

Starting Population	Control Level	Population After One Month	Percentage Of Starting Population
 500	95%	170	34%
	80%	341	68%
	70%	513	103%

Planning the Best Control



The challenges of modern cockroach control mean a single round of gel bait treatment is unlikely to provide sufficient, sustained control.

Even under the best field conditions the natural behaviour of cockroaches rarely makes it possible to control more than 80% of any population from a single baiting.

In most cases, sustained control requires an integrated approach based on a sound understanding of pest behaviour, thorough inspection, good sanitation, and a programme of treatments – including follow-up baiting and crack and crevice treatment, where necessary.

Inspection

Because cockroaches cluster together in protected harbourages and forage primarily at night, a thorough inspection of infested areas is essential to plan targeted treatment.

Inspections are best conducted at night with a torch and a small flexible mirror to examine less accessible areas for excrement, shed skins and old egg capsules as well as live cockroaches.

Pyrethroids sprayed into cracks and crevices can also be very effective in identifying occupied sites by temporarily flushing cockroaches into the open.

Sticky traps offer the best way of establishing the level and location of infestations in most cases. They should be placed in areas commonly frequented by foraging

cockroaches – particularly warm moist places such as the underneath of fridges or other appliances, wall/floor junctions, around the edges of fittings and equipment, and beneath furniture etc.

Sanitation

Cockroach infestations are invariably larger and more difficult to control where sanitation is poor.

Restricting food and harbourages can be a valuable aid to cockroach control, while good sanitation in the vicinity of baits generally improves control by reducing alternative sources of food and water and increasing the likelihood of bait contact.

Populations may be reduced or disrupted by removing clutter or heavily-infested furniture or appliances. Since changes to the environment appear to interfere with learned behaviour, sanitation can also be valuable in combating bait avoidance.

Bait Placement

The effectiveness of insecticide baits depends on foraging individuals consuming them.

This makes it important to use baits that are highly palatable and maintain their palatability over an extended period.

Even so, the restricted foraging range of most cockroaches means the effectiveness of baits can be seriously compromised by poor placement. To be effective they must be located as close as possible to every cockroach harbourage in an infested area.

Like sticky traps, they also need to be well-placed if they are to intercept foraging cockroaches. Bait points placed within the warm, damp and dark areas that cockroaches love are likely to be most effective. Removing access panels rather than just baiting on external surfaces is advisable in many cases.

Cascade Control

For the most complete and sustained control, insecticides also need to reach non-foraging females and nymphs within harbourages in sufficient quantity.

This is made possible with baits by the fact that females and nymphs will eat poisoned individuals returning to die and their faeces, especially if they have limited access to other food supplies.

The extent to which this 'cascade effect' will be effective in controlling the non-foraging population clearly depends on the potency of the insecticide.

Even with the most potent active available, fipronil, many infestations are unlikely to be completely eliminated inside a week; especially where they involve Oriental rather than German cockroaches. Control is also made difficult if the infestation is relatively large or if there is plentiful alternative food sources.





Crack & Crevice Treatment

Even well-managed gel baiting may need to be supported by complementary crack and crevice treatment.

The effectiveness of lower potency insecticide baits, in particular, tends to be restricted by a less effective 'cascade effect' as well as any restriction on uptake.

Equally, full control can only be achieved both once all eggs have hatched and nymphs have either matured to the foraging stage or have consumed sufficient insecticide from eating poisoned individuals or their faeces.

These difficulties are best overcome by the targeted treatment of key harbourages with a complementary, residual insecticide spray.

Fendona® should be the first choice for crack and crevice cockroach treatment, either to improve the speed of control alongside targeted baiting or as the main prescription in areas where baiting is likely to be less effective.

