Youth Environment and Health

December 15 2023 E & PP Info #778 Volume 17 Issue 2

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

Keep House Mice Away This Winter

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House mice are some of the most common commensal rodents found in community environments all over the world. Adult house mice are small (1/2 – 1 ounce in weight), grayish-brown rodents measuring about 5-7 inches in length including the tail. They have a pointed snout, relatively large ears, and small black eyes. The ears and tail are almost hairless, and the tail is marked with scaly rings. The upper side of the body is covered with short grayish brown or tan hair, and the underside of the body is lighter than the upper side (but not white). The feet are hairless and grayish pink in color.

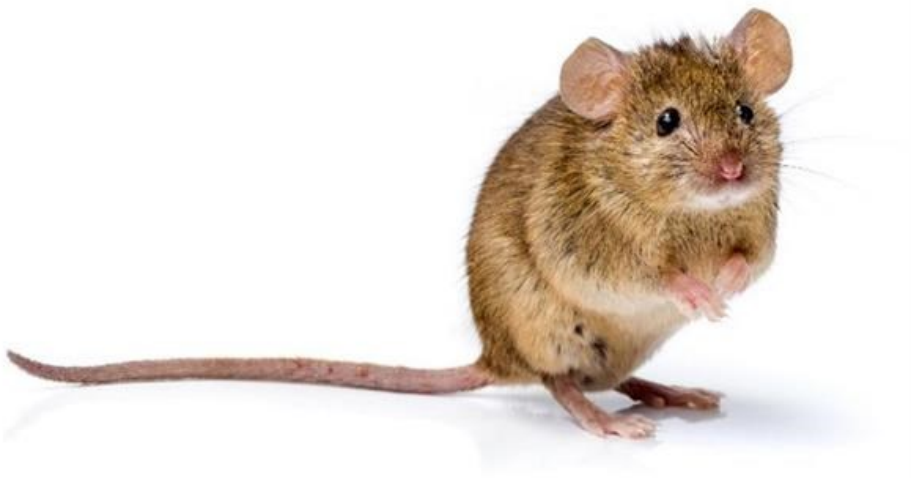

Figure 1. Adult House Mouse. Credit: ShutterStock

House mice move by walking or running on all four legs, but are also known to jump, and stand on their hind feet using the tail for balance (Figure 1). They can also climb up through vertical surfaces, to reach up to a food source or nesting site. They prefer to maintain contact with vertical surfaces such as walls as they move. **Young mice can squeeze through openings as small as ¼ inch in diameter.**

Damage caused by house mice

In human homes and structures, house mice are omnivorous and will feed on almost any human food material (Figure 2) as well as many other household items including cardboard, soap, leather, etc. Before feeding, they test the material by nibbling and this can cause unsightly chew or gnaw marks. They thrive in food storage areas or pantries if undetected for a long time, where along with consuming and damaging food and food packaging materials, they contaminate everything with their urine and droppings, and this can also cause a musky odor.

