

An Introduction \neq Infestation: Stopping Bed Bugs in Libraries

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Tompkins County Public Library



Outline

- What they are
- What they eat
- Where they live
- How to think like a bed bug
- Prevention
- Monitoring and inspection
- Assessment-based control
- Creating a policy



BED BUG AWARENESS WEEK

JUNE 3-9 2018



97%

of pest professionals have treated bed bugs in the past year

WHEN ARE BED BUGS FOUND?

51%

of pest professionals said summer was the busiest season for bed bugs

WHERE ARE BED BUGS FOUND?

MOST COMMON

91% Single Family Homes

89% Apartments/Condominiums

68% Hotels/Motels

MOST UNUSUAL

Purse Stuffed Animal

In a Florescent Lightbulb School Bus

Wheel Chair Airplane

CAN YOU IDENTIFY A BED BUG?



84%

of pest control professionals were initially contacted about a different type of pest before identifying them as bed bugs

71%

reported being contacted for fleas

BED BUGS CAN BE FOUND ANYWHERE

Percent of pest professionals who have treated for bed bugs in the following places:



OVER **50% OF CUSTOMERS**

call for bed bug treatment after noticing bites/welts on their bodies



What is a bed bug?

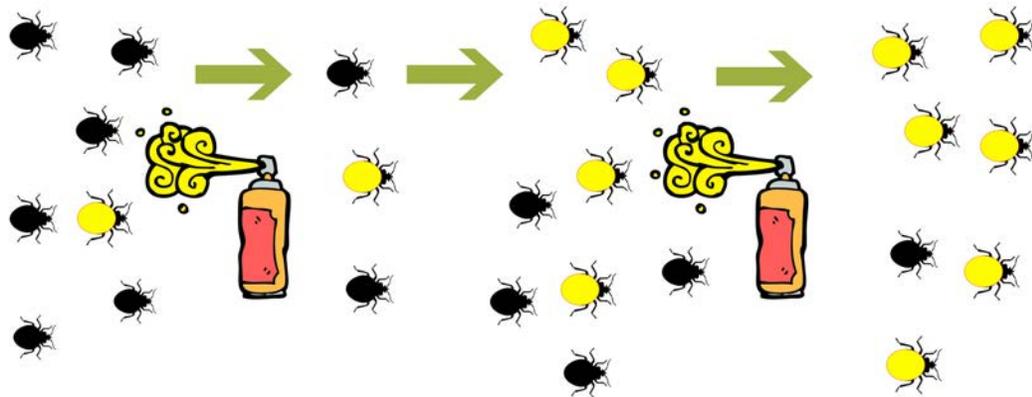
- A blood-sucking insect
- Flat
- Range in size from a sesame seed to an apple seed
- Light brown to mahogany red (depends on when they last fed)



An adult bed bug feeding on a human

Why they're back

- Change in pesticide availability
- Change in pesticide use patterns
- More travel/ mobility of people
- More infested locations
- Lack of preparedness of society in general
- Pesticide resistance

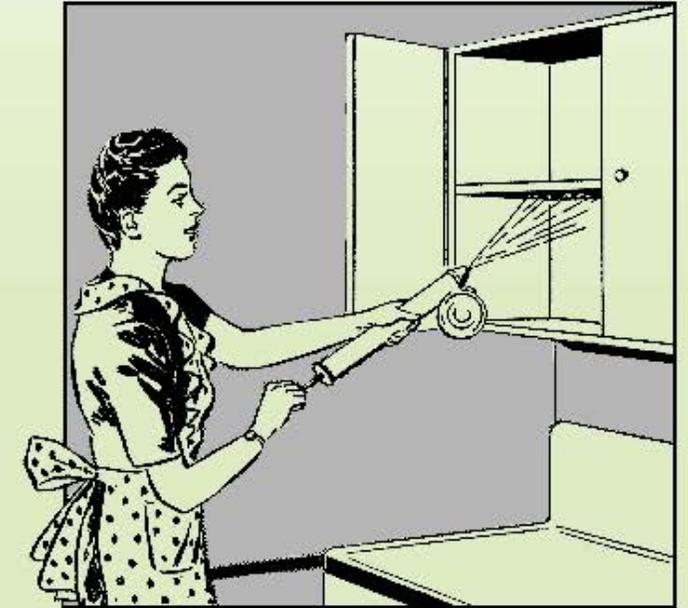


Pesticide resistance:

- Within 2-20 years insects show resistance to new pesticides
- More pesticides are needed to do the same job
- Requires PMP to switch products

DDT, Pyrethroids, and Resistance

- Initially, bed bugs were well controlled with DDT (1940s), but resistance was seen within 8 years of its use
- Today, resistance is well-documented and widespread to DDT and pyrethroid insecticides
- ***Pyrethroids remain a primary control tool for bed bugs***



**DDT... FOR CONTROL
OF HOUSEHOLD PESTS**



Prepared by the
Bureau of Entomology and Plant Quarantine
Agricultural Research Administration
United States Department of Agriculture, and
the United States Public Health Service
Federal Security Agency
Washington, D. C. • Issued March 1947



Bed bugs are a pest of public health significance

- Result in stress, loss of work, loss of productivity, loss of sleep, and financial burden
- Cause secondary infections after people scratch their bed bug bites
- Are unwelcome in our homes and workplaces
- Bed bugs do not transmit disease *under normal living conditions*.



