

# School Integrated Pest Management Law

ORS 634.700-634.850

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Oregon state adopted a school integrated pest management (IPM) law on July 1, 2012. This law applies to all areas of a school property that are accessed by students on a regular basis (indoors and outside). It includes the following, without exception:

- Public schools
- Private schools
- Community colleges
- Oregon pre-kindergarten or a federal Head Start program
- Oregon School for the Deaf, Oregon school for the Blind, and a regional residential academy operated by the Oregon Youth Authority.

Critical aspects of the school IPM law that custodial staff should be particularly aware of are:

1. **Pests are managed using IPM methods** (see IPM handout and IPM presentation for what this involves).
2. **Monitoring and inspections** are required to prevent pests, and detect them early on.
3. **An IPM Coordinator is appointed** by all school districts (or individual schools in the case of private schools, community colleges, etc.).
4. **School staff must receive IPM education** on an annual basis. For custodians, reviewing this custodial training guide with your supervisor is one way to achieve this.
5. **A pesticide applicator's license** (available from the Oregon Department of Agriculture) is required for someone to apply any type of pesticide on a school campus.
6. **Specific posting and notification** is required for each pesticide application. This is organized or delegated by the IPM Coordinator.
7. **Pesticides must be properly stored** on school campuses.
8. **Only certain pesticides** may be applied on school campuses. Pesticides with a "Danger" or "Warning" signal word on the label may not be applied, except in emergency situations as declared by the IPM Coordinator.

## WHAT IS A PESTICIDE?

It's not as common sense as you might think. Any chemical ending in "-icide" is something that kills, and is considered a pesticide. This includes herbicides, fungicides, rodenticides, mossicides, etc. All of these are different types of pesticides. Pests can include the obvious – bugs, spiders – but may also include animals like rodents, birds, and plants such as weeds, etc

Cleaners and sanitizing agents are NOT regulated by the school IPM law, and do NOT require a pesticide applicator's license to use on a school campus if they are being used according to their label and in accordance with the district's IPM plan. This includes germicides, disinfectants, sanitizers, deodorizers, antimicrobial agents, and even insecticidal soaps.

## Integrated Pest Management (IPM) in Oregon Schools

Exposure to pesticides and certain pests is an environmental health risk with particular impact on children. Your school district has chosen to use **integrated pest management** (IPM) to address insect and vertebrate pests, as well as weeds. IPM uses education and awareness, good sanitation, preventative maintenance, and other pesticide alternatives.

\*Reduced-risk pesticides may be used only if these measures fail.



### TEACHERS HAVE AN IMPORTANT ROLE IN PEST PREVENTION!

- ✓ Know your custodian and communicate your PEST SIGHTINGS to them in written form or e-mail.
- ✓ Sticky monitoring traps will be placed around your school for early detection of potential pests. Leave the sticky monitoring traps in place; if their novelty proves distracting to students, consider incorporating IPM concepts into your lesson plan.
- ✓ Keep foods in containers with snap-tight or screw-top lids. Mice and some types of insects chew right through cereal boxes, plastic bags etc.
- ✓ Good classroom sanitation is critical to pest prevention. Report spills asap to prevent ants and mice; report cleaning needs.
- ✓ Whenever possible, replace corrugated cardboard with plastic bins; cardboard imports cockroaches, provides shelter, and it's a food source!
- ✓ Clutter is a pest's best friend. Use winter and summer breaks to perform a clutter clean-out.
- ✓ Report maintenance needs: window screens, leaky faucets, etc.
- ✓ You can do your part by always remembering pests are simply after:

WATER, FOOD, and SHELTER



A successful IPM program requires education, communication, and the total support of the entire school community. Thank you for your support!

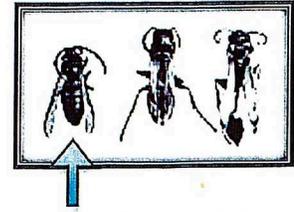
For questions about integrated pest management in Gresham-Barlow School District contact:

**Alan Crapser**, District IPM Coordinator

503-258-4702

# Yellowjacket Wasps and Hornets

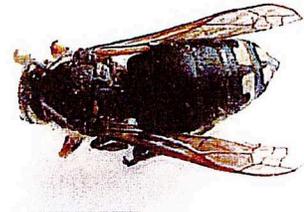
## Integrated Pest Management



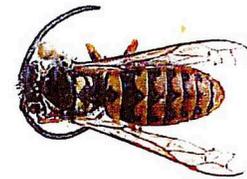
Yellowjacket wasps and hornets are common in many Oregon school environments. Yellowjacket wasps refer to several species of yellow and black ground-nesting wasps in the genus *Vespula*, as well as the yellow and black aerial yellowjacket (*Dolichovespula arenaria*) which nests above ground. Yellowjackets are stocky wasps with a body length of about one-half inch, marked by yellow and black on the head, thorax, and abdomen. Like paper wasps, yellowjackets are also eusocial, which means the nest is made up of a queen, and numerous workers who work cooperatively and assume a variety of duties: food gathering, nest expansion, nest defense, and care of the young. Yellowjackets are similar in appearance to paper wasps in that both these wasps have yellow and black markings, and may sting in defense of their nest. But the similarities end there.



Yellowjackets are stockier than paper wasps – they lack a pronounced “waist,” and also tend to tuck their legs in flight (unlike paper wasps). Yellowjackets also have entirely black antennae, whereas most paper wasps have antennae with a significant amount of orange or yellow. Yellowjackets differ from bees by more pronounced yellow and black coloration, and lack the hairy legs that bees need to gather pollen.



