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# INTRO TO BED BUGS IN APARTMENTS AND SHELTERS

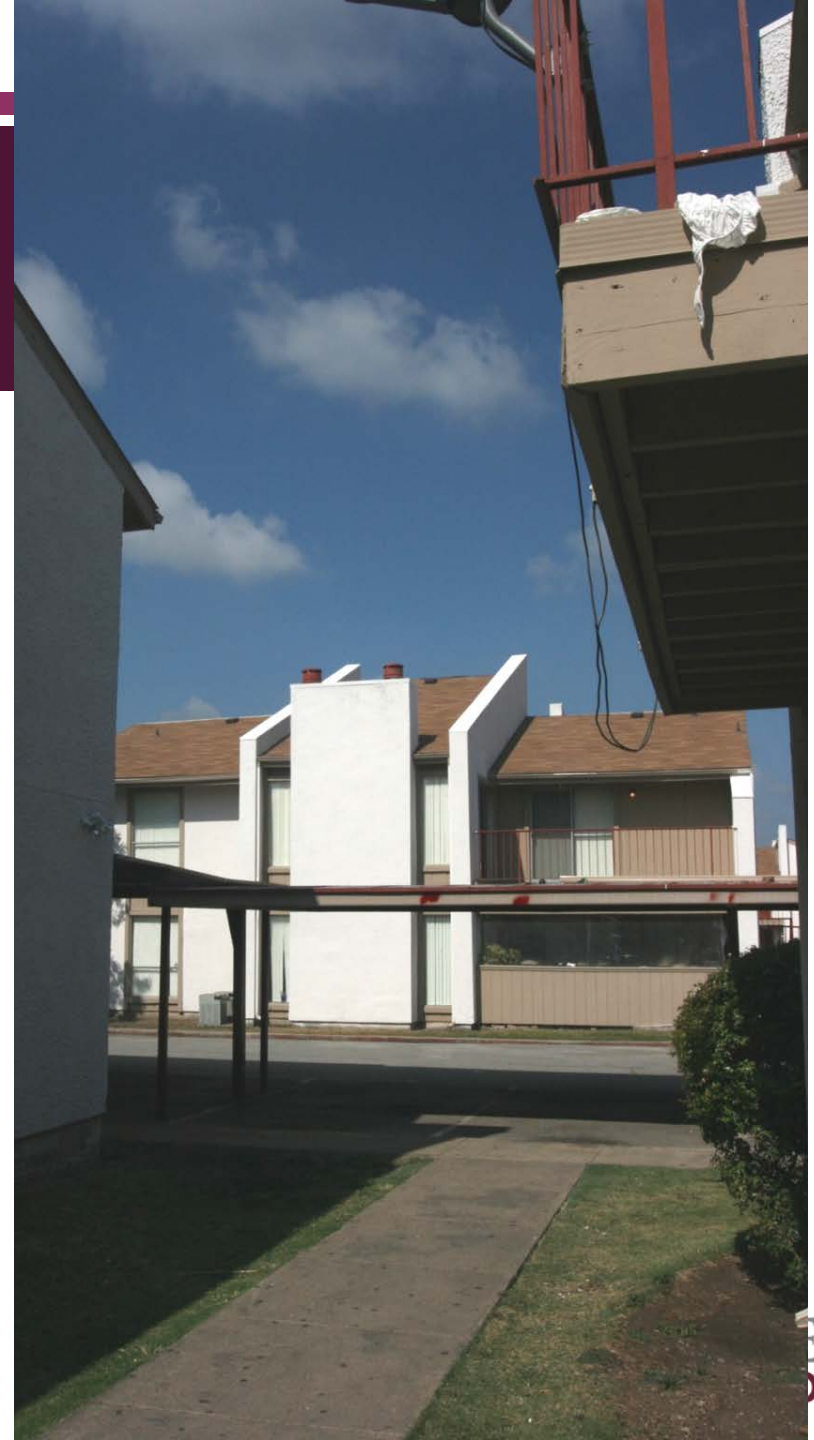
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# TODAY'S PROGRAM

- Welcome
- Intro to bed bugs
  - Myths about bed bugs
  - Biology of bed bugs
  - Health issues
  - Avoiding bed bug transport
- Control options
- Resources



# MYTHS ABOUT BED BUGS

**Bed bugs are  
too small to see**



## ADULT BED BUG

- Range in size from size of pin head to apple seed
- Flattened, oval to pear-shaped body
- Reddish brown



# MYTHS ABOUT BED BUGS

Bed bugs weren't  
a problem until  
they were brought  
from \_\_\_\_\_.





A LITTLE  
HISTORY...

BED BUGS  
IN WWII

**START FROM** *'Scratch'*  
EXAMINE YOUR BUNK AND IMMEDIATE AREA FOR BEDBUGS



"BE ESPECIALLY WATCHFUL AT NIGHT" AND  
ALLOW NONE TO PASS AT ANY TIME. DON'T  
LET A BED BUG PUT THE *Bite* ON YOU!  
SEEK, SIGHT, AND DESTROY!

