

Wildlife Damage Management Fact Sheet Series

Voles

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Voles are small microtine rodents with compact, stocky bodies and short legs and tails. Their eyes are small, and their rounded ears are partially hidden. Two species of voles reside in New York State, the meadow vole (*Microtus pennsylvanicus*) and the pine vole (*Microtus pinetorum*) (Fig. 1). The meadow vole, which is more abundant in New York, has dark brown fur with a grayish belly and when full grown can be about 5 to 7.5 inches long. The tail of a meadow vole is more than twice the length of its hind foot.

The pine vole is common in the Hudson River Valley. Range maps indicate that it can be found throughout the state except for parts of the far north, but its actual distribution is uncertain. The pine vole is a stocky little rodent with a blunt nose, short legs, and short tail. It reaches about 3.5 to 5 inches in length when full grown and has auburn-colored fur. The tail of a pine vole is shorter than its hind foot.

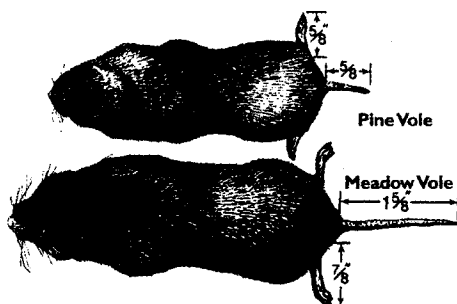


Fig. 1. Diagnostic characteristics for distinguishing pine and meadow voles.



General Biology

Voles are short-lived, prolific animals. Although individuals seldom live more than a year, their populations have the potential to increase rapidly. Voles can reproduce at any time of year, though it is most likely during spring, summer, and fall. Female meadow voles reach sexual maturity as early as three weeks of age and give birth to four to seven young after a gestation period of about 21 days. Pine voles have a lower reproductive rate, reaching sexual maturity at about four weeks of age and giving birth to two to three young after a gestation period of about 24 days.

Habitat and Food Habits

Meadow voles can be found in a variety of habitats, from low, moist swamps and fields to high grasslands, orchards, and forests. Pine voles favor open woodlands and orchards.

Meadow voles are most active above the ground and use surface trails through leaf mulch and grasses, which keeps them safe from predators as they travel. Meadow voles may live underground where the soil has been cultivated or where a burrow system is already present. Pine voles, however, are much more fossorial, spending much of their time in underground burrows that comprise extensive subsurface trail systems about 1 to 2 feet deep. The burrows open to the surface and often connect to aboveground runways.

Voles are predominantly herbivorous. Meadow voles feed primarily on grasses, sedges, seeds, grain, bark, and some insects. Pine voles prefer bulbs, roots, tubers, seeds, and bark. Voles have a very high metabolism and spend much time seeking food. They are active during the day throughout the year; during the winter they move about under the protection of snow cover.

Description of Damage

Meadow voles may cause extensive damage to orchards, ornamentals, and tree plantings by girdling seedlings and mature trees. Girdling usually occurs in fall and winter and may not be discovered until the snow melts in the spring. Voles may eat garden crops such as potatoes and sugar beets as well as ornamental herbaceous plants. Pine voles may cause widespread below-ground damage to root systems that may go undetected until the plant is excavated and replaced. Voles may also damage plantings when they build extensive runway and tunnel systems, uprooting the plants or allowing air to get in around the roots. Lawns and golf courses may be damaged aesthetically when depressions form in the ground surrounding well-established runways and burrows.

Both species of vole will girdle the trunk and roots of fruit trees, which may cause tree death, reduce yields, and prolong the time required for new plantings to produce fruit. Meadow voles usually girdle the trunks of trees at or above ground level (Fig. 2). Pine voles commonly damage underground roots and are more difficult to detect and control.

Other animals such as rabbits may also girdle trees. Vole girdling differs from that of other animals in that gnaw marks occur in irregular patches. Marks are about 1/8 inch wide, 3/8 inch long, and 1/16 inch or more deep. Typically, meadow voles girdle trees and saplings at the ground line. Rabbit gnaw marks are larger and not distinct. Rabbits girdle trees from several inches above ground to 20 inches above snow depth.

If the gnaw marks alone are not sufficient to identify the species causing damage, meadow voles will create an extensive surface runway system with numerous burrow openings. Runways are 1 to 2 inches wide and may contain feces and small pieces of vegetation 1/4 to 1/2 inch long. The vegetation near well-traveled runways may be clipped close to the ground. Small entrances to ground burrows are evidence of pine voles.