Ground-nesting yellowjackets construct their nest a few inches underground, beginning with a depression (such as from an abandoned mammal burrow). They also construct their nest in near-ground environments, such as under logs, in rotted stumps, and in rotted/hollow railroad ties used to line steps or flowerbeds. The aerial yellowjacket nests above ground, and often constructs its nest on wood or brick surfaces of first or second story structures, often in protected corners or tucked under eaves. Most species of yellowjackets will readily sting in the vicinity of their nest if they sense a threat, which includes unknowing bystanders nearby.



**Top:** an aerial yellowjacket nest found attached to a home's upper story. The layers of papery envelope surround layers of comb inside.

**Middle:** bald-faced hornet.

**Bottom:** a typical yellowjacket wasp in Oregon.

The bald-faced hornet, *Dolichovespula maculata*, is not technically a true hornet. The bald-faced hornet is black with a small amount of off-white coloring on the face, thorax, and last few segments of the abdomen (see photo). The bald-faced hornet is slightly larger than the yellowjacket, but has a similar stocky body shape. They are most often found nesting in bushes and trees, and have a fairly aggressive response to disturbance and bystanders.

Queens of yellowjackets and the bald-faced hornet emerge from winter hibernation as early as April, and begin nest construction. The first generation of workers typically matures to adulthood in May or June. Nests consist of multiple layers of comb surrounded by several layers of papery envelope, all of which is constructed from wood pulp and the wasp's saliva. As more workers are born, the nest is physically expanded to up to a foot or more; in spite of the impressive size and construction, these wasps do not reuse the nest from one year to the next. New queens produced

during the current summer will overwinter and begin a new nest the following spring. No workers survive the winter in Oregon.

Above-ground nests begin fist-sized in April and May; however, most nests remain unnoticed until they have numerous workers flying to and fro, and are fairly large in size – July or so. Some ground-nesting yellowjackets (such as the western yellowjacket, *Vespula pensylvanica*) will continue occupying and defending the nest until late November or early December. The bald-faced hornet typically abandons its nest by September. The aerial yellowjacket typically completes its life cycle and abandons the nest by August. The timing of nest removal is best if done very early when it is fist-sized (and consists of only the queen and perhaps a few workers) or after it has been abandoned.

### Yellowjacket and hornet management tips

Yellowjacket wasps and hornets are beneficial predators of a variety of pests, but the propensity for them to sting often prompts districts to take swift action. Consider the following:

1. **Is it an active nest?** Above ground nests may be the aerial yellowjacket – which abandons the nest in August – or the bald-faced hornet – which abandons the nest in September. Observe the nest mid-morning and again mid-afternoon for worker activity. Additional steps to verify activity may be taken at the discretion of the IPM Coordinator, using caution.
2. **Where is the nest located?** If the nest is located on a part of the school grounds where there is no regular student activity, share this with your IPM Coordinator. Additionally, if it is fairly late in the wasp season, it could make more sense for the district to wait for the wasps to abandon the nest, thus avoiding risk from removal or a pesticide application.
3. **Are they foraging wasps?** The stinging threat from foraging wasps is considerably lower than from wasps that are defending a nest or themselves. Wasp activity around outdoor eating areas and garbage cans will increase late summer and early fall. Cleaning the area will take care of the problem (note: research shows that some yellowjacket wasps have excellent “memories” and may return repeatedly to a food source for one or two days after it has been removed).

If a yellowjacket wasp nest or hornet nest is found and action must be taken to remove it, custodians may assist the IPM Coordinator in some or all of the following approaches:

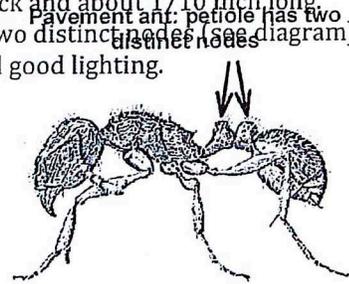
1. Notify the principal of the day, time, and location of nest removal so that students and staff stay away. Consider flagging or marking the area.
  2. For above-ground nests, verify whether it's active or abandoned. Manually remove nests that are clearly abandoned.
  3. Active, above-ground nests located in a shrub or tree can be approached pre-dawn (prior to foraging)
  4. For active ground nests, *Contact Alan Crapper to determine if the nest needs to be treated by pest control or not.*
- follow-up may be required.  
exercising great caution and the proper safety equipment.
5. Work with a pest management company qualified to treat and remove the nest.

# Ants

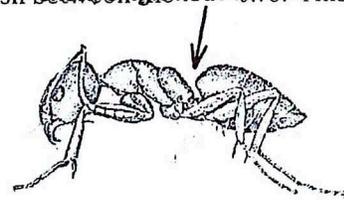
## Integrated Pest Management

There are four common types of ants in Oregon school environments. They are roughly grouped into two small and two larger ant types. The two small black ant species most commonly encountered is the pavement ant (*Tetramorium caespitum*) and the odorous house ant (*Tapinoma sessile*). The two larger ants most commonly encountered are carpenter ants (*Camponotus* spp) and field ants (*Formica* spp). Only the carpenter ants may cause structural damage, and none of these ants are public health pests.

**The pavement ant** (*Tetramorium caespitum*) is light brown to black and about 1/10 inch long. There are grooves in their head and thorax, and their petiole has two distinct nodes (see diagram) - both features can be seen with a magnifying glass or hand lens and good lighting. Outdoors, nests are often found in expansion joints or cracks, under loose stones, stacked debris, or entryway rugs. Indoor pavement ant nests are often located under doorframes or thresholds, in flooring cracks, and behind wall bases. Large numbers of pavement ants may suddenly appear around a food source and consume it within 1-2 days, then disappear. Nests have an obvious loose pile of dirt or pebbles forming a circle or semi-circle around the entrance. Pavement ants may locate their nest anywhere from a few inches to nine feet underground, and will relocate the nest to varying depths throughout the year as food, reproduction, and temperature conditions require. They typically forage no more than 30 feet from the nest.

