WILDLIFE

Managing voles in Colorado no. 6.507

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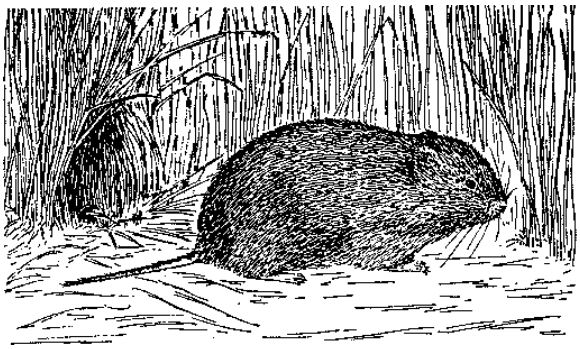
Quick Facts...

Eight species of voles are found in Colorado. They often are called meadow, field or pine mice.

Voles are small mammals that cause damage by girdling seedling and mature trees in orchards, shelterbelts and forests. They also damage field crops and frequently construct runways in lawns.

Damage by voles can be reduced by habitat modification, exclusion, repellents, trapping, and poison grain baits.

Introduction



Voles are small rodents that measure 4 to 8.5 inches long and weigh 0.8 to 3 ounces and vary in color from brown to gray. They are pudgy, with blunt faces and small eyes, small and sometimes inconspicuous ears, short legs, and a short (the long-tailed vole is an exception) and scantily haired tail.

Eight species of voles are distributed widely throughout various ecosystems of Colorado. They often are found in heavy ground cover of grasses, grass-like plants, and litter. **Southern red-backed voles** (*Clethrionomys gapperi*) are found in moist and well-developed coniferous forests. They are most abundant in lodgepole pine (*Pinus contorta*) stands, usually between 8,000 and 11,000 feet.

Meadow voles (*Microtus pennsylvanicus*) primarily occur along the Front Range and southcentral Colorado. They tend to live in or near damp marshy areas or wet meadows. **Montane voles** (*Microtus montanus*) primarily are found in the western half of Colorado in moist meadows and valleys and in grassy areas from 6,000 feet to above timberline. **Long-tailed voles** (*Microtus longicaudus*) occur just below 5,000 feet elevation to above timberline in the western half of Colorado. They are most abundant in streamside meadows. **Mexican voles** (*Microtus mexicanus*) are associated with grassy areas of Ponderosa pine (*Pinus ponderosa*) forests of southwest Colorado in Mesa Verde National Park. **Prairie voles** (*Microtus ochrogaster*) are found along streams and irrigated lands in northeastern Colorado. **Sagebrush voles** (*Lemmiscus curtatus*) occupy the driest of all vole habitats in Colorado. They occur between 5,000 and 9,000 feet in the northwest. **Heather voles** (*Phenacomys intermedius*) are found from 7,000 to 12,000 feet in the forested mountains of central Colorado. They occupy a variety of habitats but are most abundant along streams.

Voles eat a variety of grasses, forbs and agricultural crops. They also eat bark on trees and shrubs, especially during fall and winter.

Biology, Reproduction and Behavior

Voles are active day and night throughout the year and do not hibernate. They usually live between 2 and 16 months. Their home ranges usually are less than 1/4 acre and vary with season, food supply and population density. Voles

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construct many surface runways and underground tunnels with numerous burrow entrances. A single burrow may contain several adults and young.

Population densities of voles vary from species to species. Large population fluctuations that range from 14 to 500 voles per acre are common. Their numbers generally peak every three to five years. Population is influenced by dispersal, food quality, climate, predation, physiological stress, and genetics.

Voles have three to six young per litter and three to 12 litters per year. Their gestation period ranges from 20 to 23 days and they breed almost year around, although most reproduction occurs in spring, summer and fall. Females may become pregnant at 3 weeks of age.

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Damage and Control

Voles can cause extensive damage to forests, orchards and ornamental plants by girdling trees and shrubs. They prefer the bark of young trees but will attack any tree, regardless of age, when food is scarce. Monitor orchards frequently so control measures can be implemented before appreciable damage occurs. Most damage occurs in the winter when voles move through their grass runways under the protection of snow. The greatest damage seems to coincide with years of heavy snowfall.

