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Bed Bugs 101 (Biology & Behavior) and Research Update

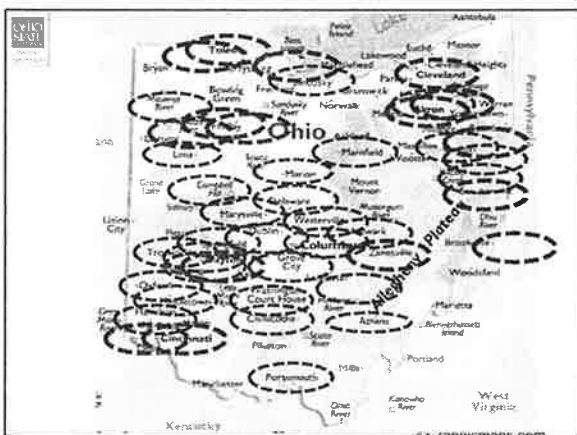
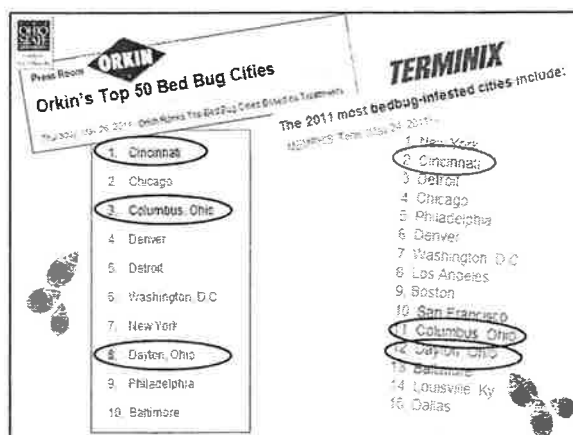


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**Bed bugs have plagued
humans for thousands
of years!**

**Bed bugs are an
emerging pest
throughout the U.S.!**



BED BUG HABITS

- Cannot fly
- Can walk very fast
- Typically hide during the day in dark, protected sites (esp. cracks & crevices)
- Prefer fabric, wood, and paper surfaces
- Can cling tightly to surfaces



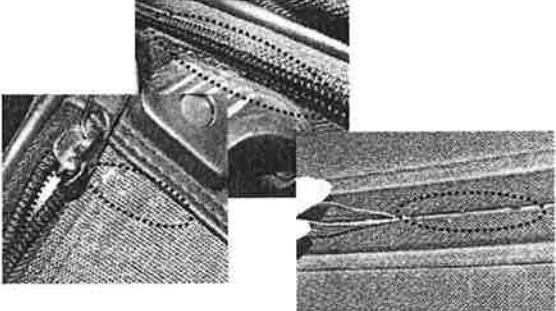
Bed bugs are very good hitchhikers!

Bed bugs can be moved from one place to another by hiding in:

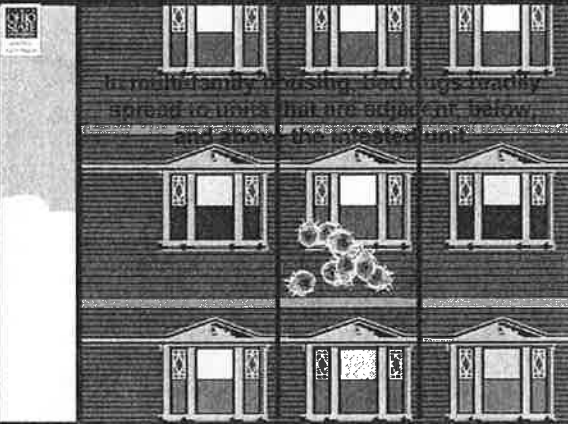
- luggage
- furniture
- bedding
- backpacks, purses, briefcases
- clothing
- ...



Bed Bugs Hiding in Luggage




In multi-family housing, bed bugs readily spread to units that are adjacent, below, or above.



