



Don't Let The Bed Bugs Bite!!!

What Every School Community Needs To Know



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Associate Professor

Bed Bugs

(*Cimex lectularius*)

- External parasites
- Blood feeders
- Typically feed at night
- Prefer to feed on humans
- Also may feed on
 - rodents
 - bats
 - birds
 - pets (cats, dogs, etc.)



Bed bugs are very good **hitchhikers!**

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

- luggage
- furniture
- bedding



Bed bugs are very good hitchhikers!

- Clothing
- Backpacks
- Purses
- Books
- Other items carried into schools



Schools typically have bed bug problems when students or staff introduce bed bugs from infestations occurring in their homes.

BE PROACTIVE

- Educate the school community on bed bugs
- Promptly respond to a bed bug case



Presentation Outline

A Bed Bug Overview

- Myths
- Historical perspective
- Identification
- Habits
- Prevention
- Integrated pest management (IPM)



Fact? or Fiction?

Fiction!!!



“You can’t see bed bugs in a home-- they are microscopic in size.”

Fact!!!



Bed bugs are small, but they can be seen without a microscope. It helps to know what you are looking for.

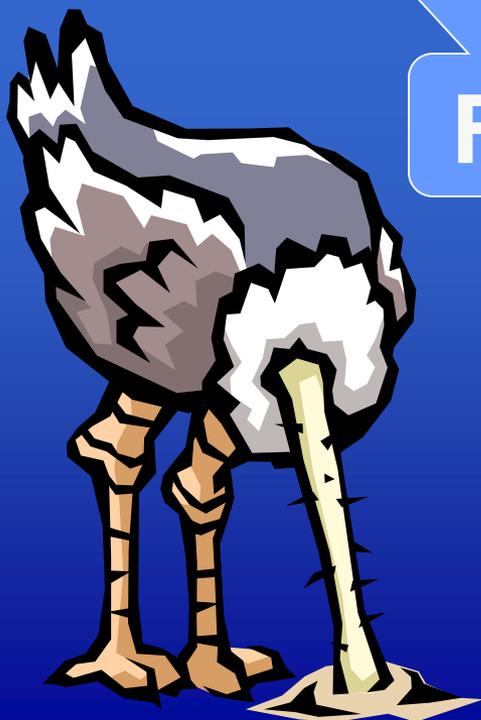
Fact? or Fiction?

Fiction!!!



“If someone has bed bugs, it is because of their bad housekeeping habits.”

Fact!!!



Even the best housekeeper can have a bed bug problem. However, clutter can greatly interfere with control efforts.

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



- Bed bugs are mentioned in
 - ancient Egyptian papyrus
 - Greek literature in 419 BC
- Bed bugs were introduced to North America by colonists from Europe

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



DAILY NEWS | NY Local

New York bedbug complaints increase 34% in a year

BY [Adam Lisberg](#)

DAILY NEWS CITY HALL BUREAU CHIEF

Tuesday, February 17th 2009, 4:00 AM

AP

New York's bedbug infestation is getting worse, with **almost 10,000 complaints** to the city last year -- one-third higher than the year before. ...



New York City Department of Education:

“Although, at present, there is no evidence of a major infestation or harborage within NYC school buildings, these tiny insects have been occasionally showing up, mainly on clothing.”

