

Bed Bug Educational Package

**Tribal Pesticide Program
Council (TPPC)**



October 2017



TRIBAL PESTICIDE PROGRAM COUNCIL

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Dear Tribal Colleagues,

We are writing to you on behalf of the Tribal Pesticide Program Council (TPPC) to ask for your assistance in educating your community about bed bugs. The TPPC is a Tribal technical resource and program and policy development dialogue group, focused on pesticide issues and concerns. One of our priority issues that we have focused on is the issue of bed bugs in Indian Country and Native Alaskan Villages. We know that bed bugs have been found in many Tribal communities, many of which lack access to useful information for addressing bed bug problems in Tribal homes and facilities. To assist in addressing this, we have collaborated with our federal partners to compile the Bed Bug Educational Package to be distributed to Tribal communities.

The Bed Bug Educational Package that we have assembled with EPA covers topics such as bed bug identification, bed bug biology and behavior, and bed bug control strategies. The information in the Educational Package is concise, easy to understand, and suitable for distribution to Tribal members, health clinics, social service programs, housing programs, and environmental programs. We respectfully request your assistance in distributing these materials to schools, clinics, hospitality establishments, and environmental programs in your community to help prevent the spread of bed bugs and address existing bed bug issues. An electronic copy of the Educational Package is available on the TPPC's website at <http://tppcwebsite.org/bed-bugs/>. If you would like to speak with someone via telephone about how to manage bed bug issues, we refer you to the National Pesticide Information Center (NPIC) at (800) 858-7378. Their hotline hours are 8:00am to 12:00pm Pacific time, Monday-Friday.

Thank you for your assistance in helping us to control bed bugs in our communities!

Sincerely,

Fred Corey
TPPC Chair

BED BUG EDUCATIONAL PACKAGE

TABLE OF CONTENTS

“Household Insect Identification Card”

The Ohio State University Extension Integrated Pest Management Program.....1

“Tackling Bed Bugs: A Starter Guide for Local Governments [Bug Biology]”

University of Washington Evans School of Public
Policy.....3

“Bed Bug Checklist for Residents”

Indian Health Services (IHS).....4

“Top Ten Bed Bug Tips”

Environmental Protection Agency (EPA).....5

“Cost-Effective and Money-Wasting Bed Bug Control Methods”

Rutgers, New Jersey Agricultural Experiment Station.....6

“How to Make a Bed Bug Interceptor Trap out of Common Household Items”

University of Florida, Institute of Food and Agricultural Sciences Extension.....10

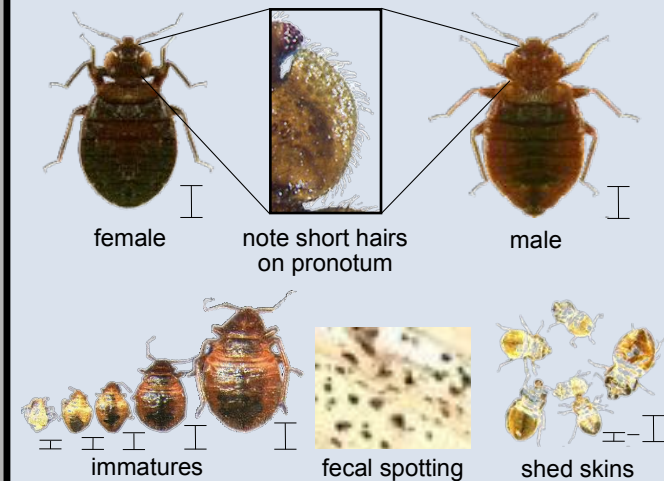
“Let’s Beat the Bug!”

University of Minnesota Extension.....14

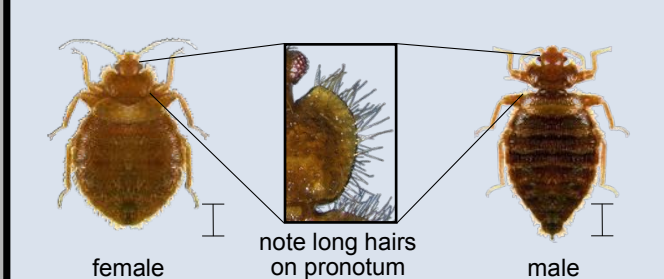
Bed Bugs in Indian Country: Additional Resources.....17