Biology



Bed bugs mating

Photo: R. Ignell

- Female bed bugs lay less than 200 eggs in a lifetime; 1-5 eggs per day
- From egg to adult – 5 weeks to 4 months
- molt 5 times; feed before each molt



Close up of eggs



Adult and nymphs

Photo: Alex Yelich

An introduction of one bug is not an infestation



Bed bug life cycle

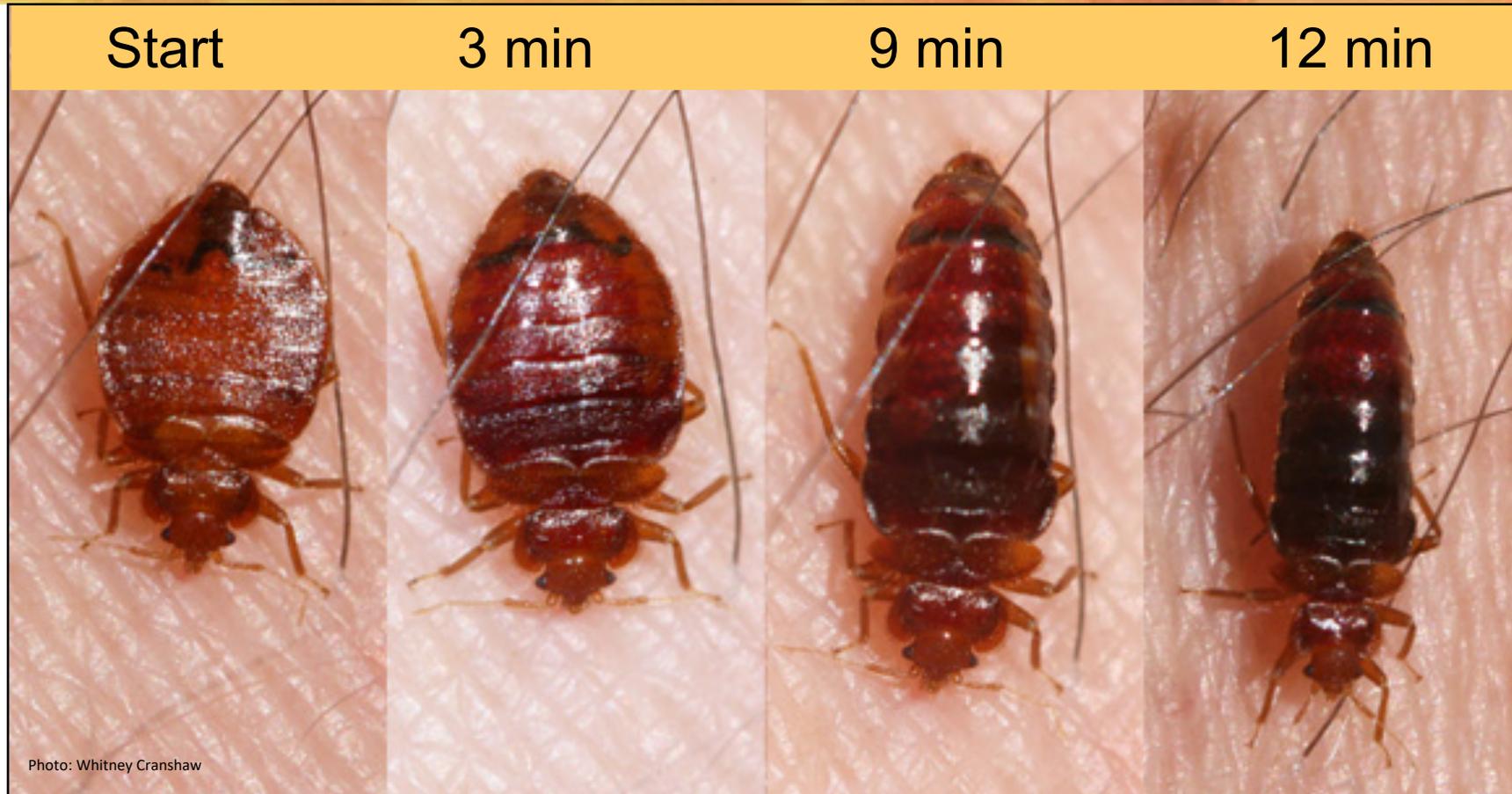


Fed



Not recently fed

The feeding process



Bed bug behavior

- Most active at night
- Hide in cracks and crevices, often in groups
- Cannot fly, jump, or burrow into skin...they crawl
- Hitchhike on coats, bags, furniture, wheelchairs...



Photo: Dr. Dawn Gouge

Bed bugs hiding in a screw hole

What bed bugs eat and drink

Blood



Can be confused with...

- Ticks
- Cockroach nymphs
- Other kinds of bug bites
- Allergic reactions to chemicals



Tick



Mosquito Bites



Cockroach Nymph



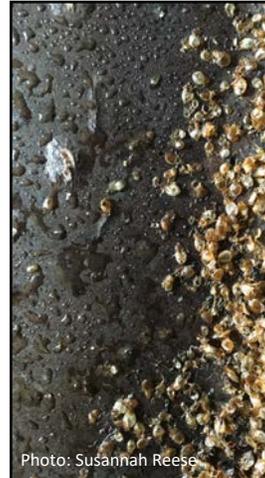
Bat Bug



Spider Beetle

Signs of bed bugs

- Bites
- Fecal spots
- Shed skins
- Dead bed bugs
- Live bed bugs



Bites

- Bed bugs cannot be confirmed by bites alone—Many people have no reaction
- Live bed bugs must be found
- Prefer feeding during darkness
- Bites often painless