<http://www.opt-osfns.org/dsf/reference/news.aspx?newspage=News&newsid=27>

Bedbugs bite into schools

By A. Montefinise and K. Boniello

New York Post

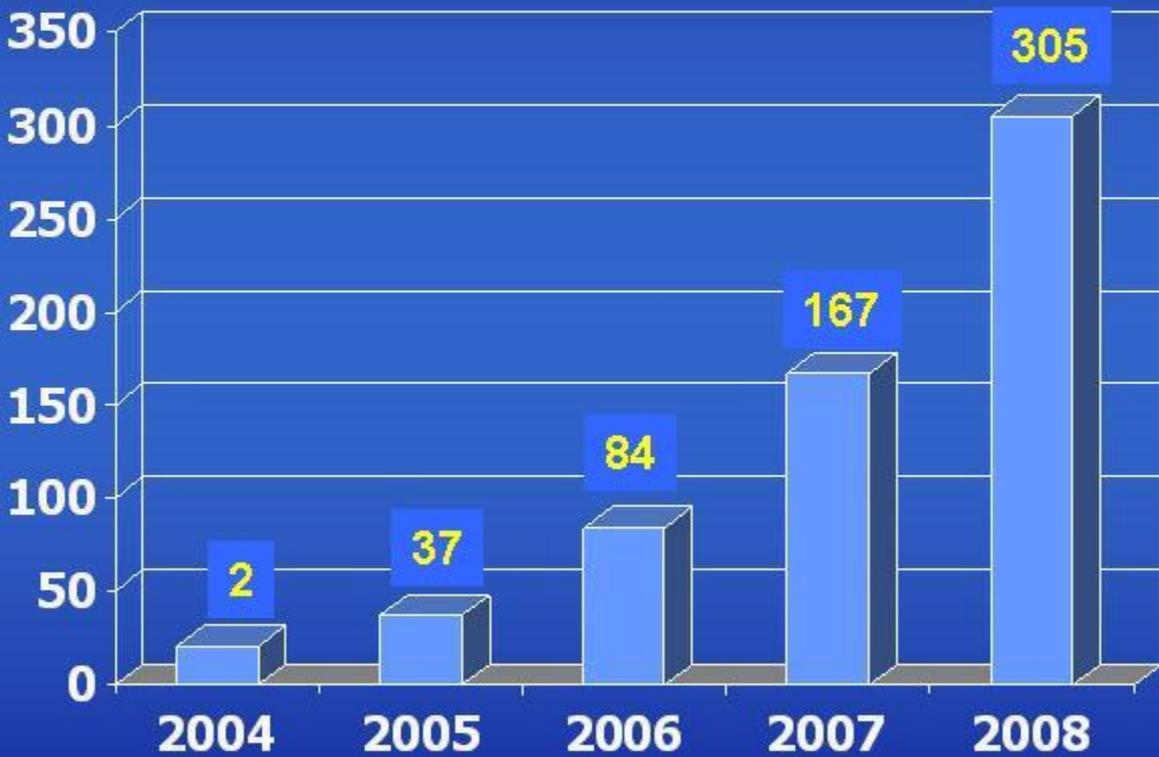
1 April 2007

34 bed bug cases at 24 public schools in Oct. & Nov. 2006

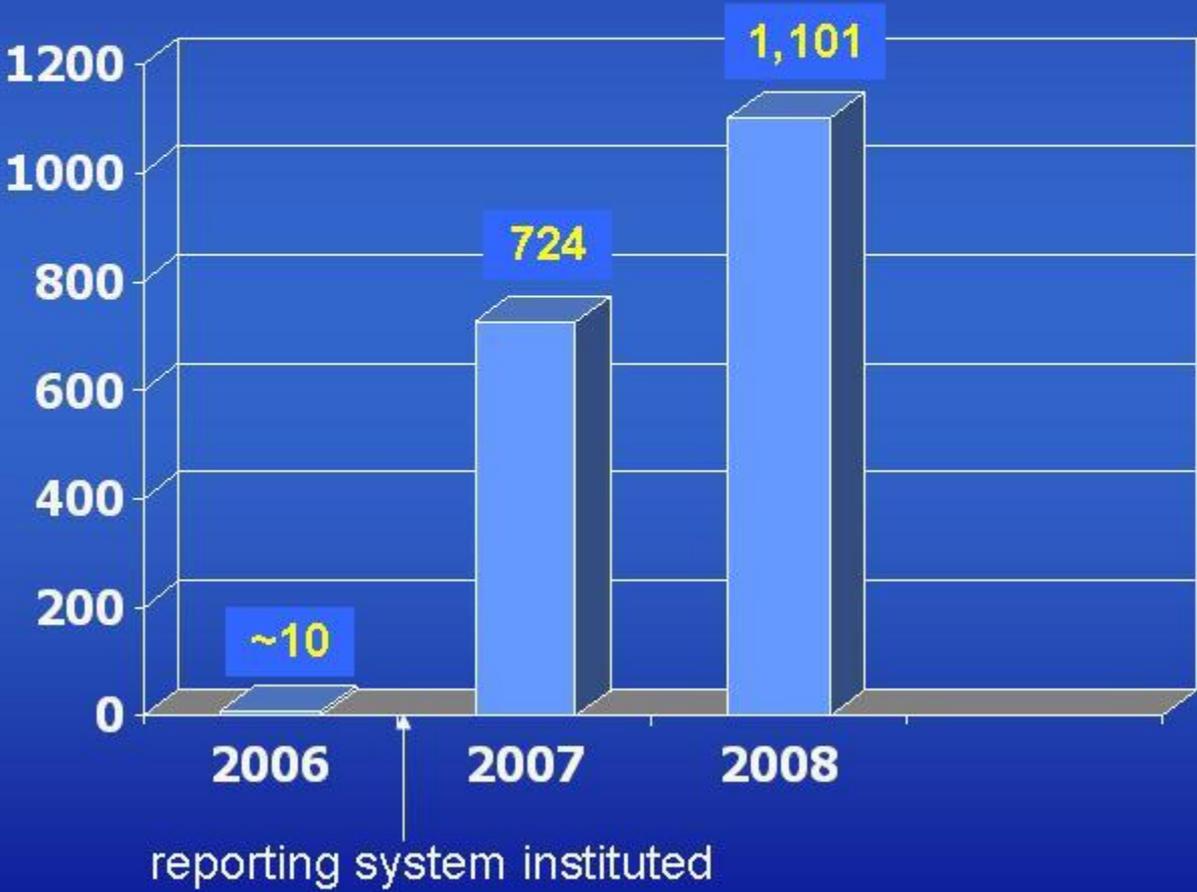
72 bed bug cases at 43 public schools in Jan. & Feb. 2007



