Virginia Cooperative Extension

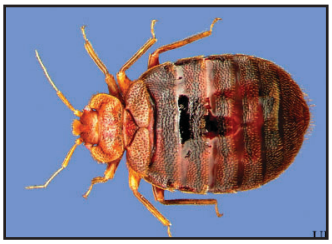
2004

Entomology

PUBLICATION 444-420

Bed Bugs

*Marc L. Fisher and Dini Miller**



Order: Hemiptera

Family: Cimicidae

Species: *Cimex lectularius* (Linnaeus) and *Cimex adjunctus* Barber

Size: Adults are ~1/4 to 3/8 inch long (6 to 10 mm).

Color: Adults are brown. If engorged with blood, adults are dark reddish-brown. Unfed immatures are nearly colorless, becoming brown as they mature and red to reddish-brown after feeding.

Description: Bed bugs are oval in shape, flat bodied, and wingless. Bed bugs have piercing-sucking mouthparts, called a proboscis. The proboscis is used to penetrate the skin of their prey (a warm-blooded animal) and obtain a blood meal. When not in use, the proboscis is held closely against the underside of the body. The nymphs (immatures) look and behave similarly to adult bed bugs, but are smaller and sexually immature.

Habitat: The common bed bug (*Cimex lectularius* L.) is often found in seams, tufts, folds, and coverings of furniture, particularly beds and sofas. In locations with large bed bug infestations, the insects may also be found in windows and doorframes, behind pictures and posters on walls, and in cracks of wall plaster. Bed bugs can be transported from one location to another in clothing, baggage, and second-hand items, including bedding and furniture.

Common bed bugs can be a particular nuisance in hotels and theaters because they provide the bed bugs with an ideal environment. Humans transport the bed bugs into the hotel or theater where they become established, and hotel and theater visitors provide the bed bugs with a constant supply of blood. Animal and poultry houses and other areas where warm-blooded animals are abundant can likewise have significant infestations.

The Eastern bat bug (*Cimex adjunctus* Barber) can be found in homes that have bat roosts, unused chimneys, attics, or other unused areas. The Eastern bat bug is a parasite of bats but may become a nuisance when bed bug populations are high or if a bat colony leaves, forcing the Eastern bat bugs to use humans as an alternative food source.

Life Cycle: Female bed bugs can lay several hundred eggs within their lifetime. Eggs are laid either singly or in clusters in cracks or crevices were adults hide. Eggs hatch, depending on the environmental temperature, in six to 28 days. Immature bed bugs undergo incomplete metamorphosis to become adults. Incomplete metamorphosis is a type of development wherein the immature looks like a small adult and must shed its skin several times to grow to an adult size and become sexually mature. In order for nymphs to molt from one stage to another, they must obtain a blood meal. After reaching adulthood, bed bugs feed about once a week. The life span of a bed bug is usually between four to six months.

Type of Damage: Bed bugs are mainly a nuisance pest. Their excrement may, however, stain carpets, walls, and furniture.

Health Risk: Bed bug bites can produce, due to an allergic reaction, an itching or stinging welt (known as a wheal) at the site of the bite. Bed bugs normally feed during evening hours while their host is sleeping and unaware. The act of the bite may be painless and go unnoticed; however, the resulting inflammation may last for several days to more than a week. In some rare cases, individual humans may experience a severe aller-

*School IPM Training program assistant and assistant professor, Department of Entomology, Virginia Tech

Virginia Tech

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

www.ext.vt.edu

VT/0604/web/444420

VIRGINIA STATE UNIVERSITY

gic reaction to the proteins found in the saliva of the bed bug. In chronic infestations, children may be susceptible to iron deficiency anemia. It is generally accepted that bed bugs are not vectors of human disease.

