



Green Bulletin

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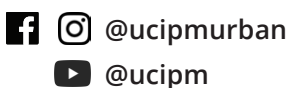
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Deer Mouse Infestation? Be Aware of Hantavirus

Hantavirus has been in the news lately. More accurately, what has been in the news is the Sin Nombre virus which is from a family of viruses called hantaviruses. We are sharing some information to help you understand the issue and protect yourself and your community.

As communities expand into the urban-wildland interface, deer mice, and other similar species, are being seen more often in and around homes. This is also true if the home is near fields, forests, or other suitable habitats surrounding those areas. Deer mice may enter homes, cabins, and other structures where they build nests and store food. If you are called on to manage a deer mouse problem, be sure to protect yourself and building occupants from potential exposure to hantavirus, which can be deadly.

Deer vs. House Mouse

Deer mice, *Peromyscus maniculatus* (Figure 1), often referred to as a white-footed mouse, is the most abundant and widely distributed mammal in North America.

They look similar to the house mouse, *Mus musculus* (Figure 2), but can be distinguished by their bicolored tail, larger eyes, and white undersides.



Figure 1. Adult deer mouse. Note the large ears and eyes and white underside of the body and tail—all characteristics that distinguish it from the house mouse.

JN Stuart, Flickr



Figure 2. House mice are frequently found in residential households. They lack a white underside and have a relatively hairless tail. They don't transmit hantavirus.

JN Stuart, Flickr

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Hantaviruses and Precautions

Hantaviruses are a group of viruses that rodents in the family Muridae carry. Deer mice are the principal reservoir of one of these viruses called Sin Nombre virus, which causes Hantavirus Pulmonary Syndrome (HPS) in people. Although human cases of this virus are rare, HPS can be a severe respiratory disease in humans with fatality rates of about 33%. Deer mice shed the virus in their saliva, urine, and droppings. A person may be exposed to hantavirus by breathing contaminated dust after disturbing or cleaning rodent droppings or nests or by living or working in rodent-infested settings. Rarely, individuals can also be infected by 1) consuming food contaminated with rodent urine or droppings; 2) touching surfaces where rodents have been and then putting their hand in their mouth; or 3) being bitten by an infected rodent. There is no evidence that North American hantaviruses spread from one person to another.

The California Department of Public Health recommends avoiding contact with all wild rodents, their droppings, and nesting materials, as well as storing all food items securely in rodent-proof containers. The most effective way to avoid contracting hantavirus from deer mice is to keep them out of houses, cabins, and dwellings by rodent-proofing and excluding them from these structures by sealing all small gaps and cracks. Once deer mice infest a dwelling, it is critical to avoid working and sleeping in these areas until the infestation has been controlled and the area has been made safe for humans.

Before occupying an infested building, open the doors and windows to air out the room for at least 30 minutes. Where possible, use an electric fan on windowsills and in door entrances to assist the process. Be sure to vacate the building during the ventilation process to prevent inhaling aerosolized particles. Wearing a commercially available cloth or paper breathing mask offers some protection and is better than no protection at all. However, only an approved respirator equipped with high-efficiency particulate air (HEPA) filters offers total respiratory protection against airborne viruses.

It is important to wear nonfabric gloves (e.g., rubber, latex, vinyl, or nitrile) when cleaning deer mouse-infested buildings. Because humans can contract the



virus by inhaling aerosolized deer mouse urine and feces, never stir up dust by vacuuming or sweeping or through any other activity.

It is essential to properly disinfect the potentially contaminated areas. Thoroughly soak contaminated areas including trapped deer mice, droppings, and nests with an appropriate disinfectant solution such as a 10% hypochlorite (bleach) solution or an EPA-registered disinfectant. To make this bleach solution, mix 1½ cups of household bleach in 1 gallon of water (or 1 part bleach to 9 parts water). Make the bleach solution fresh before use. Note that a bleach solution may damage rugs and fabrics and irritate skin. It is also very important to work in a well-ventilated space when using a 10% bleach solution. Wear nonfabric gloves whenever touching or cleaning contaminated surfaces or when handling mouse nests, dead mice, or mouse traps.

Once everything has soaked for 5 minutes (use the time recommended on the label), remove all nest material, mice, and droppings with a damp paper towel and place them in doubled plastic bags, then mop or sponge the area with the disinfectant solution. Upholstered furniture and carpets can be shampooed and steam cleaned. Once finished remove gloves and dispose of them along with the other cleaning materials in a covered trash can that is regularly emptied. After removing the gloves, it is important to thoroughly wash hands with soap and water or use a waterless alcohol-based hand sanitizer when soap is unavailable and hands aren't visibly soiled.

