

House Mice: A Guide for Property Managers

This guide will help property managers understand how house mice become pests in multifamily housing. Information in this bulletin describes:

- Why house mice are serious pests
- Signs of a mouse infestation
- Excluding mice from buildings
- How to avoid welcoming mice
- What property managers need to know about snap traps, glue boards, rodenticides and disposing of dead mice.

House mice are serious pests

The house mouse (Figure 1) is a troublesome pest and the most commonly encountered rodent in homes in the United States. House mice breed rapidly, eat many different kinds of food (Figure 2), need little or no water, and adapt to different and changing environments. In homes they feed on human food contaminating food and kitchen surfaces with droppings and urine (Figure 3). They chew on electrical wires, burrow into furniture and chew on wooden beams causing structural damage. House mice can also spread disease causing pathogens and parasites to humans and pets, including the bacterium *Salmonella* which is a common cause of food poisoning, the fungal pathogen that causes ringworm, and a number of mites, tapeworms and ticks. Their urine contains allergens that circulate in the air and can be asthma triggers for sensitive individuals. For all these reasons, house mice should not be tolerated inside homes.



Figure 1. Adult house mouse. Photo: Shutterstock

If buildings have gaps around doorways, wall penetrating conduits or under roof lines, it is easy for mice to invade. Adult mice can get through a dime sized gap, and young mice can squeeze

through smaller spaces. Homes often provide ideal temperatures, plentiful food and nesting materials and protection from outdoor predators. Mice are often drawn to buildings by warmth and food odors coming from apartments.

Mice have some limitations to their vision but can detect movement from 45 feet away. They have excellent hearing, smell, taste, and touch. They are light, strong for their size and very agile. House mice are capable of running up vertical walls at high speed. They can use wires and utility cables to travel around, jump 12 inches and survive an 8-foot fall.

Once indoors, mice establish a home base close to food and harborage opportunities that provide shelter and warmth.



Figure 2. The house mouse breeds rapidly and consumes a wide variety of different foods.
Photo: Shutterstock



Figure 3. House mice eat human food and contaminate food and kitchen surfaces with urine and feces. Photo: Shutterstock

Signs of a mouse infestation

Droppings: House mouse droppings are between $1/8^{\text{th}}$ and $1/4$ of an inch long, similar in size and shape to rice grains. Mice defecate where they feed and near, but not in their nest. Mice continuously uninate producing hundreds of micro-droplets 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 fluids.

Tracks: Foot prints may be found in house dust and spilt flour (Figure 4).



Figure 4. Rodent footprints and tail swish marks. Photo: Shutterstock

Teeth marks and chewing: Small holes with chewed edges is a sign of mouse activity. Check food packaging for spills and holes. Look for holes into protective voids which have tooth marks around the edges. Mice passing through entry points leave hairs attached to the edges of the openings. The hair is quickly lost so finding gaps with hairs evident often indicates a current infestation as opposed to a historical one.

Sound: Listen for quiet scampering and scratching in wall voids and above ceilings that is inconsistent and more common at night. If the sounds you are hearing are consistent or predictable this can indicate a mechanical or structural issue unrelated to wildlife.

Nests and stash piles: Mice build nests in undisturbed, enclosed spaces. They shred fabric, paper, cardboard, furniture stuffing, wool, building insulation, and plant material to form loose ball-shaped nests 4-6 inches in diameter. Chewed paper or cloth is often found in infested homes, although the actual nests may be very difficult to locate, even for pest management professionals. House mice will also hoard food in stash sites within their limited range of travel. So finding piles of cached pet food, human food scraps, and other edibles is quite common when an infested apartment is undergoing a deep clean and clutter removal. Stored product pest infestations are sometimes traced back to a mouse food stash.

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 rodents body as they move. Smudge marks contain chemicals mice use to communicate, and should be removed by cleaning with soap and water.

Odor: Mice have a musty ammonia-like smell that may only be detectable in enclosed spaces in which they visit. More pungent odours of decay can result from dead mice.

Excluding mice from buildings

Mice enter buildings in a number of ways. Occasionally they are introduced as stowaways, but more often than not, house mice enter buildings from outdoors. One way house mice find their

way into a building is through gaps in the exterior envelop of a building. Sometimes they stay in wall voids and attic areas, but sometimes they enter room interiors through interior gaps. Sealing both provides multiple layers of exclusion (Figure 5).