Bed bug Control Methods

Prevention (Non-chemical):

1. **Exclusion:** If an infestation is found or if you wish to take steps to keep an infestation from occurring, there are some techniques one can follow in order to exclude bed bugs from a particular location. Inspect secondhand beds, bedding, furniture, baggage, and clothing for live bed bugs before bringing them into the home. If feasible, inspect the baggage and clothing of travelers for bed bugs. In addition, caulk cracks and crevices in walls, ceilings, and floors. Paint walls and ceilings where paint is beginning to peel or chip. Repair openings in the attic or basement that allow entrance for bats and wild birds. It may be necessary to have a pest management professional help with the removal of an established bat or bird population.

2. **Sanitation:** Bed bugs are less likely to be found in well-cleaned areas. Thoroughly vacuum all floors, furniture, mattresses, pillows, upholstery, and curtains. It is very important to focus on creases, buttons, cording, and folds. After vacuuming, dispose of the vacuum bag in a plastic bag, seal the bag tightly, and immediately remove it from the home's premises. Launder all bedding, curtains, and clothing and dry in a warm-air dryer.

3. **Monitoring:** Inspect the premises for evidence of a bed bug infestation. Search for live bugs in furniture, in bedding, behind headboards, in cracks and crevices, around windows and doors, and near chimneys. Search for caste skins, eggs, egg casings, and blood stains or dark spots that are a result of bed bug excreta. Some bed bug infestations are reported to emit a sweet, musty odor that smells like raspberries (bed bug odor). Look for signs of alternative hosts in attics and chimneys such as birds, bats, and other warm-blooded animals. Bed bugs may be found in the nesting or bedding material of these alternative hosts.

Treatment (Chemical):

Note: Bed bugs are difficult to control. Calling a Pest Management Professional (PMP) is recommended.

1. **Inorganic Dusts:** Inorganic materials, such as boric acid, silica aerogel, and diatomaceous earth can be applied in cracks and crevices and provide long-term control in areas with low humidity. Silica aerogel is a finely ground silica (similar to glass) that adheres to the cuticle of the bed bug and absorbs its protective wax covering, causing the insect to dehydrate and die. Boric acid is a stomach toxicant that adheres to the cuticle of the insect. As the insect grooms itself, it ingests portions of the toxicant and dies. Diatomaceous earth is a finely ground dust composed of the shells of fossil diatoms. It works in a manner similar to silica aerogel.

2. **Insecticides:** The most common form of chemical control for bed bugs is the use of pyrethroids. Pyrethroid insecticides are applied locally to cracks, crevices, bed frames and headboards, door and window trims, and baseboards. Pyrethroids "fogs" are also available. It is important that you only use pesticides labeled for treatment of bed bugs and use them according to labeled application instructions. Some examples of home-use products that are available for non-professional use are Raid® House and Garden Bug Killer and Spectracide® Bug Stop Insect Killer. Some examples of professional-use pyrethroids that are labeled for use against bed bugs are: Demand® CS (Syngenta), Tempo® SC (Bayer), and Suspend® SC (Bayer) and Steri-Fab® (Noble Pine Products Co.) Pyrethroid products usually are quick acting but have low residual activity.

Several other classes of insecticides have been labeled or are in the process of becoming labeled for bed bugs. Two, Gentrol® and Phantom®, are professional-use products. Gentrol® IGR Concentrate (Zoëcon) was recently registered through the EPA as another option against bed bugs. Gentrol® uses the active ingredient hydroprene, an insect growth regulator (IGR). The active ingredient disrupts the normal development of insects, including bed bugs, as they go through metamorphosis. Gentrol® does not kill bed bugs. Instead, bed bugs that are exposed to Gentrol® become sterile and unable to reproduce. Another insecticide that may soon become registered for bed bugs is Phantom® (BASF Corp.) Phantom® uses an active ingredient known as chlorfenapyr. It is nonrepellent and relatively long-lasting.

Thanks to the University of Florida for permission to use the bed bug photograph. Please refer to the university's Web site for more information. http://creatures. ifas.ufl.edu/urban/bed_bug1.htm