

Vole Control in Lawns and Landscapes

Voles (*Microtus* spp.) are small mammals that occur throughout Kansas. Sometimes referred to as “meadow mice,” voles are compact rodents with short tails (about an inch long), stocky bodies, big heads, and short legs. Their eyes are small and ears partially hidden. They are usually brown or gray, but coloration varies widely.

Three species of voles occur in the state: woodland vole (*Microtus pinetorum*), meadow vole (*Microtus pennsylvanicus*), and prairie vole (*Microtus ochrogaster*) (Figure 1). Voles are small, weighing 1 to 2 ounces as adults. Overall body length varies from 3 to 5½ inches for the woodland vole, to about 4½ to 7 inches for meadow and prairie voles.



Figure 1. Prairie vole

Voles play an important role in the food chain. They provide a major part of the diet for many predators, including coyotes, hawks, owls, foxes, and snakes. The mortality rate for voles is high. Life expectancy in the wild often does not exceed two months, and few live longer than 16 months.

Voles are prolific animals. The breeding season for all voles encompasses most of the year, although peaks occur in the spring and fall. Meadow and prairie voles normally have five to 10 litters per year (almost a litter per month) with an average litter size of three to five young. Woodland voles are not as prolific, averaging one to six litters a year and a litter size of two to four young.

Meadow and prairie voles construct surface runways that can be recognized by closely clipped vegetation that provides travel lanes under ground cover (Figure 2). The

runways are usually hidden beneath a protective layer of grass or other dense ground cover. Small holes lead to underground runways and nesting areas. Gnaw marks about ¼ inch wide and ¾ inch long are found on trees or woody vegetation.

These three vole species differ in color and size. Usually it is not necessary to distinguish between the species to control the damage.

Population Dynamics

Large population fluctuations are characteristic of voles. Population peaks occur about every three to four years. These are not regular cycles and do not usually involve spectacular population explosions. Occasionally, populations swell for about a year before declining. Several factors contribute to the potential for dramatic population growth.

- Voles do not hibernate but remain active throughout the year.
- Females become reproductively active at a young age (35 to 40 days).
- Voles can give birth to a litter of three to six young every 21 days after the young of the first litter are weaned.
- If the habitat provides protection from predators and high-protein food sources exist, populations can reach devastating levels in a short time. Vegetation higher than 6 inches, snow cover, brush piles, leaves, and low-hanging limbs all provide excellent habitat protection.
- If there is good cover and high-quality food available during the population growth period, predators cannot keep up and economic damage can occur.



Figure 2. Surface runway system of the prairie vole

Food Habits

Voles eat a variety of plants, such as grasses, legumes, and crops (corn, soybeans, alfalfa, apples, wheat, potatoes, and other vegetables). In horticultural plantings such as flower and shrub plantings, orchards, and lawn and gardens, voles can cause damage by eating flower bulbs, clipping grass stems, girdling stems of woody plants, and gnawing roots. In late summer and fall, voles often store seeds, tubers, bulbs, and rhizomes. In the winter they may gnaw on stems and bark, causing significant damage to ornamental and orchard plantings (Figure 3). Plants not directly killed may be more susceptible to diseases or die from drought stress.



Figure 3. Voles may damage woody plants at or below ground level.

Vole Colonies

Voles tend to live in colonies. A vole colony may have several den openings connected by a network of underground runways. The runs of the meadow and prairie vole are on the soil surface and lead to underground dens, while the runways of the woodland vole are usually underground. Vole colonies consist of a pair of animals but more than likely will include several generations. A colony can have runways covering an area as large as a quarter acre. Voles are sometimes found in large numbers under landscape fabric and mulch piles near ornamentals or woody vegetation.

Damage Identification

Signs of prairie and meadow voles are found mostly above ground, such as trails in the grass and grass clippings and feces at the base of large clumps of grass. Feces may be brown or green, shaped like wheat grains, and are frequently left in small piles. Surface runways at ground level usually lead to entrance holes, which are about 1½ inch in diameter. Girdling of the tree at ground level will reveal paired grooves left by chisel-like teeth. Girdling completely around the tree trunk will kill the tree, so any

indication of aboveground damage is cause for instituting a control program.

Rabbits also chew on trees, but the girdling begins several inches above the soil surface. Rabbits have much larger incisor teeth than voles, which will be reflected in the size of the grooves of the girdled tree. Rabbit damage can be controlled with a plastic tree guard, but these devices will not prevent damage from prairie or meadow voles.

Voles do not commonly invade homes and should not be confused with the house mouse (*Mus musculus*). House mice are smaller in size than voles, have large ears, and a 3- to 4-inch long tail.

Controlling Vole Damage

Before initiating a vole control program, be sure to consider the extent of the problem in relation to the cost of control. Damage prevention is much more beneficial than population control after the damage has occurred. An integrated pest management strategy that includes a combination of prevention and control methods should be implemented for controlling damage caused by voles.

