



International

Advanced Bedbug Control The PelGar Guide



Leading the way in global pest control

Advanced Bedbug Control - The PelGar Guide

Welcome to PelGar's Guide to advanced bed bug control. This guide has been designed to provide you with everything you need to know about bedbugs, combined with a straightforward control regime that will help to guarantee results every time.

The History of Bedbugs

Bedbugs have been around for thousands of years, and in that time have changed very little. In the 1930's one third of all London homes were infested with bedbugs, and some experts believe we will soon be heading back to those days if greater levels of control are not achieved soon. Following on from this period, with the introduction of DDT as an insecticide, bedbug control made significant advances and the problem was massively reduced.

It is only recently that bedbugs have started to become such a problem once again. Local authority reporting of bedbug infestations in some boroughs has doubled year on year since 1995, with hot spots being identified in most major cities throughout the UK.



Volker Steger / Science Photo Library

There may be several reasons for this, the most likely being:

1. Loss of many effective pesticides, withdrawn as a result of recent UK or European Legislation. More 'work' to be done by fewer pesticides, from fewer chemical classes has, and will continue to challenge the effectiveness of the few products remaining, leading to –
2. Insecticide resistance. Pests with short generation times and cryptic life-styles such as bedbugs are ideally suited to withstand pesticide attack, especially where inadequate chemical coverage and sub-lethal dosing allows genetic selection of survivors.
3. Changes in patterns of home ownership, cultural changes and changes in pest management responsibilities have all exerted a modifying influence on the prevalence of domestic pests in high population density metropolitan and urban environments. This is especially true for bedbugs and fleas.
4. A huge increase in movements of the human population both on the 'micro-' and the 'macro-' scale has allowed the mechanical migration of bedbugs throughout our major cities and towns. Bedbugs by themselves do not travel long distances and are more inclined to 'hitch-hike' from one location to another, slowly spreading the infestation from one premise to another. Increases in tourist movements have allowed 'stowaway' bedbugs to colonise hotels, hostels and domestic houses far more frequently than was possible a few years ago.

The good news is that this guide will provide you with the information needed about bedbugs, in respect of premise surveys, control methods and tips on how to avoid re-infestation as well as introduce an advanced formula effective pesticide that will help to overcome any resistance issues.

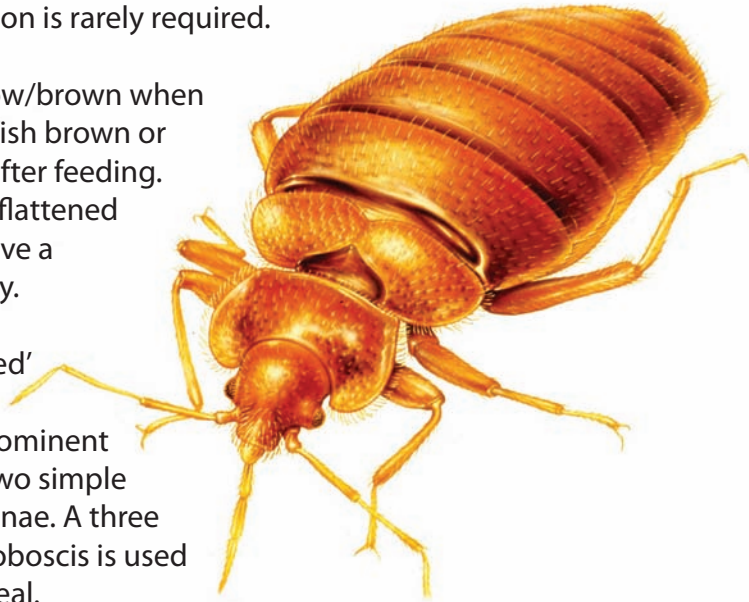
Bedbugs

Cimex lectularius and the 'tropical bedbug' *Cimex hemipterus* are common parasites of man, but are also known to feed on chickens, rodents, bats and other mammals.

Appearance

A common misconception is that bedbugs are not visible to the naked eye, probably because by the time the bite irritation sets in, the bedbug has long gone. Adults measure 4-5mm (6-7mm after a full blood feed), with females being slightly larger than the males – though as both blood feed, identification is rarely required.

Bedbugs are pale yellow/brown when unfed but turn to reddish brown or 'mahogany' in colour after feeding. They are wingless, are flattened dorso-ventrally and have a shiny oval shaped body. The short, broad head is somewhat 'telescoped' into the pro-thorax and carries a pair of prominent compound eyes and two simple four-segmented antennae. A three segmented folding proboscis is used to suck up its blood meal.