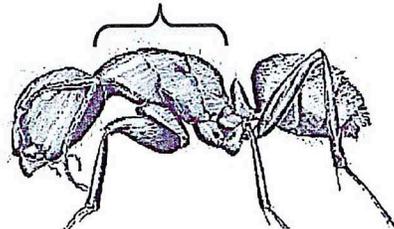


**The odorous house ant** (*Tapinoma sessile*) is dark brown or shiny black and about 1/8 inch long. They appear similar to pavement ants, but it's important to distinguish between the two. This can be done in two simple ways: 1) \*when crushed, an odorous house ant smells like coconut or vanilla; 2) the petiole of an odorous house ant has only one node, which appears hidden (see diagram). Odor house ant nests are shallow and may be found in a wide variety of places. Outdoor nests are often located in the upper layers of moist bark, compost, or leaf litter, or among stacked debris. They are drawn to plants that harbor aphids, scale insects, or mealybugs, and will consume the honeydew these plant pests produce. Indoors, these ants seek warmth or moisture to nest: in potted plants, wall voids, among stored materials, and within electronic equipment including computers, electrical outlets, and appliances. Odorous house ants forage up to 100 feet from their nest, which can make locating nests challenging. In addition, outdoor nests often "bud" and expand indoors, sometimes sharing one queen between the two nests. Because indoor nests may be linked to an outdoor nest, a thorough inspection of the building perimeter and remediation of outdoor nesting habitat is necessary when managing this ant indoors.



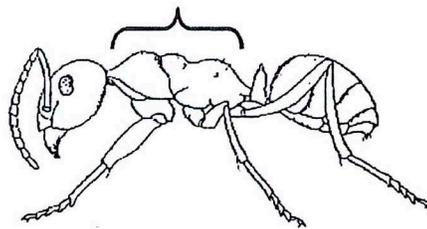
\*Note: only one other ant in Oregon emits a coconut or vanilla scent when crushed: velvety tree ants (*Liometopum* spp). These small, dark, wood-destroying ants are less common as structural pests than the odorous house ant.

**Carpenter ants** (*Camponotus* spp) may be all black, or red and black, and workers range in size from 1/5 to 1/2



inch long. The thorax is a continuous arch that remains even between thoracic body segments (see diagram). These large ants are beneficial by feeding on numerous types of insects that may otherwise pose pest problems. However, they themselves may become pests by excavating wood that is damaged from water, fungal rot, or other forms of decay that weakens the wood. Colonies are slow-growing, often occurring in wall voids or ceiling voids. New queens emerge and take flight in the spring, resulting in increased sightings. An occasional indoor carpenter ant (especially in spring) is not necessarily cause for alarm. Steady or increasing numbers over time, and regular indoor sightings throughout the year, may indicate the need for (wall or ceiling) void inspections to rule out a nest. Vacuuming a carpenter ant nest is an effective form of removal that may also kill them; following up with a desiccant dust (such as diatomaceous earth) in the void may kill any foragers that return. Outdoors, periodically inspect for dead trees and stumps close to the structure, and have them removed if carpenter ant activity is found.

**Thatching ants** (*Formica* spp) are a large, diverse group. Workers of most species are red and black, less commonly all black. They measure up to one-third of an inch long. Unlike carpenter ants, the thorax of thatching ants is uneven (see diagram). Some species build nest mounds made from interwoven layers of grass, twigs, and needles from pine or fir trees. Mounds may be a few inches to several feet high and wide. They may nest in soil or mulch that remains moist, and which is often more than three inches deep. They are known for "herding" aphids – a practice by which the ants protect the aphids from predators like wasps and beetles, and in return collect the sweet honeydew substance aphids extrude. For this reason, aphid pests may be more of an issue when thatching ants are present. Thatching ants are more commonly encountered in central and southern Oregon.



### General ant management tips for custodial staff:

1. Ants, like all pests, seek food, water, and shelter. However, preferences differ among ant groups. An important first step is to identify your ant pest and learn about its preferences.
2. Monitoring with sticky monitoring traps helps narrow down the areas of ant activity within a room, and provides a specimen for accurate identification. Ants may also be found in overhead lights (carpenter ants), corners, and along wall bases.
3. Classroom food (crumbs, residues) is a common ant attractant. Maintain diligent sanitation in classrooms that allow food. Work with teachers to establish designated snack areas in the room.
4. Kitchen counters should be thoroughly wiped down each day, and floors swept and mopped. Overnight, kitchen and pantry food should be placed in containers with snap-tight or screw-top lids, or placed in a cooler.
5. Potted plants suspected of harboring an ant nest may be placed in a sink filled with a very small amount of liquid dish soap, and left to soak 1-2 hours.
6. Clutter is a harborage (shelter) for many types of ants and other pests. Educate teachers on the importance of reducing clutter, and placing materials into storage bins with lids to discourage ants and other pests.
7. Ants are small and able to access the interior readily; however, you can limit their movements into and within a building by installing *tight-fitting* escutcheon plates around all sink pipes, and installing brush-style door sweeps on exterior doors.