1. Seal gaps of 1/4-inch or more with siliconized acrylic latex or polyurethane sealant products that stretch as gaps and cracks in buildings expand and contract due to temperature changes and other factors. Steel wool, foam fillers alone are not recommended for larger holes and cracks beyond serving as a quick temporary fix. They should be filled with good quality concrete, or stuffed with Xcluder® cloth then sealed with a siliconized acrylic latex or polyurethane sealant (Figure 6).



Figure 5. Sealing exterior and interior gaps provides multiple layers of exclusion. Photo: Shutterstock

2. Seal around water, gas, electric, and other pipes and conduits going through walls (Figures 5, 6 and 7).



Figure 6. Sealing around conduits penetrating walls. Stuff gaps with Xcluder® cloth then seal with a siliconized acrylic latex or polyurethane sealant. Photos: Lynn Ketchum, Oregon State University



Figure 7. The gap around the wire passing through the door frame needs to be filled. Photo: Shujuan Li, University of Arizona

3. Look for light “leaks” around doorways as indicators of “open” doors for house mice (Figure 8). Use correctly installed door sweeps to make all external doors mouse-proof. High-quality, brush (e.g. Sealeze®) or baffle (e.g. Xcluder®) style door sweeps close the gap between the threshold and the door base.



Figure 8. Light “leaks” around doorways are indicators of “open” doors for house mice. Photo: Shujuan Li, University of Arizona

4. Maintain and repair all ventilation screens and louvers used in attic spaces, and furnace closets (Figure 9). All gaps around the frames of screens and louvers should also be kept tightly sealed.
5. Assure that pest-proofing practices are an integral part of the planning and contract process for building construction or renovation.



Figure 9. Exterior mesh on attic vents preventing entry of pests. Photo: Shutterstock

Making mice unwelcome

1. Don't allow trash to accumulate along exterior walls; this will attract mice.
2. Don't allow contractors to throw food or food containers into crawl spaces and wall voids during construction or renovation of buildings.
3. Position trash receptacles or dumpsters away from building entry points (Figure 10).
4. Keep trash shoots, common area trash cans and external dumpsters clean, with lids closed (especially at night). Figure 10 shows well managed dumpsters, but Figure 11 shows dumpster lids that need to be closed and the area around cleaned. Drainage holes can be screened.
5. Clear away tall weeds close to buildings since weeds and seeds serve as food and shelter for mice during warm weather.
6. Encourage residents to clean up food spills daily, wash dishes in the sink, and take out trash before bedtime each day.
7. All pet foods, bird seed and human food should be stored off the floor and in the refrigerator, freezer, or in airtight containers. Remind all building users that adult mice can chew through zip-lock bags.



Figure 10. Waste management is an important component in rodent management. Dumpsters should have sufficient capacity to contain all waste and be placed at least 50 feet from buildings. Photo: Shutterstock



Figure 11. This dumpster lid should be closed, and the area around cleaned. Photo: Shujuan Li, University of Arizona

8. Encourage residents to reduce clutter in their homes and don't allow clutter to build up in common areas or in on-site offices (Figure 12). Pest management professionals and housing staff conducting visits can not see what pests are present.



Figure 12. Cluttered areas can provide harborage for mice and other pests. Inspecting for pests is more difficult. Photo: Shutterstock

9. If areas of a mouse infested building are rarely accessed consider these places highly likely to be supporting populations. When inspections for indoor house mice are undertaken the harder-to-reach spaces must be checked. This can include on top of kitchen cabinets, above dropped ceiling tiles, in storage areas, and basements. Finding mouse droppings (Figure 13) doesn't always mean a current infestation, so cleaning up droppings and monitoring the areas for more is essential.

10. Once inside, house mice will nest in an undisturbed, protected space, close to food. Unless resources dwindle they travel less than 30 feet from home, and often only as far as they need to acquire supplies. Adult females have 5-10 litters per year, and usually have between 6 and 8 pups. Mouse populations increase rapidly over time, so as soon as mice are reported a management plan should be put into action.



Figure 13. House mouse droppings and urine. Photo: Dawn H. Gouge

Snap traps, glue boards, rodenticides and disposing of dead mice

Snap traps can eliminate mice quickly if done properly. Communicate to pest management professionals and residents that traps should be inaccessible to children and pets. Placing traps inside lockbox stations avoids accidents.

Traps will be less effective in cluttered homes, and homes in which food is plentiful in multiple locations, all of the time.

Snap traps are usually placed where mice are active. Make sure that if peanut butter is used as bait on traps, no one in the home is allergic to nuts. Nesting materials like cotton wool balls, and short pieces of dental floss can also be used to bait traps.