Special Points of Interest

House Mouse &

Checklists

This issue

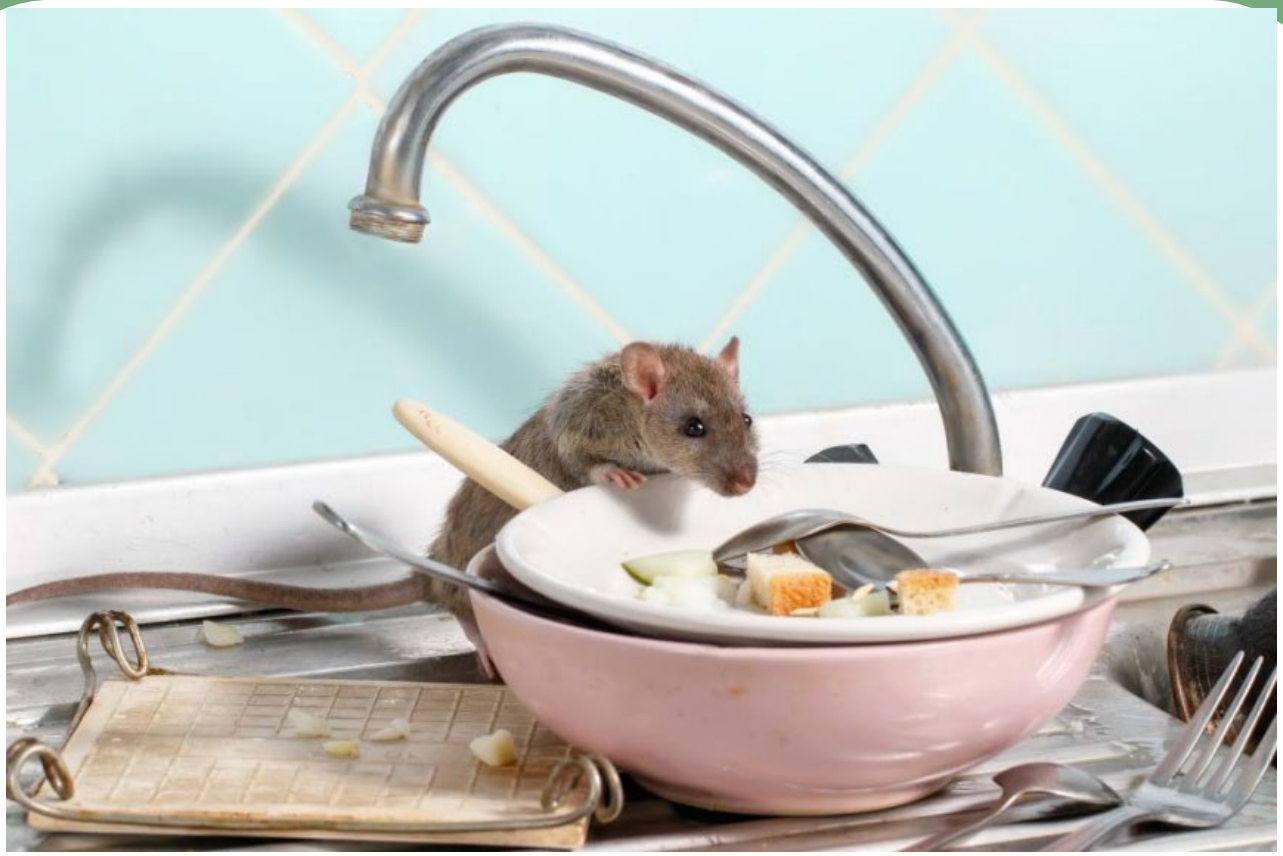

Figure 2. House mice feed on a variety of different foods. Credit: ShutterStock

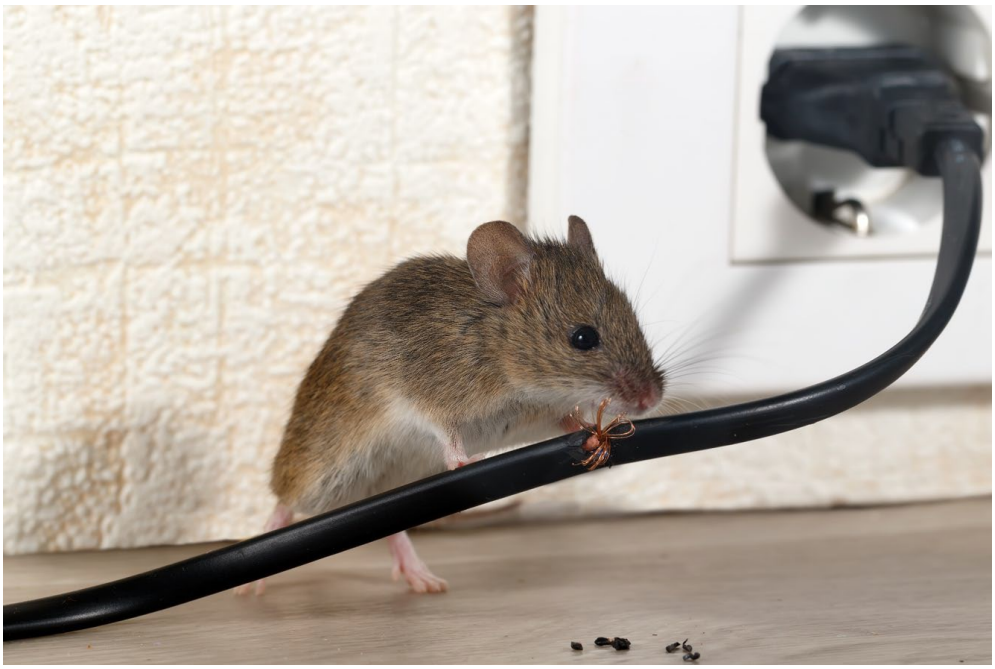

Figure 3. This house mouse has damaged the power cord by gnawing. Credit: Adobe Stock Images.

Outdoors, house mice can occasionally damage crops and garden plants. They are known for their preference for seeds and grains, which they will consume in the field as well as bring to their nests for storage. House mice can physically destroy a variety of materials found in homes and structures such as paper, cardboard, wood and cloth by shredding them to make nests. They can also cause structural damage to furniture, upholstery, woodwork, electrical (Figure 3) and plumbing lines, computer systems and machinery by chewing or gnawing in an attempt to reach food or nesting sites.

House mice are known to carry and spread pathogens that cause murine typhus, bubonic plague, leptospirosis and food poisoning. They can spread parasites such as fleas, mites, tapeworms and ticks to humans and domestic animals. Additionally, their urine contains allergens that circulate in the air and can be asthma triggers for sensitive individuals. House mice are not susceptible to SARS-CoV-2 infection, nor are they carriers of the deadly hantavirus (but the similar species-deer mice are known to carry it).

House mouse look-alikes

Several other small rodent species found in and around homes and structures, e.g., deer mice and meadow voles (Figure 4), can be mistaken for house mice. House mice can also be mistaken for young black or brown rats.

