Tree Fruit Fact Sheet
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TREE FRUIT CROPS

CORNELL COOPERATIVE EXTENSION

Meadow Vole and Pine Vole

Microtus pennsylvanicus (Ord)
Microtus pinetorum (LeConte)


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Meadow voles occur throughout most of the northern and eastern United States and Canada in low wetlands, open grasslands, and orchards. Meadow voles are most active above the ground, as evidenced by surface trails—often littered with droppings and grass cuttings—in the ground vegetation where they live (fig. 1). They sometimes live underground where the soil has been cultivated or where a burrow system is already present.

Pine voles live throughout the eastern half of the United States and favor open woodlands and orchards. Pine voles spend much of their time in underground burrows and usually have an extensive subsurface trail system that is excavated about 3 to 5 cm (1 to 2 in.) deep. These burrows open to the surface and often connect to above-ground runways.

Identification

The pine vole is a stocky little rodent with a blunt nose, short legs, and a tail that is shorter than the head-and-body length. Adult meadow voles are larger than pine voles, have longer tails, and have dark brown fur (fig. 2). A number of other physical, social, and ecological differences distinguish these two species (see table).

Damage

Both species cause substantial damage to commercial fruit trees and are pests of the home gardener and horticulturist. By girdling the trunk and roots, these rodents kill trees, reduce harvest yields, and prolong the time required for new plantings to come into production. Meadow voles usually girdle the trunks of trees at or above ground level (fig. 3). Pine voles commonly damage underground roots, making them look as though they were sharpened with a pencil sharpener (fig. 4). Pine voles can also girdle the crowns of trees at ground level, especially under cover of snow.

Management

Voles are prolific breeders, and their populations have the potential to irrupt every three to five years unless their numbers are controlled or the carrying capacity of the habitat is reduced. Mowing the groundcover reduces the availability of foods preferred by voles, removes cover that protects them from predation, and exposes the animals to the seasonal elements. Maintaining a bare strip underneath the canopy discourages voles from living near the base of trees. Wrapping 1/4-inch-mesh galvanized hardware cloth around the base of young trees (fig. 5) prevents meadow voles from girdling trees, although it does not prevent pine voles from girdling the roots and trunk below the mesh.

Distinguishing Characteristics of Meadow Voles and Pine Voles

Characteristic	Meadow Voles	Pine Voles
length (head and body)	90 to 125 mm (3.5 to 5 in.)	70 to 105 mm (2.8 to 4.2 in.)
tail	35 to 65 mm (1.4 to 2.6 in.) at least twice the length of the hind foot	15 to 25 mm (0.6 to 1 in.) less than or equal to the length of the hind foot
adult fur	course, dark brown mixed with black	soft, auburn, lacking guard hairs
eyes	large	small
ears	large	inconspicuous
nest	usually above ground, but occasionally in shallow burrows	in burrows, usually less than 30 cm (1 ft) deep
sociality	females maintain exclusive territories during breeding seasons: males are mobile	family units maintain year-round exclusive territories
food	grasses, sedges, seeds, grain, bark, some insects	bulbs, tubers, seeds, bark
damage	girdle tree trunks at or near ground surface; may girdle higher under cover of snow; sometimes damage roots	girdle crown and roots

Early detection and control of populations before they reach high levels is important. The economic threshold for voles is very low; any sighting indicates the need for control measures. Allowing populations to multiply increases the probability of damage to trees, makes future control more difficult, and can necessitate that greater amounts of poisonous bait be introduced into the environment.

Application of toxic bait is the quickest and most effective method for removing troublesome populations. Broadcasting baits across the orchard floor by hand, spreader, or airplane is the most common method of application. However, placing baits directly in runways and burrow openings may be a more effective way to control pine voles, especially when they confine their activity to below a heavy thatch layer or below thick vegetation on the ground.

In apple orchards, baits frequently are applied during the fall after the harvest. However, in some orchards, winter and/or early spring applications may also be necessary to control residual populations or reinvading animals. When conditions allow, winter applications may be particularly effective because 1) most girdling occurs at this time; 2) vole trails are readily apparent in melting snow (fig. 5); and 3) bait acceptance is likely to be greatest because preferred foods will be scarce.

Adherence to safeguards will foster efficacious use of toxic baits for the control of voles in orchards. Mowing the groundcover and raking away the vegetation, leaf litter, and other debris under the dripline helps to insure that the bait reaches the ground where voles can find it. Applying baits only when several days of dry weather are expected allows voles sufficient time to find and eat a lethal dose of bait before it decomposes. Alternating from one type of toxic bait to another forestalls or prevents the development of physiological resistance and bait shyness.

Authored by M. E. Tobin and M. E. Richmond. Photographs by M. E. Tobin and J. Ogrodnick (fig. 2). Published through the New York State Integrated Pest Management Program, New York State College of Agriculture and Life Sciences, Cornell University. Funded in part by the New York Cooperative Fish and Wildlife Research Unit. Cornell Cooperative Extension provides equal program and employment opportunities.