Household Insect Identification Card

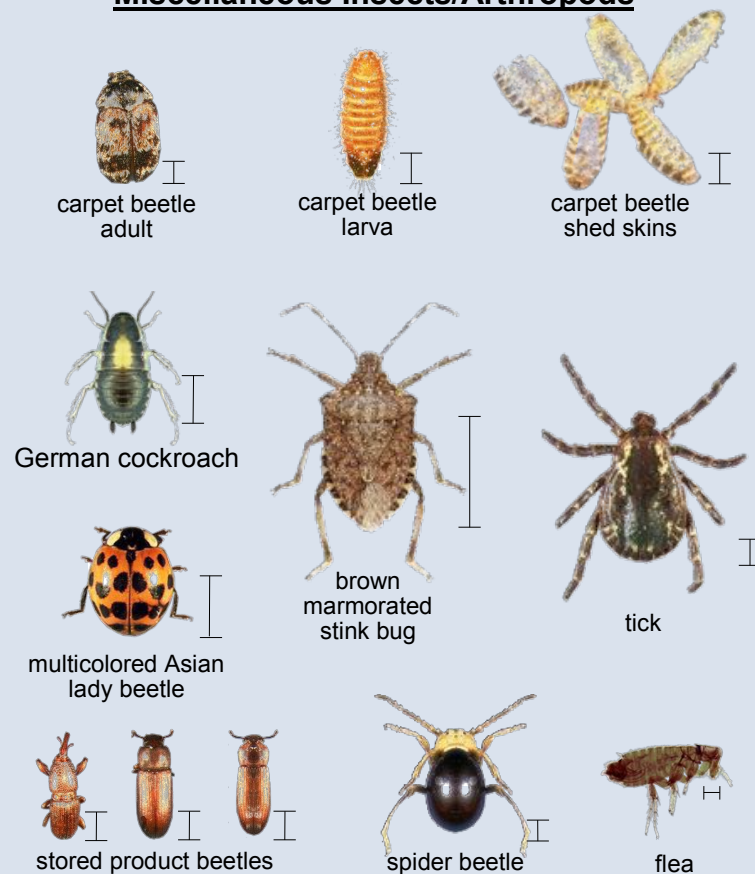
Bed Bug (*Cimex lectularius*)



Bat Bug (*Cimex adjunctus*)



Miscellaneous Insects/Arthropods



Scale bar to lower right of each insect indicates actual size.

CFAES-1001-16
S.C. Jones, D.J. DeGirolamo, J.L. Bryant

Supported in part by National Institute of Food and Agriculture, Hatch project 211891, and state and federal funds appropriated to the Ohio Agricultural Research and Development Center, The Ohio State University.

Tips for Bed Bug Prevention and Control

Correctly Identify the Insect:

- See *photos on reverse*
- Contact Ohio State University's Pest Diagnostic Clinic (ppdc.osu.edu)

Bed Bug Habits:

- Prefer to feed at night on human blood
- Hide during the day
- Hide in cracks, crevices and dark places
- Cannot fly, but walk very fast
- Can survive several months without feeding if a host is absent

Inspecting for Bed Bugs:

- Use a bright flashlight
- Look for the bugs and their dark spotting and shed skins (*see photos on reverse*)
- Carefully inspect bedrooms and main living areas where people rest or sleep, focusing on:
 - * Mattress seams, box springs, and bed frame
 - * Behind hanging pictures, baseboards, moldings, and loosened wallpaper
 - * Inside electronics (e.g., smoke detectors, thermostats, electrical outlets, etc.)
 - * Top, sides, underside, and interior of furniture
 - * Carpet tack strip (underneath carpet edges)

Travelers' Tips:

- **When preparing to leave:**
 - * Travel very light
 - * Put all items into tightly sealed plastic bags inside suitcase
 - * Be sure to take extra plastic bags so you can isolate clean, dirty, and newly purchased clothing
- **During your trip:**
 - * Carefully inspect your room for signs of bed bugs
 - * Change rooms if you find any signs of bed bugs
 - * Never store luggage on the floor or bed
 - * Keep your clothes in your suitcases, not in provided chest-of-drawers
- **When arriving home:**
 - * Do NOT take luggage inside bedrooms or living rooms
 - * If possible, launder all clothing in your luggage
 - * Store empty luggage inside sealed plastic bags

Control:

- Act immediately
- Eliminate clutter
- Caulk or seal cracks and crevices
- Launder bedding, clothes, etc.
 - * Wash in hot water (120°F [49°C] minimum)
 - * Drier set on medium to hot setting (30 minutes minimum)
 - * Confine clean items inside sealed plastic bags
- Do not use "bug bombs"
- Do-it-yourself bed bug control is very difficult
- Consider hiring an exterminator
 - * Make sure the exterminator is licensed
 - * Get at least 3 estimates before choosing an exterminator
 - * Bed bug control takes considerable time and effort

Bug Biology

Identification

- Color yellowish-white to reddish-brown
- Adult size about ¼ inch long, about the size of an apple seed
- Eggs can be seen with a magnifying glass; elongated in shape and clear-to-white in color
- Five nymphal stages, all of which feed on blood
- Shape and morphology is oval-shaped body with six legs and two antennae; varies from flat to balloon-shaped depending on how recently they last fed
- Leave dark feces marks in hiding places (mattresses, cracks and crevices)
- Leave nearly clear exoskeletons behind every time they shed, as well as blood spots on bedsheets after they feed.