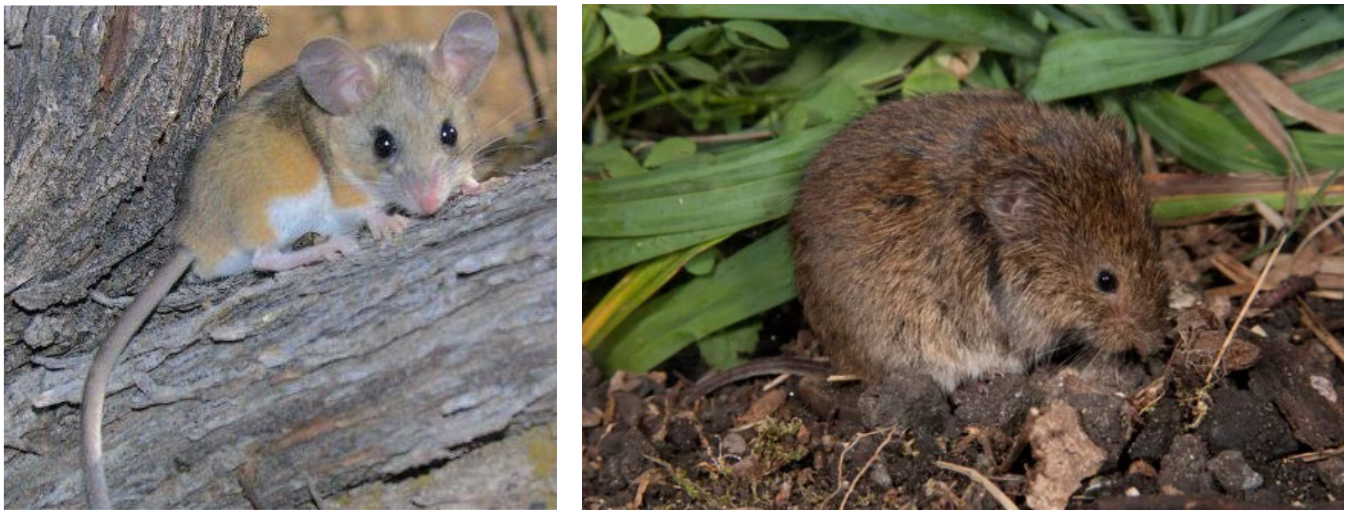

Figure 4. Deer mice (left, credit: Gregory 'Slobirdr' Smith) and meadow vole (right, Credit: Adobe Stock Images)

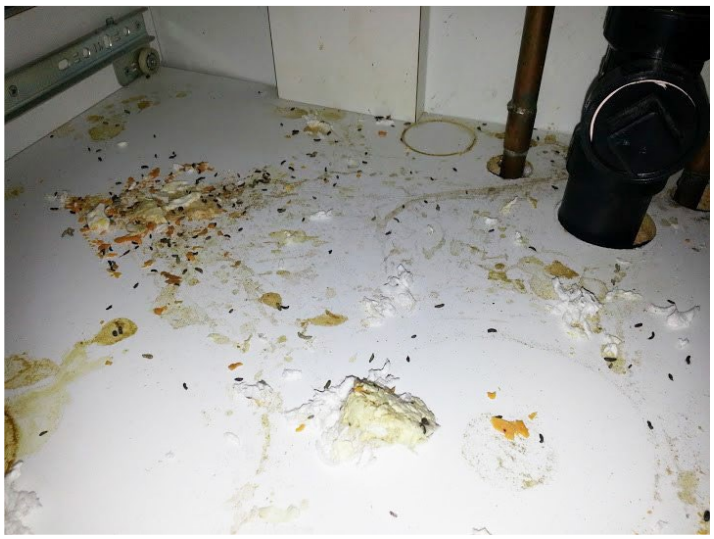

Figure 5. House mice droppings and urine. Credit: Dawn H. Gouge.

How do you know if you have house mice in your building?

House mice are nocturnal by nature and tend to avoid light but can occasionally venture out during the daytime in search of food. They are intelligent and cautious and easily escape notice. Signs of their presence are often found before the mice themselves.

Droppings: House mouse droppings are between ⅛ and ¼ of an inch long, similar in size and shape to rice grains (Figure 5). They defecate at or near where they feed and near, but not in their nest. They urinate continuously producing thousands of microdroplets of urine each day. The urine fluoresces and can be seen using a black light (UV) in an otherwise dark room. However, it is important to be aware that many substances fluoresce under UV light including some cleaning solutions.

Droppings can tell us where the mice are hiding and where they usually travel. This can help you determine which entry points need sealing up, food supplies that may be contaminated, and the best locations to place traps to catch indoor mice.

Tracks: Footprints may be found in house dust, spilt flour, or other powdery substances.

Teeth marks and chewing (Figure 6): Small holes in food packaging, chew marks on belongings and edges of baseboards and walls are all signs of mouse activity. Check food packaging in storage cupboards for spills and holes. Look for holes into protective voids which have tooth marks and/or fine hairs around the edges. House mice passing through entry points leave hairs attached to the edges of the openings.

