

# Construction Practices That Prevent Termites

# PESTPRO

From University of Florida Entomology to Landscape and Pest Managers

## Medical Importance of

# BED BUGS

# The Medical Importance of Bed Bugs

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**Blood-feeding insects can cause discomfort and disease in the hosts they parasitize, and bed bugs are no exception. Bed bugs inflict numerous negative impacts upon human hosts.**



**BED BUG BITES ON AN INFANT**



**BED BUG BITES ON ARM — EXTREME REACTION**



**CLOSEUP OF INFECTED BED BUG BITE**



**H**OST BLOOD lost from bed bug feeding can become harmful if the bed bug populations reach high enough levels. Blood loss can lead to iron deficiencies and is particularly concerning in situations involving infants, young children, and the elderly. There have been reported cases of elderly people who ended up in a hospital with cardiac problems that were brought about by severe anemia due to excessive bites from bed bugs. The process of feeding can also lead to other ailments in the human hosts.

Blood-sucking insects use various strategies to combat hosts' physiological response to blood feeding. Bed bugs, *Cimex lectularius*, use various compounds in their saliva to thwart these host responses including: a) nitrophenol, which prevents vasodilation; b) apyrase, which decreases platelet aggregation; and c) a compound that prevents clotting in the blood. Bed bugs are also "clever" enough to include an anesthetic that prevents us from feeling the bite, although the jury is still out on the presence of this anti-pain compound. The problem is that these saliva compounds can cause immune response in the host, and that is what makes us itch after a bed bug bite. The itching is followed by scratching, and this can lead to scars and secondary bacterial infections on the skin.

#### WHEN BED BUGS BITE

Individuals respond differently to bed bug bites. A study that examined how quickly a skin reaction would occur after being bitten by a bed bug showed that a little less than half of the people reacted to the bites after being fed upon by bed bugs for the first time. In the individuals who reacted, it took six to 10 days post-feeding for those reactions to occur. However, if people are bitten by bed bugs after the first exposure, the reaction times occur much faster for those people that reacted to the first bed bug bite. And those who did not react the first time will start reacting to the bed bug bites. Of course, there are those individuals that remain insensitive to bed bug bites. These people are probably the best candidates for bed bug control technicians.

Of course, bite reactions are not entirely bad. They let us know there is an insect problem that requires attention, and that perhaps it is time to contact a pest management professional.

The delay in the reaction to bed bug bites is one of the reasons why it is hard for individuals first exposed to bed bugs to pinpoint when and where they were bitten. For example, cutaneous reactions

that appear while someone is staying at a hotel may actually be caused from bites that occurred days earlier at another location. Also, individuals insensitive to bed bug bites may never realize they have an infestation until populations reach large numbers.

#### DISEASES AND BED BUGS

There has been an extensive investigation of the bed bug's ability to vector diseases. Many different diseases-causing organisms have been found in bed bugs, but few have been shown to develop in the insect and be transmissible. One disease caused by nematodes found in bed bugs is filariasis. However, research found that most of these nematodes died or did not develop in bed bugs.

Bed bugs are also unlikely vectors of some important viruses. Human immune deficiency virus (HIV) lasts only four to eight hours in these insects. The virus does not replicate in bed bugs, is not excreted in the feces, and was not shown to be able to be transmitted by infected bed bugs during feeding. There have been some studies that