Feeding and Disease

Bedbugs suck blood from the peripheral circulation system at night and reach peak activity within the few hours before dawn. Bedbugs feed relatively quickly, usually within 5-10 minutes, utilising an anticoagulant saliva to aid the flow of blood through the proboscis. It is this protein-based anticoagulant which raises the characteristic 'wheal' on the skin. Bedbug 'wheals' are different to flea bites insofar as they do not have a raised and reddened centre spot.

Some people are extremely sensitive to the bites of the bedbug, suffering intense itching with the possibility of secondary infections as a consequence of scratching the bites. Severe infestations can induce nervous illness and lead to psychological delusions brought about by constant nightly attacks.



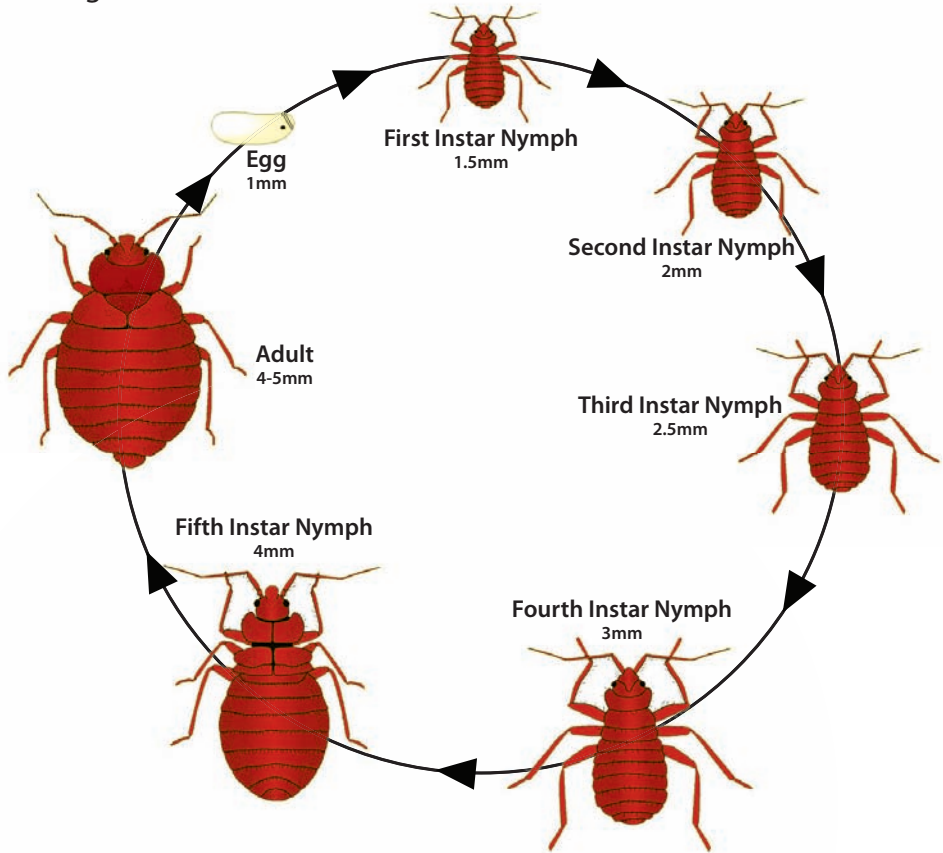
Although bedbugs possess all the necessary prerequisites to vector diseases from one host to another, there is no conclusive evidence to prove this. There are at least 25 known pathogens that are capable of living inside a bed bug or on its mouthparts. Extensive tests have been conducted in laboratory settings which conclude that bedbugs are unlikely to pass disease from one person to another. However, bedbugs have been shown more recently to harbor viruses (such as Hepatitis B) which can be transferred back to humans through faecal deposits, potentially entering the bloodstream in the process of scratching.

Breeding and Lifecycle

Fertilised female bedbugs usually deposit their eggs on rough surfaces and can lay up to five eggs per day, depending on the ambient temperature and their success in blood feeding. The eggs are fertilised while still in the ovary, and the embryo has already undergone some development when the eggs are laid.

Eggs are oval in shape and approximately 1mm in length, with an 'operculum' or lid at one end. The eggs are laid individually into cracks and crevices where they are held in place by a transparent 'cement'. The minimum time for development is 4-5 days at around 30°C, so usually 8-11 days at an average UK room temperature. No eggs will hatch if the temperature is above 37°C or below 13°C, and eggs which have not hatched within three months will die.

