University of Idaho
Cooperative Extension System

Wildlife No. 11

UI Extension Forestry Information Series

Controlling Vole Damage

Randy Brooks

Voles are mouse-like rodents that occur throughout most of Idaho. Though they commonly are called meadow mice or field mice, they are distinguished from true mice by their short tails (about one inch long), stocky build, and small eyes. Voles can cause problems by damaging lawns, gardens, tree plantings and other plants.

The most common species of vole in north Idaho are the prairie vole (*Microtus ochrogaster)*, meadow voles (*Microtus pennsylvanicus)*, and pine voles or woodland voles (*Microtus pinetorum)* which live in wooded areas.Voles are small, weighing one to two ounces as adults, with a body length of three to five and one-half inches in the pine vole, to about four and one-half to seven inches in the meadow and prairie voles.

Voles are an important food source for many predators, including snakes, hawks, owls, coyotes, weasels, foxes, mink, and badgers. Mortality rates for voles are very high. Life expectancy in the wild often does not exceed two months, and few ever live longer than 16 months. Not surprisingly, voles are very prolific animals, although the pine vole is less so than meadow or prairie voles.

The breeding season for all voles encompasses most of the year although peaks occur in spring and fall. Prairie and meadow voles normally have five to 10 litters per year and average three to five young per litter. The gestation period is about 21 days. One meadow vole held in captivity had 17 litters during one year, totaling 83 young. One of the females from her first litter had 13 litters, totaling 78 young before the mother was one-year-old.

Many vole populations are cyclic. In North America, population peaks occur about every four years. These are not necessarily regular cycles, nor do they usually involve spectacular population explosions. Occasionally, population explosions occur that last about a year before the population crashes. These peaks have resulted in severe tree seedling and crop damage problems.

Prairie and meadow voles inhabit pastures, roadsides, alfalfa fields, and other grassy or weedy sites. Preferred habitats include areas with fairly dense ground vegetation. Meadow voles are more common in low, moist areas or upland sites near water. Pine voles live in timbered areas, underground, or under the forest litter. They also inhabit fields surrounding timber, if enough ground cover is present. Prairie and meadow voles construct surface runways that are easy to recognize by the closely clipped vegetation within them. Small holes lead to underground runways and nesting areas. Pine voles have extensive underground runway systems, and spend little time above leaf litter and ground cover layer. Since pine voles spend almost all of their time underground control strategies may need to be different from those for prairie or meadow voles. It may be easiest to determine if pine voles are suspect by the location of the damage (underground versus above-ground) and the lack of surface runway systems.

Economic Importance. Probably the most extensive and costly damage caused by voles occurs to woody plants in winter. At times voles severely damage or kill many young trees and shrubs, including plantations, orchards, windbreaks, and landscape plantings. Voles will eat the green inner bark layer (cambium) of trees and shrubs when preferred foods are unavailable.

CONTINUED ON PAGE 2

Pine voles spend a much greater part of their time underground and eat a much larger portion of roots and tubers than meadow and prairie voles. Voles also cause damage by clipping and feeding on other plants we value, especially new plantations bordering forests. They eat leaves, shoots, roots, tubers, and seeds of most grasses and forbs, or broad-leaved flowering plants. Voles can damage or consume flower bulbs, garden plants and vegetables, field crops and forage crops. Voles can damage lawns by constructing runways and clipping grass very close to the roots. Though the damage done usually is not permanent, it may detract from the appearance of a well-kept lawn. Those living in areas where snow covers the ground in winter will notice these runways or trails in the spring when snow melts.

Damage Identification. Signs found at the damage scene will help you identify the species at fault. The presence of prairie and meadow voles in an area usually is determined by finding their characteristic surface runways. The runways consist of closely clipped vegetation, about one to two inches wide. Vole damage to woody plants usually occurs during late fall through early spring. During these months green vegetation is scarce, so voles feed on woody plants, which they prefer less. Voles tunnel through snow, and may gnaw on seedlings, trees, and shrubs up to the height that snow accumulates during winter. Individual tooth marks (about one-sixteenth inch wide) may be visible on the wood after winter vole damage. Rabbits leave tooth marks that are larger, about one-eighth inch wide. The gnawing marks left by voles will be irregular in appearance and at various angles. Pine voles, and occasionally meadow and prairie voles, tunnel below ground and feed on roots of trees and shrubs. Voles occasionally will use tunnels developed by moles to gain access to flower bulbs and other plant roots. This damage often is blamed on moles by mistake. Moles feed on insects and earthworms and rarely consume plant materials.

Controlling Damage. The presence of voles does not always result in significant property damage. However, because of their prolific and cyclic nature, high populations can build up quickly and can be cause for concern. Before undertaking control, consider the extent of the problem in relation to the cost of control. For example, a few voles could damage a highly valued tree or flower bed and warrant control. At other times, they may go virtually unnoticed, making control unnecessary. Generally, there is a direct relationship between vole populations and the expected overall level of damage. Remember that damage prevention is more beneficial than population control after the damage has occurred.

