



Pests and Pesticides in Child-serving Facilities: An IPM Newsletter

Special points of interest:

> Bed Bugs

> House Mice

Should We be Concerned about Bed Bugs in Schools?

Karen M. Vail

We have not yet produced a bed bug publication specific to schools. However, we offer the resources listed below as references and have reprinted the *Bed Bugs Go to School: An IPM Approach* article on the following pages of this newsletter to help you understand the strategies needed to manage bed bugs in schools.

During a discussion on the school IPM list serv (SCHOOLBUGS-L@LISTS.UFL.EDU), Mike Merchant, Texas A&M, offered this approach to a bed bug find in a school. (To join the list serv, visit <http://schoolipm.ifas.ufl.edu/> and follow the instructions under "School IPM Listserv.")

A school district in Texas recently went through a similar incident in several classrooms. Their response was to do a visual inspection of the room, alert the parents of the child, and have their IPM provider put two Nightwatch bed bug monitors out over the weekend to confirm that bed bugs were not present. The district has even invested in two of these devices, as they believe this will likely be an ongoing issue. Monitoring, not pesticide application, is probably the best first response to reports of "hitchhiking" bed bugs on a school backpack. In cases where the children continue to come to school with bed bugs, their backpacks can be bagged during the day as a precaution.

We also need to be careful with the use of the term "infested". Is spotting of a single bed bug in a classroom backpack an infestation? I think it's better if we reserve use of the term to mean a situation where bed bugs have settled in, and begun reproduction as a result of a consistent and available food supply—something that will probably not be very common in the average public school. Finding a single bed bug is a detection, not an infestation.

Bed Bugs in Schools Resources

Arizona Pest Press, *Bed Bugs Go to School: An IPM Approach*

<http://ag.arizona.edu/apmc/docs/Septemberbedbugs.pdf>

Michigan Bed Bugs: What Schools Need to Know

http://www.michigan.gov/documents/emergingdiseases/Bed_bugs_schools_293498_7.pdf

NYC Department of Education (Bed Bug Kit with sample letter at end)

http://www.opt-osfns.org/dsf/forms/Bed_Bug_Kit.pdf

North Carolina State University

<http://schoolipm.ncsu.edu/bedbugs.htm>

GSA: Bed Bugs in the Workplace

<http://ipmsouth.com/2010/09/28/bed-bugs-in-the-workplace/>

Bed Bug Web Sites Summary

<http://epserver.ag.utk.edu/personnel/Vail/BEDBUG%20WEB%20SITES.pdf>



"Finding a single bed bug is a detection, not an infestation."

*Mike Merchant,
Texas A & M.*

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BED BUGS GO TO SCHOOL: AN IPM APPROACH

By Tom Green and Dawn Gouge,
<http://ag.arizona.edu/apmc/docs/Septemberbedbugs.pdf>

Bedbugs, *Cimex lectularius*, are soft-bodied, flat-shaped, brown to rusty-red colored insects. Like fleas, ticks, head lice and mosquitoes, bed bugs feed on blood. Similar to mosquitoes, bed bug abdomens swell and become brighter red as they feed. Bed bugs can survive for months without feeding. Unlike fleas, ticks and mosquitoes, bed bugs are not known to transmit disease. Bites are often painless initially but may become large, itchy welts. Although bed bugs are most often found associated with locations where humans sleep, they are expert hitch-hikers, and may be inadvertently transported on clothing, back-packs, or other belongings to child care facilities, schools and other places.



Photo by James Hickok

Bed bugs are most active at night, often sheltering during the day within twenty feet of beds. Bed bug eggs, immature nymphal stages and adults can all be found together in bed frames, seams of mattresses and box springs, and under and behind other furnishings. Bed bugs excrete digested blood which appears as dark spots or smears in these same locations.

Bed bugs typically arrive in schools as stowaways on student or staff belongings. In at least one major urban school district, one or more confirmed specimens are typically found each month. Schools generally do not experience established, reproducing infestations unless students and/or staff reside at the school, or the school shares space with facilities where humans sleep at night. Bed bug eggs do not necessarily indicate a reproducing population; they may result from a gravid female transported into the school by a student, staff member or visitor.

When a bed bug is found, it can be difficult to determine the source. A bed bug found on a person or belongings may have come from another person. Similar to head lice, it is very important to address the issue with care and sensitivity. There is no association between cleanliness, and bed bug infestations. Anyone can experience an infestation.