## OSU School IPM Program: Custodial Training Guide

8. Avoid attracting ants to the building perimeter. Remove stacked debris near the structure, repair leaks from pipes or air conditioning units, limit bark and mulch to three inches deep or less, and trim shrubs and trees away from the building.
9. Soapy water cleans up ants and existing ant trails. However, before cleaning an ant trail, follow it to learn of the possible nest location or the food source the ants are exploiting.
10. Do not attempt to manage ants solely by killing foragers. At any given time, only about 10% of an ant nest is foraging. Killing foraging ants will not kill the queen who remains within the nest who generates new larvae daily, nor will it kill the larvae within the nest; whenever possible, attempt to locate the nest and remove it.
11. After sanitation, staff education, and attempts at locating and removing (e.g., vacuuming) the nest have failed, ant baits may be required. Speak with your District IPM Coordinator about this option.
12. **Remember: any pesticide - including ant bait - may only be applied by a licensed pesticide applicator on school grounds, and the IPM Coordinator must approve any pesticide application.**

There are many more things you can do to manage ants, depending on which ant pest you are dealing with. For more information about identifying and managing specific ants:

- Identification and Habits of Key Ant Pests in the Pacific Northwest, PNW 624. <http://cru.cahe.wsu.edu/CEPublications/PNW624/PNW624.pdf>
- Key to Identifying Common Household Ants. UC IPM Online. <http://www.ipm.ucdavis.edu/TOOLS/ANTKEY/index.html>



*Pest conducive condition: desk food that is not in a pest-proof container.*



*Pest conducive condition: clutter in classroom desk and lack of access to floor for regular cleaning.*

**W**hat is "Pest-proofing"? Pest-proofing involves making your space less attractive to pests, if not outright inhospitable. All pests—be they insects, animals, or plants—are after one or more of the following:

- Food
- Water
- Shelter

Pest-proofing a space reduces the amount of food, water, and shelter available to pests, and therefore discourages them from setting up shop. Pest-proofing is a good practice for staff to be in the habit of year-round as part of an integrated pest management (IPM) program. Forgotten food, water, and shelter can attract pests.

### WHY DO WE PEST-PROOF?

Most pests have the ability to chew through plastic bags containing snacks, and paper boxes holding cereals and crackers. Small ants can even find their way around a twist tie. Mice and cockroaches are adept at navigating cupboards where snacks are stored. When it comes to pests in schools, "open" foods are any foods that are not stored in a hard container with a snap-tight or screw-top lid.

Pests also find food from unlikely sources. Ants, mice, and cockroaches dine on the greasy residue on floors underneath large kitchen equipment. Corrugated cardboard is often used for long-term storage in kitchens and classrooms. German cockroaches can hide inside the corrugations and eat the box glues...until the kitchen or classroom offers something tastier. Cardboard boxes are also highly accessible to ants; spiders, and mice, which use them for shelter.

### PESTS NEED FOOD, WATER, AND SHELTER

**FOOD** can be residue left on a desk after eating a sticky snack, a week-old French-fry, or a stale piece of cereal under the microwave. Even bags of candy in a desk drawer are accessible to many pests.

**WATER** for a pest may be a leaky faucet or pipe underneath a sink. It might also be a leaky roof that moistens the wood and ceiling tiles, or areas of poor drainage around a building.

**SHELTER** sources include cluttered corners, cupboards and closets—areas that are not often disturbed or cleaned. Well-organized spaces that are not cluttered, are accessible for cleaning, and use bins with lids will have far fewer pests.

## WHAT IS INTEGRATED PEST MANAGEMENT (IPM)?

IPM is an approach to managing pests that focuses on prevention. Pest prevention requires communication and education so that staff is aware of the pest-conducive conditions in their workspace and how to minimize them. For teachers, administrators, and kitchen staff, minimizing pest-conducive conditions often involves sanitation, proper food storage, clutter reduction, and making minor changes to habits so that their workspace is less attractive to pests. In some states, including Oregon, IPM is a law that carries with it restrictions for who can apply pesticides on school grounds. Ask your district's IPM Coordinator for more information.

## WHAT CAN YOU DO?

Before summer, winter, or spring break, take a moment to pest-proof your workspace.

### TEACHING STAFF

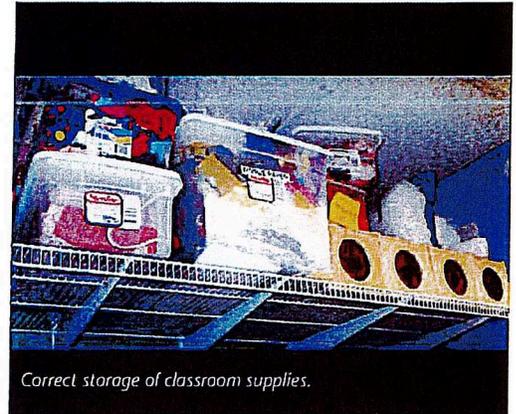
1. Take home the snack food in that desk drawer (you know the one!).
2. If you choose to leave food in cupboards during the break—including flour, sugar, cereals, and food-based art supplies—place them in a hard plastic container with a snap-tight lid. Many pests can chew through boxes and plastic freezer bags.
3. Custodians usually ask you to move “stuff” up off the floor to allow for cleaning during breaks. Consider keeping these items up off the floor permanently by installing shelves or bringing in rectangular tables to allow for better cleaning throughout the school year.
4. Clutter clean-out: the price for storing materials is dust and pests. Consider the tradeoff (a cleaner and healthier classroom) as you sort your classroom supplies.

### KITCHEN STAFF

1. Take a look in the pantry and eliminate as much corrugated cardboard as possible. This is a great time to request hard plastic bins with snap-tight lids as part of a pest management effort.
2. Remove debris from drains and drain baskets to reduce habitat for drain flies.
3. Place all food in snap-tight containers, in refrigerators, or freezers. If storage space is limited for large bags of grain products, place them on shelves (ideally metal) several feet off the floor.
4. Request to have your floors deep-cleaned during each break using either a pressure washer or a bio-enzymatic cleaner. Drains and hard-to-reach floors under heavy equipment will accumulate layers of scum that pests may feed on and breed in.

