

# Vole Identification and Management in Orchards and Tree Nurseries

Voles (*Microtus sp.*, Field, Meadow and Mountain Vole) prefer living in grasslands but are also found in cultivated fields and orchards.

The vole's diet consists primarily of grasses, sedges and forbs.

However, during the fall and winter months when herbaceous plant material is in short supply, they will also eat the roots and girdle woody shrubs and trees.

## Vole Identification

- 4 -18 cm (3-7 inches) long
- Brown/grey fur
- Big head
- Small ears
- Short tail

For information on identifying and managing pocket gophers see “Pocket Gopher Identification and Management in Orchard and Fruit Tree Nurseries” (add url when we have a site to post this).



# Signs of Voles

Voles burrow underground, and they create runways and tunnel openings in the grass.

Look for runways and tunnel opening in the grass ~ 5 cm wide.

No excavated soil piles next to hole.

**NB:** The presence of tunnels and runways in your orchard doesn't mean that you currently have voles, as these can be from previous seasons. Signs of active vole use include tunnel openings and runways that are clear of debris and the presence of fresh droppings.



Vole runways in grass after snowmelt.



Tunnel ~ 5 cm wide (2 inches).

## Other Small Mammals: Moles, Deer Mice, and Shrews Cause No Harm to Your Plants



**There are no moles in the Okanagan**

Moles make volcano shaped soil mounds but they do not damage your plants.



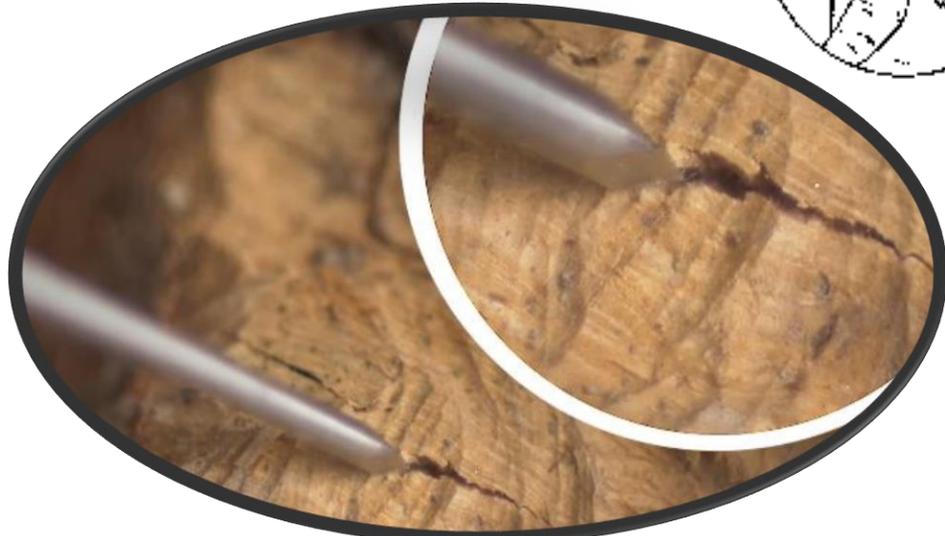
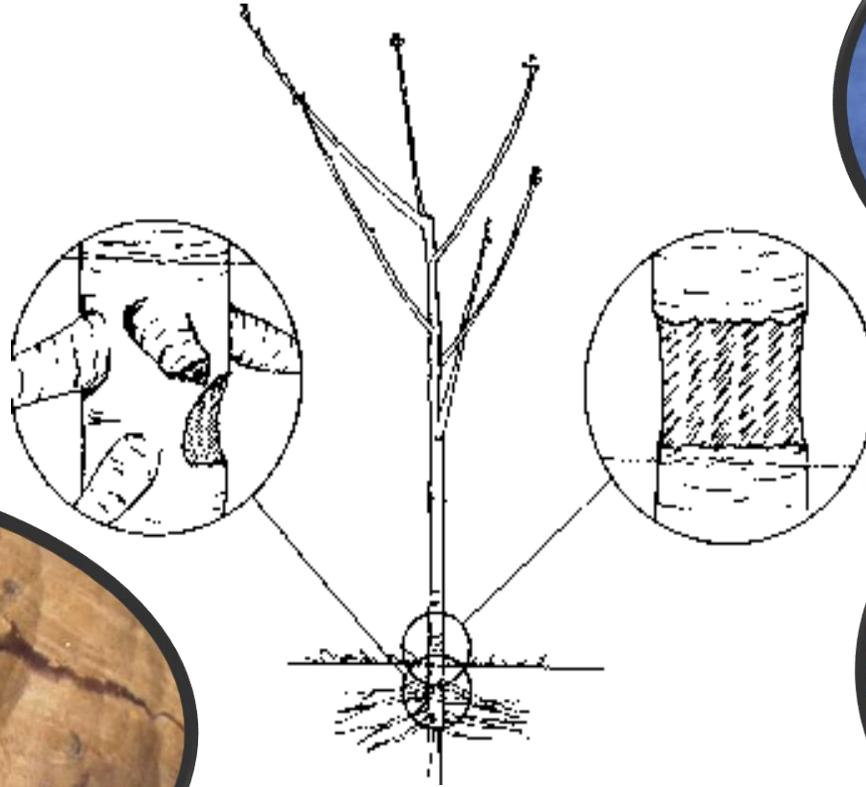
Deer mice also make tunnels but the width is < 2.5 cm (1 inch wide).