Bed Bug Complaints to Hamilton County Public Health Department



Bed Bug Complaints to Cincinnati Health Department



Some Reasons For the Resurgence of Bed Bugs

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

--IDENTIFICATION--

Shape and Size



- Beak-like mouthparts
- Oval shaped
- Body flattened (unfed bed bug)
- Body swollen after feeding
- Adults: ~1/4 - 3/8 inch long
- Young nymphs (immature bugs) are tiny (<<1/10 inch long)

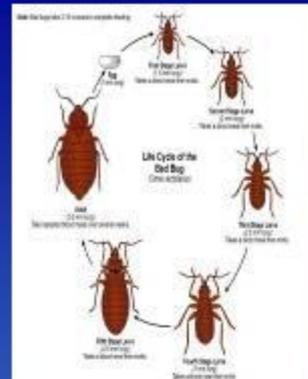
--IDENTIFICATION-- Color



- Very young nymphs:
 - almost colorless (unfed)
 - crimson (fed)
- Adults and older nymphs:
 - various shades of brown (unfed)
 - reddish brown (fed)



DEVELOPMENTAL STAGES



❖ Egg

- 1 – 12 eggs / day / female
- Glued in place
- Hatch in 6 – 17 days



❖ Nymphs (immature bugs)

- 5 nymphal stages
- Require a blood meal in order to grow



❖ Adult

- Can live 12 – 18 months
- Can survive for months without food

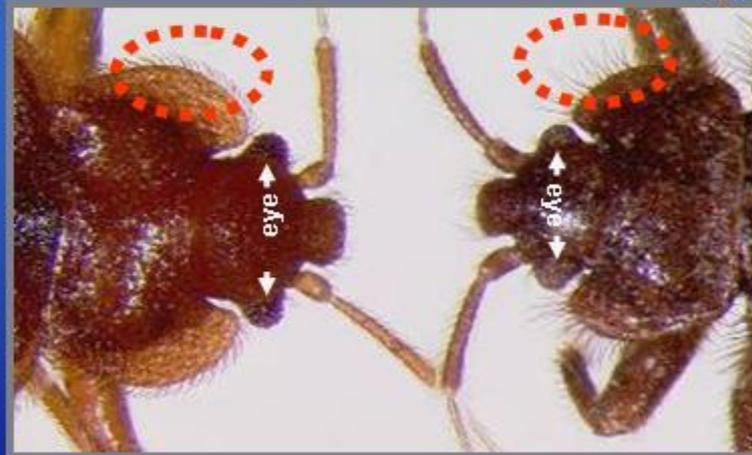
Bed Bug

(*Cimex lectularius*)



Bat Bug

(*Cimex adjunctus*)



IDENTIFICATION SERVICES

- **The Ohio Department of Health (ODH)**
 - A free service to Ohioans (including schools)
 - ID insects, spiders or other arthropods of medical or public health significance (e.g., bed bugs, wasps, flies, maggots, ...)
 - ODH submission form available online
 - http://www.odh.ohio.gov/odhPrograms/dis/zoonoses/vbdp/vb_dref.aspx

ODH Zoonotic Disease Program ID Service
614-752-1029

- **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

BED BUG HABITS

- Cannot fly
- Can walk very fast
- Can cling tightly to surfaces

**Not caused by bad housekeeping!!
Not a sign of uncleanness!!**

BED BUG FEEDING HABITS

- Blood feeders
 - Humans (preferred host)
 - Rodents, bats, birds, pets
- Attracted by carbon dioxide & body heat
- Typically feed at night



Recognizing Bed Bug Bites

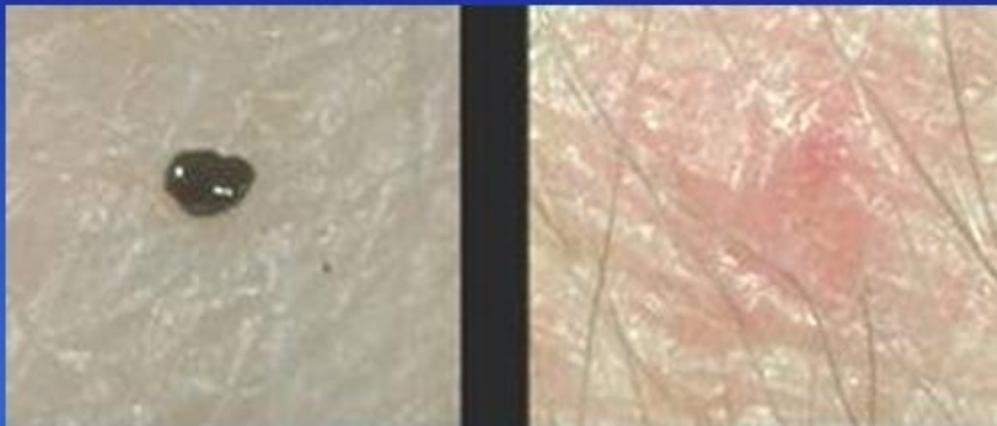


- Resemble bites from other insects & arthropods
- Typically no red spot at the center (such as with fleas and black flies)
- Typically occur on exposed skin
 - Neck and face
 - Shoulders and arms
 - Etc.
- Rarely occur on the palms or soles (such as with scabies mites)
- Often occur in rows or groups
- Confirmation based on finding bed bug evidence

INJURY FROM BED BUGS



- Initial bite is painless
- Bite reactions vary from person to person
- Some people have an allergic reaction to the injected saliva
 - Swelling
 - Welts
 - Severe itching (hrs to days)
- Scratching of bites increases inflammation, can lead to secondary bacterial infections



Photos courtesy of Dale Hodgson, Rose Pest Solutions, Inc.