Life Cycle

- Five distinct nymphal stages of development before reaching maturity
- Require blood meal to pass from one nymphal stage to the next
- Molt (shed) each time they pass through a stage of development, leaving nearly-clear exoskeletons behind
- Can breed directly with their own offspring
- Tend to breed faster during summer months
- Adult bedbugs can live over one year



Bed bug life stages. Photo credit: Allison Taisey

Resiliency

- Eggs laid intermittently in clusters; may be found in several locations
- Eggs are more difficult to kill than adult or nymphs
- Adults and nymphs may be able to survive for months without a blood meal
- Can regenerate infestations when even one pregnant female survives treatment
- Have developed some resistance to pesticides, and may require repeat treatments or different approaches. Bed bug resistance to pyrethroids, contained in many residential products on the market, is wide-spread.
- Adults can hide from pesticide applications or move along wires and walls to other areas.

Bed Bug Checklist for Residents

The following checklist is designed for residents who have, or think they have bed bugs. Typical bed bug bites are small, round and red, usually in a line or circle. You cannot identify bed bugs by bites alone as they can look like bites from other insects, rashes or hives. The first thing you should do if you suspect bed bugs is **a simple inspection**. Focus on small, dark places around sleeping areas. You may have bed bugs if you see:

- 1) Red or rust colored smears or stains on your sheets, mattress or other furniture
- 2) Dark spots in one area (about this size: •), which are droppings
- 3) Eggs, eggshells which are transparent looking or amber-colored shed skins
- 4) Live or dead bed bugs

What can you do?

Right away:

- ☐ Pull bed away from wall, be sure all bedding is off the ground
- ☐ Put clothes, bedding and other items in dryer for 20 minutes on HIGH heat
- ☐ Once you remove items from dryer, seal them in bags so bugs cannot re-infest
- ☐ Vacuum on a regular basis. Be sure to change the vacuum bag frequently and seal bag before throwing it in the garbage.
- ☐ Call someone who can help you (housing, social services, environmental health, local extension office, etc.)



Over the next few days:

- ☐ Buy a mattress and/or box spring bed bug proof cover
- ☐ Seal all cracks and crevices- hiding places around sleeping areas
- ☐ Paint your headboard/ bed frame AND nightstand to seal cracks and crevices
- ☐ Eliminate clutter
- ☐ Continue to vacuum at least once a day
- ☐ Change sheets as often as possible

If the problem remains or gets worse:

- ☐ Steam clean
- ☐ Use least-toxic products where appropriate
- ☐ Call professional pest control company with good reputation for bed bugs



Barbara Bloetscher, The Ohio State University, Bugwood.org

If you suspect bed bugs are in your home: Do's & Don'ts.

- ✓ **DO** talk to someone who can help you
- ✓ **DO** use nonchemical strategies first, they are considered to be safer and more effective
- ✓ **DO always** read and follow directions when using pesticides- the label is the law!
- ⊗ **DON'T** panic
- ⊗ **DON'T** throw away your furniture or belongings
- ⊗ **DON'T** use bug bombs or foggers

Top Ten Bed Bugs Tips

1 **Make sure you really have bed bugs, not fleas, ticks or some other insect.** You can compare your insect to the pictures on our bed bug Web page or show it to your local extension agent.

2 **Don't panic!** Eliminating bed bugs is difficult, but it's not impossible. Don't throw out all of your things because most of them can be treated and saved. Throwing stuff out is expensive, may spread the bed bugs and could cause more stress.

3 **Think through your treatment options – Don't immediately reach for the spray can.** Try other things first. Integrated pest management (IPM) techniques may reduce the number of bed bugs and limit your contact with pesticides. If pesticides are needed, always follow label directions or hire a professional. There is help available to learn about treatment options.

4 **Reduce the number of hiding places – Clean up the clutter.** A cluttered home provides more places for bed bugs to hide and makes locating and treating for them harder. If bed bugs are in your mattress, using special bed bug covers (encasements) on your mattress and box springs makes it harder for bed bugs to get to you while you sleep. Leave the encasements on for a year. Be sure to buy a product that has been tested for bed bugs and is strong enough to last for the full year without tearing.

5 **Regularly wash and heat-dry your bed sheets, blankets, bedspreads and any clothing that touches the floor.** This reduces the number of bed bugs. Bed bugs and their eggs can hide in laundry containers/hampers, so clean them when you do the laundry.

6 **Don't rely on do-it-yourself freezing as a reliable method for bed bug control.** While freezing can kill bed bugs, temperatures must remain very low for a long time. Home freezers are usually not cold enough to kill bed bugs. Putting things outside in freezing temperatures can kill bed bugs, but it can take several days when the temperature is 0° F and almost a week when the temperature is 20° F.

7 **Use heat to kill bed bugs, but be very careful.** Raising the indoor temperature with the thermostat or space heaters won't do the job. Special equipment and very high temperatures are necessary for successful heat treatment. Black plastic bags in the sun might work to kill bed bugs in luggage or small items, if the contents become hot enough (about 110°F for at least 3 hours).

8 **Don't pass your bed bugs on to others.** Bed bugs are good hitchhikers. If you throw out a mattress or furniture that has bed bugs in it, you should slash or in some way destroy it so that no one else takes it and gets bed bugs.