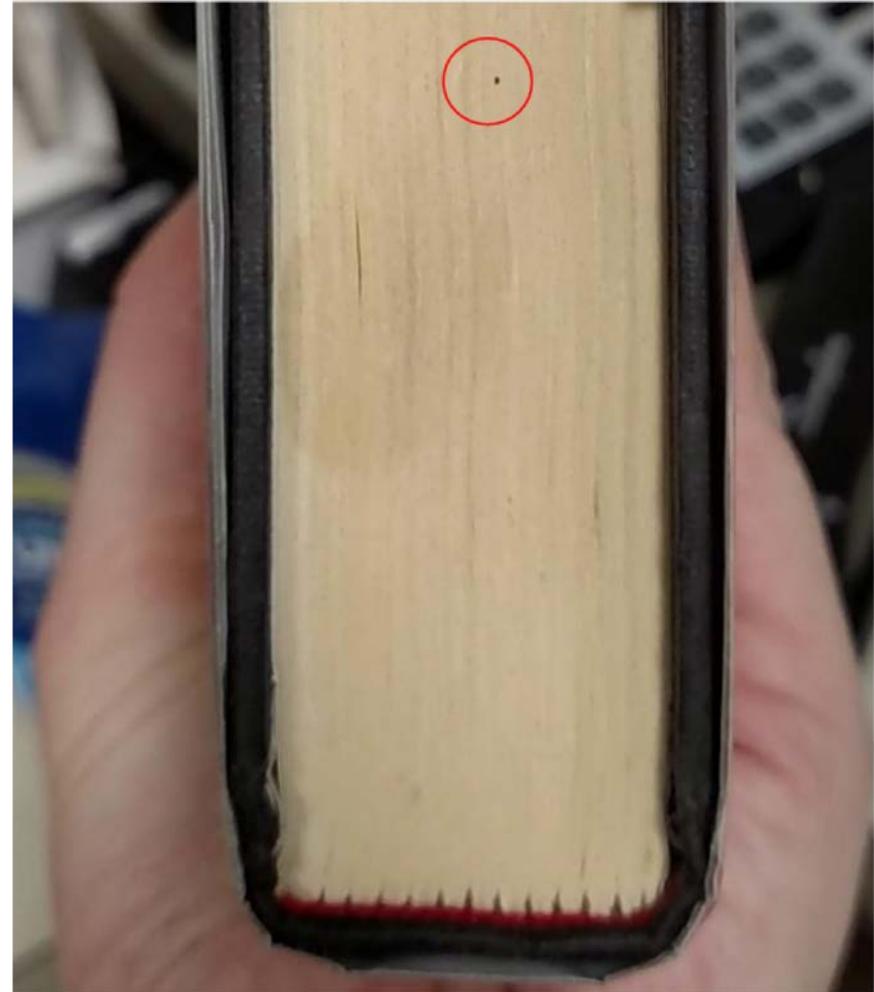
Fecal spots

- Fecal spots are bed bug droppings
- Different from cockroach frass—frass is gritty, fecal spots are smooth.
- A current bed bug infestation cannot be confirmed by fecal spots alone
- Live bed bugs must be found



A bad infestation

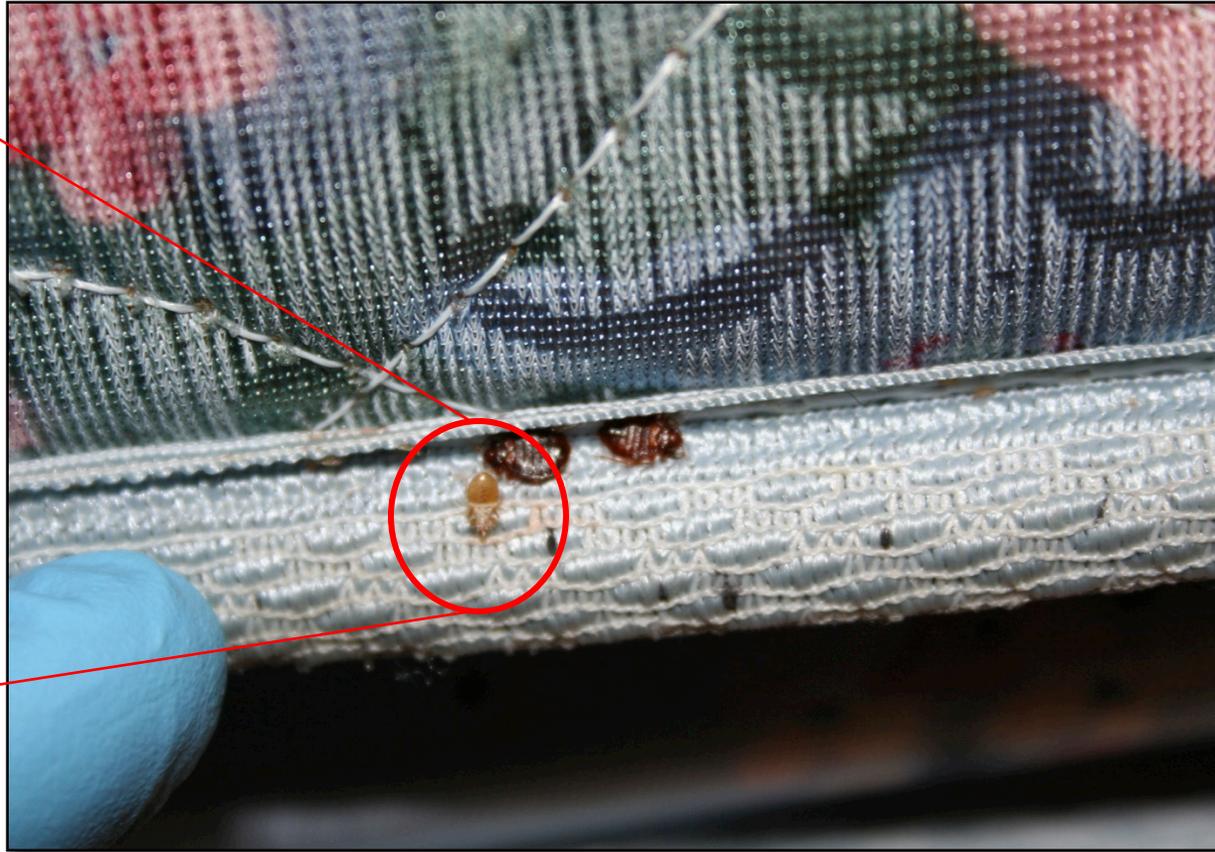
Fecal spots on books







Shed skins



Bed bug signs on a mattress seam

Dead bed bugs



Bottom



Top

Where bed bugs live

- Only inside homes and buildings
- In any crack or crevice where a credit card edge could fit
- On any item near where people rest



