



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

Roof Rats

Karen M. Vail

Just a few years ago, 2017 to be precise, Memphis made headlines as the second most roof rat-infested city in the country, according to [Terminix](#). This didn't surprise me. For years, pest management professionals (PMPs) attending UT Extension's General Pest and Rodent Control (GRC) Licensing Training informed me of the roof rat problem in Shelby County. But I was surprised this past year when PMPs in middle Tennessee told me roof rat problems were increasing there too. I haven't been informed of problems elsewhere. The [Tennessee Wildlife Resource Agency \(TWRA\)](#) indicates that roof rats are found throughout Tennessee, but that you're more likely to encounter them in higher levels of buildings near grain elevators or near large shipping docks. Please send me an email (kvail@utk.edu) if roof rats are an indoor problem in your part of the state.



Figure 1. Top: Norway Rat, bottom: Roof Rat. Photo credit: Ed Freytag (Hurley 2017)

The roof rat is easily distinguished from the Norway rat which is common and widespread throughout Tennessee. Roof rats are gray to black and have large ears whereas, Norway rats are reddish to brown and have smaller ears (Fig. 1). The tail on the roof rat is longer than the body and head combined, whereas it is shorter in the Norway rat. Roof rats produce feces that are ½-inch long and pointed on one end, and Norway rats produce ¾-inch blunt-ended droppings. Norway rats produce 8 – 9 pups per litter, roof rats 4 – 8. Norway rats travel 150 ft in a night and roof rats up to 300. But one of the most important reasons to distinguish these pests is their behavior and nesting locations.

Special Points of Interest



See the article on managing mosquitoes in schools to learn about a new successful program that was implemented in southern California.

This issue

Roof rats	1
Update on Managing Mosquitoes in Schools	4
Links/Contacts	5

Table 1. Comparison of areas of activity between roof rats and Norway rats (Anonymous 2019).

Areas of Activity	
Norway Rat	Roof Rat
<i>Existing cavities, softer soil, eroded areas adjacent to masonry or rocks, and where hard surfaces such as sidewalks or foundations meet soil. Entry holes are clean and smooth and may have grease marks on any hard edge</i>	<i>Elevated nesting sites including attics, walls, roofs, the tops of palms and other trees, and vine covered fences and walls</i>

Look up when seeking roof rats and think about power lines or tree branches guiding the rats to the structure. Roof rats tend to nest aboveground in the upper stories of a building such as in attics, spaces below roofs, walls, trees, vines covering walls and fences, shrubbery and other mature vegetation. Norway rats tend to burrow in the ground and often next to foundations or under debris. They may enter through pipe penetrations in the foundation wall or swim through pipes into the structure.

Besides being competitors for our food, rats can damage the structure by chewing holes in wood, chewing wires that lead to fires, and they can move pathogens that cause food poisoning or other symptoms. As with other rodents, successful roof rat management is going to require sanitation, exclusion, inspection and monitoring, and removal through trapping or baiting. Rats are often detected when they steal our food or leave droppings or grease marks along their routes.

Rodents often make their way indoors when temperatures start to cool in the fall, so the recent arrival of cold temperatures may have caused an uptick in rodent activity. Managing roof rats may be more challenging because you lack experience with this pest and their habits are slightly different than Norway rats.

Management

Finding the areas of activity. Roof rats may be more elusive because their areas of activity aren't as close to the ground where inspectors are searching. Most rodents use structural guidelines to move from place to place. Structural guidelines may include the interface of two surfaces such as the base of a wall and floor or beam, or attic/upper story timbers, pipes, wires, conduit, or ducts. Search these and pest vulnerable areas (for example, food service, vending machines, custodians' closets, teacher's lounges and bathroom sinks, laundry rooms, sill plates, crawlspaces, etc.) for signs of grease marks, chew marks and droppings. Like most rodents, they are active from dusk to dawn. Nontoxic monitoring bait blocks placed in tamper-resistant stations should be checked regularly for signs of bait consumption to indicate areas of rodent activity.