The juvenile bedbugs or 'nymphs' hatch by pushing off the operculum from the egg. These tiny nymphs are yellow in colour and translucent prior to their first blood feed. In between each of the five molts a bedbug nymph must go through to reach adulthood, a blood feed must be taken. Each instar looks essentially similar to the adult, but somewhat smaller (see life-cycle diagram below). The normal time taken to reach adulthood is 5-8 weeks, depending on temperature and frequency of feeding.



Adult bedbugs normally live for several months but can live for longer in ideal conditions. They also have the ability to survive for long periods without a blood feed, up to 6-8 months, increasing their survival rates and making eradication difficult if treatment is not thorough and complete.

Behaviour

Bedbugs can infest any type of human living quarters, and may not only be found in housing and short duration accommodation such as hotels and hostels, but also in cinemas, bus/truck/rail terminals, rest-rooms, offices, police cells and holding areas, as well as institutional dormitories like military barracks, hospitals and detention centres.

Bedbugs are poor hunters and can only recognise a food source once they are quite close, at which time thermal and chemical sensors allow them to locate their prey. Bedbugs are known to fall from the ceiling onto their victims, but such an action is not thought to be intentional or purposeful.

Bedbugs are attracted by exhaled carbon dioxide and body heat, not by dirt. They feed on blood, not waste, so in short the cleanliness of their environment has an effect on the control of bedbugs but, unlike cockroaches, does not have a direct effect on bedbugs as they feed on their hosts and not on waste. Good housekeeping will certainly assist in control.

Bedbugs shy away from light, this combined with positive thigmotaxis (the tendency to remain in close contact with hard surfaces) ensures that they hide away in cracks and crevices during the day.

Bedbugs produce an aggregation pheromone which brings them together. This is not a sex pheromone as it equally attracts both female and male adults. It is this pheromone that explains the grouping of bedbugs and also explains why hundreds of eggs can be found laid close together.

Bedbugs secrete an oily liquid from their coxal glands which, in heavy infestations, causes a distinct sweet smell. This smell combined with the presence of blood and excreta spots characterises bedbug infestations.



Identification

Bedbugs do not move quickly enough to avoid the attention of an astute observer, when disturbed they will not move faster than around 2cm / second.



Sinclair Stammers / Science Photo Library

Bedbugs travel easily along pipes and boards, and their bodies are very flat, which allows them to hide in tiny crevices, often avoiding detection. In the daytime bedbugs prefer to remain hidden in such places as mattress seams, mattress interiors, bed frames, nearby furniture, carpeting, baseboards, inner walls (through electrical sockets), or bedroom clutter.

Bedbugs are capable of travelling to feed, but will usually remain close to the host in bedrooms or on sofas where people may sleep, generally they will only travel as far away as they need to find an adequate hiding place.

Control

Successful bedbug control can only be achieved by a systematic approach to the problem, especially if the infestation has proved difficult to control in the past.

There are four stages we can look at in a control programme:

1. Conduct a full & comprehensive site and customer survey.
2. Appropriate and full preparation of rooms prior to treatment.
3. Professional treatment with advanced formula insecticides – ***PelGar recommends the use of Cimetrox and Vulcan P5 DP.***
4. Education of the customer.

1 & 2. Preparation & Survey

Before visiting the site prepare a suitable 'Action Check-List'. It is easier and more professional to do your thinking beforehand rather than in the face of the client. This checklist can include areas for inspection and information to be given to the client.

Before visiting the site advise the client carefully what must be done before you can undertake the treatment, this will save you time, it will also save any future misunderstandings. Explain the type of treatment that will be done and any Do's and Don'ts, or conditions that may apply. Control may be unsuccessful if the client does not undertake their responsibilities with respect to the preparation of, or access to, the area to be treated. Important details here are laundry and cleaning.

Laundry – all bedding including pillows should be laundered on a hot wash with a detergent and then placed in a hot dryer in order to kill all life stages of the bedbug. Mattresses, if necessary, should be treated with a specifically approved pesticides. Although curtains can be treated with **Cimetrol** it is advisable for these to be washed (or at least ironed) to ensure complete elimination in any creases/linings. Alternatively bedding and soft furnishings can be dry cleaned to achieve the same effect.



Cleaning – as previously stated insanitary conditions do not necessarily contribute to bedbug infestations but cleanliness will help in the control process. Thorough vacuuming of all areas/furniture may not remove eggs but will help remove the active insects. If possible, recommend the use of a HEPA filtered vacuum cleaner and ensure that all waste is immediately incinerated or double bagged and placed directly in an external bin. Thorough cleaning, before treatment, is also recommended as once the treatment has been completed cleaning and vacuuming will shorten the residual effect of the insecticide.