Couch cushion zippers



Mattress piping



Photo: Dr Dawn Gouge

Stuffed animals



Switch plates

Areas at risk for introduction and infestation

- Introduction is likely where people
 - frequently travel
 - set down personal belongings
 - sit or lay down for long periods of time
- Infestation is likely where bed bugs can
 - Crawl (upholstered furniture or bedding)
 - Feed on a person for 5 minutes without being detected
 - Hide in cracks or folds



Personal Protection

- use insect repellent
 - Avoid sitting or placing items on potentially infested surfaces
 - Wear a protective layer when moving infested items
 - Inspect after leaving (can use lint roller)
- **In the main office/community areas:**
 - Avoid fabric-covered furniture that has many crevices, if replacing purchase plastic or metal items
 - Have residents set their belongings in plastic totes during meetings
 - Vacuum office regularly



Prevent introduction and spread

- Keep coats, backpacks, purses, and bags off beds, recliners, and sofas at home and while out
- Inspect used furniture carefully before bringing it home - avoid it if possible
- Look for signs when sleeping away from home

Smooth plastic totes can keep items bed bug free or contain items with bed bugs



Many people don't know they have bed bugs

- Are unaware of the signs
- May not react to bites

Use monitors and proactive inspection!



Bed bug monitors

- Interceptors can detect up to 95% of infestations
- Trap and kill bed bugs
- Determine how bad the infestation is
- Two types
 - Passive
 - Active



Passive, moat-style interceptor (ClimbUp)



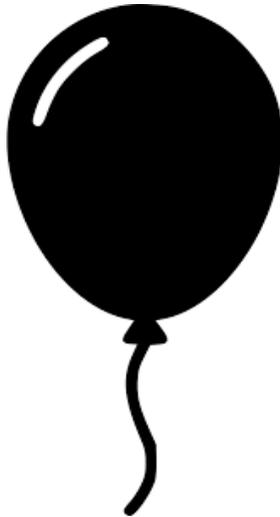
Passive, moat-style DIY interceptor from University of Florida/ IFAS Extension



Active monitor, Includes lure (SenSci Activ Volcano)



Active monitor, plug-in trap, good for vacant units (verifi)



Inspection

🐛 Two types

- Visual – always use a flashlight!
- Scent detecting canine

🐛 If bed bugs are found, inspect and place monitors around the library



Canine inspections

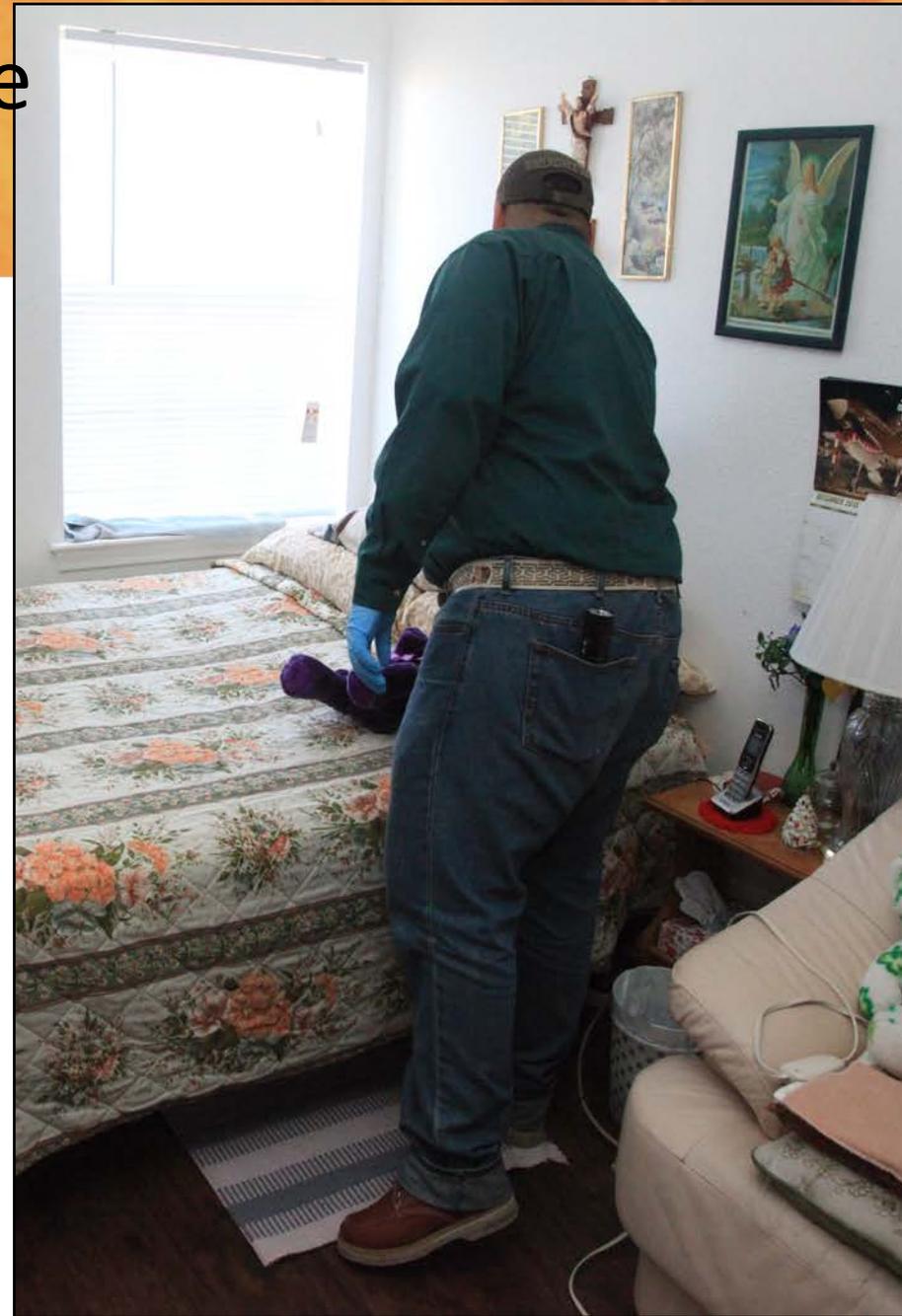
- Relatively fast, can detect low-level infestations
- *Quality of inspection varies greatly*
- Subject to false positives
- Can be expensive