9 **Reduce the number of bed bugs to reduce bites.** Thorough vacuuming can get rid of some of your bed bugs. Carefully vacuum rugs, floors, upholstered furniture, bed frames, under beds, around bed legs, and all cracks and crevices around the room. Change the bag after each use so the bed bugs can't escape. Place the used bag in a tightly sealed plastic bag and in an outside garbage bin.

10 **Turn to the professionals, if needed.** Hiring an experienced, responsible pest control professional can increase your chance of success in getting rid of bed bugs. If you hire an expert, be sure it's a company with a good reputation and request that it use an IPM approach. Contact your state pesticide agency for guidance about hiring professional pest control companies.

August 28, 2012
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Cost-Effective and Money-Wasting Bed Bug Control Methods

Fact Sheet 1251

Cooperative Extension

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Richard Cooper, Research Assistant, Department of Entomology

Bed bugs, (*Cimex lectularius* L.), have gradually become a common urban pest in the past decade. People get bed bugs in various ways such as visiting an infested place, bringing in infested furniture, or through the natural dispersal of bed bugs from an infested neighboring unit within a multi-occupancy dwelling such as an apartment building. Many people try to control bed bugs themselves to avoid the expense of hiring a professional service; however, professional services offer the advantage of a technician that is properly trained in pesticide safety and effective bed bug management. It is recommended to use professional pest control services. However, for those who still wish to control bed bugs on their own, this provides a summary of the cost effective versus money-wasting materials and methods. This information will help you combat bed bugs safely and effectively.

What Works

1. Reduce clutter or put items in plastic boxes
2. Encase mattress and box spring
3. Install bed bug traps
4. Launder or hot dry bed linens at least weekly
5. Use a heat chamber
6. Place small items in a freezer for 4 days
7. Apply steam to furniture
8. Remove bed bugs using a vacuum machine
9. Discard heavily infested items
10. Apply repellent to pants, socks, and shoes

What Doesn't Work

1. Switch sleeping location
2. Ultrasonic pest repellers
3. Dryer sheets and plant oil-based repellents
4. Moth balls
5. Rubbing alcohol
6. House cleaning materials
7. Most natural pest control products
8. Foggers
9. Most consumer pesticide sprays

Cost Effective Bed Bug Control Materials and Methods (What Works)

1. Place Items in Plastic Containers or Plastic Bags

(Figure 1). This is a simple and cost effective way to keep bed bugs out of materials and improve the speed of control in a room. Bed bugs do not like to climb or stay on smooth plastic materials. Placing small items



Figure 1

or in sealed heavy-duty plastic bags will prevent bed bugs from infesting the items. In an infested home, placing clutter in plastic containers will make bed bug elimination efforts easier. Treat items already infested before storing. Effective methods for treating infested items include hot laundering, steaming, heating, or freezing (each method is discussed below).

2. Mattress and Box Spring Encasements.

Installing encasement (Figure 2) will reduce bed bug populations immediately, eliminate many harborages and make bed bug inspection much easier. If budget is a concern, a vinyl encasement that costs \$5-10 a piece can be used, however vinyl encasements easily rip or tear.



Figure 2

3. **Bed Bug Traps.** Many bed bug traps are available to help detect bed bugs. Pitfall style traps such as shown in Figure 3 (on page 2) have been shown to be a cost-effective tool for detecting bed bugs and reducing bed bug bites while the infestation is being treated. Each trap costs a few dollars. A one bedroom apartment may need about 8-12

traps. Placing traps under the furniture legs is more effective than visual inspection for detecting bed bugs. Traps can be placed beside the upholstered furniture if no furniture legs are present or the furniture legs are too large. A recent study shows traps alone detected 95% of the infestations in a building-wide bed bug inspection (Cooper et al. 2015). Placement of traps away from beds and furniture along the room perimeters and at the corners of rooms is also helpful in reducing bed bug infestations. Inspect the traps every 1-2 weeks to determine if bed bugs are still present and where they are distributed.