### FOR MORE INFORMATION ABOUT PEST-PROOFING:

- *IPM Technical Resource Center. Pest Management Practices: Sanitation.*  
<http://extension.entm.purdue.edu/schoolipm/1pmp/pmpsani.htm>
- *Environmental Protection Agency. PestWise: Pest Management Issues in Schools and IPM Benefits.*  
<http://www.epa.gov/pestwise/ipminschoools/issuesandbenefits.html>
- *The National Pesticide Information Center (NPIC) provides objective, science-based information about pesticides and related topics to enable people to make informed decisions. To contact NPIC, call 1-800-858-7378 or visit <http://npic.orst.edu>.*



Correct storage of classroom supplies.

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### FOR MORE INFORMATION

[Urban.IPM@wsu.edu](mailto:Urban.IPM@wsu.edu)

[schoolipm.wsu.edu](http://schoolipm.wsu.edu)

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[www.ipmnet.org/Tim/IPM\\_in\\_Schools/](http://www.ipmnet.org/Tim/IPM_in_Schools/)

[IPM\\_in\\_Schools-Main\\_Page.html](http://www.ipmnet.org/Tim/IPM_in_Schools-Main_Page.html)

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# Integrated Pest Management of the House Mouse in Schools

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Tim Stock, Robert Corrigan, and Dawn Gouge



Photo: ©Milos Andera, used with permission

Figure 1. The house mouse breeds rapidly and consumes a variety of food.

**A**fter humans, the house mouse (*Mus musculus*) is the second most successful mammal in the world. It breeds rapidly, consumes a broad variety of food, requires little or no water, and adapts to a wide range of habitats (Figure 1). Unfortunately, house mice are disease vectors, and the proteins found in their urine circulate in the air and can be asthma triggers for sensitive individuals. They are considered one of the most troublesome pests in the United States.

Poorly sealed school buildings are highly vulnerable to mouse invasion. Most rooms are maintained at favorable temperatures and often contain edible items. A mouse running along the outside edge of a building is drawn into the building by warm air and food odors coming from under doors and through holes in the wall.

Mice have strong senses of hearing, smell, taste, and touch. They are excellent climbers and can run up vertical walls to get to food. They can move along wires, utility cables, or ropes and can jump vertically 12 inches and survive an 8-foot fall. Adult mice can squeeze through openings slightly larger than  $\frac{1}{4}$ -inch wide.

Once inside, mice often establish themselves near food-storage and food-preparation areas, closets, cabinet bases, or cluttered rooms. They will also climb wall utility lines for electrical or plumbing and nest within suspended ceiling spaces.

Portable-style classroom buildings are especially vulnerable to mice: they provide attractive crawl spaces; access to dark, dirt floors that are cool in summer and warm in winter; and protection from predators. Once mice gain entry to the crawl space,

Tim Stock, Integrated Plant Protection Center, Oregon State University; Robert Corrigan, RMC Pest Management Consulting; and Dawn Gouge, University of Arizona

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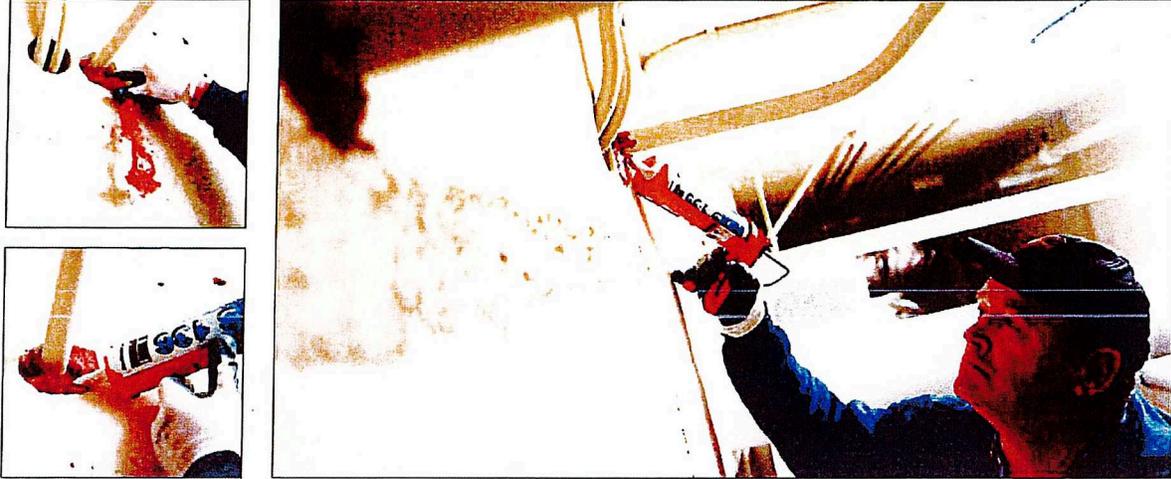


Figure 2. One way house mice find their way into a building is through gaps created for plumbing and wiring. Gaps of ¼ inch or more should be filled with Xcluder cloth then sealed with a siliconized acrylic latex or polyurethane sealant.

they find their way up through the floor along crevices or gaps created by plumbing or other utility lines, following their nose toward food odors or warm or cool air currents. Portable classrooms also contain gaps and openings through broken vent louvers and screens.

### Exclude Mice from Buildings

To reduce the threat of rodent-borne diseases, allergens, and other health threats, prevent mice from becoming established inside buildings by finding and sealing up potential access points.