If making a first visit, then upon arrival at the site confirm that the client understands your proposed plan of treatment and that they have complied with your earlier advice (given on the phone). It is useful to make a quick sketch of the treatment area for your notes, identifying any infestation 'hot-spots', any areas where it may not be possible to treat, or any un-repaired structural damage that may compromise your treatment. Identify these issues to the client and if possible obtain a signature.

Site Survey

A useful checklist for inspection will include the following, but beware, bedbugs will hide anywhere they can find, so nothing should be overlooked in the inspection or treatment process:

Mattresses – including the buttons, folds and tufts.

Bed's – frames, headboards, covers etc. In many cases it is advisable to dismantle frames. With divan style beds this may not be possible and it should be identified to the client this may be a possible failure point in the treatment programme.

Furniture – everything ranging from sofa's, to bed side tables and wardrobes – every crack and crevice in a piece of furniture is a possible harborage, be sure to turn tables and chairs upside down for inspection and treatment. Also check all soft furnishings such as curtains and cushions.

Wooden fittings – behind skirting boards, around door frames and handles, between and even under floor boards.

Electrical installations – plug sockets and switches, even electrical devices such as stereo's, TV's, telephones, table lamps etc.

Walls and carpets – behind loose wallpaper, cracks in plaster, under the edge of carpets etc. It may be necessary to pull back carpets at the edges and treat any possible hiding places underneath.



3. Professional Treatment

Advanced formula insecticides form the basis of any chemical control programme. Growing insecticidal resistance means that control with a single active ingredient is increasingly difficult. Products that include a killing agent, a flushing/knockdown agent and an insect growth regulator are ideally recommended for a host of insect problems, especially bedbug control.

Cimetrol, from PelGar International Ltd., ticks all of these boxes. Insect growth regulators are ideal for control of insects where there can be many stages of development, i.e. from egg through nymphal stages to adult. IGR's will help to create stasis in the population, meaning any insects that resist the killing agents will be halted in their development process, i.e. eggs will not hatch, nymphs will not molt and not make adulthood.



If mattresses and bedding are severely infested then it may be necessary to recommend destruction of such items. If the client agrees to the destruction of bedding, then prior to destruction these items should be chemically treated to limit the premises re-infestation potential using a product approved for this use.

Be careful when removing anything from the infested area – always cover and bag items to ensure infestations are not accidentally spread to other parts of the building/house. When mattresses are not discarded, it is recommended to place them inside a hypo-allergenic sealed/zippered mattress cover for 12 months to ensure no eggs / bedbugs survive – these are available from all good PCO distributors.

Identify any sources of infestation and begin treatment away from these 'hot-spots', moving inwards to the centres of infestation. This will ensure that insects do not disperse to untreated areas during treatment, and if any dispersal does occur, it will be toward the previously treated areas.

If necessary, and safe to do so, remove kicking boards under built in beds, cupboards etc. Remove, or at least loosen wall fitted head-boards before treatment. Treat behind picture frames close to the sleeping area. Check and treat bookcases and furniture (being careful to check the spines of the books for bedbugs. Search for and treat behind any loose wall of floor coverings and identify these to the client for remedial work.

Avoid treatment of electrical fixtures/fittings when using water based sprays. Be careful not to allow spray run-off to enter conduits or under floor ducting. Treat infested electrical fittings with an approved dust i.e. **Vulcan P5 DP** from PelGar International.



4. Education



Leave an information leaflet with the client. A well-written advisory leaflet can explain the benefits, and, limitations, of chemical treatment programme to the client and will help to discourage un-warranted call-backs. A large amount of the information in this guide can be used to inform the customer of the problem in general and how you've gone about the treatment process.

Once a room has been aired and any treated areas have had time to dry, rooms can be re-occupied. As with all particulate pesticides (WP's, SC's, SE's), the residual life of Cimetrol may be severely affected by cleaning and vacuuming. Leave this for as long as possible – ideally a minimum of seven days (preferably longer) to help ensure the majority of the bedbug population comes into contact with the residual insecticide.

Be cautious regarding the issue of guarantees. Depending on your initial assessments and the information given to the customer before treatment, they should have an understanding of the areas which may cause the treatment to fail. A second visit (10-14 days after first treatment) may be necessary to ensure eradication – it is worth building this into the costing for the treatment.

Products

PelGar recommends **Cimetrol** for use as the main insecticide for bedbug control. For use around electrical voids etc **Vulcan P5 DP** is recommended - as these are not an area to miss during treatment.