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Hantavirus and Deer Mice *continued from p. 2*

Managing Deer Mice and More Information

There are no rodenticide baits registered for controlling deer mice in residential settings. Instead, control residential deer mouse infestations using traps, excluding mice from structures, and modifying the habitat to remove sources of food and shelter.

See the *Pest Notes: Deer Mouse* at <https://ipm.ucanr.edu/home-and-landscape/deer-mouse/pest-notes/> for more information about managing these pests.

For additional information on rodent cleanup, visit the Centers for Disease Control and Prevention website, www.cdc.gov/healthy-pets/rodent-control/clean-up.html.

For more about hantavirus including a map of reported cases, see the California Department of Public Health website www.cdph.ca.gov/Programs/CID/DCDC/pages/hantaviruspulmonarysyndrome.aspx.

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Ask the Expert!

Q: Are deer mice the only rodents that carry hantavirus?

A: According to Dr. Roger Baldwin, deer mice (*Peromyscus maniculatus*) are not the only reservoirs (carriers) of hantaviruses, but they are by far the primary concern for human disease transmission in California. He says that while there are a number of hantaviruses globally, Sin Nombre virus (SNV) is the primary one of concern in the western U.S. because it can cause hantavirus pulmonary syndrome, a life-threatening disease in humans. Although other rodent species are known to carry SNV, none have been associated with disease transmission to humans in California. Baldwin also emphasized that it's important to note that the house mouse (*Mus musculus*) is considered a carrier but has not been associated with transmission of SNV to humans.

Statewide rodent sampling conducted by the California Department of Public Health (CDPH) demonstrated that *P. maniculatus* comprised more than 70% of rodents captured during California human case investigations and 20% tested positive for SNV antibodies. In comparison, about 10 to 12% of deer mice test positive for SNV during routine statewide surveillance. Only 3% of non-*P. maniculatus* collected during these same events tested positive for SNV.

For more information about hantavirus in California, visit the CDPH website at www.cdph.ca.gov/Programs/CID/DCDC/pages/hantaviruspulmonarysyndrome.aspx.



G Smith, Flickr

The deer mouse, *Peromyscus maniculatus*.

Excluding Migratory Birds from Buildings

Urban and suburban areas are important habitats for migrating birds (Figure 2), but birds can also quickly become a nuisance or economic issue when they nest on buildings, homes, and other structures. Their activities can result in disruptive noises, lead to potential structural damage (Figure 2), and their droppings can create aesthetic and human health problems. The most effective method to keep migrating and nesting birds from becoming a nuisance or causing building damage is to exclude them. If you are a structural pest management professional offering exclusion services, it is important you know of and abide by laws protecting endangered and migratory birds.

Laws Protecting Birds

Some birds that nest on dwellings may be protected under the Migratory Bird Treaty Act and Endangered Species Act. These laws prohibit the trapping, possession, or killing of listed species and their parts (eggs, nests, feathers, etc.) without a permit. Generally, there must be a good case to justify a permit and the permit process can be time consuming. To check if you need a permit, visit the U.S. Fish and Wildlife Services website.

Before any exclusionary methods are enacted, it is important to correctly identify the bird species and understand its biology and migrating/nesting season. Removing nests of protected birds must be timed according to their migration departure. Once the birds have migrated and vacated their nests, it is safe to remove them and take measures to prevent future unwanted nesting.

When it is safe and appropriate to remove the nest, wear personal protective gear such as gloves, a dust mask, and coveralls or similar clothing to protect against contamination from fleas, mites, bacteria, or other parasites that may be associated with the nest.

Physical Exclusion

Exclusion refers to any control method that denies physical access to the nest site area and is a relatively permanent, long-term solution to the problem. In California, a permit is not required for this method if it is done before the birds arrive, during nest building



Figure 1. Adult white-crowned sparrow

Jack Kelly Clark, UC IPM



Figure 2. Two mud cliff swallow nests under the eaves of a building.

WP Gorenzel, UCD

when there are no eggs or young in the nest, or after the birds have left for the winter.

Consider installing bird-type netting, hardware cloth, metal or plastic projectors, or fiberglass panels to prevent birds from gaining access to ledges, under eaves, wood siding or other wood surfaces. Lightweight, plastic, $\frac{3}{4}$ -inch mesh can be stretched from the eaves to a lower point on the building (Figure 3).

Alternatively, netting can be stretched over any flat surface subject to damage, leaving at least three inches of space between the netting and damaged surface so that the birds cannot cause further damage through the mesh. It may be necessary to net

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K Windbiel-Rojas, UC IPM

Figure 3. Bird netting on a building.