If you suspect voles are responsible but you are still not certain, a simple monitoring program can provide confirmation (Fig. 3). Set out shingles (bent in the middle, forming a low tent) or shoe boxes with openings at both ends, form-

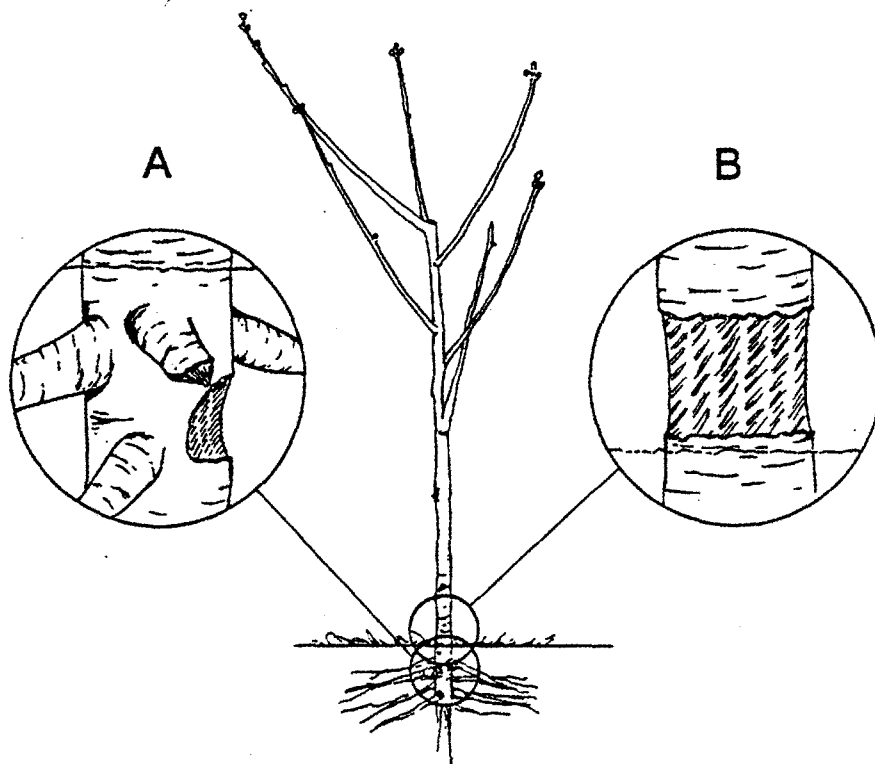


Fig. 2. A. Damage below the ground indicates pine vole activity; B. Damage above the ground indicates meadow vole activity.

ing a dark tunnel. Place a slice of apple under each station. When you check the stations, if the apple has been taken or partly consumed, then voles are likely present in the area. Capturing voles with snap-back mouse traps or box traps will confirm the species identification.

Laws and Regulations

Voles are classified as unprotected animals in New York State.



Fig. 3. A shingle with apple slices placed beneath it can serve as a useful bait or trapping station.

Preventing Damage

Population Control

Snap-back mouse traps or multiple-capture box traps (e.g., wind-up traps by Microgen) baited with apple cubes are very effective means of population control if placed under a shingle or other overhead cover. Place trapping stations in active vole runways. The best time to conduct a trapping program is in the fall when population levels tend to be highest and before snowfall.

Toxicants and Repellents

Two chemical toxicants—zinc phosphide and chlorophacinone—are legally registered for control of meadow and pine voles. Several products containing these ingredients are commercially available. These chemicals are restricted-use pesticides, however, and may be purchased and used only by certified pesticide applicators. In addition, not all products are labeled for use on lawns and golf courses, so it is important to check the pesticide label before use. As with trapping, it is best to use chemical toxicants in the fall before the first snowfall to

effectively reduce vole populations. These chemicals should be placed in bait stations to prevent consumption by nontarget animals and pets. A T-shaped arrangement of 1 1/2 inch PVC pipe covered by a soda can on the top will provide a simple and effective bait station that has been particularly effective with pine voles. Commercial bait stations designed for mice can also work.

Exclusion

Hardware cloth cylinders can be placed at the base of young trees to protect them from voles (Fig. 4). The mesh should be 1/4 inch or less in size, and the wire should be buried 3 inches below ground to prevent meadow voles from burrowing under the cylinder. The cylinder should be higher than the typical snow line because damage is greatest in the winter, and voles can travel under the snow and climb over the top of the guards. Plastic wraps commonly sold in garden supply catalogs are not as effective as hardware cloth because they may break down quickly from wind and ultraviolet light. In addition, hardware cloth allows air to circulate around the tree trunk and may

reduce incidence of disease. Some nylon-mesh guards have also proven effective in reducing meadow vole damage.