Some Reasons For the Resurgence of Bed Bugs

- International travel and commerce
- Housing with high tenant turnover
- Pesticide use has changed
 - Pesticide bans
 - Baits to control ants & cockroaches
- Insecticide resistance

Bed Bugs
(*Cimex lectularius*)

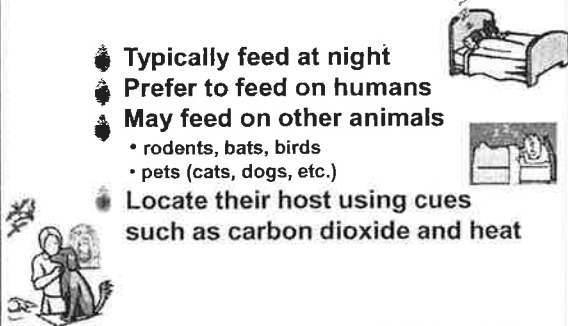


- Insects (true bugs)
- Temporary external parasites
- Feed only on blood
- Often closely associated with hosts' sleeping or resting sites (hide in many places)





**Not caused by bad housekeeping!!
BED BUGS CAN HAPPEN TO ANYONE!**

Bed Bug Feeding Habits

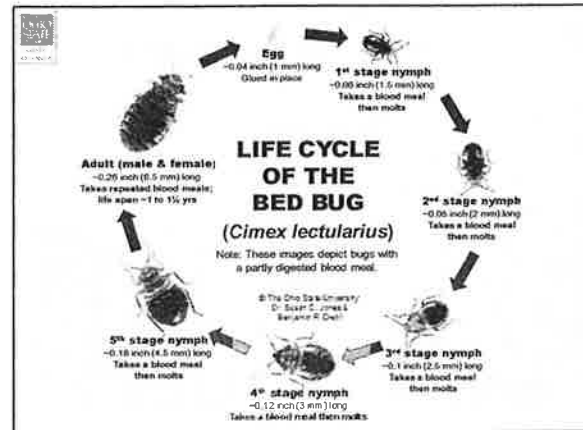
- Typically feed at night
- Prefer to feed on humans
- May feed on other animals
 - rodents, bats, birds
 - pets (cats, dogs, etc.)
- Locate their host using cues such as carbon dioxide and heat



How to recognize if it's a bed bug

- Beak-like mouthparts
- Oval shaped body
- Adults: ~1/4 to 3/8 inch long
- Body flattened (unfed)
- Body swollen (recently fed)



IDENTIFICATION SERVICES

The Ohio State University

- Fee for identification services (\$20 for insect sample)
- ID wide variety of insects and arthropods and plant diseases
- OSU submission form available online: <http://ppdc.osu.edu>

OSU Pest Diagnostic Clinic
614-292-5006

Life History Characteristics Show That Bed Bug Numbers Can Quickly Skyrocket ... (Early Detection and Treatment are Very Important)

- ❖ **Eggs**
 - > Glued in place
 - > 1 – 12 eggs / day / female
 - > A single female can produce ~150 eggs
 - > Hatch in 6 – 17 days
- ❖ **Nymphs (immature bugs)**
 - > Five nymphal stages
 - > Require a blood meal in order to grow
- ❖ **Adults (males & females)**
 - > Require repeated blood meals
 - > Can live 12 – 18 months
 - > Can survive months of starvation

