Bed Bugs and Relatives
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

• There are diagnostic symptoms associated with bed bug infestations

• Control of bed bugs is complicated and needs to be done in a thorough manner with appropriate methods for it to be effective
The bed bug family (Cimicidae) also includes insect that develop on other mammals or birds.
Bed Bug

Cimex lectularius
Bed bugs have simple metamorphosis. The life stages are egg, nymphs (5 stages) and adult.
Life Stages of Bed Bugs
Bed Bug Egg Shells
Bed bug nymphs – mixed stages

Photograph by Gary Alpert
Cast Skins Following Bed Bug Molting
Bed Bugs will feed at least once during each life stage. Adults will feed repeatedly.
Bed Bug starved (above) and after blood meal (right)
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
14 minutes – *All done!*
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
Mystery Bites and Itches – A resource to use with clients complaining of bites/itches they think were caused by insects or mites

Guidelines for County Extension Offices

Quick Facts

There are some insects, mites, and spiders that bite humans and/or can cause skin irritations or dermatitis.

Often sources of skin irritation or those that produce “bite-like” reactions include environmental allergens such as chemicals or irritant fibers. When handling a client with a concern about arthropod bites/itches, an open mind must be kept in regard to the possible identification of a source that may be the cause of the client’s concern.

Skin irritation resulting from bites of arthropods varies greatly between individuals, in large part due to individual immune responses.
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.
Detecting Bed Bugs

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

• Traps
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.
Every time a bed bug molts to the next stage it will leave behind and old skin (cast skins)
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
Secondary Bed Bug Harborages
~23%
Primary Bed Bug Harborage
~70%
“Other” Bed Bug Harborages
~7%
5 feet
Bed Bug Monitoring Devices
Bed Bug Monitoring Basics

• Harborage
• CO2 (carbon dioxide)
• Heat
• Moisture
• Other purported attractants
Monitoring Devices
Bed Bug Traps
Passive Monitor – Harborage based system
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
Eliminate as Many Bed Bug Resting Sites/Harborage as Possible

• Caulk/seal areas around baseboards, electrical sockets, etc.
• Remove clutter, particularly near the bed
• Mattress encasements?
Mattress Encasements

- Seal mattresses to prevent bed bugs from staying on mattress
- Can make inspections easier
- Can eliminate one site (mattress) where bed bugs will be hiding and where controls are needed
A simple precaution to prevent accidentally picking up bed bugs while travelling.

Do not leave anything near the bed or places where people rest, particularly overnight.
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 tolerant of low temperatures. Deep freezing for days will kill bed bugs.
High Temperatures?

Bed bugs will be effectively killed by exposure to 125°F for 10-20 minutes.
PackTite Portable Heater

Clothes Dryer
Whole room heating devices
Insecticides

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

• Various active ingredients
  – Permethrin, Cypermethrin

• 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.
Persistent Insecticides

• Primary insecticide used at present (retail) – bifenthrin*

• Will kill susceptible bed bugs for perhaps one week after application

• Will not kill egg stages

*Other insecticides, with different modes of action, are available for use by a professional pest control operator
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

Silicon dioxide from diatomaceous earth
Diatomaceous Earth

- Disrupts outer wax layer of insects by abrasion
- Can kill bed bugs if contacts body
  - Does not kill eggs
- Treated areas will be avoided by bed bugs
Silica Aerogel

Silicon dioxide as amorphous silica
Silica Aerogel

- Disrupts outer wax layer of insects by absorption
- Applied as very thin layer
  - Less repellent than DE
- Superior bed bug control in recent studies
The bed bug family (Cimicidae) also includes insect that develop on other mammals or birds.
Swallow Bug

Associated with the nests of cliff swallows
Swallow bugs exposed after nest removed
Bat Bugs

Associated with nesting bats
Hair longer than width of eye
BAT BUG

Hair shorter than width of eye
BED BUG

BadBedBugs.com
Bat Bug/Swallow Bug Control

• Eliminate future breeding of host
  – Screen out entry areas of bats
  – Prevent new nesting of swallows
    • Existing nests with young can not be disturbed

• Prevent migration of bat/swallow bugs from nesting sites into living areas of building
  – Seal points of entry
  – Crack/crevice use of insecticides at points of entry
There is a Bed Bug subsection in the Colorado State Insect Information Website.

Insect Information

All materials needed in another accessible format can be made available upon request.

Arthropods of Colorado Fact Sheets
This is a listing of about 200 downloadable fact sheets related to insects and other “bugs” found in in Colorado. It contains fact sheets that are written for the Colorado Arthropods of Interest series and the Extension fact sheets that are related to insects.