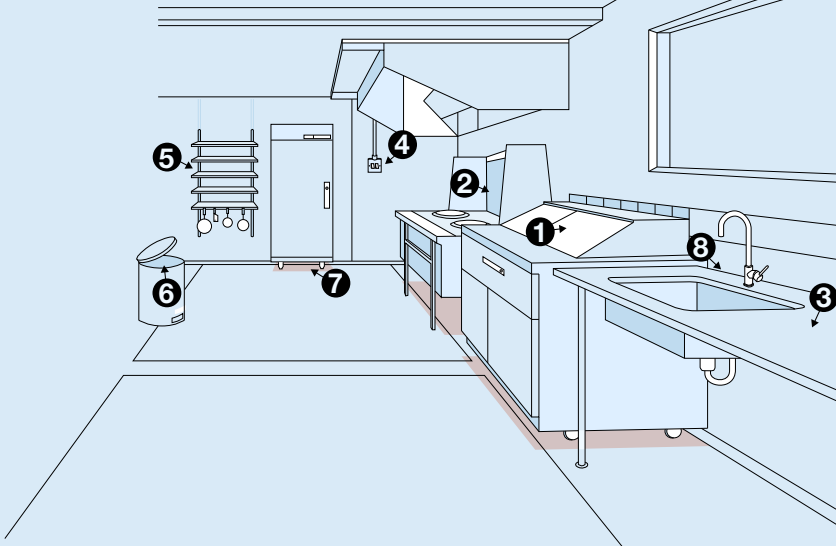
Cost Effective Control

Minimising treatment time while maximising efficacy is the best way of ensuring the most cost-effective control.

Ensuring the correct and most effective placement of modern cockroach baits can be time-consuming for less experienced operators.

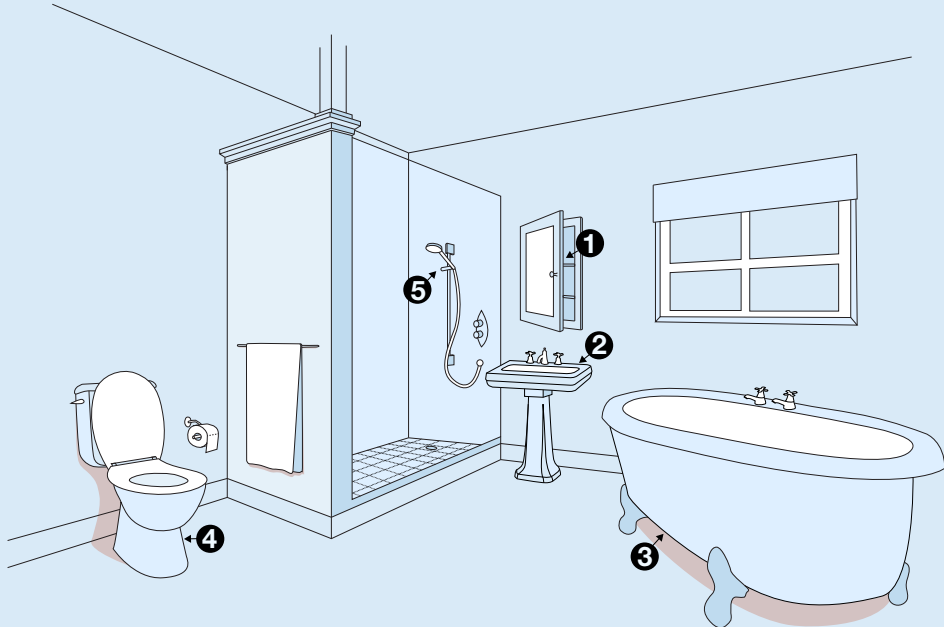
Modern guidelines based on standard bait point number recommendations rather than the traditional bait points per square metre of infested area approach can do much to speed applications.