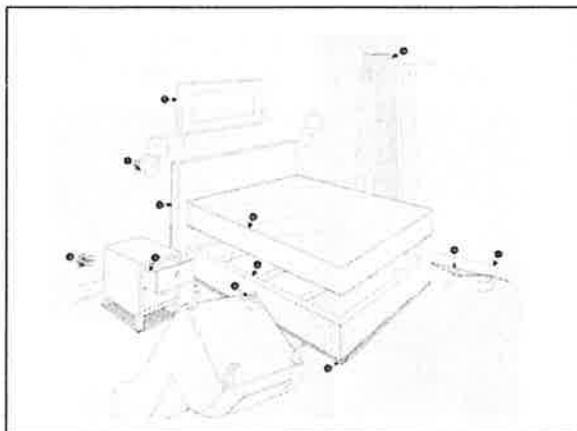
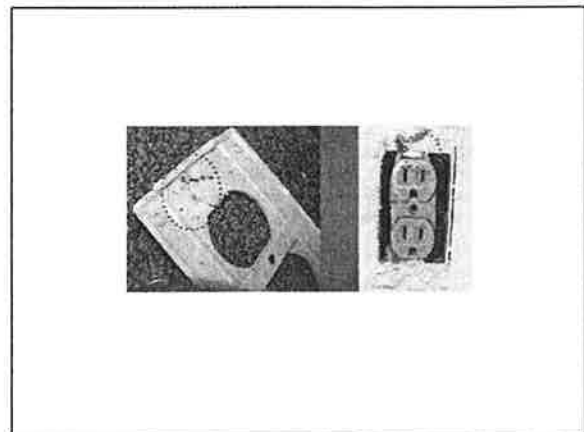
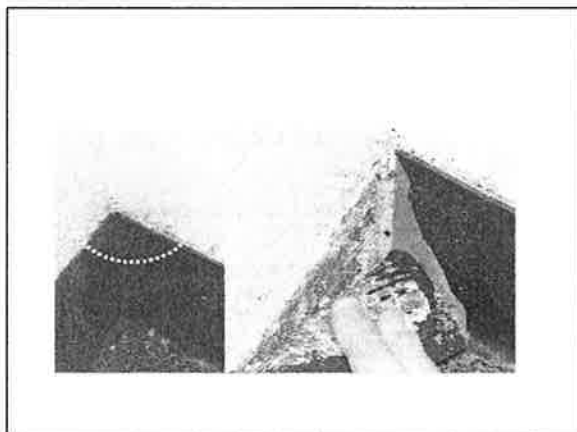
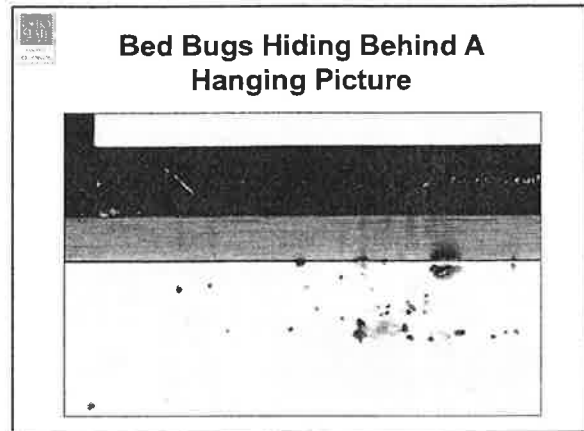
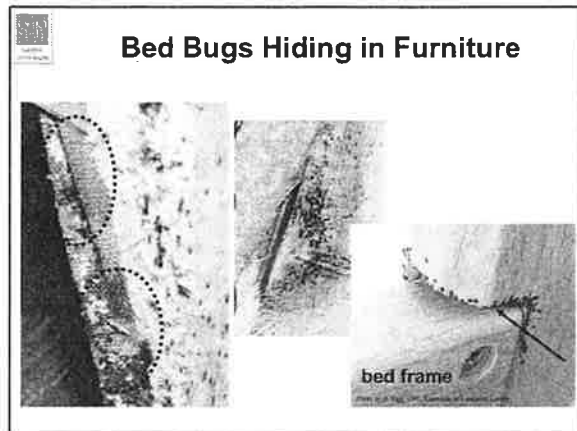
Where do bed bugs hide?



- Mattresses, box springs
- Bed frames
- Furniture
- Carpets and rugs
- Cracks and crevices
 - Baseboards
 - Window frames and door frames
 - Electric outlets and switch plates
 - Drapery pleats
 - Peeling wallpaper
 - Carpet tack strip
- Suitcases

Bed Bugs Hiding in Mattresses and Box Springs






If you wake up with itchy, red welts that weren't there when you went to bed, *perhaps* its bed bugs.