1. Seal gaps of ¼ 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 and other temporary materials are not recommended for larger holes and cracks. They should be filled with good quality concrete, or stuffed with Xcluder cloth then sealed with a siliconized acrylic latex or polyurethane sealant (Figure 2).
2. Seal around water, gas, electric, and other pipes and conduits going through walls.
3. Make all external doors mouse-proof using the high-quality, brush-type door sweeps that seal the gap between the threshold and the door base (Figure 3).
4. Maintain and repair all ventilation screens, louvers used in attic spaces, and furnace

- closets. All gaps around the frames of screens and louvers should also be kept tightly sealed.
5. Mouse-proof the crawl-space skirt around portable classrooms. To prevent moisture damage, mold, mildew, and dry rot, the crawl-space skirt should not touch the ground. Dig a trench 1 foot deep below the skirt. Along the bottom of the skirt, attach a "barrier fence" of ¼-inch hardware cloth long enough to reach the bottom of the trench and extend horizontally 6 inches, creating a shelf. Then, fill in the trench. The buried shelf will help prevent other animals such as rats, raccoons, rock chucks, and skunks from digging underneath the barrier.
6. Assure the above pest-proofing practices are an integral part of the planning and contract process for building construction or renovation.

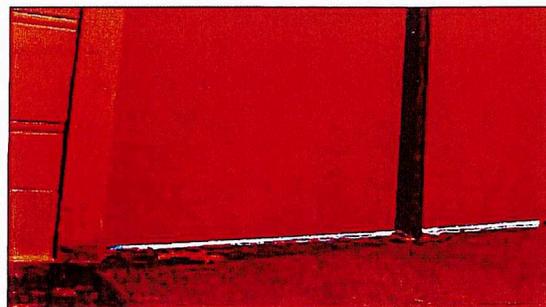


Figure 3. Gaps like these in external doors can be sealed with brush-type door sweeps.

## Don't Attract Mice

Don't allow trash to accumulate along exterior walls; this will attract mice. Don't allow contractors to throw food or food containers into crawl spaces and wall voids during construction or renovation of buildings.

Do not place trash receptacles close to exterior doorways (Figure 4).

Keep dumpsters clean, with lids closed. Drainage holes can be screened or plugged.

## Don't Harbor Mice

De-clutter storage areas and classrooms. It is best to use transparent plastic totes for storage. If cardboard boxes have not been opened in 2 years, the box and contents may be contaminated with mouse urine and feces and should be recycled or discarded. Consider having your principal mandate a 15-minute clear-out session a few times each year. Consider presenting Clutter-Free Awards for those who do the best job of removing clutter.

## Mouse-Vulnerable Areas

Once inside, mice most commonly nest or forage in mouse-vulnerable areas (MVAs), including:

1. Kitchen, pantry, food-preparation areas, and food-consumption areas, including classrooms and teachers' lounges (Figure 5).
2. The crawl space beneath portable classrooms. Invading mice will often construct platform nests on structural ledges, using grass, leaves, feathers, or the building's batting insulation.



Figure 4. This dumpster is too close to the exterior door.

The mice will also carry in and store relatively large amounts of seeds, nuts, and insect carcasses in floor and wall nooks.

3. Furnace closets (if the closet ventilation louver is not in good repair).
4. Beneath kitchen and bathroom cabinets where utility lines come up through the floor.
5. Within suspended ceilings during the cold weather months.
6. Stuffed chairs and couches in staff lounges.

These MVAs are the target zones for setting out mousetraps.

## Tips for Effective Mouse Snap Trapping

Snap trapping can eliminate mice populations quickly if done properly. The following are a few tips to make snap trapping more effective.

1. You have to de-clutter if you want to de-mouse. Trapping is much less effective in cluttered environments.

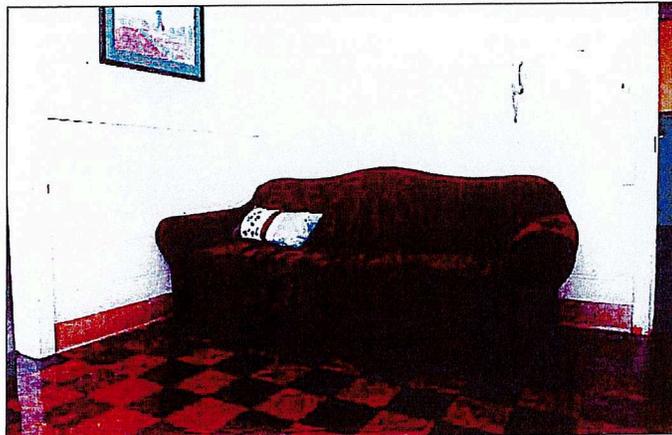


Figure 5. Once inside a school, mice will nest in such mouse-vulnerable areas as a food pantry or stuffed furniture in a staff lounge.

2. Remove the mice's food source before setting out traps. Unless food is scarce, mice typically do not venture more than 30 feet from their nest.
3. Plastic snap traps with a bait reservoir (such as the Kness Snap-E) can be set and reset easily, and can be cleaned with disinfectants and stored after you eliminate a mouse population (be sure to air out the traps to remove residual odors before storing). Wooden-based traps (such as the Victor M325 Pro Holdfast) can also be used if you don't need to keep traps for future use.
4. Despite common myths, there is no favorite bait for mice. The best strategy is to use a variety of baits among all the traps. Set a few traps with whatever foods the mice have been attacking; a few using nesting material (floss, string, cotton balls); a few with chocolate syrup, bacon bits, vanilla extract, or oatmeal flakes; and a few with grass seed or bird seed (Figure 6). The key to baiting these traps is to use tiny bits of food; do not over-bait.
5. Location, location, location. The most important rule for success in trapping mice is to place the traps where mice will encounter them easily and regularly. Mice travel along hidden, shadowy spaces such as along walls behind boxes, under equipment, around furniture, and the like. Look for places where the mice have left their droppings and install traps in those spots.