Locating the Bait Points



Commercial Kitchen

- 1. Deep Fat Fryer** – Oil splashes or dust can reduce the effectiveness of gel baits. Bait should be placed where any contaminants are least likely to hamper performance. Place bait in areas away from oil splashes, at the corners or at entry and exit points such as switches.
- 2. Cooking stations** – When other food sources are in close proximity cockroaches are less likely to detect bait odours, so effective bait placement is critical. Place bait at the corners or joints between units, at the base of the legs or near entry and exit points such as switches
- 3. Food preparation surfaces** – for longer control, bait should be placed in locations where it is least likely to be removed in the standard cleaning process. Bait should be applied on the underside of shelves at the corners or joints between units or at the base of the legs.
- 4. Pipes, conduits or Electrical Switches** – Cockroaches frequently forage along electrical trunking, conduits or pipework. Bait points should be placed at the joints and at the electrical sockets. Additionally, any site where pipe or conduit goes through the floor, wall or ceiling should have a bait point applied.
- 5. Food storage** – food storage areas are likely to see significant cockroach activity. Apply bait to the underside of shelves close to the corners or joints.
- 6. Sanitation** – Good sanitation in the vicinity of baits generally improves control by reducing alternative sources of food and water and increasing the likelihood of bait contact.
- 7. Appliances** – Cockroaches actively seek out darkness and kitchen appliances often provide the ideal harbourage. Preferably bait should be applied at likely entry or exit points, the base of the legs or at the corners.
- 8. Sink** – In infested premises, sinks invariably provide an ideal environment for cockroaches. Bait is best positioned behind the sink splashback, around the junctions of the pipework or on the underside of surfaces.



Domestic Bathroom

1. **Vanity Cupboards** – Storage areas are likely to see significant cockroach activity. Apply bait to the underside of the shelves close to the corners of the joints.
2. **Sink** – In infested premises, sinks invariably provide an ideal environment for cockroaches. Bait is best positioned around the junctions of the pipework, on the underside of the sink surface or behind mirrors.
3. **Bath** – Cockroaches prefer quiet and hidden harbourages, and actively seek darkness. The void area beneath the bath can therefore provide the ideal harbourage. Place bait at the corners of the front panel or to any other entry and exit points.
4. **Toilet** – For a treatment to be successful, bait must be applied as close to harbourages and actively used routes of travel as possible. Bait should be applied to the junctions of the discharge pipe or to gaps behind the cistern.
5. **Shower** – Pipework can provide a useful foraging network between the floors of the premise. Therefore activity can often be seen in and around the shower unit and the associated pipework. Bait should be applied to entry and exit points around the shower unit and where the pipes exit the wall.

Typical Goliath® Gel Baiting Requirements

Situation	Spots * Required
Domestic apartment – kitchen	10 - 25
Domestic apartment – bathroom	Up to 12
Domestic apartment – other rooms	Up to 12
Commercial kitchen **	100 - 300
Commercial bar/restaurant **	60 - 100

* Standard 0.03 g spot

** Assumes average size (serving 40 - 50 people)

For further advice on bait placement please go to www.pestcontrol.basf.com

Making the Most of the Products

To prevent costly call-backs and maximise both customer satisfaction and business profitability, cockroach control products need to be employed with an appreciation of their own particular strengths, limitations and requirements as well as pest behaviour.

Integrated Treatment

Baits have become the treatment of choice in most control programmes for their convenience, relative lack of preparation and minimal client disruption – in time as well as odour and exposure issues.

Baiting with a well-formulated gel like **Goliath®** is central to most domestic cockroach jobs as well as those in commercial kitchens and restaurants.

Where the areas involved are large with extensive voids, however – like some food processing sites and many factories and

warehouses – crack and crevice spraying with a well-formulated residual insecticide such as **Fendona®** can be invaluable either alongside or as an alternative to baiting.

Equally, where the pressure is on for the most rapid, total control – as it tends to be in restaurants and public food outlets – well-targeted crack and crevice treatment can be a very valuable complement to baiting to tackle non-foraging adults and nymphs.

Under these circumstances, it is not surprising that residual crack and crevice insecticide application remains an important element in modern cockroach control alongside the use of baits with sufficient 'cascade' power.