4. **Frequent Laundering and Hot Drying.** Drying cycles alone or in combination with washing with a hot water cycle are effective in killing bed bug eggs and mobile stages (Naylor and Boase 2010). Frequent washing or hot drying is essential for eradicating bed bugs that are hiding in clothing, bed sheets, pillow cases, blankets and other washable fabric materials. These items usually cannot be treated with insecticides.
5. **Containerized Heat Treatment.** Non-washable items such as shoes, electronics, suitcases, etc. can be treated using a heat chamber. Several commercial heating boxes that cost about \$200 are available for treating bed bug infested items. For example, Thermal Strike™ is a foldable heating box using regular outlets as power source (Figure 4). Four to eight hours treatment is sufficient to kill bed bugs.
6. **Freezing.** Another method for treating items that cannot be laundered is to freeze them. Household freezers usually have a temperature of -17.8°C (0°F). Small items such as shoes, telephones, and books can be de-bugged by wrapping them in plastic bags and placing them in a freezer for four days (Olson et al. 2013).
7. **Steam.** The high temperature of steam (near 212°F or 100°C) will kill bed bugs instantly. A small steam machine (such as HAAN steam cleaning sanitizer) only costs about \$60 (Figure 5). If frequent use or treatment of large areas is needed, a high capacity steamer that costs between \$100-\$1,300 is recommended. Apply steam along sofa seams, crevices and corners on bed frame, mattress edges and corners where bed bugs may hide. Reapply steam every few days until no bed bugs are found based on a combination of visual bed bug trap inspections. Be careful - steam may damage finished furniture surfaces and some fabrics such as microfiber.
8. **Vacuum.** When large numbers of bed bugs are present, a vacuum machine can be used to quickly remove live and dead bed bugs and their shed skins. Place a knee-high stocking over the end of the vacuum tube and secure it with a rubber band prior to placing the attachment, to catch the bugs and prevent them from infesting the vacuum (Figure 6). Vacuum cracks and crevices including tufts, seams, zippers, and the trim of beds and upholstered furniture where bed bugs can hide. When you finish vacuuming, remove the stocking and discard in a sealed plastic bag. It should be noted that bed bug eggs or live bed bug nymphs and adults hiding in cracks may not be able to be removed by vacuuming.
9. **Disposal.** It is usually unnecessary to dispose of furniture or personal belongings during bed bug treatment. However, heavily



Figure 3



Figure 4



Figure 5



Figure 6

infested items and difficult-to-treat furniture may need to be disposed of in some instances. For example, a heavily infested sofa with many bed bug hiding places is difficult to treat and inspect (Figure 7). Consider discarding severely infested furniture that is in disrepair or no longer wanted. If possible, replace wooden bed frames with metal bed frames in locations where bed bugs problems are severe.

10. **Repellents Containing DEET.** Preventing bed bugs is a primary concern for those who need to visit bed bug infested homes. DEET treated fabric is repellent to bed bugs (Wang et al. 2013). Commercial insect repellent products containing DEET for repelling ticks and biting insects are also helpful for preventing bed bugs when applied to outer surfaces of clothing (Figure 8). If the repellent product does not list bed bugs on the label, you should first check with your state pesticide regulatory agency to see if these repellents are allowed to be used for protection against bed bugs. It should be noted that DEET products cannot be used on furniture and should only be applied in a way that is consistent with the product label.



Figure 7



Figure 8

Money Wasting Bed Bug Control Materials and Methods (What Doesn't Work)

1. **Switching Sleeping Location.** This method does not work because bed bugs can live in a vacant room for a few months without feeding. In addition, bed bugs can follow the carbon dioxide released by a human and migrate to the new sleeping location. Switching your sleeping location makes bed bug control more difficult because bed bugs are likely to become more widely distributed throughout the home as a result.
2. **Ultrasonic Pest Repellers.** There are abundant supplies of pest repeller products (Figure 9). North Arizona State University researchers examined four pest repellers (Yturralde and Hofstetter 2012). None of the repellers affected bed bug behavior. Ultrasonic pest repellents have not been shown to be useful for controlling bed bugs.
3. **Dryer Sheets and Plant Oil-based Repellents.** Some consumers place dryer sheets on furniture in an attempt to repel bed bugs (Figure 10). Others use insect repellents containing pyrethroids or plant oils. There are no data indicating these products will prevent bed bug infestations.
4. **Moth Balls.** Moth balls are commonly used insecticides for repelling or killing fabric insects. Some consumers place moth balls under or around the bed or between the mattress and box spring for controlling or repelling bed bugs. Researchers at Rutgers University evaluated two moth ball products (Figure 11): IMS (99.8% paradichlorobenzene) and Enoz (99.5% naphthalene). Bed bug adults, nymphs, and eggs were placed throughout plastic bags filled with clothes, and the bags sealed. After one week, less than 50% of the bed bug adults had been killed, and the mothballs had no significant effect on bed bug eggs.
5. **Rubbing Alcohol.** Many web pages recommend using rubbing alcohol for bed bug control. The rubbing alcohol products available usually contain 70% or 91% isopropyl alcohol. Laboratory studies by Rutgers University show direct spray of either of these two products killed a maximum 50% of the bed bugs. In addition to their low efficacy, rubbing alcohol products are flammable materials, can create a fire hazard and should not be used to control bed bugs.
6. **House Cleaning Materials.** Some people believe house cleaning sprays are useful for killing bed bugs. A number of multi-purpose cleaner (or disinfectant) products are used for controlling bed bugs. Rutgers University researchers tested a disinfectant product that is



Figure 9



Figure 10



Figure 11

believed effective for controlling bed bugs (Figure 12 on page 4). All bed bugs survived the direct spray treatment.

7. **Most Natural Products and Detergents.** There are numerous bed bug control products based on plant-derived materials or detergents. Unfortunately, most of them are ineffective (Singh et al. 2014). Of 11 tested products tested, only two (EcoRaider and Bed Bug Patrol) achieved more than 90% bed bug mortality when directly sprayed on bed bug nymphs under laboratory conditions. One product (EcoRaider) caused 87% egg death when directly sprayed to eggs. Other evaluated essential oil products had little to no effect on bed bug eggs.