*Speak to your StopPests Consultant for more information

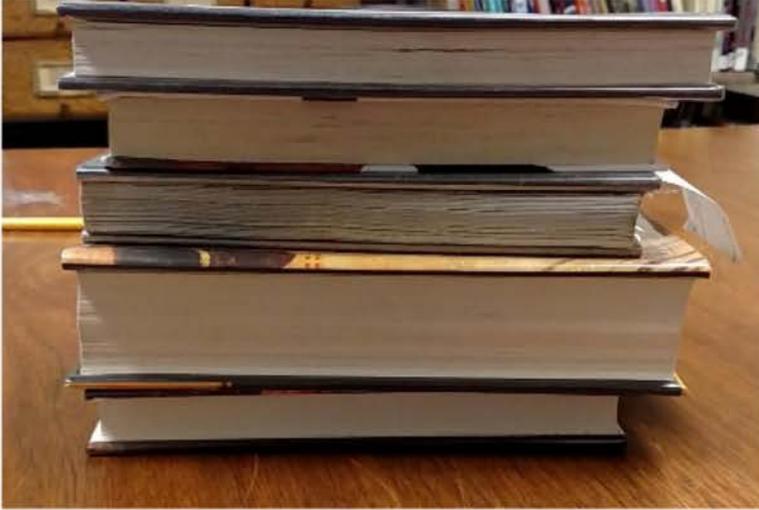


Quick visual inspection can be done by staff

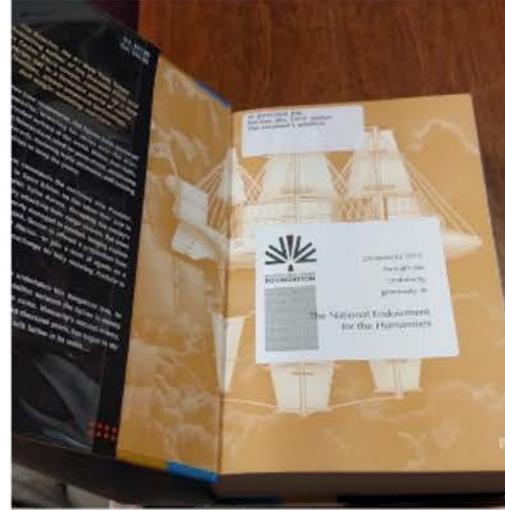
- Staff conducts this inspection
 - Inspect books upon return and periodically upholstered chairs, focus on bed bug signs which are easy to detect
 - Faster than detailed inspections because you are just confirming presence. Professional does more detailed inspection
 - Suspicious but no live bed bugs found? Leave interceptor traps



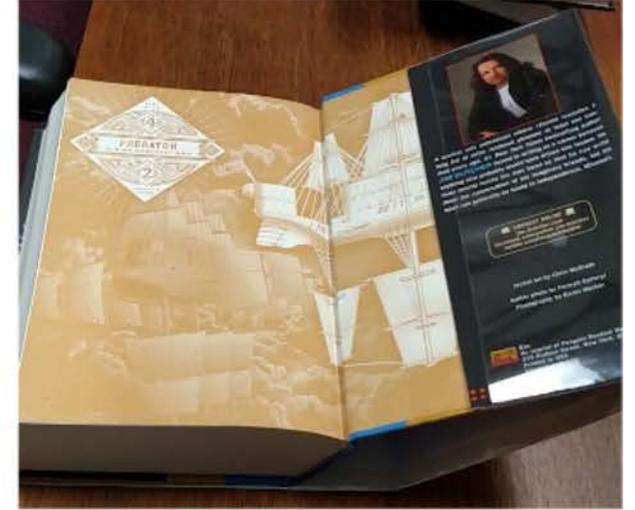
Inspection – Print materials



Step 1: Inspect page edges



Step two: look inside the front and back covers of the book



Step 3: Look under the book jacket, at both the book...



