Pest Control Newsletter

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A Traveler's Guide to Avoid Bringing Bedbugs Home

Bedbugs are parasitic insects in the genus Cimex that feed exclusively on blood. They have been known as human parasites for thousands of years. Since the 1980s, bedbug infestations have resurged. In recent years, the bedbug problem has become an issue of concern around the world. Bedbugs are often brought home accidentally or transferred to other accommodation facilities with traveling. Therefore, by following the guide suggested, travelers could largely reduce the risk of bedbug infestation in their home.

A thorough inspection of the hotel room

Travelers should check carefully their hotel room on arrival for evidence of bedbug infestation which includes detecting of live or dead bedbugs, cast skins, eggs, blood stains on bedding and the smell of bedbug which is sometimes described as 'sickly sweet'. Special attention should be paid to the mattress, the pillow, crevices of the bed, the wooden structure around the bed and the gap between wall and furniture. If bedbug infestation is detected, the traveler should request for changing of a clean room.

Minimizing the possibility of bedbugs infesting luggage

Luggage is the main way of transferring bedbugs from one location to another. Before confirming the room is free of bedbugs, luggage should be left outside, in the washroom or on pre-inspected tables. Even if no bedbug is found, the possibility of an infestation cannot be totally excluded. In new infestations when numbers are low, bedbugs can hide in less obvious locations and they are very hard to detect. Therefore, minimal belongings should be unpacked from luggage and the luggage itself should also be kept in properly sealed plastic bags at all times to prevent bedbugs from entering. After leaving the hotel, used plastic bags should be discarded immediately.

Decontamination of luggage and clothing after returning home

The eggs and the nymphs of bedbugs are usually too small to be seen by naked eyes. Bedbug adults could hide in any small crack and crevices of the luggage. Therefore, inspecting luggage for bedbugs is probably not practical for general public. If the traveler has suspicions of bedbug existence such as bite-like reaction and dark red blood stains on the bedding, it would be prudent to assume that luggage, clothing and things inside the luggage are infested with bedbugs and requires decontamination. After returning home, luggage should be kept isolated, such as in the washroom. Heat and cold treatments are non-chemical options which are considered to be more practical for the general public. If applicable, all clothing should be hot washed (at least 60°C). The luggage should also be treated by heating (contact temperature at or above 60°C for at least 20 seconds) or freezing (extreme cold at or below -20°C for at least two hours). Other items brought along with the traveler should also be treated with heating or freezing if possible. Pest control professionals should be consulted if necessary.

Cimex hemipterus

Interesting facts on mosquito's sensing ability

The mosquito life cycle is carried out in a variety of environments and conditions. They have evolved a variety of sophisticated sensory systems to detect the complicated spectrum of environmental stimuli and biological cues. Here are some interesting facts on their special sensory talents.

Pre-larval stage

All mosquitoes go through four distinct stages during their life cycle: egg, larva, pupa and adult. The first three stages occur in water but the adult is an active flying insect. Larva will hatch when it senses favorable environmental conditions such as suitable length of light/ dark cycles, water level and temperature. There is also evidence that the decreasing level of oxygen in the water signals the larvae to hatch. This may imply the water will remain stagnant at the time of their hatching, thus ensuring that the risk of being washed away has diminished. Moreover, the decomposition of organic matter causing depletion of oxygen may indicate the larvae will have an adequate food supply after hatch.

Larval stage

The development of larvae is temperature dependent, since it involves an array set of metabolic process. Apart from favorable temperature, the larvae also need to feed in order to support the developmental process as well as to escape from danger. Therefore, the larvae possess sensory neurons all over the body to detect these stimuli. The principle sensory appendages are clustered on the head where eyes carry out visual transduction, the mouthparts respond to mechanosensory and gustatory cues while the sensory cone and peg organ of the antennae mediate olfaction and gustation, respectively.

Pupal stage

Since the pupae do not feed, the sensory demands are probably associated with the visual and mechanosensory stimuli for escape purposes.

Adult stage

After the emergence of adult, both male and female adults are ready to continue their life cycle through mating, feeding and oviposition. The first thing they need is energy. Both sexes will acquire plant sugar such as nectar, damaged fruits and honeydew for energy. Plants emit a diversity of volatile compounds. Different mosquito species have different preferences, which will also differ geographically and temporally, on the type of plant source.They will locate and select the plants by visual cues with their photoreceptor cells in the compound eyes and by chemical cues with their chemosensory receptors: sensilla, distributed across peripheral appendages such as the antennae, maxillary palps or labials, tarsi and reproductive organs.

Mating of adult mosquitoes takes place soon after emergence. Interestingly, the female mosquito will locate the swarms of males by auditory, chemosensory and visual signals. Hearing is critical for mosquito mating, as males are attracted to the sounds generated by conspecific females that are in flight. The mosquito ears are long antenna, which are decorated with many flagella hairs extending out laterally from the main antennal shaft. The flagella are tuned to respond most effectively with resonant frequencies that closely match the sounds produced by the wing beats of the opposite sex. The two conspecific sexes then match up by establishing harmonic convergence and signal the mating process.

The important phase after the mating in female is to obtain a blood meal for oogenesis. Females have developed a complicated host-seeking behavior to locate and select a potential blood meal host, which involves the integration of olfactory, visual and thermal stimuli. Female mosquito first establishes a non-oriented ranging flight behavior to enhance the chance of contact with kairomones (e.g. carbon dioxide and volatile host-derived odorants). Once they are in contact with the kairomones, they will develop oriented host location behavior so as to bring them closer to the odour source. Once the female has identified the suitable host in her close vicinity, they will selectively direct to the candidate host. This process is mainly olfactory driven but as distance to host diminishes, the role of visual, thermosensory and other stimuli increases. Upon alighting on the host, the stimuli of low volatile odorant, gustatory cues as well as heightened thermal and visual signal operate synergistically.

After completing oogenesis, gravid female will actively locate suitable oviposition sites. They will select the suitable oviposition site by the use of visual cues, humidity and texture of the sites, and by the detection of oviposition pheromones (either attractive or aversive semiochemicals). One example of oviposition attractive pheromone is the apical droplets left at the tip of eggs by ovipositioning Culex females. Oviposition attractive pheromone can also be the breakdown products by the bacteria, plant-based materials or other biological cues of the particular site. Surprisingly, a recent research discovered that overcrowding of larval habitats could give rise to a range of chemical signals that deter gravid females from further oviposit in those sites.

Understanding the sensory systems and the signal transduction cascades in mosquitoes will surely be beneficial to the future development of other vector control methodology and the reduction of vector-borne disease.