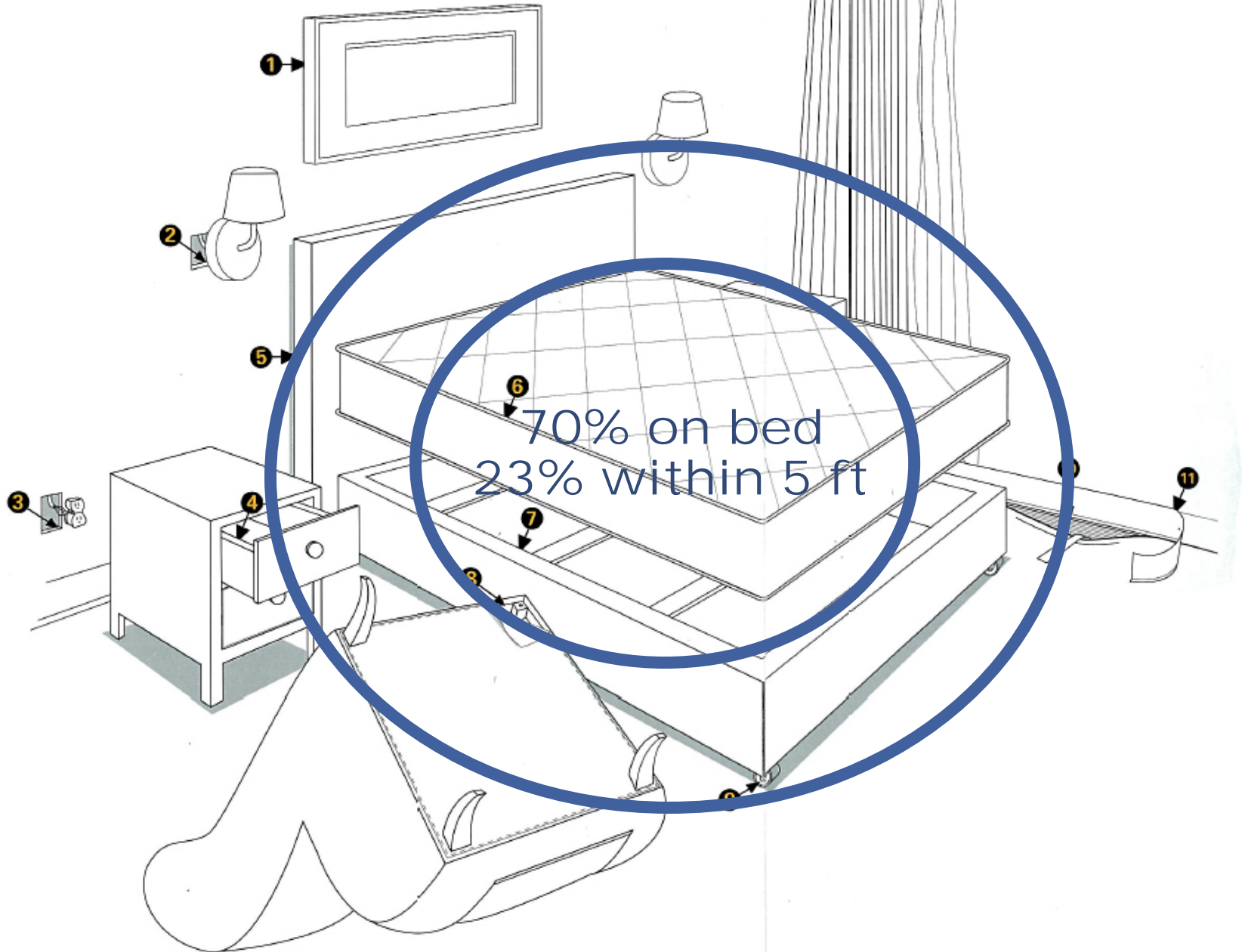
# MYTHS ABOUT BED BUGS

**You get rid of  
bed bugs by  
discarding  
infested  
mattresses**





# 7% Other harborages



# MYTHS ABOUT BED BUGS

You can get rid of bed bugs by setting off foggers (the more the better)



# MYTHS ABOUT BED BUGS

It's best to wait  
until guests  
complain



# PEOPLE AND BED BUG BITES



- Prefer feeding during darkness
- Bites painless
- More than 50% of people in multifamily housing with bed bug infestations will not report a problem
- Perhaps 1 in 20 people react obviously to bed bug bites