Sanitation and Exclusion. Rats can enter an opening greater than ½ inch so seal around pipe, wire and conduit penetrations into the structure as well as cracks in the foundation. Use hardware cloth on all vents, including soffit and ridge vents. Check gutters for water retention and remove debris if necessary. Fix leaks and remove standing water to prevent providing a moisture source to the rats. Exterior trash cans and dumpsters should be placed away from the building, especially entrances, to avoid attracting rats to buildings. Deny rodents access to garbage by using tight-fitting or spring-loaded lids on trash cans. Ensure doors to dumpsters are closed and lids are tight-fitting. If using a trash compactor, ensure it doesn't leak to prevent attracting rats to the building. Clean exterior trash cans at the end of each day to avoid leaving food for the rats. Trim trees to prevent roof rats from using them as a bridge to access the structure.

Removal. Use traps (snap or live) **in areas inaccessible to children** to trap rodents. Remember to check them regularly. These can be used to determine areas of rodent activity as well as lower the population of rats.

Both roof and Norway rats are neophobes, afraid of new things, so wait a few days to a week before setting the trap. If the traps are not triggered right away, keep them in place for a week before seeking a better location. If you see runways, set the traps in the run with trigger side towards the wall and remember to secure the traps so these large rodents don't move them. If you notice the rats prefer a particular food item, use that bait in the trap. In general, roof rats like fruits and nuts. Chocolate, dry oatmeal or trail mix are other options to bait the trap. Refrain from using peanut butter because of potential student allergies and use different baits in different traps to offer a variety of food. Floss, cotton balls, or string tied to the trigger may be attractive to females preparing a nest.

Baiting. Sometimes, trapping alone doesn't eliminate an infestation. If baits are used around schools, they should be placed on a baffle in tamper-resistant stations and the stations anchored and locked. To place baits in a school requires the pesticide applicator to be certified in category 7 and working under a licensee in General Pest and Rodent Control (GRC).

Regardless if baits or traps are deployed, devices should be checked every day for dead and dying rodents to prevent odors from disseminating into the classroom and to prevent panic/concern at the sound of a trapped or dying rat. In Tennessee, placing traps or removing dead or dying rodents does not require a pesticide certification.

Cleanup Precautions

Clean areas following CDC recommendations (<https://www.cdc.gov/rodents/cleaning/>) where rodents have been active to help prevent pathogens or allergens from becoming airborne or in contact with the person cleaning or the school's occupants.

Conclusions

Roof rats are becoming more common throughout Tennessee. It's essential to identify the rat species before choosing a management strategy because the areas to bait and food baits differ between Norway and roof rats.

Sources (accessed Nov. 27, 2019)

Anonymous. 2019. IPM Action Plan for Rodents

<https://schoolipm.tamu.edu/forms/pest-management-plans/ipm-action-plan-for-rodents/>

Hurley, J. 2017. SPN Rodenticides: How do they fit into your IPM program? <https://schoolipm.tamu.edu/2017/01/26/spn-rodenticides-how-do-they-fit-into-your-ipm-program/>

Business Wire. 2017. Terminix Releases Top 15 Roof Rat Cities List. <https://www.businesswire.com/news/home/20171016005414/en/Terminix-Releases-Top-15-Roof-Rat-Cities>

TWRA. Roof Rat, *Rattus rattus*. <https://www.tn.gov/twra/wildlife/mammals/small/roof-rat.html>

Update on Managing Mosquitoes in Schools

Karen M. Vail



In 2018, we released a publication on managing mosquitoes around schools ([Theuret et al. 2018](#)) which I hope you've found useful. In coming issues, we hope to inform you about the [MEGA:BITESS Academy](#) which has an objective to *create an integrated medical entomology and geospatial analysis (MEGA) Academy for educators (grades 6-12) by engaging them in learning medical entomology and geographic information sciences (GIS) for classroom implementation while simultaneously developing a community-driven mosquito surveillance and education program*. But today, I'm going to share with you a successful mosquito management program initiated in two southern California school districts ([Cope and Shaver 2019](#)).