Damage to crops, such as alfalfa, clover, potatoes, carrots, beets and turnips is common and most evident when voles are at high population levels. Runways and tunnel systems constructed in agricultural fields can divert irrigation water. Voles often damage lawns and golf courses by constructing runways and burrow systems.

Vole damage to trees and shrubs is characterized by girdling and patches of irregular patterns of gnaw marks about 1/16 to 1/8-inch wide. Gnawed stems may have a pointed tip. Do not confuse vole damage with damage by rabbits, which includes stems clipped at a smooth 45-degree angle and wider gnaw marks. Stems browsed by deer usually have a rough jagged edge. Voles also girdle the roots of trees and shrubs.

Other signs of damage by voles include: 1) 1- to 2-inch wide runways through matted grass and burrows; 2) visual sightings; 3) hawks circling overhead and diving into fields; and 4) spongy soil from burrowing activity. Trees that appear to suffer from disease or insect infestation may be suffering from unseen vole damage.

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Habitat Management. Elimination of ground cover of weeds and tall grasses by frequent and close mowing, tilling, or herbicide application is the most successful and longest lasting method to reduce vole damage to orchards. This will diminish the amount of available habitat and reduce their numbers. Prunings left in orchards prevent proper mowing and provide a temporary food source, which may lead to damage by voles. Planting short grasses that do not mat or lodge, such as buffalo grass, blue grama, or dwarf fescues, will provide little protective cover and may reduce vole numbers.

Meadow voles are active during the day within their runways under thick grass and vegetation. Summer removal of vegetation (2 feet of trunks of fruit trees) provides some protection because voles avoid exposed areas.

Damage to lawns can be reduced by close mowing in the fall before snow arrives and by mowing and removing tall grassy cover near lawns. To repair damage to lawns from runway construction, rake, fertilize and water the effected area. Close mowing and weed control in grassy borders adjacent to agricultural crops will reduce the habitat for voles and should reduce damage. If suitable, plant

crown vetch (a legume unpalatable to voles) in orchard and field boundaries to reduce vole populations.

Important predators of voles are: short-tailed shrews, badgers, coyotes, foxes, bobcats, barn owls, great horned owls, long-eared owls, short-eared owls, barred owls, screech owls, and some snakes. Predators will not likely keep an orchard vole-free, but they can help reduce the vole population. Orchardists should tolerate predators and protect them if they do not constitute a pest problem.

Exclusion. To protect against vole damage, encircle young trees and shrubs with 1/4-inch mesh hardware cloth or 3-inch diameter Vexar plastic-mess cylinders. This barrier should project 18 inches above the ground and 3 to 6 inches below the surface.

Repellents. Only a few repellents (including thiram and Hot Sauce {capsaicin}) are manufactured to protect trees, shrubs and vegetable crops from voles. Little data are available on the effectiveness of repellents to deter vole damage. However, in one study, thiram was reported to reduce damage to apple stems by 78 percent. A 20 percent solution of chicken eggs in water has been effective in reducing deer and elk browsing and may reduce damage by voles.

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Thiram is manufactured by various companies and sold under various trade names. Products such as Nott Chew-Not Animal Repellent (Nott Manufacturing Co.), Bonide Rabbit-Deer Repellent (Bonide Chemical Co.), and Science Deer and Rabbit Repellent (Miller Chemical and Fertilizer Corp.) are labeled for protecting most of the following from voles: tree seedlings, shrubs, ornamental plantings, nursery stock, and fruit trees. Most labels limit the use of thiram on fruit trees to the dormant season. Scram 42-S (Wilbur-Ellis Co.) and Gustafson 42-S (Gustafson, Inc.) are labeled for protecting pine seeds from voles.

Capsaicin (Hot Sauce Animal Repellent, Miller Chemical and Fertilizer Corp.) is labeled for use on ornamental trees and shrubs, fruit and nut trees, fruit bushes and vines, and nursery stock to protect them from vole damage. Limit application to fruit-bearing plants before fruit sets or after the fruit is harvested. Hot Sauce also is registered for use on beans, corn, cucumbers, melons, peas, brussels sprouts, squash, peppers, tomatoes, cabbage, and cauliflower before edible portions and/or heads begin to form.

