# *Cimex lectularius* and *Cimex hemipterus* (bed bugs)

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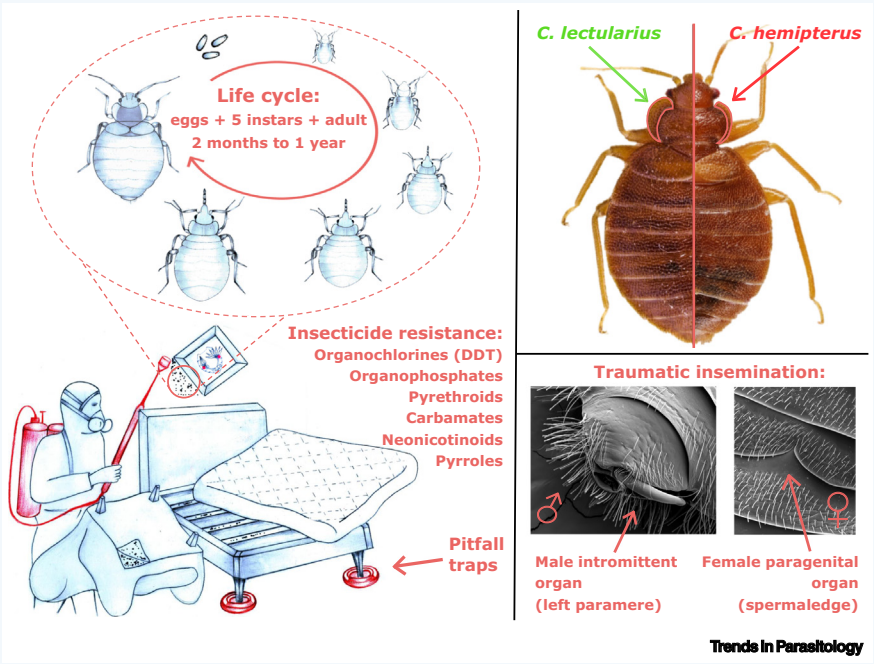
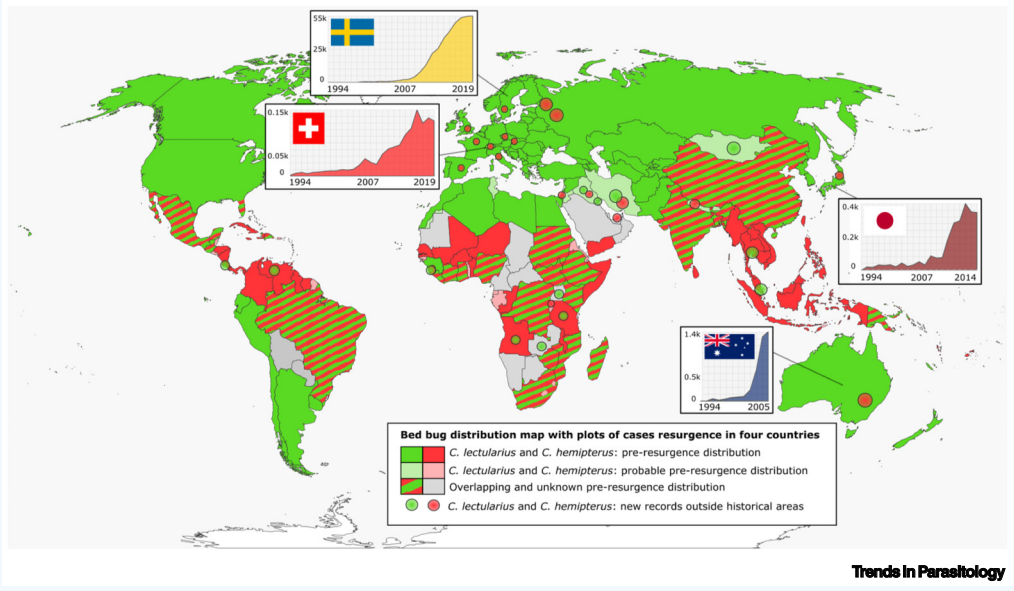



Bed bugs are obligate blood-feeding hemimetabolous insect ectoparasites with a life cycle that includes five instars, each requiring a blood meal to molt. Adults live for several months, hiding in crevices where females repeatedly lay clutches of eggs. Bed bugs mate traumatically: the male inserts its genitalia into the female secondary sex organ (spermaledge), then sperm travels to spermatheca through the hemolymph. Humans are parasitized by two bed bug species that are hard to distinguish – *Cimex lectularius* and *Cimex hemipterus*. Their historical distribution overlapped only partially, with *C. lectularius* and *C. hemipterus* being more common in temperate regions and (sub)tropics, respectively. In the 1950s, both species nearly vanished from households due to the widespread use of insecticides. However, they made a remarkable comeback in the past two decades, fueled by insecticide resistance and increased human mobility. As a side effect, these two species have become more sympatric on a global scale.




**KEY FACTS:**
Bed bug lineages specialized to humans originated on bats.

Bed bugs live in aggregations, infesting shelters and periodically feeding on the hosts, which they detect via host odors, $CO_2$, and heat.

A mild to serious skin reaction usually develops after the bite, triggering sleeping disorders and anemia during large infestations. The capacity for pathogen transmission was shown in the laboratory but without epidemiological relevance.

Due to obligatory blood-feeding, vitamins are provided by *Wolbachia*, the primary endosymbiont residing in specialized organs (bacteriomes).

**CONTROL FACTS:**
Bed bug dispersal is either passive, via infested clothes, luggage, and furniture between apartments and buildings, or active by movement within buildings; infestations are not limited to poor social conditions.

Multiple mechanisms (behavioral, reduced cuticular penetration, metabolic, and target-site DNA mutations) confer resistance to insecticides, including dust-based formulas. Bed bugs hide in inaccessible crevices, so repeated treatment with chemicals that have residual effect is necessary.

Alternative control approaches include steam or heat treatment, freezing, bioinsecticides (*Beauveria bassiana* fungus), and pitfall traps.

**TAXONOMY AND CLASSIFICATION:**
**PHYLUM:** Arthropoda
**CLASS:** Insecta
**ORDER:** Hemiptera
**FAMILY:** Cimicidae
**GENUS:** *Cimex*
**SPECIES:** *C. lectularius* and *C. hemipterus*

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## Declaration of interests

The authors declare no competing interests.

## Resources

www.cdc.gov/parasites/bedbugs/index.html

www.bedbugfoundation.org/

www.ncbi.nlm.nih.gov/genome/?term=cimex

https://bedbugs.fzp.czu.cz/en/r-14509-about-bed-bugs

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