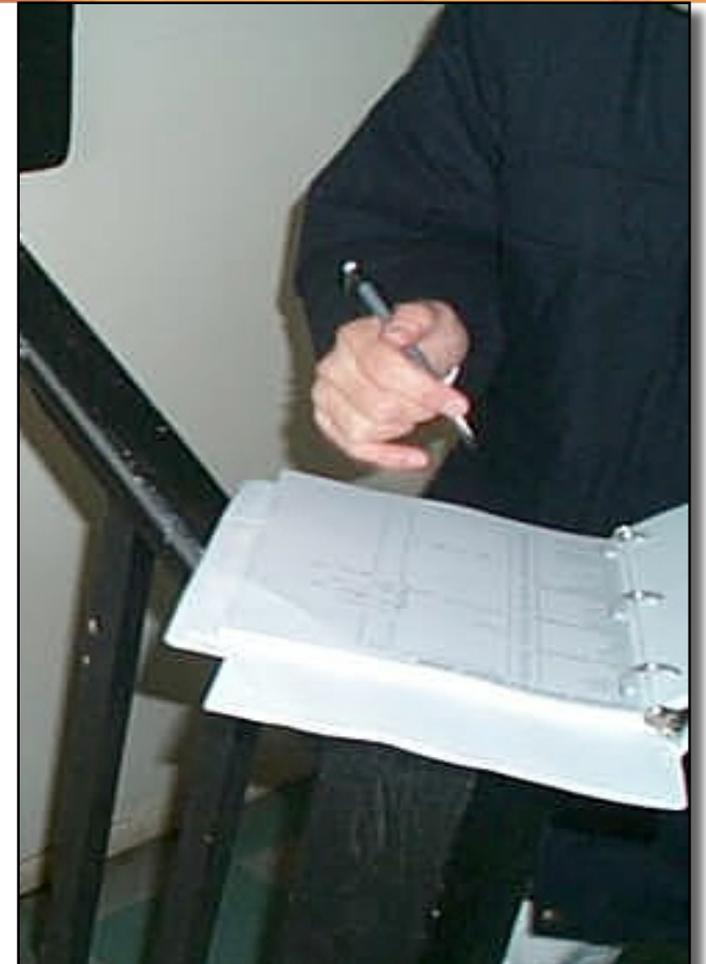
...and the cover

If someone finds a bed bug

Document all observations

Rapid response plan:

- 🐛 Save the insect
- 🐛 Report the problem
- 🐛 Don't disturb the area
- 🐛 Don't apply pesticides
- 🐛 Prevent carrying the bed bugs to other places.
Don't discard furniture
- 🐛 Have the PMP inspect and treat if necessary



Create a policy/procedure

- **The cast of characters**
- Frontline staff:
 - generally the ones to find bed bugs or bug damage while working with materials
- The Pest Management Coordinator (or group of coordinators):
 - responsible for leading the library's response to pest introductions
- Senior management
 - responsible for policy decisions and procedural signoff

The 6 steps of a library bed bug introduction

1. Identification of a bed bug or bug damage
2. Quarantine
3. Inspection
4. Treatment
5. Follow-up with customer (including suspension of privileges, if applicable)
6. Reinstatement of privileges

Be prepared for the following Quarantine scenarios

- Items with live bugs returned at the counter, where the bugs are discovered at the check-in counter;
- Items with live bugs returned in the book drop, possibly overnight;
- Items with damage (or dead bugs), where the damage is discovered at the check-in counter;
- Items with live bugs discovered after check in, where they have made it onto a book truck or the shelf;
- Items with damage discovered after check in, where they have made it onto a book truck or the shelf;
- Furniture found with live or dead bugs or bed bug skins.

Quarantine Scenarios, continued

- Live bugs: More urgent, because the item has recently been exposed to bugs.
- Dead bugs or damage: questions about how long the bugs or damage has been there; may have to look at several previous borrowers; may never be able to figure out the customer with the problem.
- Book drops: need to quarantine everything in the book drop due to transference.
- Book trucks: may need to inspect everything on the cart, but only quarantine suspicious items.
- Bookshelf: may need to look at surrounding items, but not quarantine them—or you may need to quarantine several shelves worth of materials.

The quarantine toolkit



- Each circulation counter should have a quarantine toolkit that includes:
 - Heavy duty Ziploc bags
 - Airtight plastic tubs for storing and transporting bagged materials (optional)
 - A spray bottle filled with isopropyl (rubbing) alcohol or soapy water
 - You should also find an out of the way, secure spot to store materials that are in quarantine.

The quarantine toolkit



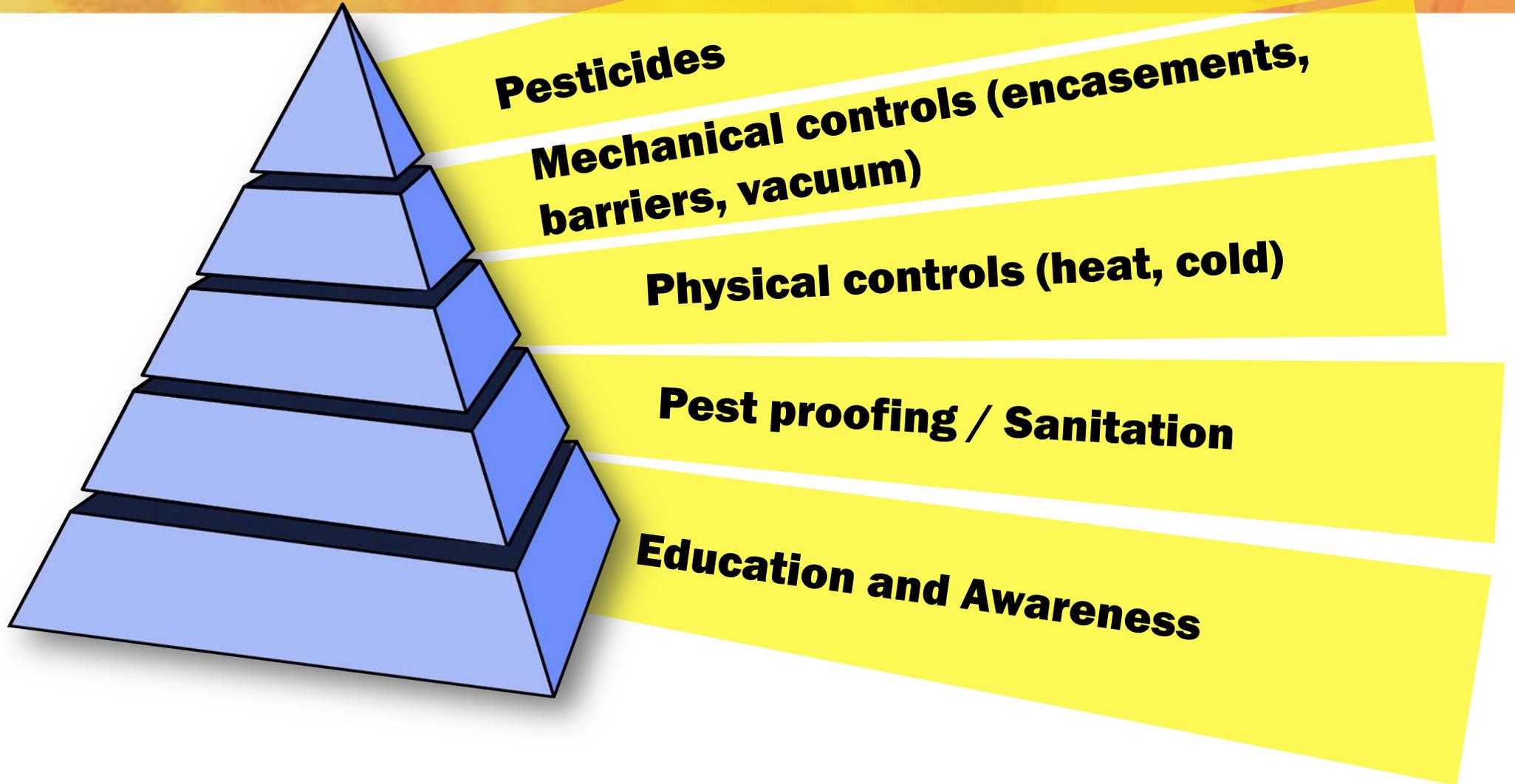
The pest management coordinator's toolkit

