

GROWING KNOWLEDGE

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Vole control

These tiny, burrowing rodents can cause problems for nursery crops

BY DANA SANCHEZ

AS WE ANXIOUSLY WAIT for the first breeding-season birds to arrive and signal winter's end, most vole species are also gearing up to produce more young.

Voles are small, native rodents that are often called “meadow mice.” Oregon is home to a total of 13 vole species. They vary in their distribution across the state's diverse habitat types, in their population density, and in other aspects of their ecology.

One famous aspect of vole ecology is their rapid reproduction, in spite of the fact they only live 2–16 months.

Unlike some species that come into conflict with human endeavors, voles do not hibernate. In fact, gray-tailed voles are capable of breeding nearly year-round in mild weather years when food is plentiful, survival rates are high, and female voles have large, healthy litters.

Our encounters with some vole species have been so infrequent that much is unknown about their ecology. However, we know that several are associated with grassland ecosystems, while others occupy habitats in forest ecosystems. The species we commonly encounter in nuisance situations in western Oregon are those whose natural diets include grasses, forbs, roots and bark.

The ecological role of voles

Voles and other burrowing small mammals perform an ecosystem service by burrowing, which aids soil formation, aeration,

and nutrient mixing. They move nutrients from the leached zone to the root growth zone in the soil as they construct and maintain their burrows. As voles go about their daily business, they deposit nitrogen and other nutrients via their urine and solid waste.

In the process of eating vegetation, voles help promote vegetation and ecosystem-wide diversity at both fine and broader geographic scales. Even when they promote or create patches bare of vegetation, they are creating habitat for other species that require that resource, such as several of our ground-nesting native pollinators.

Most voles are ultimately taken by predators — hawks, owls, some snakes, and other mammals — which in turn contributes to population regulation of a variety of species. Dead vole carcasses nourish invertebrates and the soil through decomposition. As a worldwide group of species, burrowing animals play important roles as ecosystem engineers. In some systems, the loss of burrowers is contributing to system collapse.

Problems caused by voles

Often implicated in nuisance situations in the Willamette Valley is the gray-tailed vole (*Microtus canicaudus*), which is endemic to the region (it evolved here).

Originally a prairie species, the gray-tailed vole is now closely associated with the agricultural tracts that are now



Vole control

Previous page: Evidence of vole feeding on an olive sapling.

Vole trails in grass field can be blocked to prevent their movement on a nursery.

PHOTOS BY NEIL BELL

in those spaces, and it has expanded into formerly forested areas that have undergone agricultural conversion. This vole is classified as a medium-sized vole species, weighing about 1.3 ounces, and spanning a total length of about 5.5 inches.

Another westside culprit is the long-tailed vole (*M. longicaudus*; 7.5 inches long and 2.3 ounces). It is somewhat larger and helps illustrate the range of sizes across species.

Not all vole species burrow, but those that do will reuse tunnels and entrances created by other species such as pocket gophers. We can often diagnose the presence of gray-tailed voles easily from numerous, intersecting above-ground runways underlain by a series of underground burrows accessed by small entrances. Tunnels are often occupied when underwater — gray-tailed voles are noted for their ability to swim through flooded sections to reach dry areas.

Direct impacts on vegetation are another sign we can use to identify vole presence. Damaged areas will reveal overlapping scrapes by narrow little incisors (1 mm). Generally, voles can only gnaw fairly low on plants, but they will readily take advantage of a height boost from snowpack, downed branches, or other structures, allowing them to reach higher plants.

Growers should be vigilant for vole signs that management treatments might hide. For example, weed mats or deep compost surrounding stems could allow voles to access plants they might not otherwise.

Boom and bust

Vole populations are newsworthy for their boom-and-bust reproductive cycles. Periodically, conditions become optimal for irruptive, sudden growth.

Because voles reach sexual maturity quickly and have multiple litters, they often have overlapping generations of producers. A female, her daughters, her granddaughters, and her great granddaughters might all raise litters in the same season. When food is plentiful and survival rates are high, the population can deplete most of its food supply, causing



starvation. In captivity, females can begin mating in 18 days. Gestation (pregnancy length) is typically 21 days, although it can last 23 days. Somewhat older females (28 days or greater) at first pregnancy are likely able to optimize their lifetime production, having more litters of somewhat smaller litter sizes (average 4–5 young) with higher birth weights and greater offspring survival.

Estimates suggest 4–6 babies are born each year for the average female across most vole species. California voles (*M. californicus*) were observed producing 9–11 litters in a single year, breeding for 11–12 months.

Vole control tactics

In any wildlife and human conflict, there are four resolution tactics. Given the site conditions and monitoring for what species are present in the immediate area, we can often proactively prevent the next recurrence.

1. Deploy barriers. These can keep the animal from meeting the resources. Create an above-and-below-ground barrier for relatively limited-size areas. Blocking large areas is often limited due to the initial cost. Depending on the crop or growth type of interest, single-stem caging can be used to block voles and other gnawers.

2. Modify the habitat. Remove or reduce the food and cover that would sustain a vole population. If the crop and growing system can tolerate it, periodically disturb the burrows between the rows, hiding cover and the food source for the voles.

3. Deter the animals. Apply bittering agents to make the rodents avoid or reject the very resources they need.

4. Kill them. Population reduction beyond trappable situations will likely require restricted-use products. Pesticide-treated grain baits require a pesticide

applicator's license. Products such as zinc phosphide are not species-specific in their effects and will hurt all animals and people that ingest the product.

Any pesticide product must be used according to the terms of its label, including crop type, setting or location, target pest species, application and other variables. Delivering chemicals in the burrow systems will reach the target animals without putting others at risk, including domestic animals and natural predators.

Be mindful of the vole's natural predators and look for ways to support them as a management tool. Add a raptor perch for daytime hawks, a nest box for barn owls, and be willing to tolerate the presence of foxes, weasels, coyotes, and other fur-bearing predators. In high-population years, however, natural predation alone will not be enough to prevent vole populations from having an economic effect on a crop.

Vole control in greenhouses

Inside the greenhouse, significant damage may occur beyond the plants. Voles chew pots and tunnel through growing media and in-house walkways. For those who produce food-grade products, there can be an additional food safety concern around potential contamination from animal waste products.

1. Put up barriers. Attempt to exclude all rodents from the greenhouse interior. Following the first step above, set up a barrier: Use welded-wire hardware cloth with ¼-inch mesh at least six inches above the surface around the perimeter. Include a protective L-shaped apron extending at least six inches below the surface and bent outward 6–12 inches at a 90-degree angle. The apron is recommended to prevent digging under the barrier.

2. Modify the habitat. Immediately next to the greenhouse, remove natural or nuisance plant debris, garbage and stacks

of equipment or pots that can allow voles to hide from predators, get shelter or food, and access to the structure.

3. **Seal off potential food supplies.** If there are bins with general waste or discarded plant materials, make sure to use tight-fitting lids.

4. **Set up traps.** If populations inside the greenhouse are relatively low, snap-trapping can be effective.

Snap traps are laid out so that the trigger plate lies within an active runway. If the animals have burrow openings within the greenhouse, watch for fresh, moist scat to verify that that entrance and the adjoining runways are active.

Agricultural producers can request technical assistance by consulting with the USDA Animal and Plant and Health Inspection Service (APHIS) by calling 1-866-487-3297. Trained and licensed private contractors, including wildlife control operators, are another option to consider when making and implementing a management plan. (tinyurl.com/t6uz3uq) ©

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