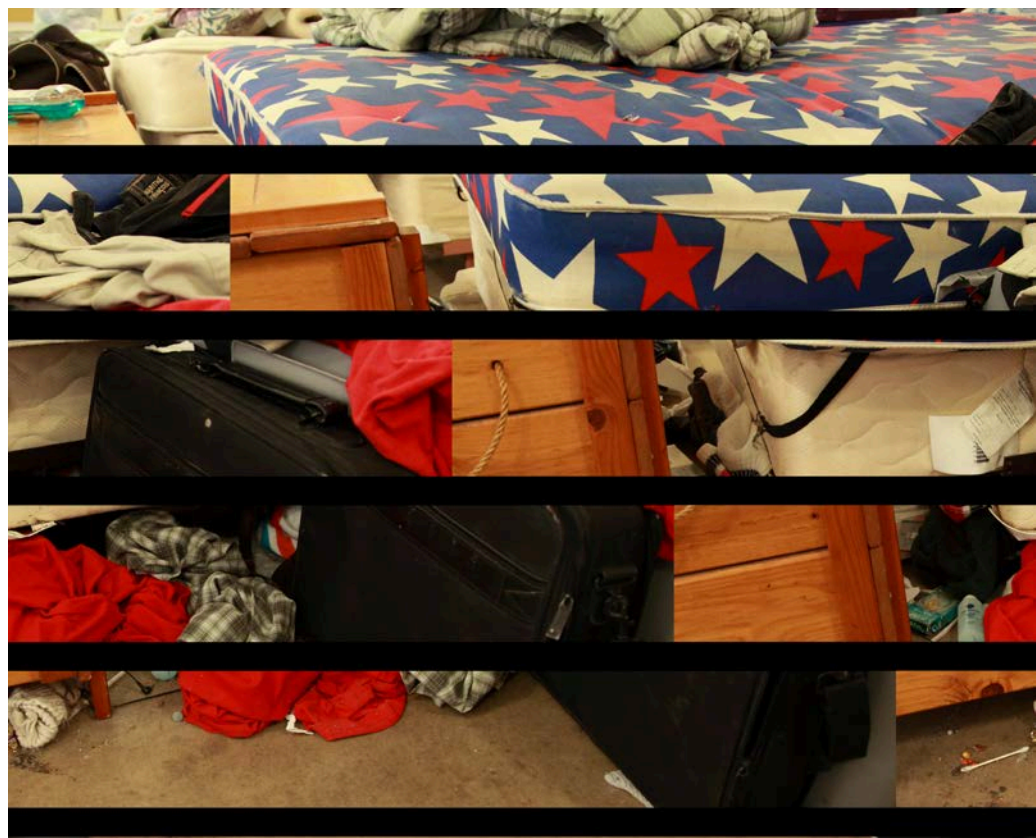
# MYTHS ABOUT BED BUGS

Dirty, messy  
people get bed  
bugs



# CLUTTER DOES NOT BREED BED BUGS

- But clutter makes bed bugs harder to control

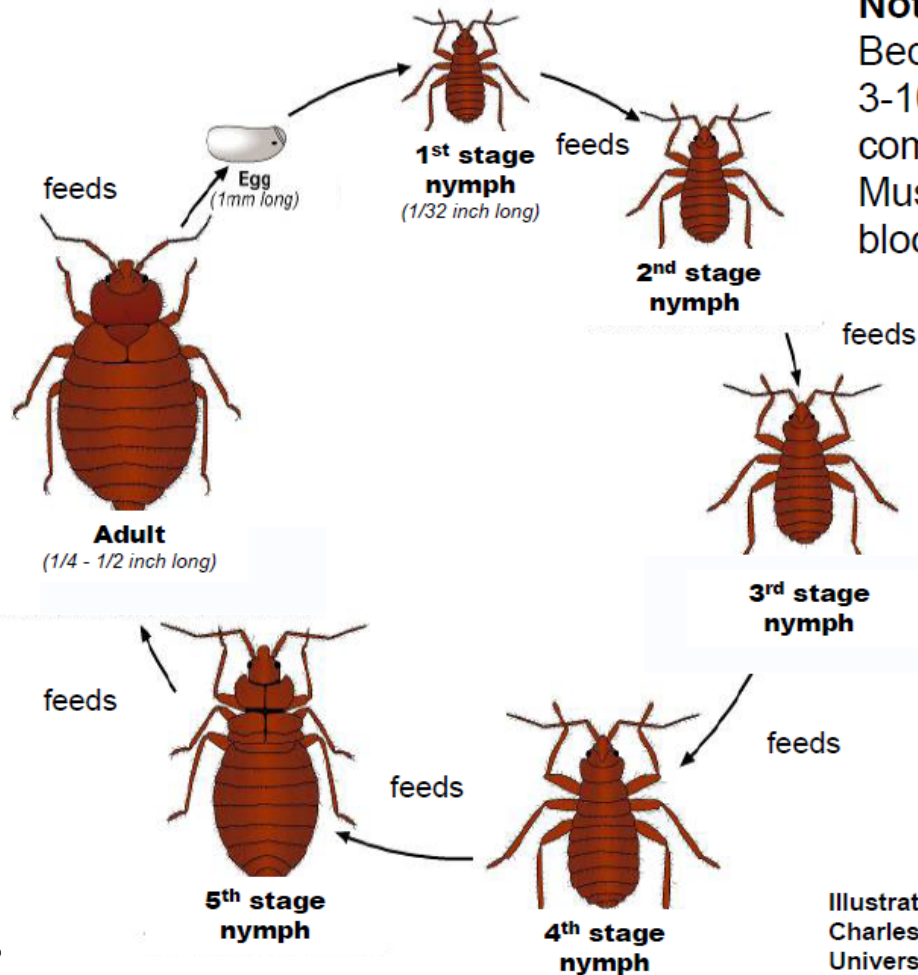


# A LITTLE BED BUG BIOLOGY



# BED BUG LIFE CYCLE

- Life cycle as short as 50 days
- Feed every 3-7 days
- Five nymphal life stages last 4-24 days each
- Adults live 3-12 months
- Females lay 3 to 5 eggs per day, up to 500 over lifetime.



