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FS399

Fact sheet

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Vole Ecology and Management

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Description:

The two most common types of voles found in New Jersey are the meadow vole (*Microtus pennsylvanicus*) and the pine vole (*Microtus pinetorum*). Meadow voles, also called meadow or field mice, are about 5 ½ to 7 ½ inches long (including tail length). They have variable colored fur—ranging from gray to yellow-brown—with black-tipped hairs, and a bi-colored tail. Pine voles, also called woodland voles, are about 4 to 6 inches long (including tail length), and have short, soft reddish-brown fur. Their relatively short tail is about the same length as the hind foot.

Pine Vole

Photo Copyright: Rob & Ann Simpson

Meadow Vole

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Habitat:

Meadow voles are usually found in grassy areas, but can be seen in marsh areas as well. Pine voles are most often found in hardwood areas with thick leaf or ground cover.

Food:

A meadow vole can eat nearly its own weight daily. Their diet consists primarily of grasses, clover, and plantain. Pine voles store food in underground burrows, and eat a wider variety of plant material than do meadow voles. Dietary mainstays include forbs, grasses, roots, and tubers. Additional diet items include seeds, fruit, bark, insects, and underground fungi.

Life History:

Voles do not hibernate, although they may slow their activity level when temperatures drop below freezing. The meadow vole is typically more active during the night than during daylight hours, while the pine vole can be active any time during the day or night. A vole's life span is short, ranging from 2 to 16 months, with females maturing in 35 to 40 days. Breeding occurs primarily in spring and summer, and they may produce from 1 to 5 litters per year, with each litter averaging 3 to 6 young.

Voles routinely build tunnels and surface runways with many burrow entrances. Meadow voles build

We would like to acknowledge with gratitude, Rob and Ann Simpson, for granting us permission to include their photos.

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a network of surface runways linked to underground burrows, whereas pine voles spend most of their time in a tunnel and burrow system 1–4 inches below ground. Several adults and young may be found in a burrow network.

Identifying Vole Damage:

The most recognizable sign that meadow voles are present is the presence of surface runways. Surface runways are 1–2 inches wide and often-used runways may have grass and other nearby vegetation clipped close to the ground. Feces and small pieces of clipped vegetation can be found in surface runways. Although not as easily seen as the surface runways of meadow voles, shallow tunnels constructed just under the ground's surface by pine voles may be detectable.

Tunnel and burrow construction can cause damage to roots of plants and interfere with crop irrigation by displacing water and causing levees to wash out. Additional damage caused by voles includes girdling and gnawing damage to orchards, ornamentals, and tree plantings, and eating plant material ranging from field crops (i.e. grain, potatoes) to seeds, bulbs, and rhizomes. Girdling and gnawing damage can occur to seedlings and mature trees, and is often distinguished by non-uniform gnaw marks at various angles and in irregular patches. Gnaw marks are about 1/8 inch wide, 3/8 inch long, and 1/16 inch or more deep.

Controlling Vole Damage:

• Exclusion

Wire or metal barriers, at least 12 inches high and with a mesh size of ¼ inch or less, can exclude voles from an area. Barriers can also be used to protect seedlings and young trees by encircling the seedling or tree. Barriers should not be placed directly on the seedling or tree, but rather 1–2 inches from the trunk. The bottom edge of any barrier should be buried 6 inches below ground to prevent voles from digging under the barrier.

• Habitat Modification

The elimination of weeds, ground cover, and crop litter in and around the garden and lawn reduces the availability of food and cover for voles. Mulch should also be cleared at least 3 feet from the base of trees to eliminate cover for voles. Lawn and turf should be mowed regularly. A weed-free or vegetation-free strip is an excellent buffer around areas to be protected. The wider the buffer strip, the less likely voles (primarily meadow voles) will cross it. Frequent tillage in the garden removes cover, destroys existing runways, tunnels, and burrows, and may eliminate a majority of the vole population.

• Toxicants

One of the most commonly used single-dose toxicants for vole control is zinc phosphide. Zinc phosphide is a Registered Use Pesticide available as a concentrate, or in pelleted or grain bait applications. As a Registered Use Pesticide, application must be done by a certified pesticide applicator. Zinc phosphide is marketed in New Jersey under many different trade names and is available at farm supply stores.