INJURY FROM BED BUGS



- Sleeplessness
- Agitation
- Anxiety
- ...
- No conclusive evidence of disease transmission

BED BUG HABITS

- Hide during the day
- Hide in dark, protected sites
- Prefer fabric, wood, and paper surfaces



BED BUG HIDING PLACES

- Mattress, box springs
- Bed frame
- Furniture
- Cracks and crevices
 - Carpet tack strips
 - Baseboards
 - Window frames and door frames
 - Electric outlets and switch plates
 - Wall hangings
 - Drapery pleats
 - Peeling wallpaper
 - Ceiling moldings
 - etc.



BED BUGS CAN INFEST:



- Hotels and motels

- Dorms

- Shelters

- Apartment complexes

- Private homes

- Planes, buses, trains, ships

- etc.

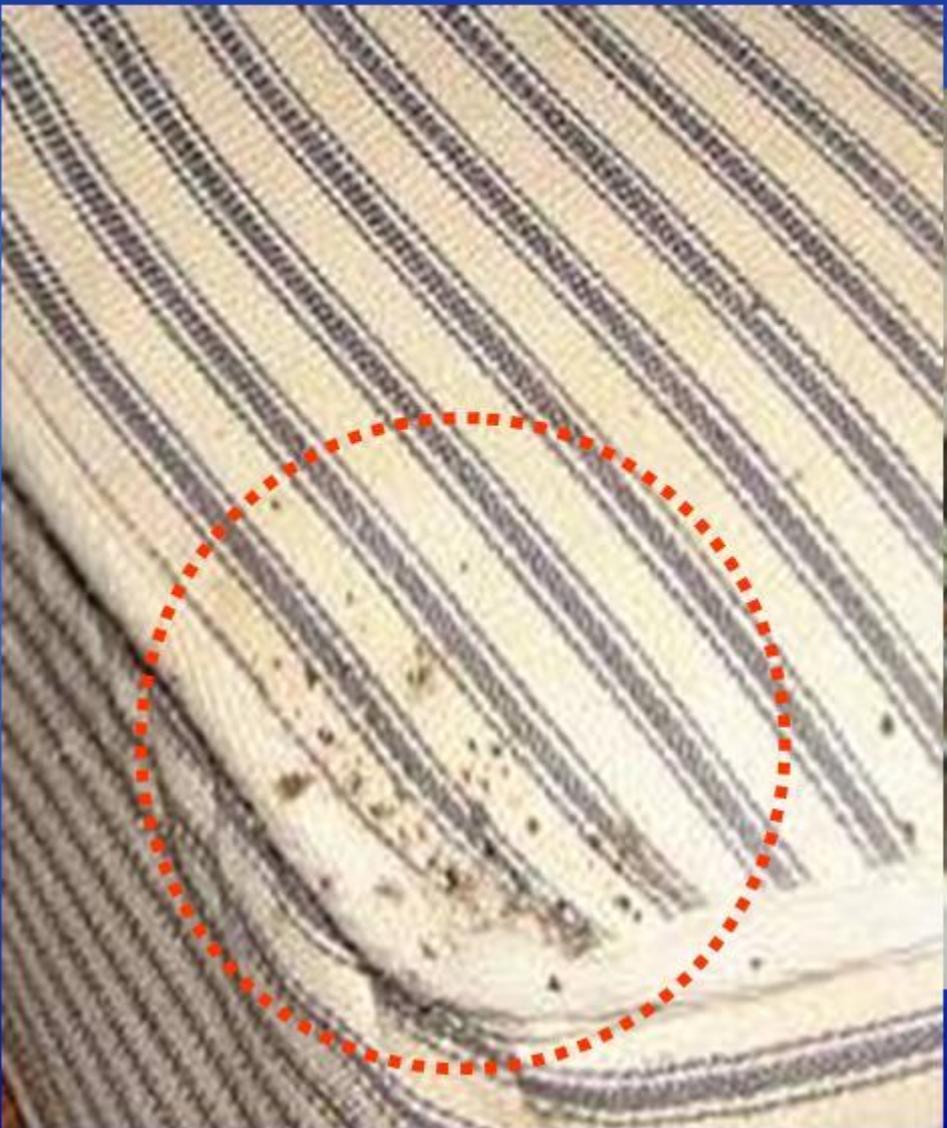


Recognize the telltale signs of bed bugs!