**Note:**  
Bed bug takes 3-10 minutes to complete feeding. Must feed on blood to develop.

Illustration by: Scott Charlesworth (Purdue University), based in part on R. L. Usinger (1966) *Monograph of Cimicidae*





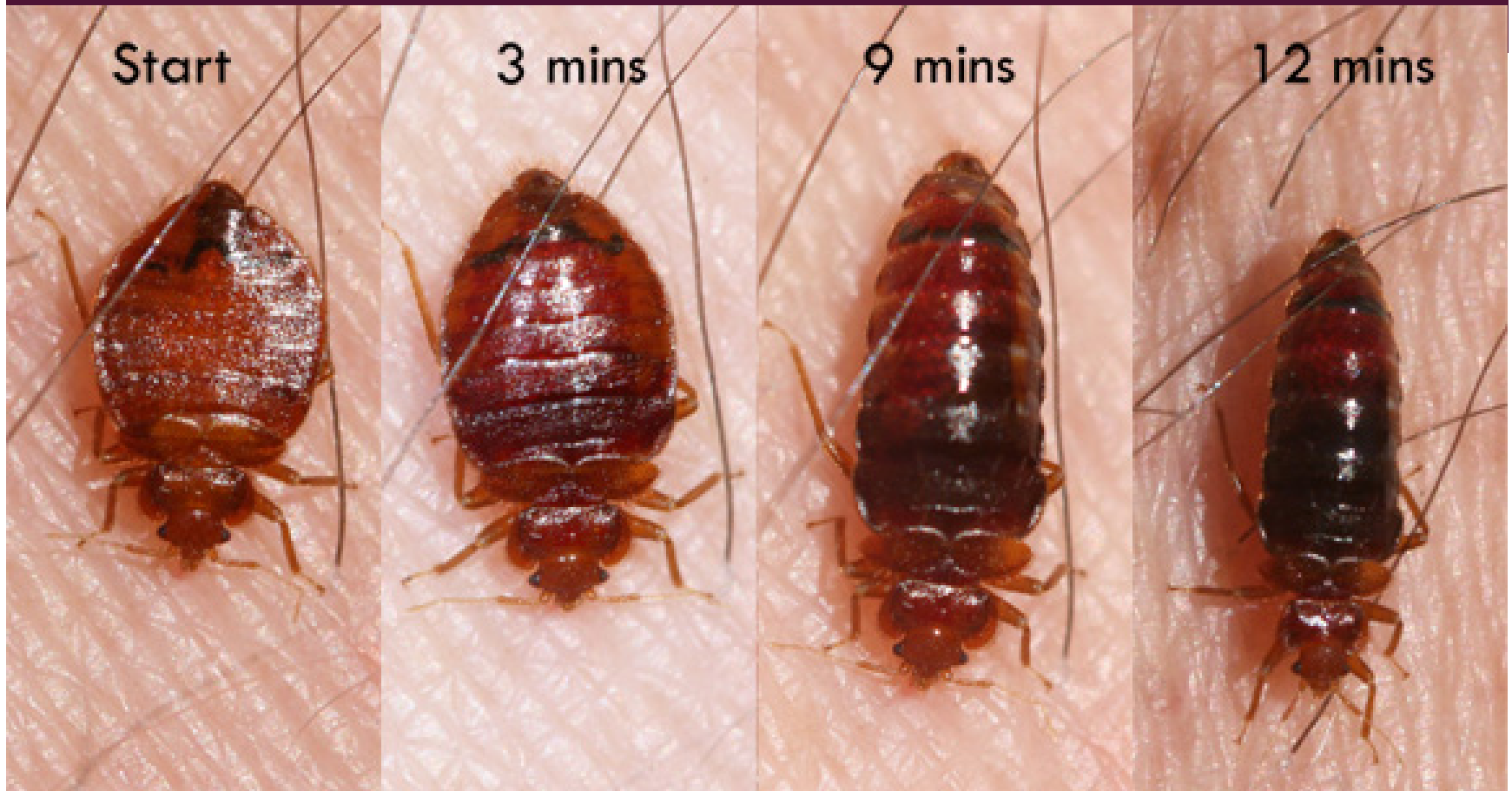




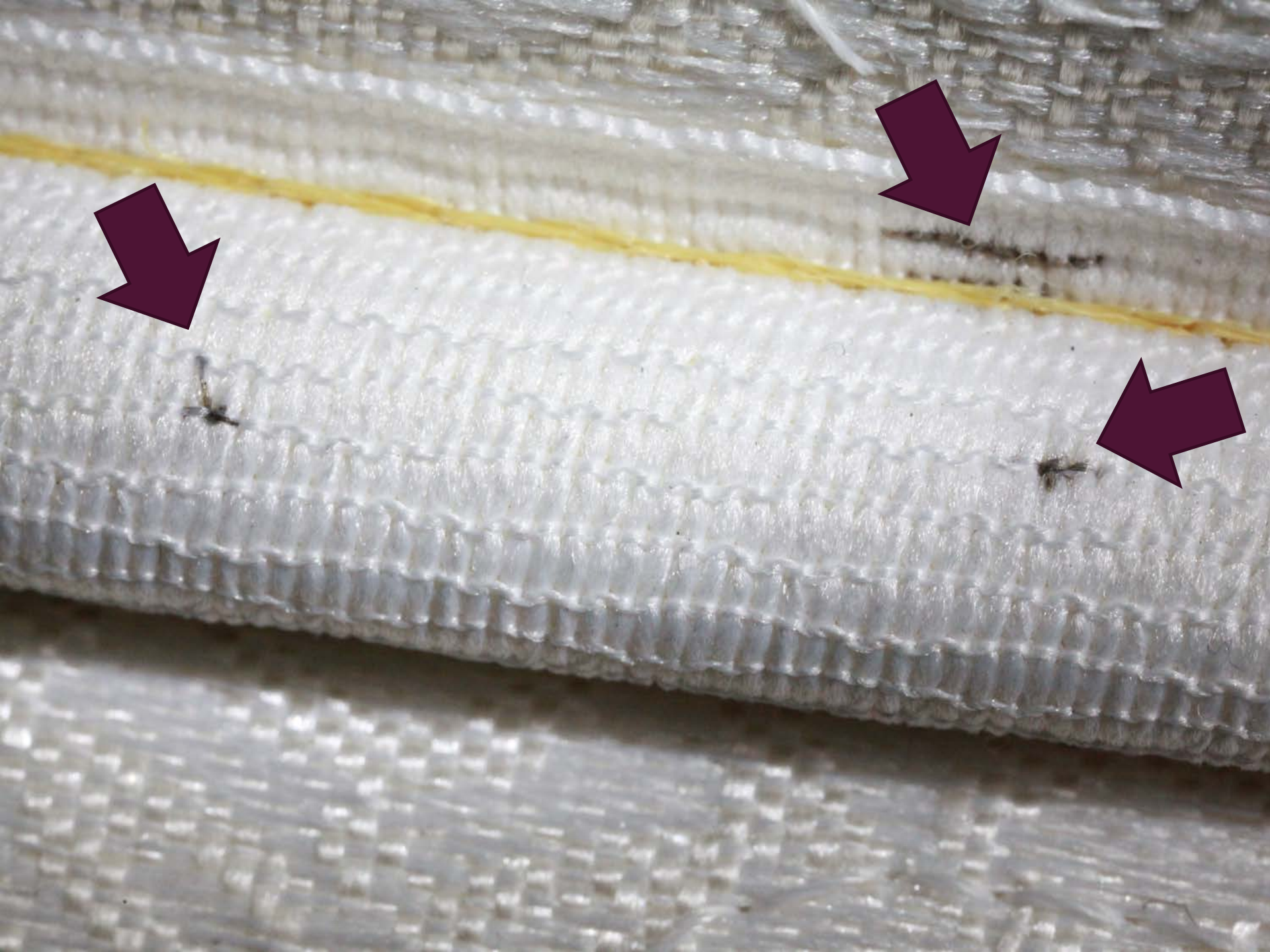
# NYMPHS



# THE FEEDING PROCESS



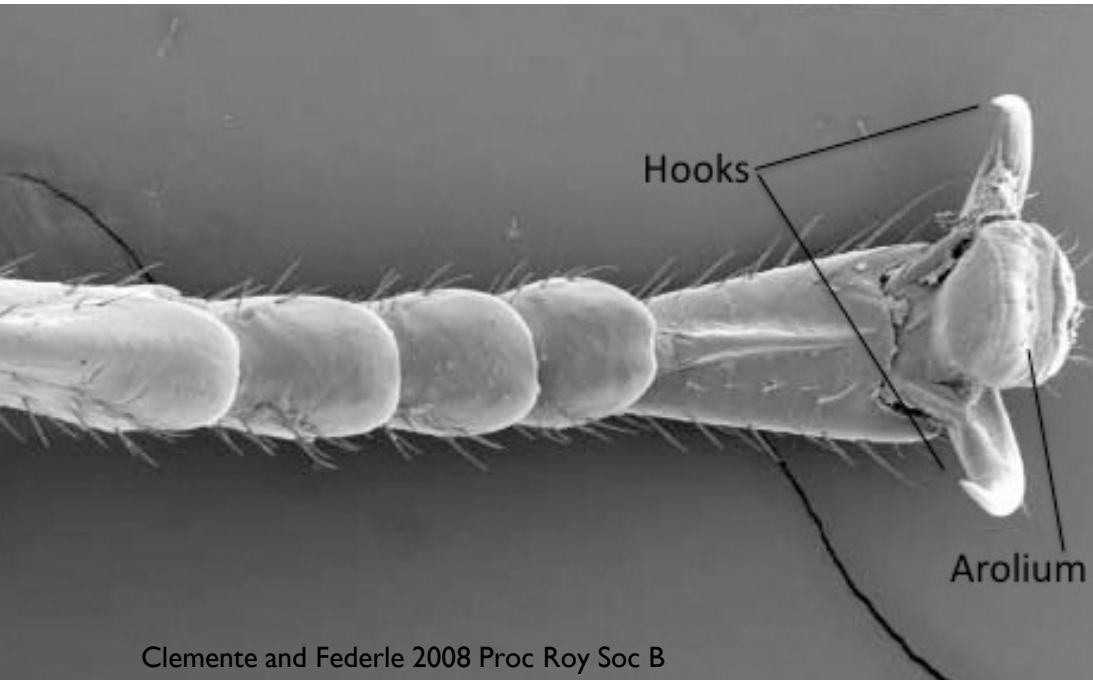




# BED BUG FEET

Bed bug feet lack pads for smooth surfaces

Cockroach feet adapted for smooth or rough surfaces



Clemente and Federle 2008 Proc Roy Soc B



Photo by Adam Nadel/Polaris and <http://content.time.com>











# NOT BED BUGS

Dermeestid beetle larva



Brown banded cockroach nymph



# SOME FACTS ABOUT BED BUG BEHAVIOR

- Attracted to humans by body odor, body heat, carbon dioxide
- May hide in different locations each day
- Excellent hitchhikers in luggage, used furniture, bedding, clothing
- Adults and large nymphs may walk out door of one apartment and into another
- May enter adjoining rooms via wall voids or cracks in wall



