

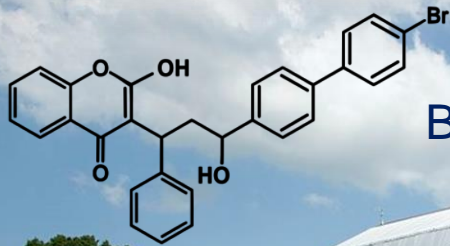
Integrated Pest Management Control in Berry Fields

Sofi Hindmarch

Project Coordinator Fraser Valley Conservancy

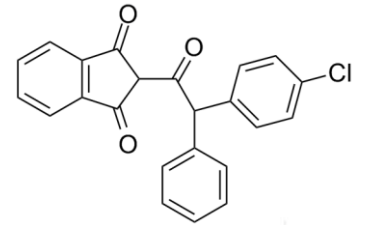


Fraser Valley Conservancy
Placing lands in trust for our future



Bromadiolone

Chlorophacinone

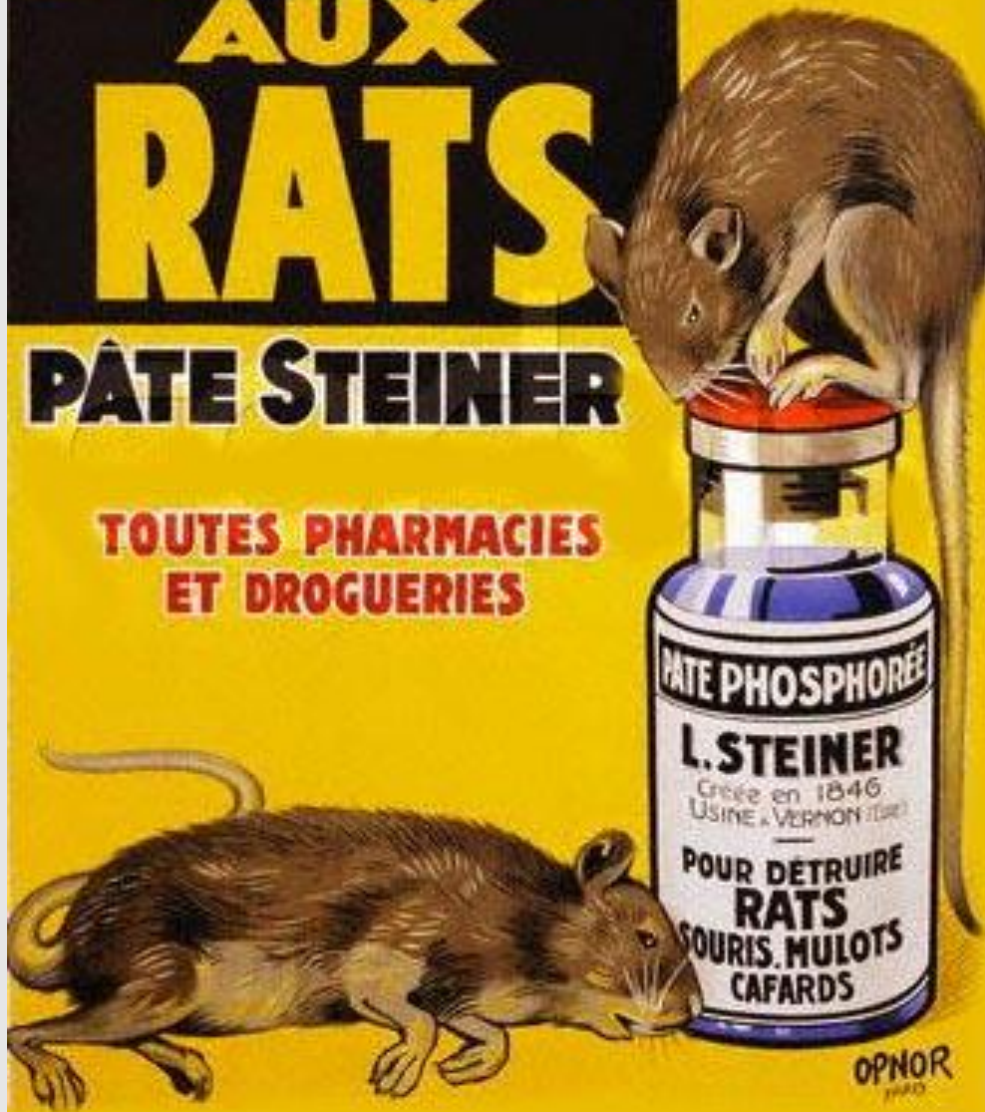




MORT AUX RATS

PÂTE STEINER

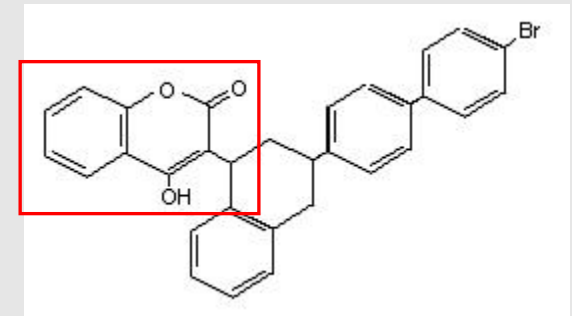
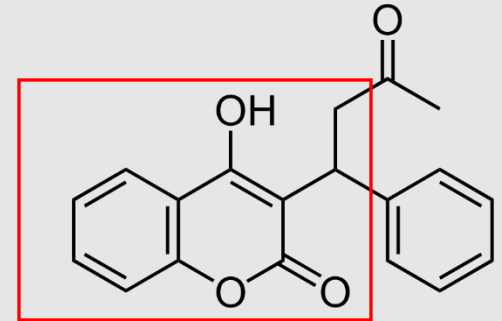
**TOUTES PHARMACIES
ET DROGUERIES**



OPNOR
1943

Anticoagulant rodenticides

- First generation (FGARs) e.g. warfarin, chlorophacinone, diphacinone
- Tasteless, odourless
- Problem - Resistance in rat populations
- Second generation (SGARs) e.g. brodifacoum, difethialone, bromadiolone
- More toxic (lower LD50)
- Single feed killing – reduced resistance dev'pt



Rodent control in agricultural fields

Secondary

Tertiary?



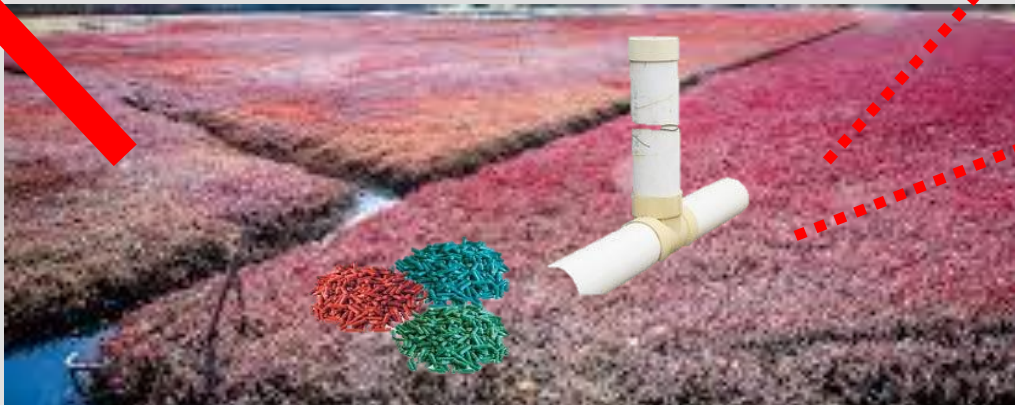
Target

Non -Target



Gophers, voles, ground squirrels are target species when ARs are mass applied in agricultural fields

Primary



Integrated Pest Management

Not a strategy to diminish the use of pesticides.

Decision making framework utilizing best management practices/A pathway to an objective i.e. reducing rodent damage.

Any rodent control should consider the risk hierarchy – the least severe intervention methods should be considered first and a method that will be the most effective given the specific circumstances.

- Monitoring**
- Prevention:**
 - I. Cultural**
 - II. Physical (i.e. exclusion techniques)**
 - III. Biological**
 - IV. Trapping**
 - V. Chemical**



Monitoring

Vole Identification

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



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 field 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.



