



FactSheet

Extension

Ohio State University Extension Fact Sheet

Entomology

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Bed Bugs

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Bed bugs are parasites that preferentially feed on humans. If people aren't available, they instead will feed on other warm-blooded animals, including birds, rodents, bats, and pets.

Bed bugs have been documented as pests since the 17th century. They were introduced into our country by the early colonists. Bed bugs were common in the United States prior to World War II, after which time widespread use of synthetic insecticides such as DDT greatly reduced their numbers. Improvements in household and personal cleanliness as well as increased regulation of the used furniture market also likely contributed to their reduced pest status.

In the past decade, bed bugs have begun making a comeback across the United States, although they are not considered to be a major pest. The widespread use of baits rather than insecticide sprays for ant and cockroach control is a factor that has been implicated in their return. Bed bugs are blood feeders that do not feed on ant and cockroach baits. International travel and commerce are thought to facilitate the spread of these insect hitchhikers, because eggs, young, and adult bed bugs are readily transported in luggage, clothing, bedding, and furniture. Bed bugs can infest airplanes, ships, trains, and buses. Bed bugs are most frequently found in dwellings with a high rate of occupant turnover, such as hotels, motels, hostels, dormitories, shelters, apartment complexes, tenements, and prisons. Such



Mature Bed Bug

Common name	Scientific name
Bed Bug	<i>Cimex lectularius</i>
Tropical Bed Bug	<i>Cimex hemipterus</i>

infestations usually are not a reflection of poor hygiene or bad housekeeping.

Distribution

Bed bugs are fairly cosmopolitan. *Cimex lectularius* is most frequently found in the northern temperate climates of North America, Europe, and Central Asia, although it occurs sporadically in southern temperate regions. The tropical bed bug, *C. hemipterus*, is adapted for semitropical to tropical climates and is widespread in the warmer areas of Africa, Asia, and the tropics of North America and South America. In the United States, *C. hemipterus* occurs in Florida.

Identification

Adult bed bugs are brown to reddish-brown, oval-shaped, flattened, and about 3/16 to 1/5 inch long. Their flat shape enables them to readily hide in cracks and crevices. The body becomes more elongate, swollen, and dark red after a blood meal. Bed bugs have a beaklike piercing-sucking mouthpart system. The adults have small, stubby, nonfunctional wing pads. Newly hatched nymphs are nearly colorless, becoming brownish as they mature. Nymphs have the general appearance of adults. Eggs are white and about 1/32 inch long.

Bed bugs superficially resemble a number of closely related insects (family Cimicidae), such as bat bugs (*Cimex adjunctus*), chimney swift bugs (*Cimexopsis* spp.), and swallow bugs (*Oeciacus* spp.). A microscope is needed to examine the insect for distinguishing characteristics, which often requires the skills of an entomologist. In Ohio, bat bugs are far more common than bed bugs.

Life Cycle

Female bed bugs lay from one to twelve eggs per day, and the eggs are deposited on rough surfaces or in crack and crevices. The eggs are coated with a sticky substance so they adhere to the substrate. Eggs hatch in 6 to 17 days, and nymphs can immediately begin to feed. They require a blood meal in order to molt. Bed bugs reach maturity after five molts. Developmental time (egg to adult) is affected by temperature and takes about 21 days at 86° F to 120 days at 65° F. The nymphal period is greatly prolonged when food is scarce. Nymphs and adults can live for several months without food. The adult's lifespan may encompass 12-18 months. Three or more generations can occur each year.

Habits

Bed bugs are fast moving insects that are nocturnal blood-feeders. They feed mostly at night when their host is asleep. After using their sharp beak to pierce the skin of a host, they inject a salivary fluid containing an anticoagulant that helps them obtain blood. Nymphs may become engorged with blood within three minutes, whereas a full-grown bed bug usually feeds for ten to fifteen minutes. They then crawl away to a hiding place to digest the meal. When hungry, bed bugs again search for a host.

Bed bugs hide during the day in dark, protected sites. They seem to prefer fabric, wood, and paper surfaces. They usually occur in fairly close proximity to the host, although they can travel far distances. Bed bugs initially can be found about tufts, seams, and folds of mattresses, later spreading to crevices in the bedstead. In heavier infestations, they also may occupy hiding places farther from the bed. They may hide in window and door frames, electrical boxes, floor cracks, baseboards, furniture, and under the tack board of wall-to-

wall carpeting. Bed bugs often crawl upward to hide in pictures, wall hangings, drapery pleats, loosened wallpaper, cracks in plaster, and ceiling moldings.

Injury

The bite is painless. The salivary fluid injected by bed bugs typically causes the skin to become irritated and inflamed, although individuals can differ in their sensitivity. A small, hard, swollen, white welt may develop at the site of each bite. This is accompanied by severe itching that lasts for several hours to days. Scratching may cause the welts to become infected. The amount of blood loss due to bed bug feeding typically does not adversely affect the host.