Early instar bed bug smashed on a piece of tape

# BED BUG BITES



- Not all people react
- May bite multiple times
- Some people react severely

# BED BUGS AND INFECTION



- Blood sucking ectoparasites
  - Like head lice
- BBs *postulated* in transmission of more than 40 human diseases--no scientific evidence that transmission has ever occurred (Goddard & deShazo 2009)
- Recently shown capable of harboring and transmitting Chagas disease

CLINICAL REVIEW

CLINICIAN'S CORNER

## Bed Bugs (*Cimex lectularius*) and Clinical Consequences of Their Bites

Jerome Goddard, PhD  
Richard deShazo, MD

**C**IMEX LECTULARIUS HAS BEEN known as a human parasite for thousands of years, but scientific studies of this insect are recent and limited.<sup>1,2</sup> International travel, immigration, changes in pest control practices, and insecticide resistance may have contributed to a recent resurgence of this blood-sucking insect in developed countries.<sup>1,3</sup> Bed bug infestations have been reported increasingly in homes, apartments, hotel rooms, hospitals, and dormito-

**Context** Bed bug (*Cimex lectularius*) infestations are rapidly increasing worldwide. Health consequences include nuisance biting and cutaneous and systemic reactions. The potential for bed bugs to serve as disease vectors and optimal methods for bed bug pest control and eradication are unclear.

**Objectives** To present current knowledge of the health and medical effects of bed bugs and to explore key issues in pest control and eradication efforts.

**Data Sources** A search of MEDLINE and EMBASE databases (1960-October 2008) for articles using the keywords *bed bugs*, *Cimex lectularius*, *humans*, *parasitology*, *pathogenicity*, and *drug effects*. For pest control, PubMed and Toxline searches (1960-October 2008) were performed using the keywords *bed bugs*, *Cimex*, *control*, *prevention*, and *eradication*. Manual searches of older journals, textbooks, pest control trade journals, and newspapers (1892-October 2008) were also performed.

**Study Selection** Original accounts or investigations of bed bugs, clinical responses with sufficient detail of cause and effect between the bed bug bite and clinical response, and convincing evidence of substantiated presence of bed bug exposure. For pest control, documentation that an eradication measure quantitatively decreased bed bugs.



# OTHER HEALTH EFFECTS

- Anemia in severe cases
- Secondary infections
  - Impetigo
  - Ecthyma
  - Lymphangitis
- Other pathogens?
  - Lowe & Romney. 2011. *Bedbugs as vectors for drug-resistant bacteria* [letter] *Emerg. Infect. Dis.* (June)



Impetigo

# MENTAL HEALTH IMPACTS

- Anxiety and stress
- Insomnia
- Delusions of parasitosis



Kevin and Marcos chose the cold Chicago streets over bed bug-infested shelters last winter.

## TIPS FOR AVOIDING BED BUGS AT WORK

- Avoid embarrassing client or neighbor
- Risk is low
- Choose kitchen chair over upholstered furniture or beds for sitting or placing work tools



# TIPS FOR AVOIDING BED BUGS AT WORK

- Bring work in smooth sided tote or bag
- Don't bring work home, or quarantine and treat first



# BED BUG CONTROL



# WHAT IS INTEGRATED PEST MANAGEMENT (IPM)?

- ⦿ An environmentally sound approach to pest control
- ⦿ Inspection based
- ⦿ Quality pest control using the least hazardous chemicals and techniques
- ⦿ “best management practice” for pests