The next few pages provides you with the essential information on these products. For any additional information, sample labels or MSDS's, please contact PelGar International Ltd. - details on reverse cover.

Cimetrol (HSE 7453)

Contains alpha-cypermethrin 4.65% w/w, tetramethrin 4.65% w/w, pyriproxyfen 1.86% w/w.



Cimetrol was specifically designed and formulated for effective control of bedbugs and fleas, although the product carries a very broad spectrum label and has proved excellent in many situations against many pests.

Cimetrol contains the killing agent alpha-cypermethrin, the knock-down and flushing agent tetramethrin, and the insect growth regulator pyriproxyfen, and has a deadly triple killing effect.

Insect growth regulators (IGR's) work in several different ways, with the key objective of preventing one stage of the insects life progressing into the next. There are many different types of IGR available in the market today ranging from ecdysone inhibitors and chitin synthesis inhibitors to the juvenile hormone analogues (JHA's or 'juvenoids').

Pyriproxyfen, the active IGR in **Cimetrol**, is a juvenoid and exerts its control effect whenever a pest insect moults either from larva to larva, larva to nymph or nymph to adult. Pyriproxyfen also causes female pests to lay sterile 'fatty' eggs. With sterile females and nymphs prevented from reaching sexual maturity, stasis of the population is soon created.

Active at extremely low rates, pyriproxyfen exerts a control effect across the whole life-cycle of pests, whatever their development pattern. Whether holo-metabolous (complete), such as fleas and beetles, or hemi-metabolous (incomplete), such as bed-bugs and cockroaches, pyriproxyfen is the perfect partner for the powerful killing agent alpha-cypermethrin.

Cimetrol is not just a specialist product kept for use in difficult situations. It is a product that should be used in all situations to give fast and effective control of a variety of pests. **Cimetrol** gives you the ability to achieve greater levels of control first time, saving money, time and reputation, and is fast becoming many pest controllers product of choice.

Formulated as a Suspo-Emulsion (SE), **Cimetrol** combines fantastic residual control with fast flushing and knockdown of the target pest.

Cimetrol is licenced for use in domestic, commercial, and industrial premises including kitchens, hotels, dormitories and sleeping areas, hospitals (excluding occupied wards), military establishments & food storage and processing areas. For use against bedbugs, fleas, cockroaches, earwigs, silverfish and other bristletails, beetles (and their larvae), ants, spiders, mites, ticks, lice, flies, mosquitoes, moths (and their larvae) and wasps.

Available in 500ml bottles from all good pest control distributors.

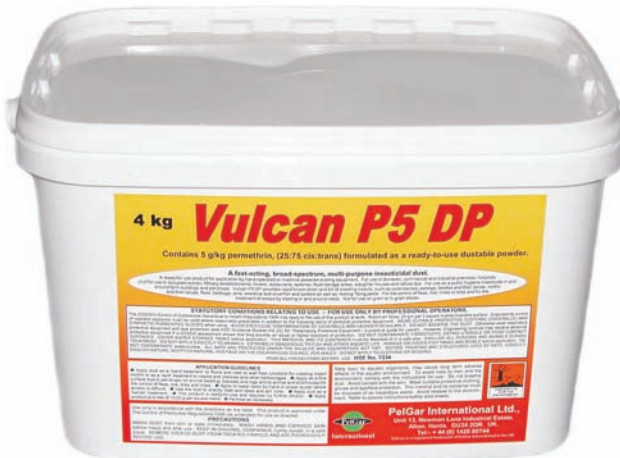
Vulcan P5 DP (HSE 7453) Contains Permethrin 0.5% w/w.

Formulated as a ready-for-use dust for use in voids and around electrical installations where liquid sprays may not be appropriate. Vulcan P5 DP contains anti-caking agents and adjuvants to produce a free flowing product.

Vulcan P5 DP can be used for the general control of crawling or resting insects, and is a must for use in bedbug treatments around electrical sockets etc. that may otherwise cause a failure point in a treatment regime.

Vulcan P5 DP can be applied by hand or powered dusters, and also offers excellent wasp and ant control.

Available in 400g dusters and 4kg buckets.



Good luck with your future bedbug control programmes, with the right products and the right knowledge, bedbug infestations can soon be bought under control.

PelGar is always willing to offer help and advise on the use of all of its products to help ensure they are used to the best of their ability. Please feel free to call or e-mail PelGar to speak to an expert.

Information on all PelGar products can be found in the PelGar Product Catalogue, available free from PelGar International Ltd.



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