Shrew: weight: 5-6 gram, length: 8-10 cm.

# Vole Damage on Plants

Damage can be below or above ground. Voles chew through the root system and girdle the base of the plant stem.



**Girdling:** Look for parallel grooves made by front teeth which resemble scratches in many different directions.

Voles typically damage young trees (<10 years).

# Vole Management

Vole damage occurs typically in the late fall and winter when grass has low nutritional value and voles are looking for alternative food sources.

Regular field monitoring can help you identify problem area(s), perimeter locations where voles are reinvading the field, and evaluate effectiveness of treatment. In the spring, cover up existing vole tunnels and runways in the field. In the summer and early fall, monitor the number of new or actively used vole tunnels and runways.

# Vegetation Management

Mowing and keeping the grass or cover crop short between the rows of plants, at the base of trees and around the perimeter of the orchard has shown to reduce vole numbers.

Removing pruning and brush piles from the orchards also reduces the likelihood of voles getting established in these locations.

# Exclusion

Plastic or wire tree guards can be placed around the base of the tree. To be most effective tree guards should extend at least 45 cm above ground and 15 cm below.

Ensure that the guard is of sufficient diameter to allow for several years of tree growth. Also check guards regularly to ensure no vole damage is occurring within the tree guard.



Research has shown that short grass and less vegetation reduces vole abundance.



Plastic or wire tree guards can be effective against vole damage on fruit trees.

# Encouraging Predators of Rodents



Red-tailed hawks and barn owls are efficient hunters and primarily eat voles and other small mammals on farmland.

Birds of prey and snakes are great allies in combating your vole problem as voles are an important food source for them.



If you have kestrels and hawks hunting your fields in the daytime and owls doing rodent control at night do not use rodenticides or reduce your use to an absolute minimum.

These predators can manage pests very effectively and exposure to rodenticides through rodent prey can result in sickening and/or death of birds and other non-target wildlife.



Kestrel and owl nest boxes and raptor perches can be installed in your field.

\* For information on how to attract barn owls to your field see [“Farming with Barn Owls in BC”](#)

# Rodenticides

If vole damage persists despite carrying out all the above measures, there are rodenticide products available that are specifically designed to be used in agricultural fields. Bait should only be placed in burrows or tamper resistant bait stations.

In Canada, **only products containing the active ingredients: chlorophacinone, diphacinone or zinc phosphide can be used outside in a field setting. It is imperative that you understand and follow the label directions for use.**

Chlorophacinone and diphacinone are anticoagulant rodenticides, and target rodents will have to feed multiple times to obtain a lethal dose. Anticoagulant rodenticides inhibit the production of vitamin K necessary to regulate the viscosity of the blood, resulting in the vole bleeding to death over a 5-7 day period.