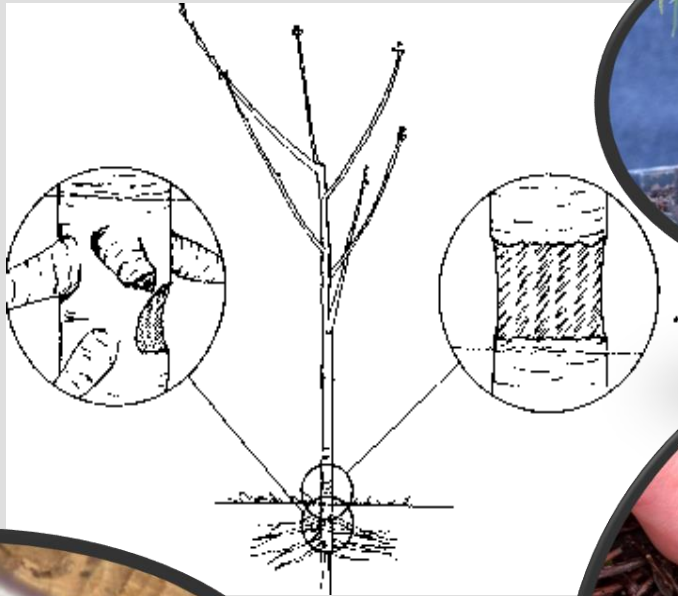
Deer mice also make tunnels but the width is < 2.5 cm (1 inch wide).



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.



Photo credit: Miranda Elsbey



Prevention



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.



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

Cultural: 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 field has shown to reduce vole numbers.

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



Exclusion

Fence

Fence preventing voles entering your field – i.e. exclusion zones

Below ground ?



Tree Guards

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.



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

Biological



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](#)"

BARN OWLS AS RODENT CONTROL CANDIDATES

Barn Owls are excellent rodent hunters, especially field voles, and they can be implemented as part of an Integrated Pest Management Program (IPM)

- A nesting Barn Owl pair and their chicks eat 1200 or more small mammals per year.
- Barn Owls will hunt within a 1 km radius when food is abundant. They are not territorial so nest boxes can be placed close to each other ~ 100 meters apart.
- Farmers have reported reduced rat and vole problems on their farms after a breeding Barn Owl pair has taken residence on their farm.
- Some farmers have noted fewer pigeons and starlings in buildings occupied by Barn Owls.



3 owlets soon ready to leave the nest. The owlets will start to learn how to fly when they are around 60 days old.

Field voles are the favourite food of the Barn Owl.



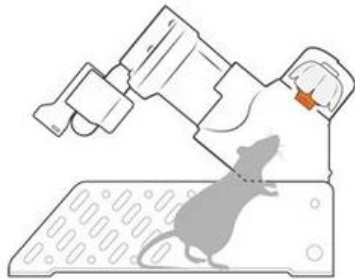


Trapping

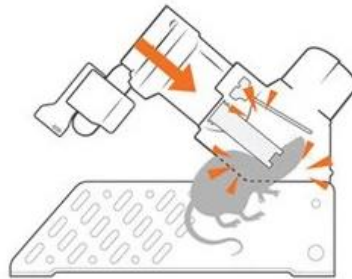


Goodnature© bolt trap

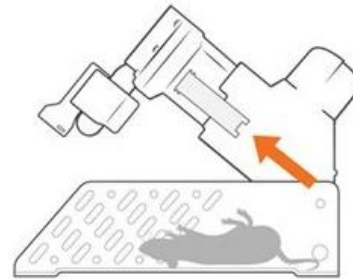
The instant kill, self-resetting bolt trap developed by Goodnature© designed to control rats and possums in New Zealand can it be modified for use in berry fields.



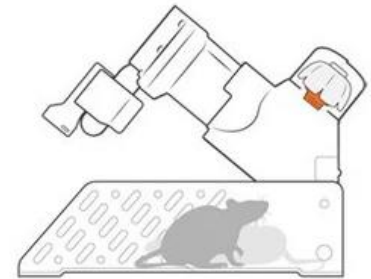
Sniff sniff
Lure attracts pest into the trap



Kapow!
Pest moves trigger, firing the trap



Auto-reset
The pest drops as the trap resets itself



Sniff sniff...
Lure continues to attract pests for constant control





Chemical

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.**

[Home](#) → [Health](#) → [Product safety](#) → [Consumer Product Safety](#) → [Reports and Publications – Consumer Product Safety](#) → [Pesticides and Pest Management](#)
→ [Fact Sheets and Other Resources](#)

New Use Restrictions for Commercial Class Rodenticides in Agricultural Settings

(PDF Version - 103 K)