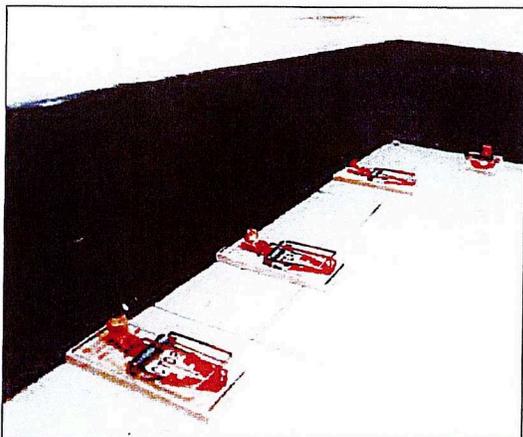


Figure 6. Traps should be baited with a variety of foods. There is no favorite bait for mice.

6. Place traps up against walls with the snap end facing the wall (Figure 7).
7. Use a sufficient number of traps (e.g., twelve traps for two or three mice is not too many).
8. Pre-bait the traps. Pre-baiting means installing the traps, but not actually setting them for the first few days. After pre-baiting for 2 to 3 days, set the traps and check them every 24 hours.
9. When installing traps and when collecting or emptying traps, always wear disposable gloves or rubber gloves that can be disinfected (see "Precautions for Handling," page 5).
10. If the mice do not show any interest, the traps are likely not in mouse-active areas and will need to be moved to better spots.
11. Remove any captured mice and re-set the traps.
12. After leaving set traps out for 2 to 3 days, shut down (remove) the traps for 2 to 3 days, then shuffle them to new positions 5 to 10 feet up, down, or sideways from the original positions and set again. Leave set traps out for another 2 to 3 days.
13. Repeat the Set-Remove-Shuffle-Reset sequence until all mice are eliminated (Figure 8).

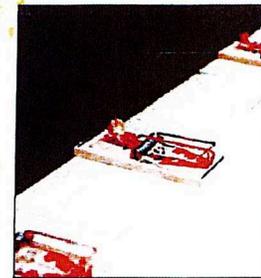


Figure 7. The proper way to position a snap trap against the wall.

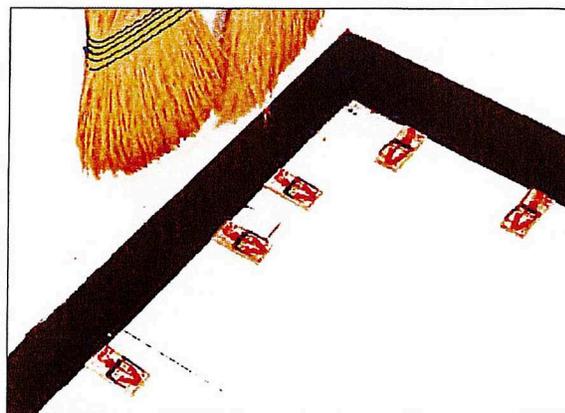


Figure 8. Follow the Set-Remove-Shuffle-Reset sequence to eliminate mice populations quickly. Twelve traps for two or three mice is not too many.

Continued on page 6

## Precautions for Handling and Removing Rodent Carcasses and Feces from Schools and Other Public Buildings

Despite good efforts, some mice inevitably gain entrance to schools and other public buildings. Most mice and the accompanying excrement are not considered to be highly hazardous to our health. Still, it makes sense to practice good safety measures when handling dead rodents in traps or cleaning up rodent excrement.

### Precautions When Handling Dead Rodents

1. Wear rubber or disposable plastic gloves such as those purchased in boxes of 100 by pest management professionals and building custodians.
2. Do not reuse a wooden mousetrap that has caught a mouse. Before handling, spray the dead mouse and any trap with disinfectant until wet.
3. Any inexpensive household disinfectant will suffice, as will a weak (5 to 10 percent) solution of bleach and water.
4. Turn a re-sealable plastic bag inside out.
5. With a hand inside the bag, pick up the rodent and the trap.
6. Invert the bag over your hand and seal the bag, with the rodent and trap inside it.
7. Wrap the bag in newspaper and dispose in a dumpster or garbage can.
8. Spray the area where the trap or the dead mouse was lying with a light spray of disinfectant and let dry.
9. Dispose of the gloves in the trash, or for reuseable gloves, spray the outside of the gloves with disinfectant, then remove the gloves and wash hands with soap and water.

### Precautions When Cleaning up Small Amounts of Rodent Droppings

1. Do not sweep up or vacuum feces because this can cause the excrement residues to become airborne and be inhaled.



Figure 9. Wear rubber or disposable gloves and use a disinfectant when cleaning up mouse feces.

2. Wear rubber or disposable plastic gloves such as those worn by pest management professionals and building custodians.
3. Spray the droppings and affected area with disinfectant until wet (Figure 9).
4. Use a wet paper towel to pick up the disinfected droppings.
5. Place the droppings and paper towel into a resealable plastic bag and seal the bag.
6. Place bag in a dumpster or garbage can.
7. Dispose of the gloves in the trash, or for reuseable gloves spray the outside of the gloves with disinfectant, then remove the gloves and wash hands with soap and water.

Note: Employees wishing to maximize personal protection in certain situations—such as when removing rodent feces in enclosed spaces—should wear coveralls and a respirator with a HEPA P100 filter.

Adapted from: CDC Hantavirus Preventative Recommendations ([www.CDC.gov](http://www.CDC.gov)); Army Pest Management Bulletin, 2001, Vol. 22 (4); Communications from Robert Corrigan, Ph.D. RMC Pest Management Consulting.

## Inspect and Monitor for Mice

When inspecting, look for fecal pellets in mouse-vulnerable areas. Also look at cardboard boxes, stuffed furniture, and similar items for signs of gnawing or nests.