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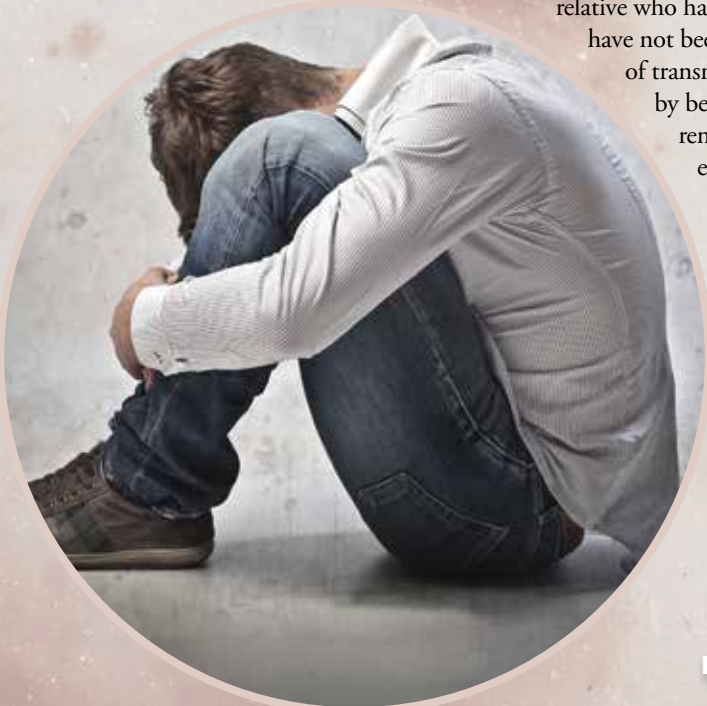
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**KISSING BUGS ARE BED BUG RELATIVES THAT CARRY CHAGAS**



**CHAGAS TRANSMISSION MAY BE POSSIBLE BY BED BUGS**



**BED BUGS CAN CAUSE WORRY, ANXIETY, DEPRESSION AND PTSD**

point to the possibility of bed bugs serving as vectors for hepatitis B virus (HBV) through bed bug feces. However, more recent studies have concluded that bed bugs are unlikely HBV vectors in nature.

Nevertheless, Chagas disease has not received enough attention in relation to transmission by bed bugs. The *Trypanosoma cruzi* protozoa that cause Chagas disease remain the most likely candidates for a disease that can be vectored by bed bugs. These protozoa are capable of developing in bed bugs. However, transmission of these disease organisms was unsuccessful in dogs, hamsters, and guinea pigs, but was successful in the bats. *Trypanosoma cruzi* is vectored by over 100 species of kissing bugs, relatives of bed bugs. The transmission of the disease is through the insect feces. Host immune response to the blood feeding of the kissing bugs causes the host to itch near the bite wound. The feces containing *T. cruzi* are then scratched into the wound. With bed bugs, the transmission route could be the same.

The vector competence of bed bugs in relation to the Chagas disease protozoa was primarily examined in the early 20th century, and there has not been much other work done since. There have only been two reported transmissions of *T. cruzi* by bed bugs that did not involve injection. Both studies involved rodents, not humans.

There is a single case where a boy contracted Chagas disease after sleeping in the same bed bug-infested bed with a relative who had the disease. While there have not been any human case studies of transmission of Chagas disease by bed bugs, this transmission remains a possibility. This is especially important given the rising cases of *T. cruzi* in the United States, and the rapid spreading of bed bug infestations in various regions of the country.

## PSYCHOLOGICAL EFFECTS

It is easily assumed that a blood-sucking parasite such as the bed bug could inflict physical bodily harm on the host upon which it feeds. However, negative psychological effects caused by real or perceived infestations of *C. lectularius* can also be damaging to the host's health and wellbeing. Some of the negative psychological effects experienced by individuals with infestations or individuals who fear becoming infested by bed bugs have been described in the past. Responses to infestations include major depressive episodes and anxiety spectrum disorders. Anxiety spectrum disorders can be in the form of acute stress disorder, adjustment disorder, and phobias.

These disorders can appear due to the infestation or they can be preexisting disorders that get worse because of the bed bug infestation. Social isolation can also occur because of the negative stigma associated with bed bug infestations or can be from self-imposed withdrawal. Infested individuals may also experience depression and suicidal thoughts, decrease in occupational or education productivity, and other psychological problems. Some experiences from having an infestation can even manifest similarly to post-traumatic stress disorder (PTSD).

Psychological issues can also develop in individuals who do not currently have an infestation but are worried about getting one. Most of these psychological issues focus on maladaptive behaviors such as insomnia, paranoia, itchiness, and taking unreasonable precautions to risky behavior that could lead to an infestation, such as not staying at hotels, avoiding public transportation, and avoiding public places such as movie theaters. These disorders are usually worse in individuals who have previously had bed bug infestations. These disorders, along with delusional parasitosis, can also be driven by media coverage of bed bug infestations.

You do not have to scare your clients with horror stories about bed bug infestations, but have an informed discussion with them about the real medical importance of bed bugs. **PP**

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