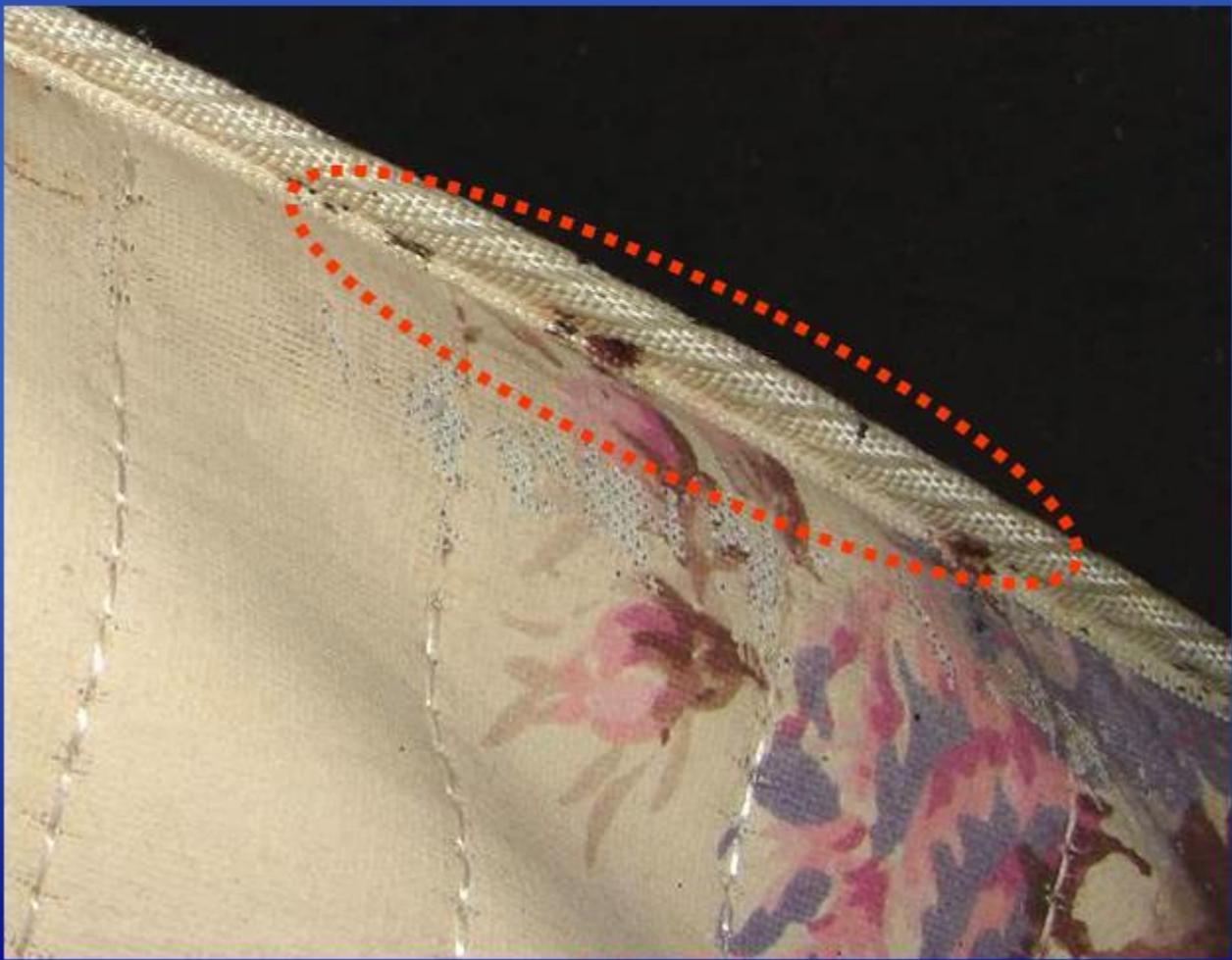
- Welts on exposed skin
- Black fecal spots
- Shed skins & eggshells
- Live bed bugs (nymphs & adults)
- Blood stains from crushed bugs