# INTEGRATED PEST MANAGEMENT FOR BED BUGS

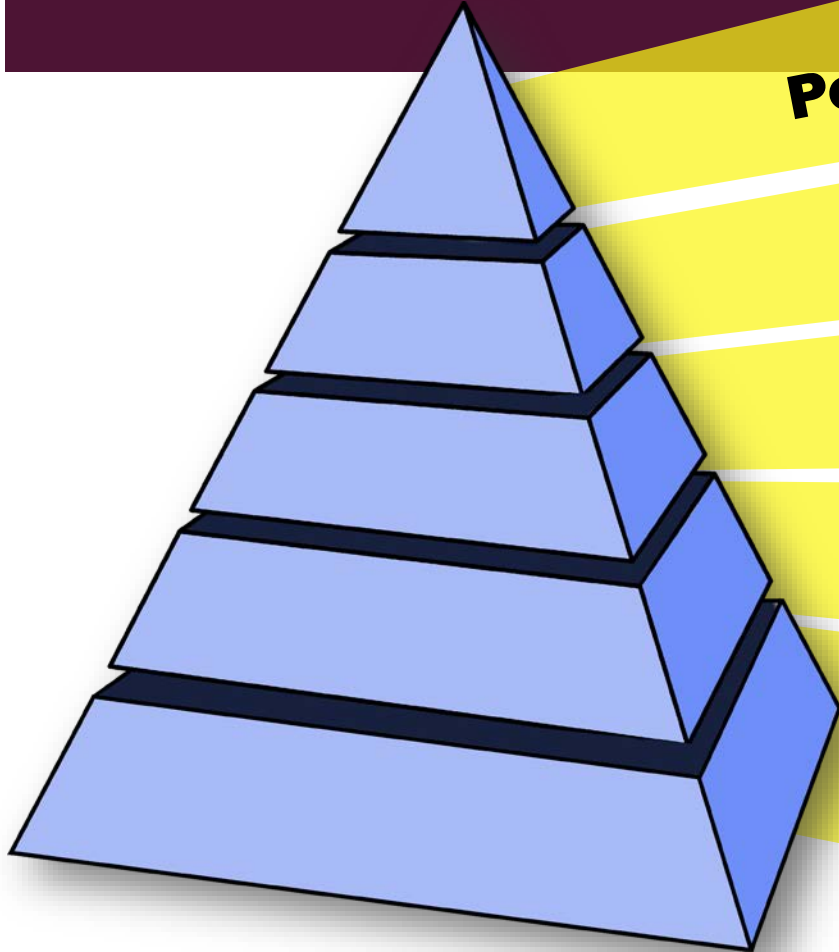
**Pesticides**

**Mechanical controls (barriers)**

**Physical controls (heat, cold)**

**Pest proofing / Sanitation**

**Education and Awareness**



# ITS ALWAYS BEST TO HIRE A PROFESSIONAL

- Licensed and trained to safely apply pesticides
- Knows how to locate and identify pests
- Experienced in what works and what doesn't





# AND THE LEGAL ISSUE

- Laws vary from state to state
- Check to see if it is legal for managers to apply pesticides or control pests without a license
- Illegal in Texas and other states.

# MONITORING: THE KEY TO EARLY DETECTION



# WHY YOU CANNOT RELY ON COMPLAINTS TO MANAGE BED BUGS

- Some may be embarrassed to complain
- Many will not know signs of bed bugs
- Most people do not react to bed bug bites
  - In apartments less than half of infested units knew (or admitted they knew) they had bed bugs
  - Perhaps as few as 5% of individuals react strongly to bed bug bites initially



Bed bug bites on hand

# EARLY DETECTION IS KEY

- Early infestations of bed bugs usually confined to bed or within 5 feet of bed
- Advanced infestations spread away from bed, spreading problem

Small infestations of bed bugs stay together



# VISUAL MONITORING IS NOT ALWAYS ENOUGH

- Skill and thoroughness of technician inspectors highly variable
- Extremely time consuming when done right (at least 10-15 minutes per bed)
- Disruptive of resident's privacy
- Limitation of even best inspector to always find low level infestations



# MONITORING TRAPS

- Verifi, Climbup, Blackout and BDS system



# HOW A CLIMBUP/BLACKOUT TRAP WORKS



Smooth,  
(sometimes talcum  
powdered) plastic  
unclimbable for bbs

Bb drawn to bed  
climbs rough  
outside of cup,  
falls into moat

Fabric tape or roughened plastic outside cup

# CLIMBUPS

- Can be both monitor and barrier if installed under feet of bed





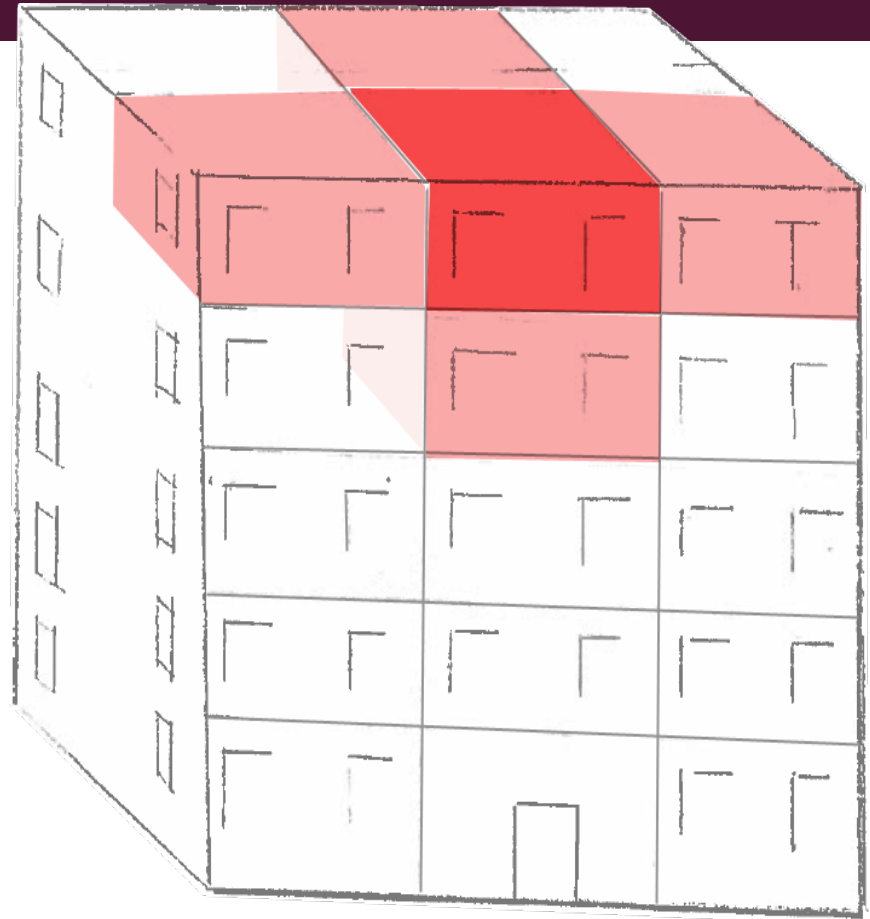
# WHAT TO DO IF YOU LIVE IN AN APARTMENT?