Resources

Miscellaneous Insect Information
This contains a variety of downloadable fact sheets and pamphlets on diverse miscellaneous subjects, from “Bug Mugs” and “Life in a Colorado Water Garden” to “Mystery Bites and Itches” and “Commercially Available Sources of Biological Control Organisms: Sources and Uses in Colorado.”

Some Entomology Hot Links:
- Colorado Hemp Insect Website
- Western Colorado Entomology Website
- IPM Images/Bugwood (Cranshaw)
- IPM Images/Bugwood (Peairs)
- Entomology Resources List
- Honey Bee Swarm Hotlines
Links to some of the better materials available regarding bed bugs and their management

**Bed Bug Information**
This is a listing of downloadable publications, web links, and other resources that can be used for helping manage bed bugs.

- **Bat Bugs, Bed Bugs, and Relatives** (Extension Fact Sheet)
- **Bed Bug Identification Poster**
- **Bed Bugs in Schools**
- **Bed Bugs, Tenants, Landlords, and the Law**
- **NPMA Guidelines on Bed Bug Management**
- **Tips for shopping at thrift stores and garage sales**
- **University of Minnesota Bed Bug Website**
- **The Ohio State University Bed Bug Website**
- **Bed Bugs Fact Sheet, University of Kentucky**
- **Bed Bugs and Your Apartment, Texas A&M**
A particularly good treatment for how to try and manage bed bugs in a home
A particularly good blog oriented to apartment dwellers

Insects in the City

Bed bugs and your apartment

Bed bug problems are becoming more common in apartment communities. More than ever, it’s important for tenants and landlords to understand these insects and what it takes to eliminate them from apartments.

What are bed bugs?

Bed bugs are tiny insects that live by feeding on human blood, usually at night. They are secretive, hiding in cracks and crevices during the day, and coming out at night to feed. The bite of the bed bug is painless and may or may not leave a red mark or itchiness.

How do I know whether I have bed bugs?

...
Perhaps the best, comprehensive discussion of what is involved in bed bug management.

**Bed Bugs**

ENTFACT-636: Bed Bugs | Download PDF | En Español

by Michael F. Potter, Extension Entomologist
University of Kentucky College of Agriculture

Until fairly recently, most people (and even pest control professionals) had never seen a bed bug. Bed bug infestations actually used to be very common in the United States before World War II. But with improvements in hygiene, and especially the widespread use of DDT during the 1940s and '50s, the bed bugs all but vanished. The pests persisted, however, in some areas of the world including parts of Africa, Asia, and Eastern Europe. Over roughly the past decade, bed bugs have made a dramatic comeback in the U.S.—they’re appearing increasingly in homes, apartments, hotels, health care facilities, dormitories, shelters, schools and public transportation. Other places...
Let's Beat the Bed Bug!

Bed Bug Identification Card

The Bed Bug Identification Card is a simple visual tool to help in identifying bed bugs. Showing the actual size of bed bugs and a couple of hiding places this small card can be carried in your wallet for when you need it the most.

Let's Beat the Bug Completely!

Did I find a bed bug?
- Don't panic! bed bugs can be beaten
- ID is critical! Most things you find will not be bed bugs
- Mystery bites do not equal a bed bug infestation
- Use tape to capture what you think might be a bug
- Check other furniture, not just the bed

Bed bug removal tool
(Use the card edge to push bed bugs from cracks)

Avoiding bed bug issues
* CALL a Pest Control Professional * TRY NOT to do-it-yourself *
**DO NOT USE RUBBING ALCOHOL**

Easy Prevention Steps
In an apartment, use traps and inspect around resting & sleeping areas
When arriving home, keep backpacks and luggage away from sleeping areas
When traveling, check sitting and sleeping areas

Think you have bed bugs?
visit www.bedbugs.umn.edu for more information

Resources

Homeowners and Tenants

Property Owners and Managers
Bed Bug Guidelines for Social Service Providers Who Conduct Home Visits

Amelia Shindelar
Community Health Coordinator

Dr. Stephen A. Kells
Associate Professor
Some Key Points in the Minnesota Publication

• A simple “bed bug kit” may be useful to keep in your vehicle while making visits
  – Plastic/garbage bags
  – Tape
  – Change of footwear
Some Key Points in the Minnesota Publication

- A simple “bed bug kit” may be useful to keep in your vehicle while making visits
- Avoid placing anything on upholstered furniture or bedding
Some Key Points in the Minnesota Publication

• A simple “bed bug kit” may be useful to keep in your vehicle while making visits
• Avoid placing anything on upholstered furniture or bedding
• Avoid sitting on cloth covered furniture
  – Possibly bring folding chair
Some Key Points in the Minnesota Publication

• A simple “bed bug kit” may be useful to keep in your vehicle while making visits
• Avoid placing anything on upholstered furniture or bedding
• Avoid sitting on cloth covered furniture
• Bring into the home only things that are needed for the site visit