Figure 12

8. **Foggers.** Foggers are widely used for controlling indoor pests. A study by Ohio State University indicates foggers are completely ineffective against bed bugs (Jones and Bryant 2012). Figure 13 shows a resident used nine foggers simultaneously in a studio apartment. Using nine foggers in a studio apartment poses a high risk of fire and personal injury. More importantly, it failed to eliminate the bed bugs.



Figure 13

9. **Pyrethroid Sprays.** Pyrethroids are a class of insecticides commonly used for indoor pest control. Recent studies show majority of the field bed bug populations are resistant to pyrethroids. The effectiveness of these products when used as the sole method of control is often very low due to prevalence of bed bug insecticide resistance.

Photo credits: Figure 2, Richard Cooper; Figure 6, Karen Vail from University of Tennessee; All other figures, Changlu Wang.

Final Thoughts for Eliminating Bed Bugs

The most effective way to achieve bed bug elimination is to follow an integrated pest management (IPM) principle that includes monitoring, using a combination of several treatment methods, follow-up evaluation of the results, and re-treatment until elimination. After treatment, bed bug numbers become small and more difficult to find. To avoid premature termination of treatment, use a combination of visual inspection and bed bug monitors to detect bed bugs and confirm if bed bugs are indeed eliminated. Stop treatment only when you cannot find bed bugs after using the above-mentioned methods for a month. When more than a few apartments are infested in a multi-unit dwelling, a building-wide approach will be necessary and will most likely require the experience of a pest management professional.

For more information about bed bugs, please visit the following web sites: U.S. Environmental Protection Agency: <http://www2.epa.gov/bedbugs>. Rutgers University: <http://njaes.rutgers.edu/bedbug/?info>.

Literature Cited

1. Cooper, R., C. Wang, and N. Singh. 2015. Evaluation of a model community-wide bed bug management program in affordable housing. *Pest Management Science* 71. DOI 10.1002/ps.3982.
2. Jones, S. C., and J. L. Bryant. 2012. Ineffectiveness of over-the-counter total-release foggers against the bed bug (Heteroptera: Cimicidae). *Journal of Economic Entomology* 105: 957-963.
3. Naylor, R. A., and C. J. Boase. 2010. Practical solutions for treating laundry infested with *Cimex lectularius* (Hemiptera: Cimicidae). *Journal of Economic Entomology* 103: 136-139.
4. Olson, J. F., M. Eaton, S. A. Kells, V. Morin, and C. Wang. 2013. Cold tolerance of bed bugs and practical recommendations for control. *Journal of Economic Entomology* 106: 2433-2441.
5. Singh, N., C. Wang, and R. Cooper. 2014. Potential of essential oil-based pesticides and detergents for bed bug control. *Journal of Economic Entomology* 107: 2163-2170.
6. Wang, C. L., L. H. Lu, A. J. Zhang, and C. F. Liu. 2013. Repellency of selected chemicals against the bed bug (Hemiptera: Cimicidae). *Journal of Economic Entomology* 106: 2522-2529.
7. Yturralde, K. M., and R. W. Hofstetter. 2012. Efficacy of commercially available ultrasonic pest repellent devices to affect behavior of bed bugs (Hemiptera: Cimicidae). *Journal of Economic Entomology* 105: 2107-2114.

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How to Make a Bed Bug Interceptor Trap out of Common Household Items¹

Benjamin A. Hottel, Rebecca W. Baldwin, Roberto M. Pereira, and Philip G. Koehler²

Bed bugs have become an increasingly common pest problem throughout the United States. They have been found in many different places where people congregate, from schools and restaurants to doctors' offices and movie theaters, but the worst infestations are usually in the places where people live, rest, and sleep, like houses, apartments, hotels, and homeless shelters. At these locations, bed bugs are most common around pieces of furniture people sit or lie down on—beds, chairs, and sofas. To discover whether bed bugs are present in a room or a piece of furniture, a device called a bed bug interceptor trap can be helpful. Interceptor traps catch and collect bed bugs when they try to travel between their human hosts and their hiding places. Bed bug interceptor traps are easy to make out of commonly found household items and disposable plastic containers.

How an Interceptor Trap Works

Interceptor traps placed on all of the legs of a piece of furniture can help prevent bed bugs from infesting that piece of furniture and also reduce the movement of bed bugs already on the furniture to the rest of the room. Interceptor traps rely on the poor ability of bed bugs to climb on smooth surfaces. The traps have rough areas to allow bed bugs to enter easily and a smooth-surfaced moat that prevents them from escaping. Bed bugs trying to either get onto or leave a piece of furniture find themselves trapped in this smooth-surfaced moat instead.