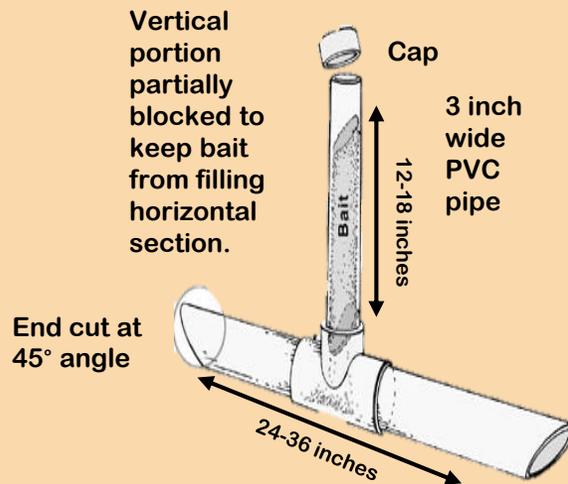
Example Products:

Rozol RTU

Ground Force



Products with chlorophacinone and diphacinone should be placed in a tamper resistant securely fastened bait station to reduce the risk of other non-target species and pets eating the bait.



PVC made t-bait station



Approved (tier 1) bait station



Bait station placed in tree nursery.

# Rodenticides continued

- Zinc phosphide products are single feed instant kill products: phosphine gas ( $\text{PH}_3$  gas) develops after the zinc phosphide has been digested by a target rodent.
- Products in which the active ingredient is zinc phosphide should be applied directly in runways and vole tunnels.



Zinc phosphide pellets

Zinc phosphide products have lower secondary toxicity risk when compared to anticoagulant rodenticides.

However, zinc phosphide products are highly reactive and should not be applied when it is wet outside or in regions that experience a lot of rainfall.



**For all treatments remove dead animals:** Poisoned carcasses pose a significant risk to predators and scavengers. Check fields regularly every 2-3 days after treatment.

# Mechanical Burrow Builders

- Mechanical burrow builders can be used by a professional pesticide applicator.
- The soil has to be moist enough to enable the creation of stable artificial burrows.
- The machine has to be set the same depth as the vole runways.
- In orchards and Christmas tree plantations, create short runs of tunnels that run parallel to rows of trees.
- Place a tunnel between rows and on either side of the plantation.
- Apply rodenticide bait as per label instructions.
- To monitor for new vole holes - Immediately after application use harrow, leveler or similar equipment to cover all mounds.
- Check treated area 7- 10 days after application for new vole runs.
- Any new vole runs should be treated.
- Treating field margins may prevent or slow reinvasion.
- To minimize secondary poisoning: Check field regularly every 2-3 days and remove poisoned carcasses.



For more detailed information refer to: [Using burrow builders for pocket gopher control.](#)

# For All Rodenticide Treatments

- Voles have small territories (range from 100 - 200 m<sup>2</sup>) so rodenticides should only be applied to areas where rodent damage is occurring. Application should carefully follow the instructions on the product label. After rodenticide is applied it is important to monitor the area every second day to:
  - Check for recent vole activity and damage.
  - Remove vole carcasses.
  - Refill bait stations, if needed.
  - Ensure all bait stations are securely fastened.
- After damage has subsided and there are no fresh signs of vole activity, remove the bait but keep up the monitoring to ensure that there is no new damage.
- Removing bait reduces the risk of non-target species consuming the bait such as other small mammals, insects and songbirds.
- Removing bait also reduces the risk of voles becoming resistant to rodenticides.
- If rodenticides are applied do not attempt to attract raptors to hunt in this field due to risk of secondary rodenticide poisoning.
- If additional applications are needed, make sure to alternate active ingredients to prevent bait shyness.



Monitor baited area regularly to assess whether the rodenticides are reducing vole damage and ensure that there is no bait easily available for non-target mammals, insects and songbirds.

## More Information:

**For up to date information on where rodenticides can be applied see [the Health Canada - Pest Management Regulatory Agency website](#)**

**For more information on how to manage voles:**

**[North Carolina State University: Voles in commercial orchards and ornamental nurseries](#)**

**[Vole management in Fruit Orchards](#)**

**[BC Fruit Tree Production Guide: Pests](#)**

**[Living with Wildlife in BC: Rodents](#)**

**For information on how to control pocket gophers in orchards and nurseries: URL TBA**

**Outreach Videos on Vole management in Berry Fields (also applicable to orchards and nurseries):**

**[Identifying voles in berry fields](#)**

**[Minimizing vole damage](#)**

**[Using rodenticides](#)**