TELL-TALE SIGNS OF BED BUGS



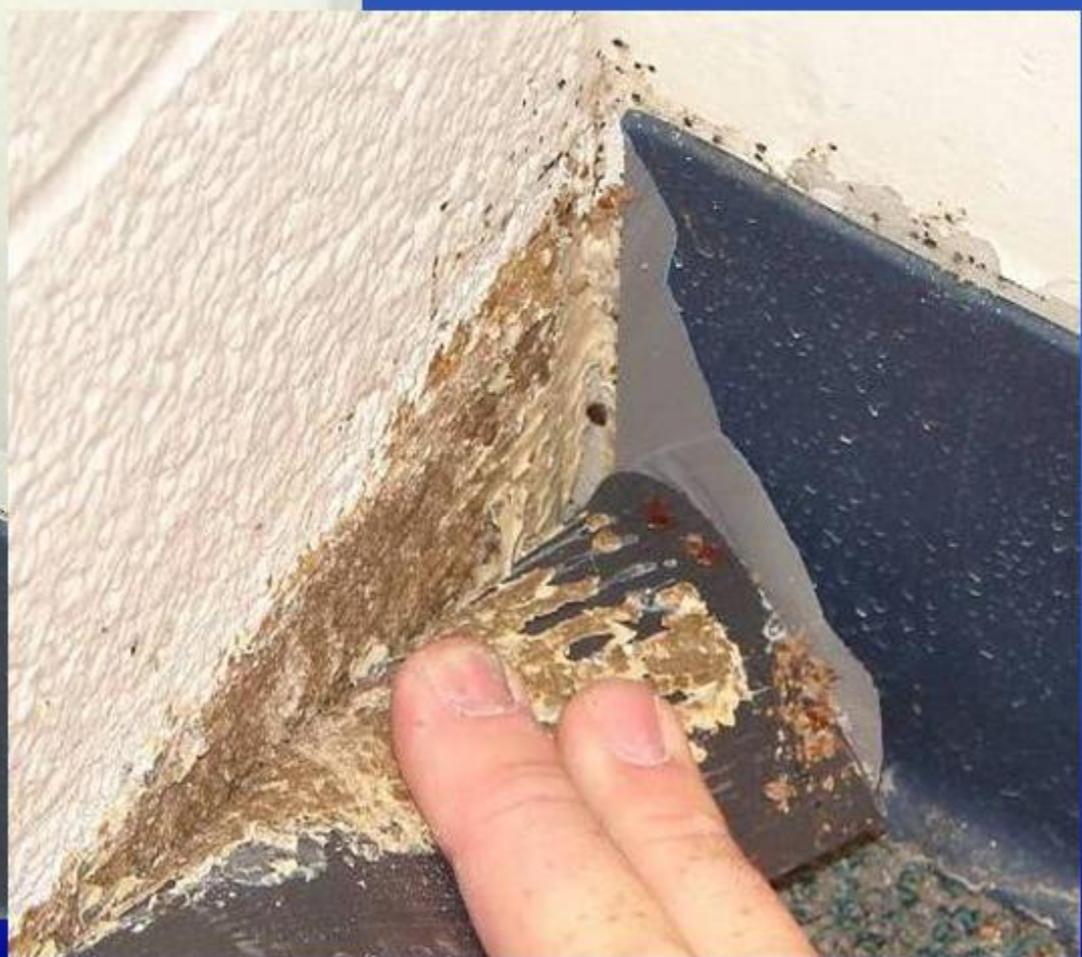
TELL-TALE SIGNS OF BED BUGS



TELL-TALE SIGNS OF BED BUGS



TELL-TALE SIGNS OF BED BUGS



TELL-TALE SIGNS OF BED BUGS



Bed Bug Prevention

- Recognize the tell tale signs of bed bugs
- Take measures to reduce the risk of bed bug infestation
- Prevent bugs from spreading to new sites

Did you check for signs
of bed bugs in your
hotel/motel room when
you last traveled?



BED BUG PREVENTION FOR TRAVELERS

Make it **STANDARD PRACTICE** to check
for bed bugs in hotel/motel rooms!

- Pull back the bedding and look for black fecal spots on mattress & box springs (especially along seams)
- Carefully examine the underside of the bed skirt
- Look for bb signs along bed frame
- Open nightstand drawers and look for bb signs along inner/outer edges
- Look for bb signs along baseboards



BED BUG PREVENTION FOR TRAVELERS

**Reduce the chances of getting bed bugs
from hotel/motel rooms!**

- **Keep clothes in your zipped suitcase**
 - Don't keep clothes in hotel chest-of-drawers
 - OK to hang clothes in closet
- **Keep your suitcase on the luggage rack**
(after first inspecting it for bb signs)
 - Don't store your suitcase on the bed, floor,
or upholstered furniture

BED BUG PREVENTION AT HOME

Don't bring infested items home!

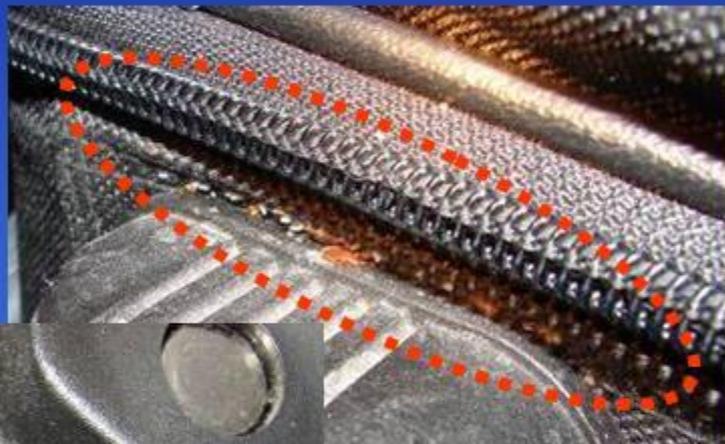
- Inspect clothing and luggage of travelers



- Inspect secondhand beds, bedding, furniture, & clothing



TELL-TALE SIGNS OF BED BUGS



Fact? or Fiction?

Fiction!!!



“If I ignore the bed bug problem, it will eventually go away.”

Fact!!!