Items Needed to Create an Interceptor Trap

1. A small container that will fit under a furniture leg (example: a margarine tub or a food storage container)
2. A large container that the small container will fit inside (example: food storage container)
 - When the small container is placed within the larger container, there should be at least one-quarter inch space between the walls of the two containers
3. Rough-surfaced tape (example: masking tape)
4. Glue (example: hot glue gun or super glue)
5. *Option:* Surface applications to make escape from the traps even more difficult
 - Unscented baby powder (talcum powder)
 - Car polish
6. *Option:* Support structures for each trap to prevent the traps from cracking under the weight of the furniture
 - Square of tile
 - Square of plywood

1. This document is ENY-2029, one of a series of the Entomology and Nematology Department, UF/IFAS Extension. Original publication date January 2014. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

2. Benjamin A. Hottel, graduate student; Rebecca W. Baldwin, undergraduate coordinator; Roberto M. Pereira, associate research scientist; Philip G. Koehler, professor; Department of Entomology and Nematology, UF/IFAS Extension, Gainesville, FL 32611.

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U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.



Figure 1. Items needed to make a single bed bug interceptor trap. From left to right and top to bottom: Car polish, square tile, baby powder, glue, large container, small container, rough-surfaced tape.

Step-by-Step Instructions for Creating an Interceptor Trap

1. Cut four pieces of rough-surfaced tape. The cut pieces should be at least as high as the wall of the smaller container.



Figure 2. Four pieces of rough-surfaced tape cut to match the height of the wall of the small container.

2. Evenly space and firmly press the four pieces of tape vertically on the inside surface of the smaller container to connect the inner top edge with the container bottom.



Figure 3. Rough-surfaced tape placed into the small container.

3. Wrap the rough-surfaced tape around the exterior side of the larger container so that the entire outer surface is covered from the base to the upper edge of the container.

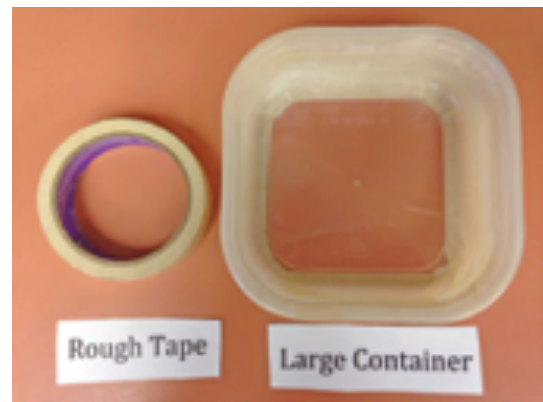


Figure 4. Rough-surfaced tape and a large container are needed for step #3.



Figure 5. The rough-surfaced tape has been tightly wrapped around the large container. It is important that the tape is wrapped tightly and that no cracks or crevices are created where bed bugs can hide.

4. Glue the smaller container onto the center of the bottom of the larger container.



Figure 6. The small container has been glued inside the center of the large container. The walls of the containers should not touch.

5. Make surfaces smooth so that bed bugs cannot escape.

Option: Apply car polish or talcum powder to the interior side of the larger and exterior side of the smaller container. Follow the directions on the car polish bottle on how to apply and buff the product. If using talcum powder, do not touch the dusted trap surface with your hands. Talcum powder should be reapplied as necessary.



Figure 7. Baby powder and finished bed bug trap.



Figure 8. Use a sponge or a brush to dust the trap with powder.

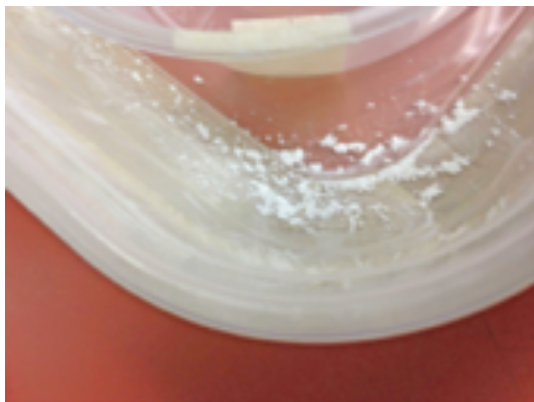


Figure 9. Bed bug trap with finished talc application.

6. Move the piece of furniture to be protected away from walls and other furniture, and place a trap underneath each of its legs. With beds, bedding should not be touching the floor, walls, or other furniture.



Figure 10. Interceptor trap placed under the leg of a piece of furniture.

Option: On carpeted floor, place a square of tile or plywood underneath the trap to prevent the trap from breaking under the weight of the furniture.



Figure 11. Square of tile placed underneath an interceptor trap.

Any bed bugs found caught in the moat of the trap (Fig. 12) can be left there to die or drowned in soapy water. (Spray them with a 10% dish detergent and water mixture.) To make sure the insects in the trap are in fact bed bugs, take them to an expert for positive identification. Use tweezers or a cotton swab to put them in a leak-proof container of 70% rubbing alcohol. If you can't extract them from the trap because they've managed to creep under the smaller container, put the whole trap in a sealed plastic bag and take it to a pest control professional or county Extension agent, who can help you take the next step toward eradication.



Figure 12. Bed bug interceptor trap with victims.