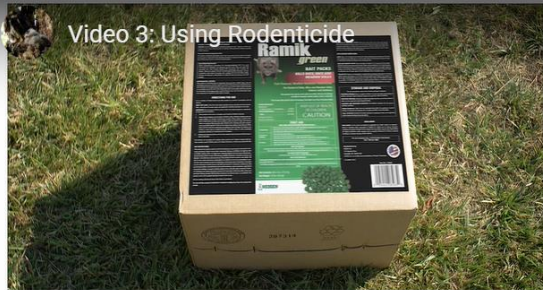
As of January 1, 2013, use restrictions for several commercial class rodenticides registered for the control of Norway rats, roof rats and house mice will come into effect on product labels. The intent is to protect the public from the use of these products in areas where they are not intended to be used. **Pest Management Regulatory Agency**
canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/rodenticides-agricultural-settings.html

These restrictions apply to products registered for use in and around buildings or structures. Use of rodenticides in areas such as fields, crop land, orchards, landfills (garbage dumps) and nurseries is unchanged unless these areas are open to the public or bait is accessible to pets or livestock.

The major new requirements are as follows:

- Bait must either be placed in tamper-resistant bait stations or in locations not accessible to the public (e.g., in a locked building)
- Outdoor, above-ground placement of rodenticides must be contained in tamper-resistant bait stations (e.g., bait stations must be locked)
- Residential and/or outdoor uses of rodenticides containing certain active ingredients are now prohibited





APPROVED RODENTICIDES

Watch later Share



Ramik Green



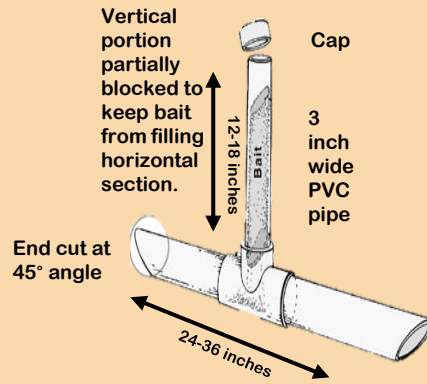
Ground Force



Ramik Brown

Rodenticides

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 (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.

For All Rodenticide Treatments

- Voles have small territories (range from 100 - 200 m²) 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.

Summary

IPM decision making framework. Any rodent control should consider the risk hierarchy – the least severe intervention methods should be considered first and a method that will be the most effective given the specific circumstances.

Obvious measures that will reduce the likelihood of infestations should be explored before rodenticides are utilized.

Sustainable control can only be achieved by reducing the rodent carrying capacity of the environment.

Changing emphasis from rodenticides being the primary intervention to last resort when all other options have been explored.

It is important to review approaches to control holistically and to integrate a range of control measures into your treatment strategy.

Long-term baiting should be the exception, and not the modus operandi which pest control operators now offer as a service to their clients.

VOLE CONTROL SERIES

Video 1: Vole identification

https://www.youtube.com/watch?v=c_mNEV3I0aM

Video 2: Minimizing vole damage

<https://www.youtube.com/watch?v=SFm7Ep1lkDI>

Video 3: Using rodenticide

<https://www.youtube.com/watch?v=SFm7Ep1lkDI&t=5s>



For more information: barnowlsbc.ca

A site for the conservation of Barn Owls in British Columbia



BarnOwlsBC

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[Vole Control in Berry Fields](#)

[Vole and Pocket Gopher Control in Orchards and Tree Nurseries](#)

Vole Control in Berry Fields



Field vole (*Microtus townsendii*) Photo Credit: Sean McCann

Vole damage to berry crops can cause significant costs to a grower if the damage occurs on well-established productive plants. The application of rodenticides can be an effective tool to combat vole damage, however, there is evidence that this has unintended consequences to non-target raptors and other wildlife. Most farmers are aware of the risk rodenticides present to non-target wildlife, but feel they are left with little other choice due to lack of effective alternatives. We are currently assessing the feasibility of a non-chemical, instant kill, self-resetting rodent control method as an alternative to rodenticides. This approach could give berry farmers the opportunity to control voles and simultaneously attract barn owls and other vole-hunting raptors.

We are currently assessing whether the Goodnature® bolt trap designed for rats can be modified and used for controlling voles in berry fields.



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Lower Mainland
Horticulture
Improvement
Association



BC blueberries
Powered by nature.



Farmers and Landowners





Thank You!