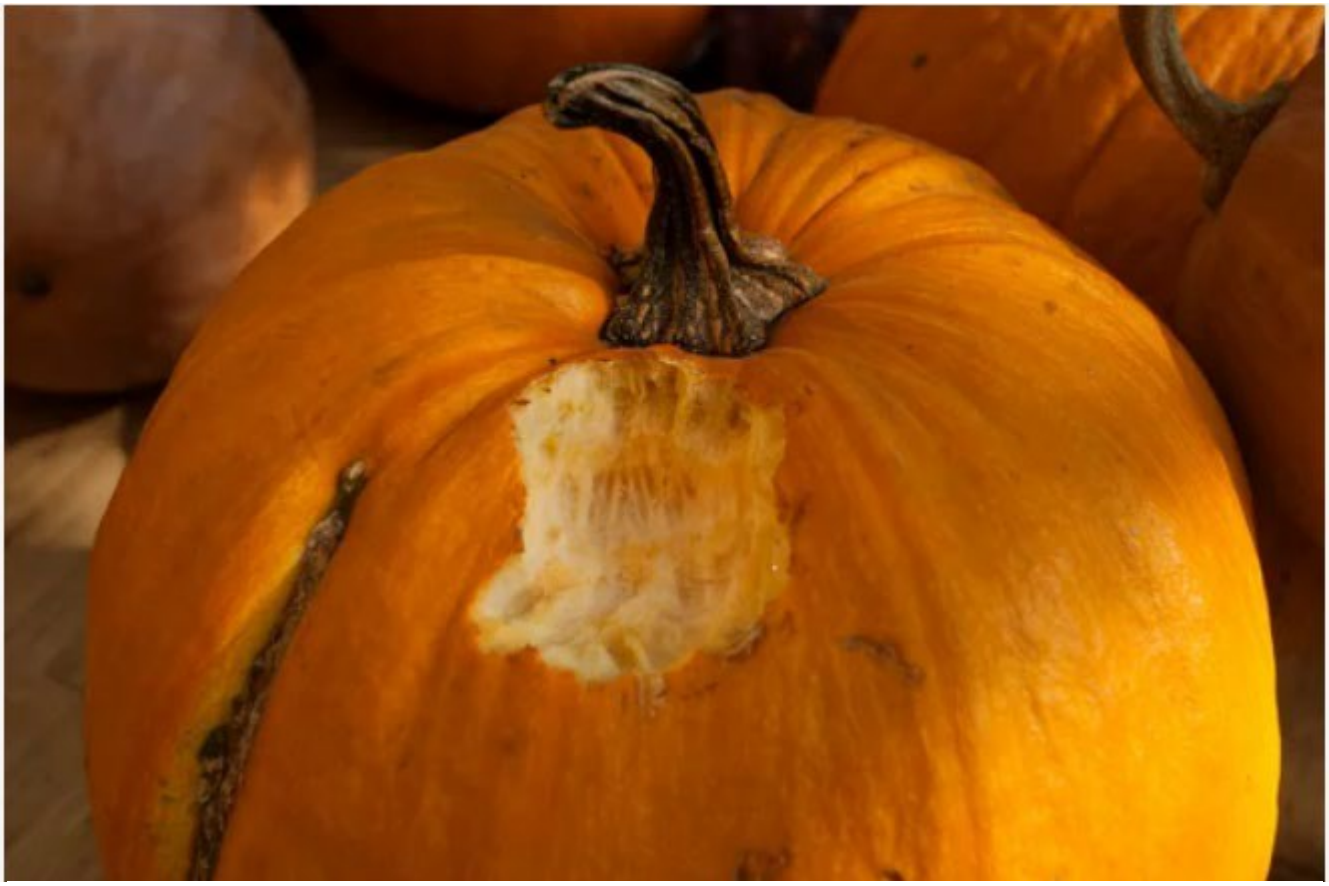

Figure 6. Gnaw marks on a fall pumpkin. Credit: Adobe Stock Images

Sound: Listen for quiet scampering and scratching in wall voids and above ceilings, or occasional squeaks that are inconsistent and more common at night. If sounds are consistent or predictable this indicates a mechanical or structural issue unrelated to wildlife.

Nests and stash piles: House mice build nests in undisturbed, enclosed spaces (Figure 7). They shred fabric, paper, cardboard, furniture stuffing, wool, building insulation, and plant material to form loose ball-shaped nests 4-6 inches in diameter.