While the California program discusses the Asian tiger mosquito, *Aedes albopictus* and the yellow fever mosquito, *Aedes aegypti*, in Tennessee, we only need to be concerned about the Asian tiger mosquito which is found throughout the state. Historical Tennessee records exist for the yellow fever mosquito, but the mosquito hasn't been seen recently. We would also hope this California program is effective against *Aedes triseriatus*, the eastern tree hole mosquito, which is the primary vector of LaCrosse encephalitis, a viral disease that occurs in eastern and middle Tennessee that can affect children under the age of 16.

The *Aedes* mosquitoes listed above are considered container mosquitoes, which means the eggs, larvae and pupae complete their development in water that is often found in containers. While wearing repellent when outdoors and removing/treating larval habitats (emptying water from containers) are a part of a recommended mosquito management program, the program implemented in southern California schools added two other components.

Catchmaster Ovi-Catch™ Autocidal Gravid Ovitrap (AGO) Mosquito Trap (OVI-1, AP&G [Atlantic Paste & Glue], Bayonne, NJ) were placed in hidden or locked locations to prevent tampering. Preferably, these locations were also cool, shaded, protected from the wind and moist. The trap, when installed, contains water, organic material and a glue board arranged so females attracted to the location to lay eggs are trapped on the glue.

A Final Feed™ spray (garlic oil, AP&G, Bayonne, NJ) was applied to adult mosquito resting areas. School personnel appreciated a tool that could be applied to the perimeter of the schoolyard to contact mosquitoes finding their way onto school property. Final feed is a sprayable bait. Mosquitoes contacting the bait suppress their blood feeding and typically die within a few days. In other trials, mosquito population reductions of 90% have been reported 2 – 3 weeks after application.

I've hyperlinked the article so you can see the California mosquito control program's details. If you are interested in implementing a similar program, contact me and we'll see what we can do to help.

Source

Theuret, D., R. Trout Fryxell and K. Vail. 2018. W774 They Want to Suck Your Blood! Mosquito Management Around Schools and Childcare Facilities . <https://extension.tennessee.edu/publications/Documents/W774.pdf>

Cope, S. and J. Shaver. 2019. Summary of Integrated Mosquito Management in Southern California Schools. https://schoolipm.tamu.edu/files/2019/11/Mosquito_Management_In_Schools-FINAL1.pdf

This newsletter produced by :

Karen Vail, Ph.D., Professor,
 Extension Urban Entomologist
 Entomology and Plant Pathology
 370 Plant Biotechnology Bldg.
 2505 E J Chapman Drive
 Knoxville, TN 37996-4560
 ph: (865) 974-7138
 fax: (865) 974-8868
 email: kvail@utk.edu
 web: <http://schoolipm.utk.edu>
<http://epp.tennessee.edu/people/directory/dr-karen-vail/>



Jennifer Chandler,
 Research Specialist III
 Entomology and Plant Pathology
 370 Plant Biotechnology Bldg.
 2505 E J Chapman Drive
 Knoxville, TN 37996-4560
 ph: (865) 974-7138
 fax: (865) 974-8868
 Email: jchand11@utk.edu

Comments or questions
 on this newsletter?

Contact kvail@utk.edu

Follow us on
 Facebook at
<http://tinyurl.com/UrbanIPMTN>



Partial support for this newsletter provided by the USDA
 NIFA CPPM EIP grant (# 2017-70006-27287) awarded to the
 University of Tennessee.

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, or covered veteran status.

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 <http://schoolipm.utk.edu>

NATIONAL IPM INFORMATION

eXtension's Pest Management In and Around Structures: Urban Integrated Pest Management http://www.extension.org/urban_integrated_pest_management

National School IPM
schoolipm.ifas.ufl.edu/

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

IPM Institute of North America
www.ipminstitute.org/

School IPM PMSP—all schools IPM by 2020 <https://ipminstitute.org/projects/school-ipm-2020/>

National Pest Management Association IPM
www.whatisipm.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://extension.tennessee.edu/Pages/Office-Locations.aspx>

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.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.