Habitat Modification – Reducing the suitability of habitat for voles lessens the likelihood of future damage. High vole populations cannot become established without food and protection from predators. Grass and weeds can be controlled around young trees and shrubs through cultivation, herbicides, and mowing. Normal cultural practices employed in establishing windbreaks, orchards, and other woody plantings often are effective in reducing vole habitat and potential population highs. When food and cover are nearby during the growing season, extensive damage still may occur to trees and shrubs where snow accumulates because snow acts as protective cover. Strategies other than habitat modification may be needed where high vole populations exist in the fall near woody plantings.

Exclusion – Exclusion is a practical method of protecting small trees and shrubs from vole damage. Voles can be discouraged by installing woven wire or hardware cloth fences (one-fourth inch or smaller mesh) around small flower beds or gardens. The fence should be about 12 inches high and the bottom should be tight to the ground or buried slightly. Where pine voles are a problem, the fence should extend about six inches below ground. Fences also help keep out other wildlife that cause damage, such as rabbits, ground squirrels, and deer.

Place woven wire or hardware cloth cylinders around individual trees or shrubs. Again, the cylinder should be tight to the ground or buried slightly, but should extend higher than the maximum snow depth in winter, including drifts. Where rabbits also are a potential problem, the height should be at least two feet above

CONTINUED ON PAGE 3

the snow depth, if possible. When making the cylinder, overlap the edges at least one inch and fasten securely so gaps do not form that could admit voles. These cylinders should last about five years, so make them large enough in diameter to accommodate expected trunk growth if they remain in place during the growing season. Good success has also been achieved using plain aluminum foil wrapped around the stem or bole.

Placing raptor perches in fields and plantations to encourage birds of prey to roost/perch works.

Repellents – Various thiram, "hot sauce", and naphthalene/sulfur repellents are registered for vole damage control on certain plants. They are not registered for use on gardens or plant parts destined for human consumption. Repellents are relatively expensive and provide only short-term protection. Precipitation may wash some off. When foods are in short supply, such as in winter, the effectiveness of repellents usually decreases.

Traps – Voles can be controlled easily by trapping if only a few are causing problems. Set single mouse snap traps perpendicular to vole runways, with the triggers in the runways. Or, set two traps together within the runway, with the triggers facing away from each other. Peanut butter mixed with oatmeal makes good bait to place on the trap triggers.

Toxicants – Reduction of large vole populations is accomplished most effectively with toxic baits. Zinc phosphide is federally registered for vole or field mouse control. It usually is a restricted use pesticide that may be purchased and used by certified pesticide applicators only. Contact your local Extension Office for information on becoming a certified pesticide applicator.

Some formulations of zinc phosphide are packaged in small containers and are registered as general use pesticides. These may be purchased and used by the general public. Zinc phosphide is available in formulated pellets or treated grain. Toxic bait may be applied by hand in spot treatments by placing bait in runways or burrow openings. Hand-baiting is the only application method that can be used in urban areas such as lawns, ornamental plantings, parks, and golf courses. Toxic bait also may be broadcast applied according to label directions. Broadcasting will increase the amount of bait applied per acre and the hazard to non-target wildlife. Use of toxic bait is most appropriate in young woody plantings or orchards, when habitat reduction efforts have failed to keep vole populations in control. Applicators have found that placing zinc phosphide treated grain under boards or tin, and even in PVC pipe can be an effective means in keeping non-target species from coming in contact with the product. Remember to read all pesticide product labels thoroughly and comply with all directions given.

Fumigation – Gas cartridges and aluminum phosphide tablets may be used to fumigate vole tunnels if they are labeled accordingly. Fumigation may not be very effective, however, since vole tunnels often are shallow and complex. Aluminum phosphide is a restricted use pesticide.

Safety Precautions. Use pesticides safely. *All toxicants and fumigants used to control voles can be hazardous to humans, pets, livestock, and non-target wildlife if used improperly.* Only use products the Environmental Protection Agency registers for voles, and use only according to label directions. Read pesticide product labels carefully and comply with all directions given. If needed, seek assistance from your County Extension Educator.

Integrated Pest Management. As in most vertebrate pest situations, a combination of methods may be more effective than relying on any one method for vole damage control. Most vole damage problems in urban and backyard areas probably involve small vole populations that can be controlled with habitat modifications, fencing or exclusion, snap-trapping, and repellents. Non-urban vole damage situations (e.g. plantations) may involve larger vole populations over greater areas, and can be dealt with by habitat modifications, repellents, and toxic baits when necessary.

This information first appeared in Woodland NOTES, Vol. 11, No. 2.

About the Author: *Dr. Randy Brooks* is an Area Extension Educator - Forestry and Professor at the University of Idaho.

The University of Idaho provides equal opportunity in education and employment on the basis of race, color, religion, national origin, gender, age, disability, or status as a Vietnam-era veteran, as required by state and federal laws.