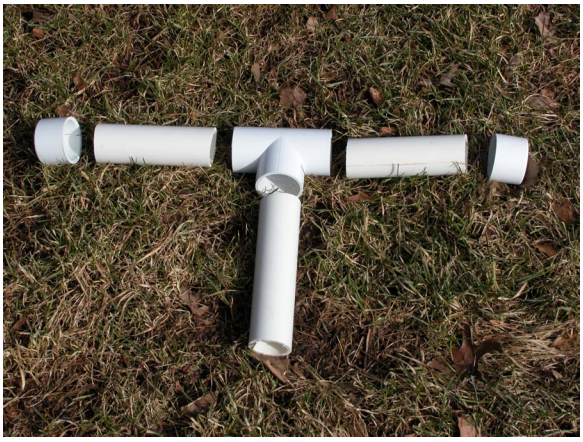
Anticoagulants may also be effective in controlling vole damage. However, anticoagulant baits are slow acting and may take up to 15 days to be successful. Furthermore, most anticoagulants require more than one feeding for maximum effectiveness. Anticoagulants may be purchased at farm supply, hardware, and garden stores.

To ensure the legality of a particular toxicant in New Jersey, information can be obtained by calling the New Jersey Department of Environmental Protection's Pesticide Control Program at (609) 530-4070. As with all toxicants, follow the manufacturer's suggested guidelines.

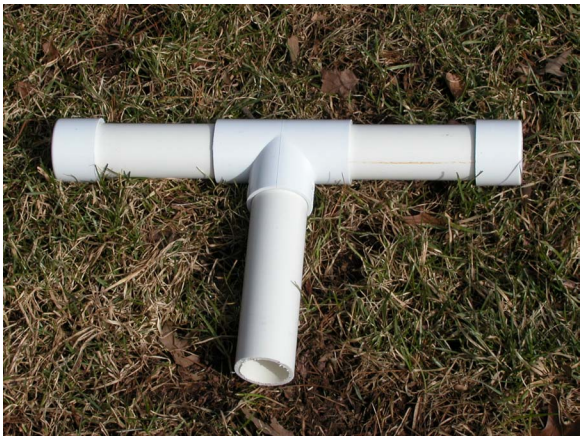
To avoid injury to non-target species, broadcasting bait is not permitted for vole control in New Jersey. New Jersey pesticide law requires the use of tamper-resistant bait stations. Bait stations can be con-

Photos of "T" bait stations and snap-back trap are courtesy of Joseph B. Paulin.

structed from shingles or PVC pipe, among other materials. Shingles should be bent to form an A-shaped roof, and one shingle should be placed over each burrow opening with bait placed in the burrow and under the shingle. Alternatively, a T-shaped bait station can be constructed from 1½ inch diameter PVC pipe. The pipe forming the bottom of the "T" should be left open so voles can enter and exit, and the ends of the "T" should be capped. The caps should be removable so bait can be placed in each end of the "T".



Example of an unassembled "T" bait station.



Example of an assembled "T" bait station.

Hand placement of baits directly in runways and burrow openings is more effective for pine vole control since their activities are largely confined to their subterranean burrows. Since pine voles cache food and meadow voles do not, pine voles can be more susceptible to bait that require repeated intake, such as anticoagulants. The two voles' food preferences also affect their control. Meadow voles will feed on dry baits such as corn and oats, whereas pine voles prefer fleshy baits such as apples.

• Trapping

Trapping large populations of voles is generally labor intensive and not cost-effective. However, mouse traps (snap-back traps) can be effective in controlling a small, local vole population. To catch a vole, place the trap perpendicular to the surface runway with the trigger end in the runway. Apple slices or a peanut butter-oatmeal mixture make good baits, and voles are easiest to trap during fall and late winter.

Example of a snap-back trap.

• Additional Control Methods

Although many predators supplement their diet by feeding on voles, voles have a high reproductive potential, and thus, predators do not typically control vole populations. Fumigants are not effective due to the complexity and shallowness of the tunnel systems. Repellents and frightening agents have not been demonstrated as an effective control method.

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Desktop publishing by Rutgers-Cook College Resource Center

Revised: March 2004

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