BED BUGS BITES:

- Initial bite is painless
- Resemble bites from other insects & kin
- Some clues that it may be bed bug bites:
 - Typically are on exposed skin
 - Often in groups or rows

Confirmation based on finding bed bug evidence



Injury From Bed Bugs

- Allergic reaction in ~70% of humans
 - Welts
 - Severe itching
- Anemia
- Asthma
- Scratching of bites increases inflammation, can lead to secondary bacterial infections
- No conclusive evidence of disease transmission (reviewed by Goddard & deShazo, 2009. *JAMA* 301(13): 1358-1366)

Detection and Treatment Options

- Thermal Remediation
- Bed Bug Dogs
- Integrated Pest Management

THERMAL REMEDIATION... (fancy way of saying heat treatment!)

- Heat home to 120 – 150 degrees
- Time varies, usually at least 8 hours
- Typically more expensive

CANINE DETECTION

- Often used as a safeguard in busy public spaces
- Assists early detection to avoid costly remediation later
- Check references – do your research!

INTEGRATED PEST MANAGEMENT (IPM) FOR BED BUGS

- Correctly identify the pest
- Use Sanitation measures
- Use non-chemical measures
- Apply insecticides to targeted sites

Contact a professional pest control company to treat for bed bugs

- Make sure properly licensed to apply pesticides
- ODA web site lists licensed pest mgt. companies and applicators





Contact a professional pest control company to treat for bed bugs

Once you've made sure they are properly licensed to apply pesticides:

- It's advisable to obtain at least 3 estimates
- Check for satisfied customer references that relate to bed bug control
- Recognize that bed bug control typically takes several insecticide treatments

Preparing a home/apartment for treatment

Remove clutter!

- Clutter offers many hiding places for bed bugs
- Clutter makes bed bugs difficult to detect
- Clutter makes bed bugs difficult to treat



Launder bedding, clothing, etc.!

- Wash in hot water ($\geq 120^{\circ}\text{F}$)
- ★ Drier on hot setting (≥ 15 mins.)
- Dry clean items
- Bag items after they are inspected/laundered (be sure to seal the bags)



Vacuum thoroughly!



- Use a high efficiency particulate air (HEPA) filtered vacuum
 - vacuum up cornstarch or talc using the attachment as the final step
 - dispose of vacuum bag afterwards
- Heavy-duty vacuum cleaner useful for cracks & crevices
- Vacuum prior to chemical treatment

Don't share your vacuum with other people!

Encase mattresses & box springs!

- Be sure to encase both the mattress & box springs
- Specialized encasements trap bed bugs and eggs
 - May take "1 year to "starve bugs out"
 - Restricts any new bug activity to the exterior of the encasement, where bugs can be more easily treated
- Be careful not to tear or damage encasements and make sure the zipper stays closed
- Some suppliers: Clean Rest, Mattress Safe, National Allergy Supply, Protect-A-Bed, ...



What if can't pay for treatment?

- Follow steps for prep (clean, vacuum)
- Contact exterminators to see if payment plan is option
- Try to limit exposure to infested areas to limit spread



What shouldn't I do for a bed bug problem?

Typically, you shouldn't dispose of furniture.

- Infested furniture usually can be treated.
- Bed bugs can quickly infest replacement furniture.
- Items placed on the curb often are picked up and reused, thereby spreading bed bugs to other households.



What shouldn't I do for a bed bug problem?

DO NOT apply insecticides to

- Human skin
- Clothing
- Bed linens
- Bedding

Products containing DEET have not been shown to repel bed bugs



BUYER BEWARE:

Grocery store insect sprays won't eliminate a bed bug infestation!



- Must be sprayed directly on the bed bugs ('kills on contact')
- Most bugs are hiding and **WILL NOT** be killed
- Little or no residual activity (the chemical breaks down quickly)



BUYER BEWARE:

Boric acid products don't work!

- Boric acid does not kill bed bugs.
- Boric acid is a stomach poison that must be eaten by an insect.

Remember that bed bugs feed only on blood.



DO NOT use "bug bombs" against bed bugs!

- "Bug Bombs" ("foggers") don't work
- Few bugs will be killed!
- "Bug Bombs" may cause bed bugs to scatter!!!