In areas with past or potential mice problems, snap traps with bait reservoirs (e.g., Snap-E, Mini Rex, JAWZ, etc.) or nontoxic detection blocks (e.g., Detex or NoTox) placed inside bait stations or covers (e.g., Kness Stick-All Mouse & Insect Trap, or the Kness Snap-E cover) may be used to monitor activity (Figure 10).

Place the stations or covers in areas where they are less likely to be accidentally disturbed.

If using snap traps, place one bacon bit or something similar in the reservoirs. Check the traps once every *24 hours*. Ants will occasionally carry off the bacon bit, so it is good to carry extra bacon bits when checking traps.

Replenish block baits on an 8- to 12-week basis, or as necessary due to consumption or spoilage.

When using nontoxic detection blocks, you should put them inside tamper-resistant bait stations designed so the blocks will not fall out if the stations are picked up and shaken.

Possible locations for the bait stations:

1. Within the furnace closet, in the back area of the closet, preferably behind the furnace
2. Beneath any kitchen sink
3. In a warm area behind a kitchen stove
4. In the suspended ceiling above the kitchen stove, sink, or near the furnace closet

To monitor for mice under portable classrooms, put one or two tamper-resistant bait stations along the middle of the side of the skirts underneath the portable. To achieve this, each portable must have an access door that opens easily and closes tightly.

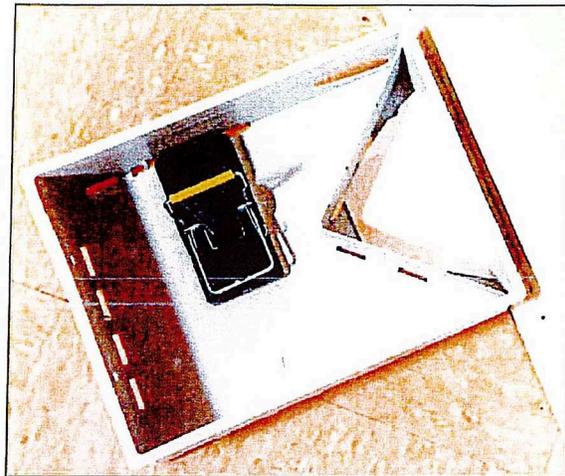


Figure 10. A Kness Stick-All with a plastic snap trap inside.

Exterior storage sheds (bike sheds, dumpster sheds, and equipment sheds) should also be monitored for mice. This can be accomplished by installing two bait stations—one on each side of the shed. The baits should be replenished on an 8- to 12-week basis, or as necessary due to consumption or spoilage. Construction and renovation projects should have active rodent monitoring programs to reduce the possibility of “building in” a rodent problem.

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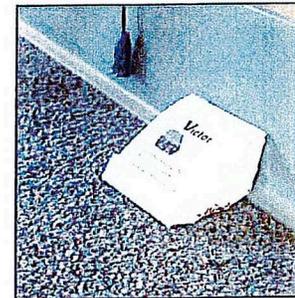
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## Pest Monitoring Protocol for IPM in Schools/Child Care

**When placing sticky monitor traps, it is important to remember a few things:**

- Monitors should be placed indoors in **all** existing pest vulnerable areas (PVAs) and hot spots (see next page for a complete list of PVAs).
- Monitors should be placed with the vertical side against a wall or window frame (see picture).
- Monitors should be placed out of the way of people or activities; secluded corners are often good spots.
- Use the double-sided tape on the underside to secure the monitor.
- If monitors are not catching pests, think about how the pests may be entering and relocate the monitor. Zeroing in on pest activity within a room can help address the cause of pest entry and ultimately what action(s) is required.
- Monitor locations should cover the site well. Use too many as opposed to too few.
- If monitors are placed in a classroom, the teacher should be informed of its purpose.
- All monitors should have a placement date, location, a number (if more than one), and initials.
- A record of monitor locations should be kept in case someone else has to check them.
- Stickers (e.g., sticky dots) may be useful when placed at eye-level to indicate monitors are present underneath shelving or equipment.
- Monitors should be checked monthly and *should be changed* when it is filled with pests, dust/dirt, or *when four months have passed*.
- Typically, an elementary school requires 20 monitors, a middle school 30, a high school 35.
- Monitoring stations should not be stored alongside volatile pesticides.



**Sticky monitoring traps are placed against the wall, baseboard, or window ledge.**

### General Information:

Use other structural elements as monitors: window ledges, floor drains, light coverings, and spider webbing all may contain pests, feces, webbing, etc., and thereby help monitor pest activity.

Numerous different types of monitor traps exist; experiment with the different options to see what works most effectively in your facility.

Pest Vulnerable Areas (PVAs)	Monitor Placement Area
1. Kitchen/cafeteria	Dry storage and pantry, dishwasher area, near external cafeteria doors, near floor drains, within the lower panels of serving counters
2. Staff lounge	Behind vending machines, in counter or drawer, behind microwave, behind or next to refrigerator
3. Custodian's storage	Under shelving, near floor sink, near external door (if present)
4. Reported hot zones from pest sighting log	Under counters, sinks, near windows
5. Special Education or kindergarten classrooms	Near food preparation area and backpack storage, under sink
6. Home economics, life skills classrooms	Near stove or refrigerator, near washer/dryer, under counter
7. Stage areas	Under stage storage, in equipment room
8. Locker areas	Under lockers
9. Concession stands	Under counters, behind or next to equipment
10. Classrooms with animals/plants	Near pet food or plants
11. Cluttered classrooms	Remove clutter, monitor in storage areas, under sinks
12. Bathrooms (optional)	Near external doors, near cracks and crevices, near utility pipes without escutcheon plates
13. Nurses station (optional)	Under desk, under sink, near external door