Rows of three or so welts on exposed skin are characteristic signs of bed bugs. Welts do not have a red spot in the center such as is characteristic of flea bites.

Some individuals respond to bed bug infestations with anxiety, stress, and insomnia. Bed bugs are not known to transmit disease.

Tell-tale Signs

A bed bug infestation can be recognized by blood stains from crushed bugs or by rusty (sometimes dark) spots of excrement on sheets and mattresses, bed clothes, and walls. Fecal spots, eggshells, and shed skins may be found in the vicinity of their hiding places. An offensive, sweet, musty odor from their scent glands may be detected when bed bug infestations are severe.

Control Measures

A critical first step is to correctly identify the blood-feeding pest, as this determines which management tactics to adopt that take into account specific bug biology and habits. For example, if the blood-feeder is a bat bug rather than a bed bug, a different management approach is needed.

Control of bed bugs is best achieved by following an integrated pest management (IPM) approach that involves multiple tactics, such as preventive measures, sanitation, and chemicals applied to targeted sites. Severe infestations usually are best handled by a licensed pest management professional.

Prevention

Do not bring infested items into one's home. It is important to carefully inspect clothing and baggage of travelers, being on the lookout for bed bugs and their tell-tale fecal spots. Also, inspect secondhand beds, bedding, and furniture. Caulk cracks and crevices in the building exterior and also repair or screen openings to exclude birds, bats, and rodents that can serve as alternate hosts for bed bugs.

Inspection

A thorough inspection of the premises to locate bed bugs and their harborage sites is necessary so that cleaning efforts and insecticide treatments can be focused. Inspection efforts should concentrate on the mattress, box springs, and bed frame, as well as crack and crevices that the bed bugs may hide in during the

day or when digesting a blood meal. The latter sites include window and door frames, floor cracks, carpet tack boards, baseboards, electrical boxes, furniture, pictures, wall hangings, drapery pleats, loosened wallpaper, cracks in plaster, and ceiling moldings. Determine whether birds or rodents are nesting on or near the house.

In hotels, apartments, and other multiple-type dwellings, it is advisable to also inspect adjoining units since bed bugs can travel long distances.

Sanitation

Sanitation measures include frequently vacuuming the mattress and premises, laundering bedding and clothing in hot water, and cleaning and sanitizing dwellings. After vacuuming, immediately place the vacuum cleaner bag in a plastic bag, seal tightly, and discard in a container outdoors-this prevents captured bed bugs from escaping into the home. A stiff brush can be used to scrub the mattress seams to dislodge bed bugs and eggs. Discarding the mattress is another option, although a new mattress can quickly become infested if bed bugs are still on the premises. Steam cleaning of mattresses generally is not recommended because it is difficult to get rid of excess moisture, which can lead to problems with mold, mildew, house dust mites, etc.

Repair cracks in plaster and glue down loosened wallpaper to eliminate bed bug harborage sites. Remove and destroy wild animal roosts and nests when possible.

Trapping

After the mattress is vacuumed or scrubbed, it can be enclosed in a zippered mattress cover such as that used for house dust mites. Any bed bugs remaining on the mattress will be trapped inside the cover. Leave the cover in place for a year or so since bed bugs can live for a long time without a blood meal.

Sticky traps or glueboards may be used to capture bed bugs that wander about. However, the effectiveness of these traps is not well documented.

Insecticides

Residual insecticides (usually pyrethroids) are applied as spot treatments to cracks and crevices where bed bugs are hiding. Increased penetration of the insecticide into cracks and crevices can be achieved if accumulated dirt and debris are first removed using a vacuum cleaner. Avoid using highly repellent formulations, which cause bed bugs to scatter to many places. Dust formulations may be used to treat wall voids and attics. Repeat insecticide applications if bed bugs are present two weeks after the initial treatment since it is difficult to find all hiding places and hidden eggs may have hatched.

Do not use any insecticide on a mattress unless the product label specifically mentions such use. Note that very few insecticides are labeled for use on mattresses. If using an appropriately labeled insecticide on a mattress, take measures to minimize pesticide exposure to occupants. Apply the insecticide as a light mist to the entire mattress, opening seams, tufts, and folds to allow the chemical to penetrate into these hiding areas. Allow the treated surface to completely dry before use. Do not sleep directly on a treated mattress; be sure bed linens are in place. Do not treat mattresses of infants or ill people. Alternatives to using an insecticide on a mattress are discussed in the 'Sanitation' and 'Trapping' sections.

No insecticides are labeled for use on bedding or linens. These items should be dry cleaned or laundered in hot water and dried using the "hot" setting.

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