Information for pest management professionals and pesticide applicators

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Integrated Thrips Management in Landscape Settings

Summer can be prime time for pest thrips infestations in California's urban landscapes. All thrips belong to the insect order Thysanoptera and are characterized by small (less than 2 mm), slender, cigar-shaped bodies, piercing-sucking mouthparts, and fringed wings as adults. Most species range from light amber to almost black, depending on the life stage. The life cycle includes a kidney-shaped egg often inserted into plant tissue, two active but wingless larval stages, the nonfeeding prepupal and pupal stages, and a winged adult.

Common Damage

Pest thrips feed on developing plant tissues and can scar or distort leaves, flowers, and fruit. Thrips extract plant cell contents as they feed, so high-density infestations can result in leaves or petals that appear bleached, stippled, or deprived of color. Some species of thrips are efficient vectors of certain plant viruses, although this is rarely an issue in the landscape.

Thrips can attack annual and perennial plants, both herbaceous and woody, although healthy woody plants usually tolerate thrips damage. Some thrips move into gardens and landscapes in the summer, as adjacent agricultural and natural areas dry out. Others are associated with the active tender growth seen in landscapes during spring and summer. Regular monitoring during these times can help to confirm the presence of pest thrips and their natural enemies and whether local populations are increasing or decreasing. Yellow or blue sticky cards can be employed to intercept adult thrips in flight, while striking or shaking foliage or flowers over a white sheet or a piece of paper is a useful sampling method for settled adults and larvae.

Thrips You'll See Most Often

Common pest species on landscape ornamentals include greenhouse thrips (Figure 1), western flower thrips (Figure 2), and the recently introduced myoporum thrips (Figure 3). Greenhouse thrips attack many woody perennials, including *Rhododendron* species, and are usually found feeding in groups on the undersides of leaves. They deposit conspicuous specks of black excrement at feeding sites. Western flower thrips are common on most flowering plants when pollen is present. Generally, flower thrips don't cause damage in landscapes, but high densities can scar and sometimes distort developing flowers such as roses (Figure 4) and annual bedding plants. A recent invader to the state, myoporum thrips causes extensive shoot twisting and galling (Figure 5), but only on several species of *Myoporum* landscape shrubs in coastal regions.

Not all thrips are pests, however, and many plant-feeding species also eat pollen, fungi, small insects, or mites. Additionally, some species such as the banded-wing (Figure 6), sixspotted (Figure 7), and black hunter thrips (Figure 8) are highly predatory and should be considered beneficial and desirable in the landscape.

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J. K. Clark, UC

Figure 1. Black adult and yellow larvae of greenhouse thrips.

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Figure 2. Western flower thrips adult.

L. L. Strand, UC

Figure 3. Myoporum thrips adult.

WHAT'S INSIDE ...

Deer Mouse Infestation? Be Aware of Hantavirus

Deer mice aren't normally found within urban and residential areas unless fields, forests, or other suitable habitats surround those areas. However, deer mice may enter vacated 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 mice (Figure 1) are similar to the common house mouse (Figure 2) but can be distinguished by their bicolored tail, larger eyes, and white undersides.

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 36%. 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. There is no evidence that North American hantaviruses spread from one person to another.

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 important to properly disinfect the potentially contaminated areas. Thoroughly wet contaminated areas including trapped deer mice, droppings, and nests with an appropriate disinfectant solution such as Lysol or a 10% hypochlorite (bleach) solution. To make this bleach solution, mix 1 1/2 cups of household bleach in 1 gallon of water (or one part bleach to nine parts water). Note that a bleach solution may damage rugs and fabrics and irritate skin. Wear nonfabric gloves whenever touching or cleaning contaminated surfaces or when handling mouse nests, dead mice, or mouse traps.

Once everything has soaked for 10 minutes, remove all nest material, mice, and droppings with a damp towel and then mop or sponge the area with the disinfectant solution. Upholstered furniture and carpets can be shampooed and steam cleaned. If you wish to reuse the gloves used while cleaning contaminated areas, you must properly disinfect them before removal. 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.

For additional up-to-date information on rodent cleanup, visit the Centers for Disease Control and Prevention Web site, http://www.cdc.gov/rodents/cleaning/index.html.

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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.

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

Managing Deer Mice in Residential Settings

Although rodenticides are available for controlling house mice and rats, there are no toxic baits registered for controlling deer mice in residential settings. It is a violation of the product label to use rodent baits labeled for use "*only* against house mice, Norway rats, and roof rats" in an attempt to control deer mice. Instead, residential deer mouse control should be accomplished by using traps, excluding mice from structures, and modifying the habitat to remove sources of food and shelter. See the *Pest Notes: Deer Mouse* at http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74161.html for more information about managing these pests.

—Excerpted with modifications from the Pest Note by Niamh Quinn, Evolution, Ecology, and Behavior, University of Liverpool, Liverpool, U.K., niamh.quinn@liverpool.ac.uk; Roger Baldwin, UC Statewide IPM Program, Kearney Agricultural Center, Parlier, rabaldwin@ucanr.edu; and Bob Timm, UC Research and Extension Center, Hopland, rmtimm@ucanr.edu