House mice will also hoard food in stash sites within their limited range of travel (Figure 8). So, finding piles of cached pet food, human food scraps, rodenticide bait and other edibles is quite common when an infested home is undergoing a deep clean and clutter removal.

Figure 7. Mouse nest with young ones. Credit: Kelly Madigan

Pantry pests including beetle and moth species as well as many other foraging insects may be traced back to a house mouse food stash, nest, or dead mouse carcass.

Smudge marks (rub marks): These marks occur along frequently used travel routes on baseboards, pipes, and other conduits. They darken over time as oil and dirt rubs off the rodent's body as mice move along the same routes of travel repeatedly (Figure 9). Smudge marks contain chemicals mice use to communicate and should be removed by cleaning with soap and water.

Shredded materials: House mice will use insulation materials to nest within. They will also move insulation materials to nest sites. Finding wall void and attic insulation pulled out or in unexpected places can be an indicator of mouse activity (Figure 10).

Odor: House mice have a musky ammonia smell that is often more noticeable in enclosed areas like pantries, cabinets, and drawers. The urine smell is often stronger along baseboards and walls that they move along depositing microdroplets of urine as they go. Extremely pungent odors of decay can result from dead mice as their bodies decompose.

.Figure 8. House mice stash pile in a kitchen cabinet. Credit: Shake Nair

Figure 9. House mice entry point beside a faceplate. Note oily rub mark at the hole entrance. Photo: Susannah Reese, Stop-Pests.org.

Managing house mice

If you suspect you have house mice act quickly. Get expert advice or contact a pest management company with a good track record of resolving rodent infestations in homes. An integrated pest management approach will include all of the following elements:

• Reducing access to food resources - improving sanitation, pet food and waste management habits so no food is accessible overnight.

• Pest proofing to prevent mice from coming in from outside - sealing interior wall void openings like gaps around pipes and electrical conduits and securing food in storage containers to prevent mice accessing stores.

• Safe catch or trapping and removal of interior mice.

• Inspection and ongoing monitoring for signs of indoor mouse activity.

A publication for school facility managers can be found at https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9062_1.pdf

A publication for housing managers can be found at http://www.stoppests.org/what-is-ipm/using-ipm/property-manager-ipm-guides/.

A publication on pest proofing your home against house mice and other pests can be found at https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1677-2015.pdf

The above article is reprinted with permission from the University of Arizona Agriculture, Life & Veterinary Sciences & Cooperative Extension, School & Home Integrated Pest Management (IPM) Newsletter – November 2023, https://acis.cals.arizona.edu/docs/default-source/community-ipm-documents/newsletters/azhomeschoolipm-nwsltr_housemice-nov-2023_vf.pdf?sfvrsn=65dfb20b_0

Time to Prepare for Winter Break Checklist

Karen Vail

Yes, it's time for the annual reminder to prepare for winter break to prevent a pest population explosion while you're gone. I made a checklist of activities that you should circulate to the teachers, cafeteria folks, custodians and others that work in the school. The idea is to limit the pests' access to the basic necessities of life - food, harborage and water.

Clutter Reduction

Check	Activity
	Clutter=pest harborage, so reduce clutter as much as possible.
	Reduce the amount of cardboard in the school and use plastic totes to store items instead.
	Send the kids home with craft projects made of food to prevent pests from nibbling on these over the break.
	Breaks allow teachers time to ponder their physical classroom. Not only does clutter provide a place for pests to hide, clutter makes it difficult to clean or inspect in, under and around it. Ask yourself why something is here and if you can do without it.

Building Maintenance

Check	Activity
	Ensure water is in the p-trap of any sink or toilet, especially in those that are rarely used. Think of the locker room showers, toilets and sinks of the elementary school that used to be a high school. Cover/plug drains in classrooms that have American cockroaches.
	Check door thresholds to ensure gaps are smaller than 1/4 inch so rodents can't enter. Replace worn door sweeps or thresholds.

