WORK STUDY › OPPORTUNITIES FOR PROFIT

BEDBUG

DELIVERING HIGH QUALITY TRAINING

Killgerm® TRAINING

BIOLOGY

Bedbugs belong to the family Cimicidae, within the order Hemiptera – the true bugs. There are two common species that feed on humans, namely *Cimex lectularius* and *Cimex hemipterus*.

Cimex lectularius is the cause of most domestic complaints, and is known as the common bedbug.

DESCRIPTION

Adult bedbugs are oval, wingless insects, which are about 5-7 mm long. They are flattened dorsoventrally and this particular feature allows them to hide in narrow spaces such as into cracks and crevices. When unfed, they are pale yellow or brownish in colour, but after a full blood meal, they take a darker uniform 'mahogany' brown colour.

Bedbugs have piercing mouthparts formed into a proboscis, used to pierce the host's skin. They have three pairs of legs that are slender but well-developed and with efficient tarsal claws for clinging on to the host during feeding.

BITING HABITS

Both male and female bedbugs take blood meals and are thus equally important as pests. Blood provides them with the proteins necessary for their survival and for the production of eggs in females. They normally prefer human hosts to fulfil their blood requirements, but in the absence of people, bedbugs will also feed on a variety of other hosts, such as rabbits, rats, mice, bats, poultry and other birds.

During daylight hours, both adults and nymphs hide in dark and dry places, such as in cracks and crevices commonly found in furniture, walls, ceilings or floorboards, underneath seams of wallpaper and between mattresses and beds. At night, adults and nymphs crawl from these resting places to feed on sleeping people, after which they return to their resting sites to digest the blood meal.

LIFE CYCLE

Females lay their eggs in cracks and crevices. They produce an average of 2-3 eggs per day. During their lifespan that usually extends over a few months, each female could lay on average 400-500 eggs.

Cimex lectularius bionomics – Eggs	
Temperature (°C)	**Egg hatching time (days)**
10	22 - 25
23	12 - 14
27	6 - 9

The eggs hatch after about 12 - 14 days at 23°C and give rise to nymphs. These newly hatched bedbugs also feed on the blood of vertebrates. Hatching could take place within less than a week if temperatures are about 27°C, and under low temperature conditions, it may be delayed for several weeks. The unhatched eggs could remain viable for 3 months.

There are a total of 5 nymphal stages. The developmental time is greatly dependent upon temperature, food availability and relative humidity. Each nymphal instar would require one or more blood meals for further development.

The life cycle from egg to adult can be as short as 3 weeks under ideal conditions. Adults survive more than a year without blood feeding.

Cimex lectularius bionomics – Eggs to Adult	
Temperature (°C)	**Complete cycle (week)**
16	34
20	17
23	9
25	6.5

Engorged bedbug nymphs following a blood meal

Classic example of bedbug bites

Adult bedbug feeding & excreting excess water ingested.

NUISANCE PESTS

Because of their preference for human hosts, bedbugs live in close association with human beings and consequently cause substantial nuisance through their blood-feeding habits. The bites cause itching and redness for most people.

MEDICAL IMPORTANCE

There is no evidence of bedbugs being involved in the transmission of infections or diseases to people.

Bedbug activity can however cause considerable distress. Reaction to their bites is variable. Some people show little or no reaction whereas others may suffer severe reactions and have sleepless nights.

CONTROL

Inspection
While attending a bedbug complaint, the first step is to conduct a thorough inspection of the premises to determine the extent and source of infestation. Areas that need to be covered include mattresses, bed frame, bed head, bedside furniture and other furniture, electrical fittings and appliances, underneath carpet edges and skirting, wallpaper and paint if loose, curtains and any wall hangings.

Signs of bedbug activity include the presence of live bedbugs, cast off nymphal cuticle, and hatched or unhatched eggs. Bedbug activity could also be detected by small dark brown or black marks on the bed sheets, caused by the bedbugs' excreta that consist mainly of excess blood ingested during feeding. Houses with high bedbug activity may have a characteristic sweet and rather sickly smell.