Predator odors, such as the urine from red foxes and coyotes, also may be effective vole repellents. These odors are not commercially manufactured, but fox and coyote urines can be purchased from some trapper supply houses.

Trapping. Use mouse snap traps to remove small populations of voles from backyard lawns. Place traps perpendicular to runways with the trigger end in the runway and bait with small amounts of rolled oats or peanut butter. Set traps in the fall before most damage occurs. Trapping is not practical for controlling voles on large areas.

Poison Grain Baits. Rodenticides usually are a short-term solution to damage by voles. Habitat management usually is more successful than rodenticides for eliminating damage in orchards.

Two percent zinc phosphide is the only **legal grain bait** for controlling voles in Colorado. Zinc phosphide baits are available in pellet form (Bell Laboratories' ZP Rodent Bait AG, Chempar's Ridall Zinc) on oats (Bell Laboratories' ZP Rodent Bait AG, USDA/APHIS/ADC Zinc Phosphide on steam-rolled oats) and on corn (Hopkin's Zinc Phosphide Bait). One study indicated that pelleted zinc phosphide baits provide greater control of voles than zinc phosphide placed on oats or corn. Most of these baits are labeled for use in orchards and groves, nurseries, ornamental and non-bearing fruit trees, grapevine yards, and non-crop areas such as lawns, ornamentals, golf courses, and parks. The labeled method of application varies somewhat among manufacturers.

However, most of these products are labeled for hand baiting, broadcast baiting, and/or trailbuilder baiting in orchards and groves, nurseries, and ornamental and non-bearing fruit trees. In grapevine yards, these products are labeled for broadcast baiting. The Chempar product also is labeled for hand baiting. In non-crop areas, these products are labeled for hand baiting in conjunction with a prebait.

To prebait, scatter 4 or 6 pounds (see label instructions) of untreated oat groats, rolled oats or barley (see label instructions) per acre two to four days before placing a toxic bait. Prebaiting encourages consistent acceptance of bait.

When hand baiting around trees**,** place 1 teaspoon (4 grams) of bait at two to four locations around each tree in surface trails or at the mouth of holes leading to underground burrow systems. In non-crop areas, hand baiting generally consists of placing 1 teaspoon of bait around each active burrow or runway. The most successful control is achieved when the bait penetrates the grass cover to reach the runways. To broadcast bait, spread 4 to 10 pounds of bait per acre with a cyclone seeder or by hand. Bait also can be spread with a trailbuilder. A trailbuilder usually is pulled by a tractor, creates a burrow in the ground and deposits 1 teaspoon of bait at 4 to 5 feet intervals. Two to 3 pounds of bait per acre usually is recommended.

Zinc phosphide baits are limited for use only on voles of the genus Microtus. Some of the zinc phosphide products and/or usages are limited to meadow voles.

To minimize hazards to birds, do not apply zinc phosphide bait to bare ground, areas without vegetation, or in piles. Also, do not apply to crops destined for use as food or feed. Zinc phosphide can be applied to orchards and groves only during the dormant season after harvest.

The best time of year to use zinc phosphide baits on lawns is during fall before snow cover. Application of bait during spring, after snow melt, usually is ineffective.

Unpredictable rain and snowfall will severely limit the lifespan of baits exposed on orchard floors. During wet periods, place baits in jars, metal cans, bait stations, polyvinyl-chloride tubes, or under tar paper, shingles, and split automobile tires. Unfortunately, baits placed under these objects and directly on the ground absorb moisture and generally do not persist more than two weeks.

Because zinc phosphide is toxic to animals, store it away from humans and pets. Zinc phosphide can be absorbed in small amounts through human skin. Wear rubber gloves to avoid contact with the chemical and take extra care to avoid breathing zinc phosphide dust.

Zinc phosphide baits are classified as restricted use pesticides, which means landowners must obtain private certification from the Environmental Protection Agency before they can purchase or use these products. Certification materials, as well as sources of supplies, are available from the local county Colorado State University Cooperative Extension office.

Fumigants usually do not work for control of voles because their burrows are too shallow and complex.

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