- Extra heavy duty Ziploc bags
- Extra airtight plastic tubs for storing and transporting bagged materials (optional)
- A spray bottle filled with isopropyl (rubbing) alcohol
- A LED flashlight
- A magnifying glass
- Latex gloves
- A library card for placing quarantine holds
- Access to reports on item and patron borrowing history (if available)



Got Bugs – Now what?

Integrated pest management for bed bugs



Know your treatment options

• Vacuuming

• Isolation

- Encasements
- Clear bags
- Closed plastic containers
- Make the bed an island

• Freezing *not as reliable as heat

- Chest freezer

• Heat

- Clothes dryer
- Steam
- Container
- Whole unit

• Pesticides

- Spray
- Dust
- Fumigation

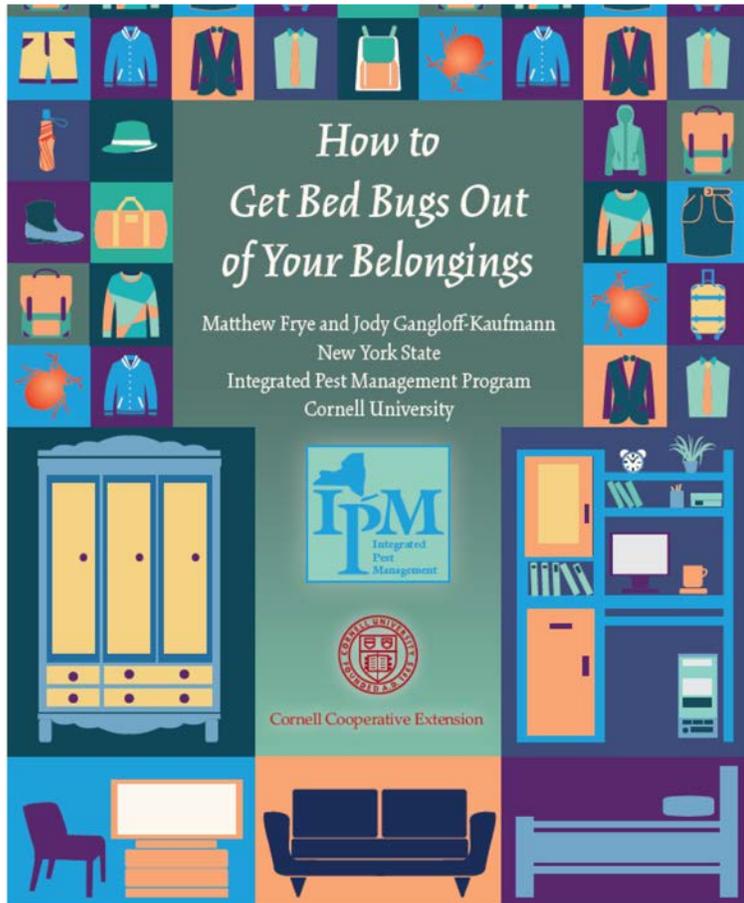
Non-chemical treatment options: Heat

- Whole unit heat treatment
- Portable heat chambers
- DIY heat chamber
(instructions from University of Florida)
- Steam – (training needed)
- Clothes dryers
 - free tokens or one machine designated *bed bug treatment only*



Building staff at a property in Pennsylvania test out their new ZappBug portable heat chamber.

NYS IPM Resource



Books - Paperback, hardcover, school notebooks, binders, etc.

Recommended

Special Instructions

Inspection

Bed bugs are most likely to be found in the protective cover or the book binding. Inspect suspect books over a white sheet or in the bathtub, with a vacuum ready and waiting.

Isolation

Store inside an airtight plastic bag or bin for six months.

Vacuum

Remove and vacuum protective covering and book binding.

Heat

Hair dryer or space heater. Remove protective covering and point hair dryer into binding; combine with vacuuming.

Not Recommended - Hand wash, Steam, Freeze, Desiccant dust

Book shelf - See Furniture, wood and metal

DIY heat chamber (U of Florida)

Temperature vs. time needed to kill bed bugs

| Temperature | Time Needed | |
|-------------|-------------|------------|
| | Adults | Eggs |
| 113°F | 90 minutes | 8 hours |
| 118°F | 2 minutes | 90 minutes |
| 122°F | 0 minutes | 0 minutes |



University of Florida Cooperative Extension

Steam



- Provides immediate kill of all life stages
- Penetrates into cracks and 1-2 cm into fabric, up to 6 cm in cracks
- No pesticide residue
- Slow!