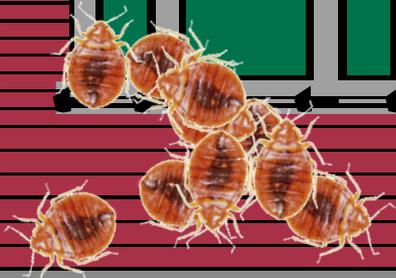
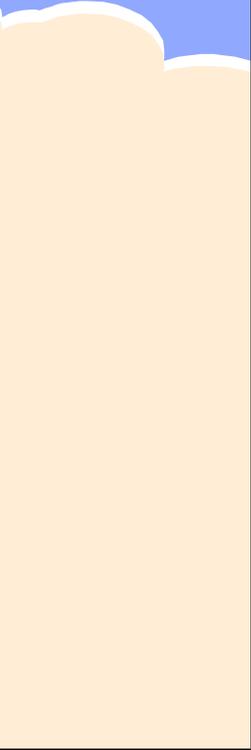
If untreated, the bed bug problem will become **MUCH** worse.



&



**CENTRAL OHIO
BED BUG
TASK FORCE**



Management Tips

If bed bug evidence is found:



Immediately contact a professional pest control company for treatment. Use a licensed, reputable pest management professional that has considerable experience treating for bed bugs.

- Verify that potential pest control co. or individual is properly licensed to apply pesticides
- ODA web site lists licensed pest control companies and applicators

Home | Newsroom | Contacts

Ohio.gov | Department of Agriculture

Google Custom Search

Divisions | Forms | Regulatory Programs | Promotional Programs | Laws & Rules | Licensing | Meetings & Notices

Ohio Department of Agriculture **Pesticide & Fertilizer Regulation Section**

<p>Programs and Information</p> <p>Pesticide and Fertilizer Section Home Plant Industry Division</p> <p>Ohio Pesticide License Application</p> <p>Commercial Applicator (Form: 4204-003) Pesticide Business (Form: 4204-003) Dealer (Form: 4204-003) Recert Opportunities More on Commercial Licensing</p> <p>Commercial Study Materials</p> <p><u>Online Services</u> - </p> <p>Application Information</p> <p>Licensed People Search</p> <p>Licensed Company Search</p> <p>Exam Registration</p>	<p>Pesticide & Fertilizer Regulation Section</p> <p>Ohio Department of Agriculture Division of Plant Industry Pesticide & Fertilizer Regulation Section 8995 East Main Street Reynoldsburg, OH 43068-3399 Phone: (614) 728-6987 Tollfree: 800-282-1955 Email: pesticides@agr.ohio.gov</p> <p>The Pesticide & Fertilizer Regulation section licenses pesticide dealers and applicators and offers training and testing sessions throughout the year. This not only helps assure the safe use of pesticides, it also helps prevent misuse and mishandling. The section licenses 50,000 pesticide applicators and more than 13,000 pesticide products. This section also administers the Clean Sweep Program and the Pesticide Container Recycling Program to protect consumers and the environment. The programs assist pesticide users with proper disposal of unusable and out-of-date pesticides and are free of charge to the public.</p> <hr/> <p>PESTICIDE RESOURCES</p> <p>Pesticide Education Program</p> <p>Commercial P.E.P.</p> <ul style="list-style-type: none">• Study Materials <p>Private P.E.P.</p> <ul style="list-style-type: none">• Study Materials <p>Certification Opportunities</p>
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**OH Dept. of Agriculture
Pesticide Regulation Section
614-728-6987; 800-282-1955
http://www.agri.ohio.gov**

Management Tips

If bed bug evidence is found:



Use a professional pest control company for treatment

- **Licensed professionals can apply restricted use pesticides**
- **Treating for bed bugs is time-intensive and labor-intensive**
- **Team-approach is useful for locating and treating bed bugs**
- **Treat any active bug harborage as soon as it is located, then continue the in-depth inspection**

Management Tips

If bed bug evidence is found:



Typically 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

INTEGRATED PEST MANAGEMENT (IPM) FOR BED BUGS:

Correctly identify the pest

+

Use sanitation measures

+

Use non-chemical measures

+

Apply insecticides to targeted sites



SANITATION



❖ Exterior of the building

- Remove wild birds, bats, rodents (alternative hosts)
- Caulk cracks and crevices
- Repair or screen any openings



❖ Interior of the building

- Repair plaster cracks
- Glue loosened wallpaper



SANITATION

★ ★ ★ • Remove clutter

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

SANITATION

★★★ • **Laundry 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

• **Steam cleaning**

- Dry steam preferable (less moisture)
- Provides no residual protection
(area is prone to re-infestation)



Vacuumping

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



Non-Chemical Measures-- Encasements

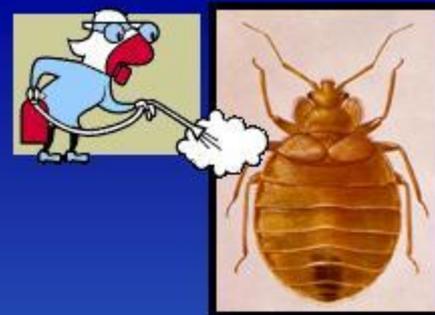
- Be sure to encase both the mattress & the box springs
- Trap bed bugs and eggs
- May take 1 year to “starve bugs out”
- Restricts any new bug activity to the exterior of the encasement, where bugs can be more easily treated
- Useful to protect new mattresses & box springs
- Be careful not to tear or damage the encasements