"Bug Bombs" will worsen the bed bug problem!!



COAAA has stayed on the forefront of the bed bug problem in central Ohio.

- Three staff on COBBTF
- Clinical practices group meetings
- Written policy
- Safety committee tracking locations
- Trainings (new staff)
- Chairs and dryer

Things to consider when entering an infested area:

- What are you wearing?
 - Light colored clothing
 - Booties
 - Tyvek suits



Things to consider when entering an infested area:

- Are you going to need to sit?
 - 'bed bug' chairs



Things to consider when entering an infested area:

- How is the client going to feel?
 - Stigma attached
 - Provide education
 - Company policy
 - Ensure therapeutic relationship



Things to consider when entering an infested area:

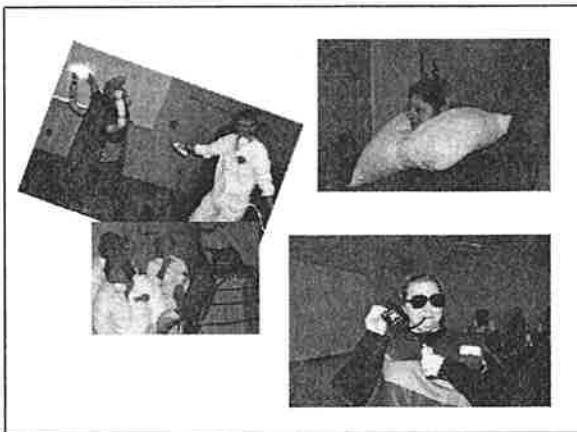
- Where do you go after visiting an infested area?
 - Carry extra clothes
 - Carry trash bags

WHAT *NOT* TO DO

- Don't spray yourself with mosquito repellent (DEET). It is useless against bed bugs!
- Don't use rubbing alcohol indiscriminately! Alcohol is VERY flammable, and it should NEVER be sprayed indoors.
- DON'T use Diatomaceous Earth indiscriminately
- Don't EVER spray yourself, your clothing, or your shoes with ANY insecticide! Many insecticides can be absorbed through your skin.

After treatment

- Mattress covers
- Monitor environment
- Provide support for PTSD

**Support for Professionals**

- Address ongoing feelings
- Use PPE as needed to prevent exposure
- Discuss need for dryer

Bed Bugs in the Workplace**Survey the Premises**

- Train your staff to know what bed bugs look like and how to identify them.
- Carefully inspect the area where the suspected bed bug was found as soon as you can.

**Bed Bugs in the Workplace**

- Because bed bugs like to hide, it is important to know where to look for them:
 - check the folds and seams in upholstery, lockers, baseboards, cubicle walls, furniture joints and corners, electrical outlets, switches, piles of papers and other nooks and crannies.

Bed Bugs in the Workplace

Respond To Your Findings: If you find more bed bugs...

- Don't kill them or crush them! It is impossible to make a positive identification from smashed bug parts!
- Put the live bug(s) in a pill bottle or a tightly sealed plastic bag so that your pest management professional (PMP) can make a positive identification.
- Try to isolate the area where the bug(s) were found.

Bed Bugs in the Workplace

Act Quickly:

- Contact your PMP immediately.
- Verify bug, request treatment plan and follow-up.
- Treatment should not occur while people are in the area.

Bed Bugs in the Workplace

Debunk the Misconceptions

- When one or two bed bugs, are found, most people assume that there are many more in the building, which isn't always the case.
- Bed bugs are a pest, but they shouldn't be a cause for panic. There is no need to suspend your operations, especially if the bed bugs were only found in a few isolated places.



Bed Bugs in the Workplace

- Companies with high contact with the public (schools, hospitals) often use canine detection monthly to help identify early infestations.
- Schools and companies may encourage putting backpacks and purses in a rubbermaid container.
- Verifi units can be placed in corners of high traffic areas to help detect infestations.
 - <http://www.fmcprosolutions.com/BedBugs/>
 - Ohio Exterminating Company sells them, other Columbus retailers

