Identification and Management of Bed Bugs

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Bed Bugs - Key Points

• Bed bugs are present – and can be common in Colorado

• Also present are closely related bugs that feed on bats or swallows

• Diagnosis of bed bugs is best done with collection of the insect

• Control of bed bugs requires use of a method that will kill all stages throughout the building
The Bed Bug Complex in Colorado
Bat Bugs

(*Cimex pillosellus, Cimex adjunctus*)
Hair longer than width of eye
BAT BUG

Hair shorter than width of eye
BED BUG

BadBedBugs.com
Swallow Bug
Bed Bug

*Cimex lectularius*
Bed Bug Egg Shells
Bed bug nymphs – mixed stages

Photograph by Gary Alpert
Cast Skins Following Bed Bug Molting
Bed Bug starved (above) and after blood meal (right)
Bed Bugs will feed at least once during each life stage. Adults will feed repeatedly.
Bed bug settling on arm
Two minutes after feeding initiated
Five minutes after feeding initiated
Nine minutes after feeding initiated
Eleven minutes after feeding initiated
Reaction to Bed Bug Bites

- Bite is painless; reaction is to proteins in saliva
- Redness, itchiness common
- Often takes days for reaction to fully develop
- Reaction severity highly variable
- There is no feature of a bed bug bite that is diagnostic
Important Note:

Bed bugs do not transmit any human pathogens.

27 agents of human disease have been found in bed bugs.

None of these agents reproduce or multiply within bed bugs, and very few survive for any length of time inside a bed bug.

There is no evidence that bed bugs are involved in the transmission (via bite or infected feces) of any disease agent.
Fear of bedbugs cancels Great Sofa Roundup in Fort Collins

By Monte Whaley
The Denver Post

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Bedbugs are taking a bite out of the Great Sofa Roundup.

Organizers of Colorado State University’s annual event fear that the tiny insects, which hide in bedding and furniture, could spread to the apartments and homes of those who adopt the discarded sofas.
Bed Bug Internet Search Frequency

• 1. Cincinnati
• 2. New York
• 3. Newark
• 4. Waterloo
• 5. Reston, VA
• 6. Toronto
• 7. Denver
• 8. Vancouver
• 9. Herndon, VA
• 10. Philadelphia
Detecting Bed Bugs

• Signs of bed bugs
  – Fecal spotting
  – Cast skins, egg shells
  – Live insects

• Traps

• Bed bug sniffing dogs
Bed Bug starved (above) and after blood meal (right)
Bed bug fecal spot (Photo by Gary Alpert)
Bed bug and fecal spotting. Photo by Gary Alpert.
Bed bug egg shells.
Photo by Gary Alpert.
Cast Skins Following Bed Bug Molting
Where to look for bed bug signs?

• Seams of mattresses
• Crevices of bed frames
• Crevices of side tables, furniture, clocks, etc. next to sleeping areas
• Crevices of molding, electrical fixtures
• Wall hangings near sleeping area
Bed Bug Monitoring Devices
Bed Bug Monitoring Basics

• Harborage
• CO2 (carbon dioxide)
• Heat
• Moisture
• Other purported attractants
Bed Bug Traps
BB Alert Passive Monitor –
Harborage based system
BB Alert Active Monitor – Harborage based system + Heat
Beacon – Carbon dioxide generating monitor
“Step-ups”

• Can prevent bed bugs from crawling onto beds
• Useful as monitoring aid
Bed Bug Controls?

- **Insecticides**
  - Persistent sprays/dusts
  - Non-persistent sprays
- **Temperature**
  - High temperature
  - Low temperature
- **Starvation**
- **Ultrasonics**
Control

-Ultrasonic Devices

These devices DO NOT work to control bed bugs.

Furthermore, they DO NOT control fleas, mosquitoes, dust mites or MOST other insects.

Don’t waste your money!!!
Starvation? – Bed bugs can survive 6 months to one year between meals.
Cold Temperatures?

Bed bugs are highly tolerant of low temperatures

Dry Ice/Freezing
High Temperatures?

Bed bugs *will be effectively killed* by exposure to $125^\circ F$ for 10-20 minutes.
Whole room heating devices
PackTite

- Designed to hold typical traveller’s suitcase
  - Useful for reliably disinfecting small items
- Includes electrical heater
- Locally produced
Insecticides

- Persistent (ca 1 week residual) insecticides
- Dessicant dusts
- Non-persistent, contact insecticides
- “Bug bombs”/”Total release aerosols”
“Bug Bombs”

- Various active ingredients
  - Pyrethrins
  - Permethrin
- Active ingredients *ineffective* at killing bed bugs
- Method of application *ineffective* at penetrating to bed bug harborage areas
- Incidental effect of use may be to disperse bed bugs
Non-persistent Contact Insecticides

• Many products will kill a bed bug if it is applied directly onto a bed bug
• Non-persistent contact products include:
  – Cedar oil
  – Other essential oils
  – Alcohol
• Ability to kill an exposed bed bug does not translate into ability to manage a bed bug infestation
Desiccant Dusts

• Act primarily by damaging exoskeleton and accelerating water loss
  – *Wicking epicuticular waxes*
  – *Physical cutting of exocuticle*

• Diatomaceous earth
• Silica aerogel
Diatomaceous Earth

Mined from deposits of the bodies of freshwater diatoms
Diatomaceous Earth

- Can kill bed bugs if contacts body
  - Does not kill eggs
- Treated areas will be avoided by bed bugs
Persistent Insecticides

- Primary insecticide used at present – bifenthrin
- Will kill susceptible bed bugs for perhaps one week after application
- Will not kill egg stages
Principles of Bed Bug Control

- Apply controls simultaneously to all areas of infestation
- Do not move any items from infested areas until eradication has been completed
- Repeated applications are required to provide successful eradication
Prevention/Mitigation of Bed Bug Problems

- Monitoring program to detect early onset infestations
- Design to limit bed bug establishment
- Prompt quarantine and treatment of infested sites
Everyone should be regularly inspecting rooms for evidence of bed bugs
Monitoring Devices
Mattress Encasements

- Can prevent establishment of bed bug harborage *on a mattress*
- Can seal bed bugs in an infested mattress – if kept intact
Other Design Considerations

• Seal cracks in rooms that may serve as harborage areas
  – Diatomaceous earth may be useful for non-sealed sites

• Keep beds from wall contact
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