The Labeling is the Law



DIRECTIONS FOR USE

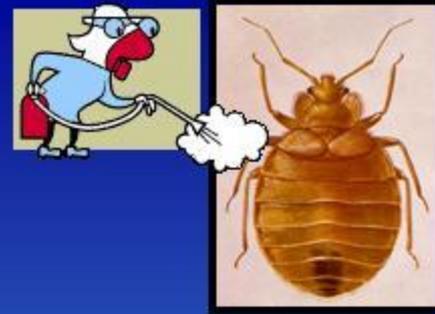
It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.



Insecticides

- Residual insecticides (usually pyrethroids)
- Low impact products (diatomaceous earth, silica gel, insect growth regulators, etc.)
- Don't keep using the same insecticide (rotate insecticide use)
- Spot treat all harborage sites





Insecticides

- DO NOT apply insecticides to
 - Human skin
 - Clothing
 - Bed linens
 - Bedding

Products containing DEET have not been shown to repel bed bugs



BUYER BEWARE

Products That "Kill On Contact"

- **Need to spray it directly on the bed bugs**
- **Most bugs are hiding and WILL NOT be killed**
- **Typically provides only short-term effects**
- **Has little or no residual activity (the chemical breaks down quickly)**

BUYER BEWARE

“Bug Bombs”

Do NOT use “bug bombs” against bed bugs

- Few bugs will be killed
- They will cause the bugs to scatter

BUYER BEWARE

Boric Acid Products

- **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)**

INTEGRATED PEST MANAGEMENT (IPM) FOR BED BUGS:

✓ Correctly identify the pest

+

✓ Use sanitation measures

+

✓ Use non-chemical measures

+

✓ Apply insecticides **to targeted sites**



For More Information

<http://centralohiobedbugs.org>

- Links to bed bug fact sheets
- Parent or guardian notification letter for schools
- Bed bug identification & management guidelines for schools
- Etc.

Home • Target Areas • Bed Bug FAQs • Partners • Links • Photos • About Us • Contact Us

The Central Ohio Bed Bug Task Force formed in November 2009 because of the growing number of bed bug infestations in Franklin County. It is a collaborative endeavor including representatives from local governments, health departments, social service agencies, pest control applicators, landlord and tenants rights groups, fire departments, the Ohio Departments of Agriculture, Commerce, Health, and the Ohio State University Extension.

The goal of the task force is to prevent bed bug infestations through education and serve as a resource to those struggling with an infestation.

No community is immune to bed bugs. Socio-economic status is not an indicator of one's susceptibility to a bed bug infestation nor is it an indicator if someone is dirty. Anyone can experience an infestation.

Bed Bug Brochure
Click [HERE](#) for more information

National Geographic Video Link
Click [HERE](#) for more information

University of Kentucky's College of Agriculture article about Bed Bugs
Click [HERE](#) for more information

OSU Extension Fact Sheet on Bed Bugs
Click [HERE](#) for more information

Upcoming Trainings
Bed Bugs are back...Keep them out of the firehouse!
January 25, 2009
8:30 a.m. - 1:15 p.m.
Click [HERE](#) for info

Responding to a Bed Bug Incident at School

- Obtain samples of the insect for positive ID
- Arrange for professional inspection ASAP
- Try to determine who has bed bug infestations at home so that you can offer guidance and suggestions:
 - Provide educational material on bed bugs
 - Communicate the importance of eliminating the bed bug infestation at home
 - Suggest limiting the number of items brought to school
 - Suggest storing school items inside a sealed container away from beds and upholstered furniture at home

Reference: L. J. Pinto, R. Cooper, & S. K. Kraft. 2007. *Bed Bug Handbook: The Complete Guide to Bed Bugs*. Pinto and Associates, Inc. Mechanicsville, MD.

Responding to a Bed Bug Incident at School

- **Have a trained individual (e.g., school nurse) inspect items that are brought into school**
 - Be discreet
 - Be respectful
 - Be aware of unnecessary social stigmas
 - Inspect items prior to entering classrooms

Reference: L. J. Pinto, R. Cooper, & S. K. Kraft. 2007. *Bed Bug Handbook: The Complete Guide to Bed Bugs*. Pinto and Associates, Inc. Mechanicsville, MD.

For More Information

<http://ohioline.osu.edu>

College of Food, Agricultural, and Environmental Sciences

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<http://ohioline.ag.ohio-state.edu>

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OSU Extension

Fact Sheets:

- HYG-2105 (Bed bugs)
- HYG-2105A (Bat bugs)

SUMMARY

A Bed Bug Overview

- Myths
- Historical perspective
- Identification
- Habits
- Prevention
- Integrated pest management (IPM)



Thank You!



Sleep tight,
and don't let the ...
... well, you know the rest