If a suspected bed bug is found in school, it should be collected for identification by a trained professional. Other bed bug-like species may be found in schools, including bat bugs or swallow bugs. To collect the specimen, use a piece of tissue, or forceps to place the bug in a plastic bag, double bag, then tape the outer bag closed. Do not crush the specimen. If the specimen will not be identified immediately, place the bag in a freezer for several hours to kill the bed bug and prevent escape. Do not mail or transport live specimens as they are skilled escape artists.

Collect the following information for each specimen: date found, name and contact information of person collecting specimen, location found (e.g., on a student, on student's belongings or on walls or furniture), room number, school name, school principal name and phone number.

If the specimen is confirmed to be a bed bug, the principal and school health professional should be notified and the following steps are recommended:



1. The classroom or other area where the bed bug was found should be carefully inspected by a trained professional including desks, floors, walls and storage areas for student belongings. A thorough cleaning may be needed including vacuuming with special attention to cracks and crevices in furniture and equipment, walls and floors, and laundering washables in hot water and drying on the highest heat setting. Delicate fabrics can be soaked in warm water and laundry soap for several hours before rinsing. Infested items that cannot be cleaned or treated with high heat (>120F for several hours) should be disposed of. If necessary, a licensed pest management professional can treat infested areas with pesticides labeled for bed bugs.

2. If the bed bug was found on a student's clothing or other belongings, the child's parent(s) or guardian(s) should be notified. **There is no need to send the student home.**

Similar to head lice, the school health professional should manage the case including re-inspecting belongings, desk, classroom, etc. until the problem is resolved. Student belongings such as backpacks can be isolated in tight-sealing plastic containers or bags to reduce potential for bed bug dispersal, both at home and in school while the problem is being resolved.



3. Parents of all children using the room where the bed bug was found should also be notified and provided with basic information about bed bugs including description, signs and symptoms, strategies to monitor for and eliminate infestations in homes including cleaning, laundering and specially designed mattress and box-spring covers that can entrap bed bugs and reduce harborage opportunities. The information should include where to go for additional help.

In the home environment the common bed bug will feed on a variety of animals but prefers humans, so pets such as dogs and cats are not a major host for bed bugs. Bed bugs feed for about ten to fifteen minutes at night, then drop off the host and crawl to a sheltered crevice where they'll remain for a few days while digesting the meal. They will bite all over the body, especially on exposed areas, such as the face, neck, arms, and hands.

People experience a range of reactions to the bites; some are unaware, while others experience an allergic reaction to the saliva injected while the insects feed, and may develop painful welts. Repeated bites tend to generate more severe reactions and heavy infestations of bed bugs may cause anemia in children and the elderly. Bed bug problems in the home may also cause stress, financial hardship, and sleeplessness. Because they can survive for almost a year without feeding, bed bug infestations can persist in abandoned buildings or those that are only used seasonally.

Don't let the bed bugs!

Inspect and monitor classrooms. If specimens are confirmed, inspect crevices in baseboards, pictures, furniture, window, and door casings, wallpaper, behind electrical switch plates, in telephones, radios, clocks, behind wall mounted art-work. Look for the insects, their cast skins, bug poop, and eggs near crevices.

• Schools are not ideal places for bed bugs as they prefer to hide during the day and few people are around during the night. However, hungry bed bugs will feed during the day.

- Evening school staff on-break in rest areas may be the first to notice regular bites.
- Faculty lounge, office area or nurses office with upholstered furniture or a cot may become infested. Similarly schools that have child care facilities with stationary bedding are prone trouble spots.
- Schools with dormitories provide ideal habitat for populations to rapidly increase.

In nearly all cases, careful inspection, vacuuming, laundering and school health professional case management will be adequate to resolve a confirmed bed bug sighting in schools without space heat or steam treatment. Note: Bleach and ammonia are not effective against bed bugs. Soap and water is effective for removing bed bugs, eggs and debris from surfaces.