Cultural Practices

Decreasing the height and density of ground cover can greatly reduce the suitability of an area for voles. Meadow voles require more than 40 percent ground cover, so keeping grass mowed close to the ground or creating an herbicide swath beneath fruit or ornamental trees can provide outstanding control. These management practices will reduce but not eliminate pine voles. Removing fallen apples or prunings from beneath trees can also reduce the attractiveness of the area to both meadow and pine voles.

Mulching has been shown to increase vole numbers and damage in orchards because straw or wood shavings provide adequate cover for tunneling and nesting. Synthetic mulches such as black plastic or nylon also may provide suitable habitat. Increasing the amount of bare ground in problem areas or using coarse stone or chunks of pine bark will help reduce damage because these materials cannot support tunnel systems.

References

- Bromley, P. T., W. T. Sullivan, and M. L. Parker. 1994. *Voies in Horticultural Plantings*. Raleigh: North Carolina Cooperative Extension.
- O'Brien, J. M. 1994. "Voies." In *Prevention and Control of Wildlife Damage*. S. Hygnstrom, R. Timm, and G. Larson, eds. Lincoln: University of Nebraska Cooperative Extension.
- Tobin, M. E., and M. E. Richmond. 1993. *Vole Management in Fruit Orchards*. U.S. Fish and Wildlife Service Biological Report 5. Washington, D.C.: U.S. Department of the Interior.

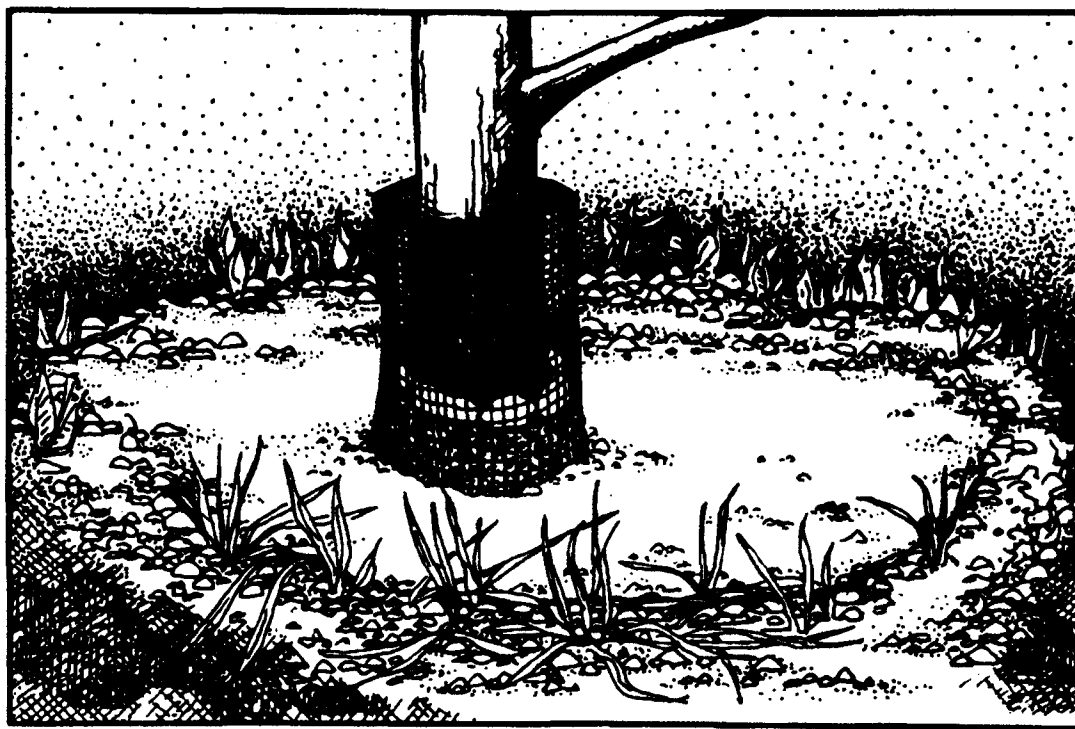


Fig. 4. Tree guard installed to protect from vole or rabbit damage.

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