Cultural Techniques

Cultural practices, such as mowing, using herbicides to control competing vegetation, and frequent tillage can reduce the dense ground cover that serves as vole habitat. Although mulching with sawdust or wood chips is an important cultural practice for many ornamental plantings, this practice also provides excellent habitat for voles. Good sanitation in the garden, orchard, or lawn also is essential. Remove unused garden crops and clear all fruit from the orchard floor. Piles of dead branches and brush should be burned, chipped or hauled away to eliminate rodent habitat. Anything that removes or reduces vegetative cover helps make the area unsuitable for voles. A 4-foot diameter vegetation-free area around the base of young trees or vines will reduce problems.

Exclusion

Young trees can sometimes be protected by placing cylinders made from hardware cloth mesh (¼ inch or less) around the stems. Hardware cloth should be buried at least 6 inches deep to keep voles from burrowing under the wire cylinder and leave about 12 inches above the ground to reduce potential damage. Voles can climb well and sometimes forage on top of the snow, and thus a fence may need to be taller than 12 inches. However, these exclusion techniques are not always practical, nor will they protect the plant in all situations.

Trapping

Trapping is effective for small numbers of voles and is often the most practical and economical method to use around the home and in the lawn and garden area. A snap-type mousetrap used with a small piece of apple or a

peanut butter-oatmeal ball works well for bait. To improve trap success, bend a shingle to form an arched roof over the trap so that the trap spring arm will clear the shingle. To trap pine voles in the deeper tunnel runs, some excavation will be needed to place the trap down on the run. Place the trap at a right angle to the run. Prairie and meadow voles can be caught by setting traps at right angles to their runways or back-to-back within the run. No excavation is needed because these species travel along surface runways. Do not skimp on the number of traps. Ten traps would be the minimum number to use in a yard or small garden. To reduce opportunities for disease transfer, wear plastic or rubber gloves when handling dead voles.

Chemicals

There are approximately 28 products registered to control voles in Kansas. These products include repellents, toxicants, and fumigants. It is not possible to summarize the use of each of these labeled pesticides in this publication. Some of these materials are registered for lawns and landscapes and others for crop fields or rangelands. Most of these products are labeled “restricted use pesticide” and require special training and a pesticide applicator permit to purchase and use. Make sure the product is labeled for the pest and the site of use. As always, follow label directions.

Repellents

Various “hot sauce” repellents are registered for vole damage control on ornamental plants. They are not registered for use on gardens or plants intended for human consumption. Repellents are relatively expensive to use and, at best, provide only short-term protection. Precipitation often washes off the repellent and re-application through the year often is necessary. When foods are in short supply, as in the winter, the effectiveness of repellents usually decreases.

Using rodenticides in home landscapes

The reduction of large vole populations is accomplished most effectively with toxic baits. A successful rodenticide program can be both effective and economical for home gardeners as well as commercial producers when vole damage is severe.

Home gardeners and managers of horticultural landscapes should consider using one of the labeled anticoagulant rodent baits to control voles. Anticoagulants require multiple feedings to kill the animal (up to five days). These rodenticides are usually safer around nontarget species, and bait shyness will not develop because the animal does not associate its weakened condition with the bait. The active ingredient in those anticoagulants includes chlorophacinone, warfarin, and diphacinone. Warfarin products are not restricted use pesticides.

Bait placement and use of bait stations

Place 1½ ounces (about 4 teaspoons) of bait in active holes, trails or runways, or in tamper-resistant bait stations or areas where voles have been observed or have been known to forage. Establish these covered bait stations at 10-foot intervals throughout the infested area. Placing these baits in protected areas will attract the rodents to the station, prevent ingestion of bait by nontarget animals, and minimize exposure to the weather.

Bait stations can be made from 2- to 3-inch PVC pipe constructed in an L-shape or upside-down T-shape. The horizontal pipe should be at least 24 inches long. Bait stations also can be made from rolled tar paper, mailing tubes, or similar durable materials. Bait stations also can be purchased commercially from numerous rodent control suppliers.



Figure 4. Homemade bait station constructed with 2-inch PVC pipe. Each leg is 12 inches long. Bait is filled from the top and then capped tightly.

Some 2% zinc phosphide products are also labeled for vole control. Zinc phosphide is an acute toxicant, usually recommended when a quick knockdown of vole numbers is needed. Zinc phosphide is extremely toxic and care must be taken to avoid risks to children, nontarget wildlife, and pets. Apply one teaspoon of zinc phosphide bait by hand around each active burrow or runway. Allow pellets to fall through grass to the ground surface but do not apply to bare ground. Do not place bait in piles. Zinc phosphide should be used when no rain or snow is forecast within 48 hours of the treatment. After the vole population has been reduced with this treatment, an application of the anticoagulant bait will control voles during the winter months. Fumigants are not recommended for vole control around home lawns or landscapes.

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