The role of the professional

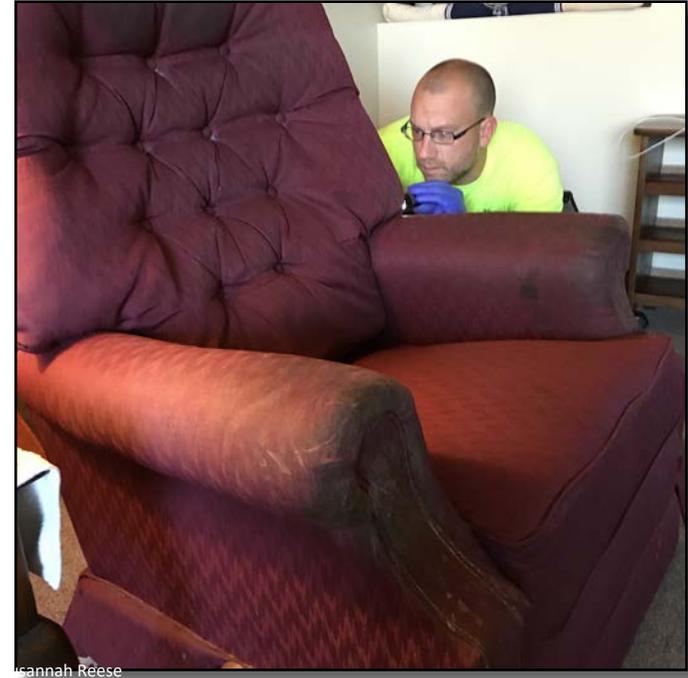
- Must be trained and licensed to apply any pesticides
- Knows how to monitor, locate, and identify pests
- Experienced in what works and what doesn't
- Knows state laws regarding pesticide use



Picture: National Pesticide Information Center and Dr. Michael Merchant

The PMP's role

- ALWAYS thoroughly inspects the reporting unit and the adjacent areas
- Provides site-specific preparation guidelines
- Follows the label
- Returns to inspect every two weeks and treat if bed bugs are found and follows-up until bed bugs are not found for two consecutive visits



Find a good contractor and provide oversight

You MUST:

- Oversee contractors
- Keep records of progress and reduction of pest population

PMPs MUST:

- Report monitoring results. How else will we know if treatment worked and the contractor is doing the job?

Both:

- Decide which areas need attention (not complaint-based)
- Confirm elimination



Pesticides

- Only PMPs should use
- Bed bugs tolerant of many insecticides
- Types of formulations
 - Aerosols
 - Dusts
 - Fumigants
 - Sprays

Read the label!



Understanding chemical treatments

- Bed bugs are resistant to many of the commonly used chemicals. There is no silver bullet.
- Pesticide sprays have limited residual effect
- Most sprays only work on contact
- The most effective chemicals are combination products (neonicotinoids + pyrethroids)
- Dusts are effective as long as they are kept dry

*Ask your StopPests consultant for advice on product efficacy

NO!



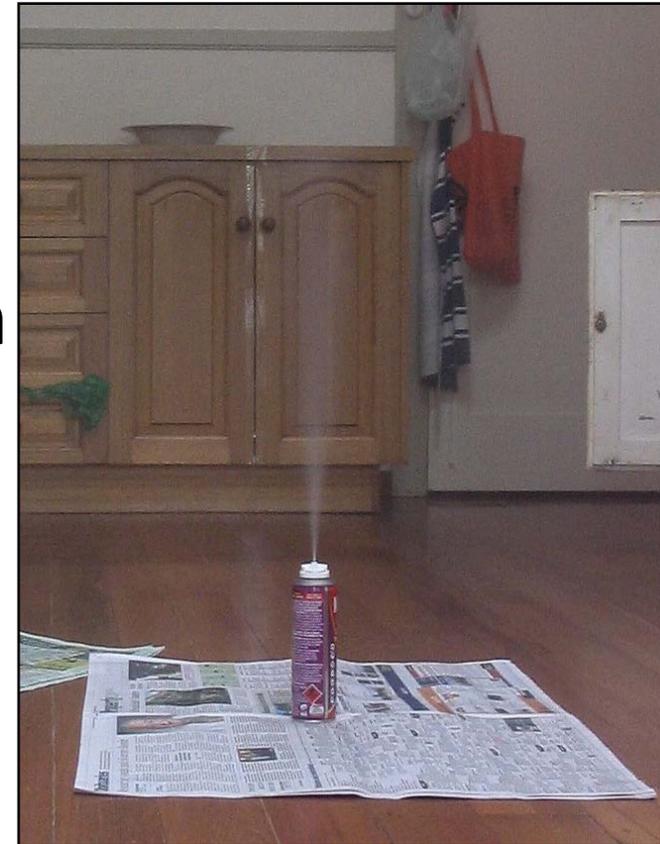
Alternative to NUVAN and IGRs

It's neem!
Must have
license to
purchase.
Used in
enclosed
space



Only PMPs use sprays

- Sprays are not effective when used by homeowners/tenants for bed bug control
- Over-the-counter-sprays and foggers cause the bugs to scatter so the problem becomes harder to deal with



Questions?

Webinars

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Pest Solutions 

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IPM Guide
for Affordable Housing
Free Download



News You Can Use

August 29, 2018 **Free Webinar: Developing a Pest Exclusion Program for Cockroaches and Rodents** On September 12th at 1:00pm (EDT) Matt Frye will present a free webinar "Developing a Pest Exclusion Program for Cockroaches and Rodents". Register here: https://cornell.zoom.us/webinar/register/WN_x-C5zHgrSFqEuVziojCrcA

More blog entries here.

Looking for the pest control contracts webinar **Good Bed Bug Control Starts With Good Contracts?** [View the webinar here.](#)

Lowering Costs with an In-House Bed Bug Management Plan (VTech Bed Bug Webinar) Learn about what works for bed bug management in multifamily housing.

[More training opportunities here.](#)

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- Using IPM
- Funding Sources

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- Help with Housekeeping
- Getting Help

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- Webinars

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- Evaluate Your Success   
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