Managing bed bugs

- Inspect and monitor for bed bugs constantly, they arrive with people and their belongings. Inspect donations and monitor lost-and-found areas with extra vigilance.
- Vacuuming is an effective way to remove bed bugs and the dirt that provides them with shelter.
- Bed bugs are sensitive to extreme temperatures in all of their life-stages. So toss all infested clothing in a hot (140°F) dryer for 40 minutes.
- Eliminate shelter by sealing cracks and crevices with a silicone based sealant. Seal around utility conduits.
- Remove clutter.
- Separate student back-packs and coats. Most bed bugs in schools will be coming in with students and can be found on, and in the student's belongings.
- Encourage staff and faculty to report bed bug sightings.

Information taken from:

Frishman, A. 2000. Bed bug basics and control measures. *Pest Control* 68: 24.

Green, T. A., and D. H. Gouge, eds. 2010. *School IPM 2015: A Strategic Plan for Integrated Pest Management in Schools in the United States*

Greenberg, L., and J. H. Klotz. 2000. *Pest notes: Bed bugs*. UCDANR publication 7454. University of California Statewide Integrated Pest Management Project, Riverside, CA.

Krueger, L. 2000. Don't get bitten by the resurgence of bed bugs. *Pest Control* 68: 58-64.

Reid, B. 1990. Don't let the bed bugs bite. *Pest Control* 58 (6): 48-50.

House Mouse Management

During our fall 2010 inspections of the three TN IPM demonstration schools, house mice were the most common pest listed in the log book. In some cases, we assume this was due to mice entering large gaps under exterior doors. Listed below is a description of the house mouse and its control.

The house mouse is the most common rodent infesting schools today. Though not native to North America, having arrived with early settlers from Europe and elsewhere, the house mouse has adapted brilliantly to life with humans. They invade and contaminate our dwellings, our places of work, and even cause significant economic damage to food stores and crops in agricultural areas.

The adorable house mouse is 5 to 8 inches long and light brown, grey or sometimes black with a lighter belly. It is equipped with a naked tail and ears larger than his cousin, the deer mouse.

The deer mouse (a.k.a. “white-footed mouse”) has a furry tail, white feet, and a gray to brown body that contrasts sharply with his white belly. Deer mice will invade out-buildings in rural areas and are less common in urban environments. The deer mouse “is the most widely distributed and abundant mammal in North America and currently the primary reservoir host of Hantavirus” (Corrigan, 2001).



House mouse. Credit: NPWRC

Mice may infest schools year round, but as the house mouse cannot hibernate he is more likely to invade structures in the fall. While in search of food and shelter from colder temperatures, mice are drawn to buildings - which initially offer them cover. From there it only takes a hint of warmth or the scent of food from an access point to invite a *permanent* mouse resident.

Modes of entry include open windows and doors, cracks and small openings around piping, air ducts, roofing, and doors. Any hole ¼” or larger can accommodate a mouse. That means if you can stick a pencil into a hole this size  a mouse can also get through it!

Like many types of pests, mice are hitchhikers and can be inadvertently brought indoors in stored boxes (especially corrugated cardboard boxes) and pallets. Arts & crafts supplies, Christmas ornaments, blankets and clothes, are all commonly stored materials with mice. They can also access building roofs via overhanging shrubs and trees, and will climb vertical surfaces and wires if need be.

Mice owe their success to being highly adaptable; they base their foraging activity on when humans are least present (allowing them to escape our awareness), they can survive on just about any kind of food so their dietary needs adapt readily, and they can go without water for considerable periods if necessary. This adaptability and secretive nature makes infestations difficult to perceive until numbers are considerable.

Once mice have gained entrance, they can do serious damage by contaminating food and gnawing at materials. Evidence of mice (other than sighting the animal itself) includes damage to food containers, nesting materials, and the small, tapered fecal pellets left in areas where the mouse feeds or is harbored - i.e. **CLUTTERED AREAS!** Every school has their fair share of “clutter bugs”, no not insects, but teachers and members of staff who “have too much STUFF” to allow good sanitation standards to be maintained.

Additional evidence of mice includes grease trails and smidge marks along the patrol path of their territory – around wall skirting, entrance holes, etc. Also, mouse urine fluoresces, so the hundreds of micro droplets they lay down each day can be viewed using a black light in an otherwise dark room.

Keep mice out of schools and homes by:

- 1) Repairing or sealing all openings that allow entrance.
- 2) Removing indoor and outdoor debris that could harbor mice such as woodpiles, clutter, and mulch piles.
- 3) Clearing high weeds – since weeds and seeds serve as food and shelter for mice during warm weather.
- 4) Cleaning up food scraps and storing foods appropriately to prevent easy access to food. All pet foods, bird seed and human food should be stored off the floor and in glass, plastic, or metal containers with lids.