Parties in the classroom

Check	Activity
	While waiting to use snacks and other food items, store them in pest-proof containers such as sealed plastic, glass or metal containers
	Use water as the beverage of choice.
	If sugary drinks are used, clean any spills quickly. Spills to carpet should be reported immediately so they can be thoroughly cleaned before break.
	Rinse and empty soda cans and plastic bottles before depositing them in the recycle bin.
	Line garbage cans with plastic bags/liners so food debris isn't left in the can when it is emptied.
	Empty garbage cans and recycle bins often and definitely before leaving for break. If you notice food items in the garbage can after you remove the plastic liner, take the time to remove the food so the pests can't celebrate too. You won't regret it.
	If garbage cans are overflowing. Stop using them until the plastic liner can be removed, tied off, and the liner replaced. Ideally the tied bag would be brought to the dumpster.
	After the party, ensure all surfaces are cleaned. Look under furniture and remove food debris.
	Send remaining food home.
	Return cardboard boxes used to bring in supplies to the owner, or recycle.

Follow these steps to reduce the pest and allergen load in the classroom!

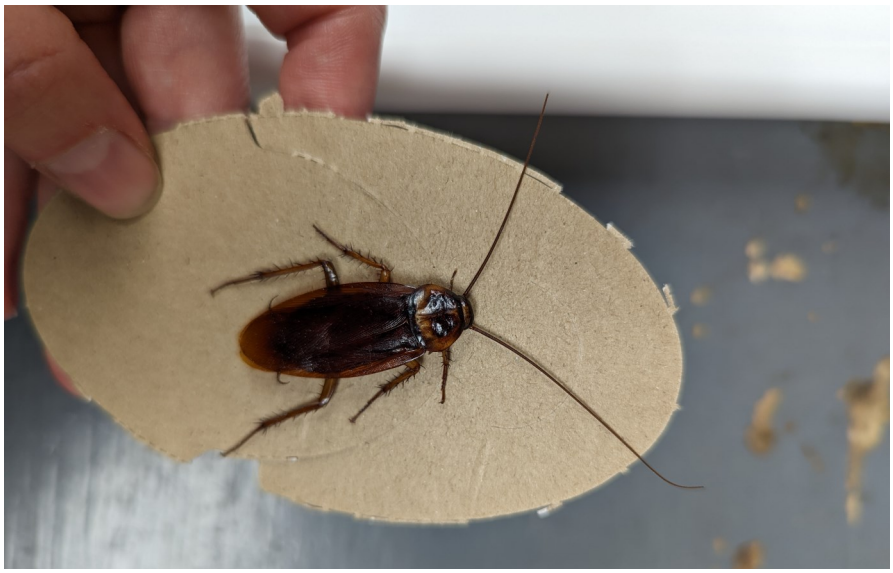

Figure 1. Unless you want some of these visitors, ensure water is in the p-trap of any sink or toilet, especially those that are rarely used. Cover or close drains in classrooms with sinks.

Modified from:
Vail, K. and J. Hurley. 2020. Prevent Pest Conducive Conditions when Preparing Classrooms for Winter Break and Shifts to Virtual Learning. Pests and Pesticides in Child-serving Facilities: An IPM Newsletter 14(3):2-3

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Partial support for this newsletter provided by the USDA NIFA CPPM EIP grant (#2021-70006-35577) awarded to the University of Tennessee.

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NATIONAL IPM INFORMATION

eXtension's Pests in the Home
https://pestsinthehome.extension.org/

National School IPM
schoolipm.ifas.ufl.edu/

IPM in Schools Texas
http://schoolipm.tamu.edu/

IPM Institute of North America
www.ipminstitute.org/

The Pest Defense for Healthy Schools Online IPM Training for School Employees
pestdefenseforhealthyschools.org

EPA schools
http://www2.epa.gov/managing-pests-schools

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 https://utextension.tennessee.edu/office-locations-departments-centers/

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 and registered for use in your state.

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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