It has been noted that bedbugs are commonly introduced in second-hand furniture and bedding, where the bugs often remain undetected for considerable periods until a suitable host appears. It is thus strongly recommended to get the furniture inspected and/or treated by a pest control professional to eliminate the risks of introducing bedbugs.

Bedbugs occasionally crawl from one room to another, spreading the problem throughout the hotel, hostel, or domestic premises.

Chemical Treatment
Upon identification of bedbug activity, a residual spray application could be carried out on the floors, walls and furniture, in line with label directions.

Additionally, it is recommended to conduct targeted treatment of cracks and crevices, (microencapsulated formulation for longer residual) which are the main harbourage areas, with either a residual spray or dust application. These cracks and crevices could be lightly sprayed with a flushing agent to test for the presence of bedbugs.

The suggested treatment regime, shown below, utilises a mixture of insecticide groups and formulations, ensuring an integrated approach to control and resistance management.

Molecular-mesh products are available to spray directly at bedbugs, resulting in physical control by immobilisation, as an important resistance management tool to feature at any point within the treatment regime described below.

***Cimex lectularius* suggested insecticide treatment regime**	
Treatment 1 *(initial treatment)*	**Residual Carbamate + Powder (e.g. silicon dioxide / diatomaceous earth)**
Treatment 2 *(after 2 weeks, or depending on temperature and therefore egg hatch)*	**Residual Synthetic Pyrethroid + IGR + Powder (e.g. silicon dioxide / diatomaceous earth)**
Treatment 3 *(after 4 weeks, or depending on temperature and therefore egg hatch)*	**Residual Carbamate + Powder (e.g. silicon dioxide / diatomaceous earth)**

* At the time of printing, the listed insecticides are approved for use. Due to ongoing changes as part of the Biocidal Products Directive, please check approval status of insectides with Killgerm Technical Department.

KILLGERM OFFER A WIDE RANGE OF PRODUCTS FOR BEDBUG MONITORING, CONTROL & PREVENTION

APPLICATION PRODUCTS

Cimetrol Super
Contains:
Contains: 25% cypermethrin, 10% tetramethrin, 20% piperonyl butoxide, 1% pyriproxyfen

ULV 500
Contains:
4.4% phenothrin, 2.2% tetramethrin, 8% synergist

Ficam W
Contains:
80% w/w bendiocarb

K-Othrine® WG250
Contains:
25% deltamethrin

Effect® Microtech CS
Contains:
8% permethrin, 4% tetramethrin, 8% piperonyl butoxide

Fendona 6SC
Contains:
5.8% alphacypermethrin

Vazor® DE Powder
Contains:
Silicon Dioxide

EQUIPMENT

Exodus

Gloria 5 Litre

Cimex Eradicator

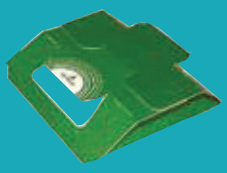
IK9

Vazor® Cypermax Plus
Contains:
10% w/w cypermethrin and 5% w/w tetramethrin.

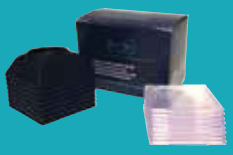
MONITORING DEVICES

Agrisense Bedbug Roll

Climbup insect interceptor



Trappit bedbug monitor



Sensci Volcano

Vazor® Provecta
A 'molecular-mesh' non-residual product to spray directly at bedbugs, resulting in physical control by immobilisation, as an important resistance management tool.

PROTECT-A-BED

Mattress Encasement

Water Soluble Laundry Bags

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USE BIOCIDES SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE.

KILLGERM CHEMICALS LIMITED
Wakefield Road, Ossett
West Yorkshire WF5 9AJ
TELEPHONE: 01924 268 400
EMAIL: info@killgerm.com

www.killgerm.com