Jack Kelly Clark, UC IPM

Figure 4. A plastic owl on a rooftop intended to frighten away roosting birds.

the entire side of a building; otherwise birds may move just beyond the netted area and continue their activities.

If a plastic net is used, it should be attached so that it can be pulled taut. This prevents flapping in the wind, which looks unsightly and results in tangles or breakage at mounting points. The net should not have any loose pockets or wrinkles that could trap and entangle birds.

While bird netting and other materials are available in stores and online, extensive netting may be a bigger task than some residents want to take on themselves, especially if it involves a two-story building. In this case, it is advisable to call a bird control professional.

Frightening Devices

Models of hawks, owls, and snakes are sold at many garden centers, but these devices are ineffective (Figure 4). Plastic twirlers or windmills fastened to the eaves, and aluminum foil or brightly colored plastic strips hung from above repel by movement and reflection and have been used with inconsistent success. Various other gadgets or frightening devices are marketed for birds, some with limited success. Once established, birds such as woodpeckers are persistent and are not easily driven from their territory or selected pecking site.

Resources for More Information

For legal and permitting information about birds and other wildlife visit the California Department of Fish and Wildlife web site www.wildlife.ca.gov/ and the U.S. Department of Fish and Wildlife www.fws.gov/program/migratory-bird-permits.

Read more about the Migratory Bird Treaty Act and find more resources at www.fws.gov/law/migratory-bird-treaty-act-1918 and the USDA-APHIS Wildlife Services www.aphis.usda.gov/wildlife-services/publications/technical.

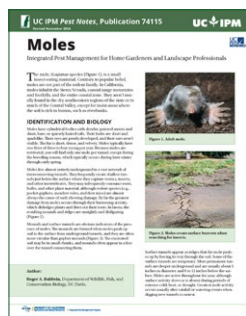
For more detailed information about installing netting, see UC IPM *Pest Notes: Cliff Swallows* at ipm.ucanr.edu/home-and-landscape/cliff-swallows/pest-notes/ and *Woodpeckers* at ipm.ucanr.edu/home-and-landscape/woodpeckers/pest-notes/.

Websites change frequently at the state and federal levels. The websites referenced in this article were accessed at the time of publication.

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Modified from the original article published in November 2014 in the *Retail Nursery and Garden Center News*.

Revised Pest Notes



Moles

UC IPM has a newly updated resource to help in your mole management efforts. This revised fact sheet, *Pest Notes: Moles*, is authored by Roger Baldwin, a Human-Wildlife Conflict Cooperative Extension Specialist from the Department of Wildlife, Fish, and Conservation Biology at UC Davis. The publication covers identification, biology, legal status, and management techniques such as exclusion, trapping, and chemical control.

Online at

ipm.ucanr.edu/home-and-landscape/moles/pest-notes/



Phytophthora Root and Crown Rot

We have recently published an update to *Pest Notes: Phytophthora Root and Crown Rot*. Authored by UCCE advisors Jim Downer, Steven Swain, and Ed Perry, this revised publication includes a new section on mulching to control tree diseases. New photographs showing symptoms in landscape plants to aid in identification have also been added.

Online at

ipm.ucanr.edu/home-and-landscape/phytophthora-root-and-crown-rot/

Visit UC IPM's Pest Notes web page ipm.ucanr.edu/PMG/PESTNOTES/index.html for these and many more titles.

Updated UC IPM Pesticide Database

UC IPM has modernized our home and garden Pesticide Active Ingredient Database: ipm.ucanr.edu/home-and-landscape/pesticide-active-ingredients-database. This database is designed to help residents and licensed professionals better understand the risks pesticide active ingredients pose to people and the environment.

Each active ingredient page includes what it is, how it works, and what pests it is designed to control, as well as potential hazards of the active ingredient. The potential hazards table includes toxicity information for water quality, natural enemies, honey bees, and people or other mammals. Most pages also include example products available to the general public and licensed professionals.

The database is linked to UC IPM's *Pest Notes*, allowing viewers to compare toxicity ratings of pesticides listed as potential tools when selecting management options.

Always read and carefully follow all precautions and safety instructions provided on the pesticide container label, as well as any other regulations regarding the use of pesticides. Not following label directions, even if they conflict with information provided herein, is a violation of state and federal law.

No endorsements of named products are intended, nor is criticism implied of products not mentioned.

For more information about managing pests, contact your University of California Cooperative Extension office, or visit the UC IPM website at ipm.ucanr.edu.

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