Concluding Comments

Use bed bug interceptor traps in places of human habitation to detect bed bugs before they become established. It is much easier to manage a bed bug invasion if you catch it early. A few bed bugs can be stopped, but an infestation of thousands of them is much more difficult and expensive to control. Further information on bed bugs can be found at *Bed Bugs and Blood Sucking Conenose* <http://edis.ifas.ufl.edu/ig083>.

Let's Beat the Bug!

Laundering Items to Kill Bed Bugs

In Short:

- Washing your clothes is an easy way to kill bed bugs.
- Sort your clothes into plastic bags before you leave the infested area.
- Wash and dry clothes and bedding on the highest temperature the fabric will allow.
- If you still have bed bugs in your home keep the clean clothes in clean plastic bags or plastic boxes so they will not get bed bugs again.

Washing clothes and bedding is a simple and cheap method of killing all bed bugs. It is a very important part of both do-it-yourself bed bug control, and when you have a professional pest management company apply insecticides. Washing will kill some of the bed bugs, but it is the heat of drying that will kill any remaining bed bugs. With a few common-sense practices, you can easily disinfest clothes and ensure these items do not become bed bug hiding places as you remove bed bugs from the rest of your home.



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Key Steps In Washing Clothes to Control Bed Bugs

There are three main steps to think about when washing items to remove bed bugs. These steps include: sorting clothes; washing and drying; and storing clean clothes.

Sorting clothes

- ✓ In the infested area, pre-sort clothes as you would when you normally wash clothes and place each sorted pile into its own plastic bag. Make note of the washing instructions. This will allow you to set the highest allowable wash and dry temperatures for your clothes.
- ✓ Separate dry-clean-only clothes because these should not be made wet, but they may be placed in a dryer.
- ✓ Seal the bags prior to moving your laundry. This will prevent bed bugs from moving into other areas of your home or the Laundromat.



For more information contact the Bed Bug InformationLine at 612-624-2200, bedbugs@umn.edu, or visit www.bedbugs.umn.edu

Let's Beat the Bug!

Washing and drying clothes

- ✓ Tip each bag into a washer (or the dryer for dry-clean-only).
- ✓ When each bag is emptied, fold the bag opening into the center then wrap the rest of the bag around the opening.
- ✓ Immediately put empty bags into another clean bag and seal before disposal.
- ✓ Wash and dry the clothes on the hottest temperature the fabric can safely withstand.
- ✓ For dry clean clothes that are able to be placed in a dryer, put into a dryer on at least medium to high setting and run the dryer for at least 30 minutes. Then take dry clean clothes to a professional cleaner's for cleaning and pressing. Drying will kill the bugs but not clean the clothes.
- ✓ If you want to only kill bed bugs and do not need to wash your clothes, simply putting infested items in the dryer for 30 minutes on high heat will kill all the bed bugs.

Storing cleaned clothes

- ✓ Fold clothes as soon as they are removed from the dryer. If you are doing laundry in a commercial laundromat or laundry facility in an apartment complex, place the clothes immediately into a new plastic bag. Do not set your clothes on a folding table unless you have inspected the table for bed bugs.
- ✓ Keep the clean clothes in bags until you arrive at your apartment.
 - If you have successfully controlled bed bugs in your home, take the laundry out of the bag and put away.
 - If you still have an infestation, keep the folded laundry in the bag and remove clothes as needed. This will prevent the clothes from becoming reinfested.



Updated on May 15, 2014

Bed Bugs in Indian Country: Additional Resources

The **Tribal Pesticide Program Council (TPPC)** provides links to training and technical assistance resources, in addition to a list of funding opportunities that tribal communities could potentially use to address bed bug issues.

- <http://tppcwebsite.org/bed-bugs/>

The **National Pesticide Information Center (NPIC)** can provide objective information on bed bug identification, monitoring and infestation control using integrated pest management.

- <http://www.npic.orst.edu/pest/bedbug/>
- *Hotline:* 1-800-858-7378 (8:00am - 12:00pm PST, Monday-Friday)
- *Email:* npic@ace.orst.edu

Visit **EPA's Bed Bug Information Clearinghouse** for an extensive list of resources/articles and information on how to prevent, identify, and control bed bugs.

- <https://www.epa.gov/bedbugs/bed-bug-information-clearinghouse>

Stop Pests in Housing (StopPests.org) can provide technical assistance by phone and materials to educate tribes on how to rewrite contracts to include IPM approaches.

- <http://www.stoppests.org/pest-solutions/bed-bugs/>

Virginia Tech, Bed Bug & Urban Pest Information Center provides information on how to address bed bug infestations in multi-unit housing complexes with limited resources.

- <http://www.bedbuginfocenter.ento.vt.edu/index.html>

Visit **Rutgers, New Jersey Agricultural Experiment Station** for bed bug information for multi-family housing residents and building managers.

- <https://njaes.rutgers.edu/bedbug/>

University of Minnesota, Let's Beat the Bed Bug! offers a variety of resources on bed bug prevention and control, in addition to webinars for pest management professionals.

- <http://www.bedbugs.umn.edu/>
- *Information line:* 612-624-2200 or 1-855-644-2200
- *Email:* bedbugs@umn.edu