- Report suspected bed bugs to landlord
- Landlord is responsible to keep apartments free of pests
- Do necessary prep work asked for by pest control



# WHAT ABOUT MY NEIGHBORS? SHOULD THEY BE TREATED?

- All surrounding units should be inspected (monitored) and treated if necessary



# PESTICIDES FOR BED BUGS

- Bed bugs are tolerant of many insecticides
  - Pyrethroid resistance well documented
  - Few effective, residual treatments
- Types of formulations
  - Aerosols
  - Dusts
  - Fumigants
  - sprays



# AEROSOLS

- Contact sprays
  - Pyrethrins (several Trade names)
  - EcoRaider and Bed Bug Patrol\*
  - Pyrethroid sprays (Zenprox, others)
- Residual sprays
  - Aerosols with Phantom (chlorfenapyr), dinotefuran (Alpine) or imidacloprid
  - Combination sprays:
    - Temprid, Tandem, Transport



# BEST BOTANICAL BASED PRODUCTS

- EcoRaider™ – equivalent in direct kill, egg kill, to top professional sprays according to Rutgers University studies
  - 1% geraniol, 1% cedar extract, and 2% sodium lauryl sulfate
- Bed Bug Patrol™ – good contact killer
  - 0.003% clove oil, 1% peppermint oil, and 1.3% sodium lauryl sulfate
- Sterifab, rubbing alcohol provides some control (but is flammable)



# DUSTS

- Limited where they can be used
  - Most for VOID areas only
- Dessiccants
  - Diatomaceous earth (pest control grade)
  - Silica aerogel (TriDie, Cimexa)
- Pyrethroid dusts
  - Tempo
  - Deltadust
- Other dusts
  - Alpine



# Insects in the City



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 [Yard & Garden](#) | 
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 [Biting & Stinging](#) | 
 [Pesticides & Mgmt](#)

## Bed bugs

### Bed bugs

Mostly absent from the U.S. for the past fifty years, bed bugs are making a comeback. Increased international travel and immigration, along with the loss of effective insecticides, has helped this insect spread faster than any other urban insect pest. The following links and fact sheets should help you learn how to avoid and eliminate this pest where it is found.



Human bed bugs change shape and color as they feed. Photos courtesy Whitney Cranshaw, Colorado State University.

- [How to Select a Bed bug Control Provider \(Ento-033\)](#) - Got bed bugs? Time to call a professional. This publication provides details on what to ask when looking for an experienced professional. Also, advice for apartment managers and tenants preparing for a bed bug treatment.
- [Do-it-Yourself bed bug control \(ENT-3012\)](#) - Trying to control bed bugs yourself isn't easy, but here are some suggestions to improve your chances of success.
- [First Aid for bed bugs](#) - An Insect Update post from 2012 about my daughter's bed bug experience and how to get (almost) immediate relief from the little biters.
- [Bed bugs and your apartment \(ENT-3013\)](#) - For apartment renters, how to recognize bed bugs and work with your apartment manager to prepare for an effective treatment.
- [What is a bed bug interceptor?](#) - One of the most useful tools in managing and

#### ▼ HELPFUL RESOURCES

[Books about insects](#)  
[Insects in the classroom](#)  
[Resources for insect collecting and observing](#)  
[Insect identification help](#)

◊ [Diagnostic sample guidelines](#)

▶ [FEEDBACK](#)

▶ [MORE LINKS](#)

#### NEWS UPDATES

News Updates is the *Insects in the City's* news feed. Click on News Updates below, or use the categories search to find the information you need. If you would like to receive Updates automatically, as they are posted, subscribe via RSS feed or by entering your email address in the "Subscribe for Insect News" box below.

#### NEWS UPDATES

[Rutgers study shows best home treatments for bed bugs](#)  
[Possible impact of Emerald Ash Borer in Texas](#)  
[Scale insect misery loves company](#)  
[Plan Bee: Insecticide tags on nursery plants](#)  
[Kids, bee careful out there](#)

#### NEWS BY CATEGORY

[Beneficial insects](#)  
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## RESOURCES

- <http://http://citybugs.tamu.edu/factsheets/biting-stinging/bed-bugs/>

# HOW TO SELECT A BED BUG CONTROL PROVIDER

- What questions to ask a pest control company
- How to make sure you find an experienced professional
- Advice for apartment managers on bed bugs





# BED BUGS AND YOUR APARTMENT

- FAQs for renters
- What to expect from a pest control company

## 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?

Because of their small size and painless bite, bed bugs may initially go unnoticed. If you notice that you are waking up with itchy welts, see tiny red spots on bedding, or think you have seen the bugs, you may have a problem. Bed bugs do not have nests, but will congregate in choice hiding places. These areas may be marked by tiny dark spots and stains, and may have a sweetish odor.



*Bed bugs are small, and come out mostly at night.*

### Will bed bugs hurt me?

Fortunately bed bugs are not known to carry any diseases to humans, although some people may experience irritation or allergic reactions to bed bug bites. Mostly bed bugs are considered disgusting and can be a source of stress and concern for people living in infested apartments.

### How do bed bugs get into my apartment?

Bed bugs are no longer an unusual pest in apartments. Since approximately 2000, bed bugs have reemerged as an important pest in the United States. Bed bugs are



# QUESTIONS?