Glue board traps for rodents are not the same as sticky monitoring traps for general pest monitoring. Rodent glue boards trap live mice which can be heard squeaking in distress for prolonged periods of time. This can distress residents severely, and locations rarely have a person onsite 24/7 willing to dispatch and dispose of a mouse stuck on a glue board. They

should **never** be accessible to children or pets. There are situations in which they may be used by pest management professionals for sound reasons.

Rodenticide baits are designed to kill rodent mammals and come in different forms that effect rodents in different ways. Some rodenticides stop normal blood clotting (the anticoagulants e.g., bromadiolone, chlorophacinone, brodifacoum), some effect the nervous system (e.g., bromethalin, strychnine), some alter the blood calcium balance (e.g., cholecalciferol), or turn into toxic gasses in the presence of water (e.g., zinc phosphide turns into phosphine gas).

Rodenticide baits are also designed to be highly attractive to rodents and are often formulated with grains, fish oil, molasses, fruits, vegetables, meat extracts and peanut butter to make them attractive and palatable. However, this also makes them attractive to children and pets.

Discourage residents from using rodenticides by rapidly responding to rodent reports in and around buildings.

Rodenticide baits are rarely justifiable as an indoor control option in multifamily housing. Remind residents that house mice collect food (including rodenticide bait) and store it in stash piles within their home range, so even if baits are placed in a bait box initially, mice will transport the bait outside the box.

Not all rodent bait contains a toxicant. There are very useful monitoring baits that are used to confirm active rodent infestations.

Make sure staff know how to safely dispose of dead mice, and clean up areas contaminated with urine and droppings. There may be occasions when pest management professionals cannot visit the same day a dead rodent is found, and not all companies undertake rodent cleanup duties.

Precautions when handling dead house mice:

1. Wearing disposable gloves spray the dead mouse and any trap with disinfectant until wet.
3. Any inexpensive household disinfectant will suffice, as will a 10% solution of bleach diluted in water. However, surrounding carpet and furnishings may be damaged by some disinfectants.
4. With a hand inside a disposable plastic bag, pick up the rodent and the trap if one is associated, and invert the bag over the rodent and seal or tie the bag with the rodent and trap inside.
7. Place the bag in a second plastic bag and dispose in an external dumpster.
8. Spray the area where the trap or the dead mouse was lying with disinfectant that will not damage the surface, and follow the directions of use for the specific disinfectant used.

9. Dispose of gloves in the trash. Then wash hands with soap and water.

Cleaning up small amounts of house mouse urine droppings and nesting materials:

1. **Do not sweep up or vacuum contaminated areas because this can cause the residues to become airborne and inhaled by residents and staff.**
2. Wearing disposable gloves spray urine, droppings, nesting materials and affected areas with a disinfectant that will not damage the surface, and follow the directions of use for the specific disinfectant used.
3. Use wet disposable towels to wipe up the disinfected droppings and nesting materials.
4. Place materials and used towels into a plastic bag and tie the bag. Place inside a second bag and place in an external dumpster.
5. Mop or sponge the area.
6. Dispose of gloves in the trash. Then wash hands with soap and water.

Note: Employees wishing to maximize personal protection in certain situations (e.g., removing a build up of rodent feces in an enclosed space) should wear overalls and a respirator with a HEPA P100 filter.

Additional Information and Literature on the Web

Stock, T., Corrigan, R. and Gouge, D.H. 2015. Integrated Pest Management of the House Mouse in Schools. EM9062. Oregon State University, Extension Service.

https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9062_1.pdf

Geiger, C.A. and Cox, C. 2012. Pest Prevention by Design – Authoritative guidelines for designing pests out of structures.

https://sfenvironment.org/sites/default/files/fliers/files/final_ppbd_guidelines_12-5-12.pdf



Acknowledgements

This guide was written by Susannah Reese - StopPests in Housing, Dawn H. Gouge PhD - University of Arizona, Tim Stock, School IPM Program, Oregon State University, Robert Corrigan - Corrigan Consulting, Shujuan Li PhD - University of Arizona, Shakunthala Nair PhD – University of Arizona, and reviewed by Deborah J. Young PhD – StopPests in Housing. July 2020.

The Northeastern IPM Center receives support from the U.S. Department of Housing and Urban Development's Office of Lead Hazard Control and Healthy Homes through the U.S. Department of Agriculture, NIFA agreement #2016-4866825905. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the U.S. Department of Agriculture or those of other funders.