To minimise the chance of cockroaches developing either insecticide resistance or bait aversion, it is advisable not to use a single bait active ingredient or formulation as the sole means of control over an extended period in the same location.

Supporting gel baiting with crack and crevice treatment can avoid this situation without the complication of bait rotation.



Goliath® Gel

The high potency of fipronil and great palatability of its formulation make **Goliath®** Gel faster acting against all major cockroach species than any other gel bait (Figure 1).

A single standard bait spot of **Goliath®** Gel is capable of killing 1000 cockroaches, with the advanced formulation ensuring it remains highly attractive to foraging individuals even in the presence of other food sources for as long as three months.

Laboratory and field studies show fipronil is readily transferred to non-foraging cockroaches through the 'cascade effect', its superior potency providing the best possible control of egg-bearing females and young nymphs that seldom venture far from harbourages.

The particular potency of fipronil also means at least 60% less bait is required to treat infestations than any other gel bait, allowing a single cartridge of **Goliath®** Gel to go at least three times further and making it highly cost-effective in use.

Containing 0.05% fipronil, **Goliath®** Gel is supplied in 35g cartridges, each providing 1166 standard 0.03g bait spots. It is applied through a special dosing pistol which allows the bait spots to be accurately, easily and rapidly placed in even the least accessible of locations.

Very limited absorption through the skin means the small, extremely stable and odourless bait spots are safe to use in sensitive areas with minimal disruption to people or pets.

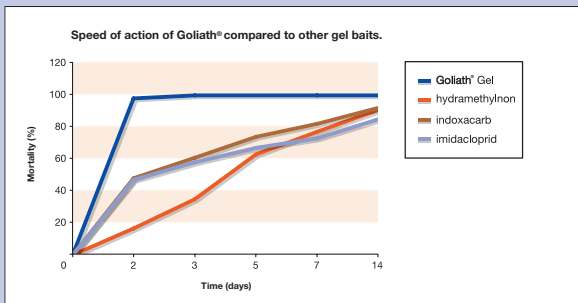
Depending on the level of infestation, **Goliath®** Gel should be applied at 1-2 standard 0.03g bait spots/m² of infested surface for German cockroaches and 2-3 baits spots/ m² for Oriental cockroaches in the primary locations suggested.

Cleaning areas before treatment will improve the effectiveness of the bait by minimising other sources of food.

Clients should always be made aware of baiting locations and the need to avoid either clearing them away inadvertently or contaminating them with spot cockroach treatment.



Figure 1:



Fendona®

Fendona® should be the first choice for crack and crevice cockroach treatment, either to improve the speed of control alongside targeted baiting or as the main prescription in areas where baiting is likely to be less effective. It is also valuable as a flushing agent to pinpoint harbourages.

The advanced, low dose, alpha-cypermethrin formulation is absorbed rapidly by cockroach cuticles, delivering knockdown in as little as 30 minutes. Micro-particles further ensure excellent surface coverage and reliable residuality for up to three months.

As a different class of chemistry to fipronil with a different mode of action, it is well-suited for use alongside **Goliath®** Gel in treatment strategies designed to combat resistance development and bait aversion.

Virtually odourless and non-staining, it has very low toxicity to humans and other warm-blooded animals for the greatest safety as well as acceptability in indoor use.

Fendona® 6 SC is supplied in 500 ml bottles containing 60g/litre of alpha-cypermethrin as a water-based suspension concentrate for dilution with water at the rate of 5 ml/litre and application through all standard knapsack or hand-held sprayers as a coarse, low pressure spray.

Fendona® should be applied to all identified or suspected harbourages within the infested area. Where used as a complement to baiting, care must be taken to avoid contaminating nearby bait points.





Goliath® and **Fendona®** are trademarks of BASF.

Goliath® contains fipronil. **Fendona®** contains alpha-cypermethrin.

Use biocides safely. Always read the label and product information before use.

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