MOUSE MANAGEMENT

PREVENTION

Sanitation – keeping floors and shelves free of food debris is critical. The “Breakfast in the Classroom” program does not have to be at odds with IPM. For example, choose foods like bagels over muffins to minimize crumbs. Make sure floors are swept or vacuumed regularly, **especially** areas under furniture on rollers. Corner cleaning is imperative.

Mouse-proof buildings – school staff should notify maintenance of holes and entryways. Corners, doors, and openings around pipes are common entry points. Remember to look up at ceilings and down low, too!

Mice may breed year-round and a female may have 5 to 10 litters per year.



Areas surrounding pipes need to be sealed to prevent mouse entry.



Mouse feces in cabinet under sink in an FCS classroom.

TRAPPING

A trapping program *combined with prevention methods* should be implemented if an infestation is apparent.

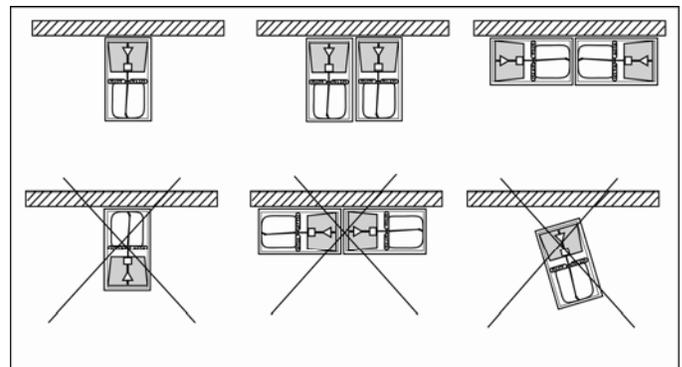
When mice become trapped on glue boards, instances have occurred where students were exposed to very upsetting noises and sights as confused faculty or staff try to discover the source of the distress. Mice take a long time to die stuck on glue boards, so traps are the more humane and effective approach.

We recommend mechanical traps to control light to moderate infestations of mice. Victor traps can be placed along the base of walls and in corners of rooms where mice are suspected. Traps should be set in the evening and collected the following morning prior to the arrival of students.

Careful inspection should be done before ending trapping as multiple infestations are not uncommon.



The Victor snap trap with expanded trigger.



Snap traps should be placed with the trigger against the wall.

Excerpted and modified from *Combating the House Mouse* Pest Press Issue 4, 2006. Alabama School Integrated Pest Management, http://www.ag.auburn.edu/enpl/schoolipm/documents/2006_december-mice.pdf

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Information sources:

Illinois Department of Public Health, Prevention & Control website: <http://www.idph.state.il.us/envhealth/pchousemouse.thm>

Pest Press – Marc Lame, Indiana University. <http://www.mccsc.edu/~jjochim/ipm.html>

“Rodent Control: A Practical Guide for Pest Management Professionals” – Dr. Bobby Corrigan

University of Florida Entomology and Nematology Department’s School IPM <http://ifas.ufl.edu>

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**Comments or questions
 on this newsletter?
 Contact kvail@utk.edu**

For more information about IPM in Tennessee schools and other facilities, or to view past issues of *Pests and Pesticides in Child-serving Facilities*, please visit schoolipm.utk.edu or utyeah.utk.edu

NATIONAL IPM INFORMATION
 eXtension's Pest Management In and Around Structures: Urban Integrated Pest Management
<http://www.extension.org/Urban%20Integrated%20Pest%20Management>

National School IPM
schoolipm.ifas.ufl.edu/

IPM in Schools Texas
schoolipm.tamu.edu/resources.htm

IPM Institute of North America
www.ipminstitute.org/

School IPM PMSP—all schools IPM by 2015
http://www.ipminstitute.org/school_ipm_2015.htm

National Pest Management Association IPM
www.whatisipm.org/

EPA schools
www.epa.gov/pesticides/ipm/schoolipm/index.html

For further information about the IPM program at your school or in your county, contact your county Extension Agent or the school IPM Coordinator. For county agent contact information, please visit www.agriculture.utk.edu/personnel/districts_counties/default.asp

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Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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