

## Rat Control in Alberta

Albertans have enjoyed living without the menace of rats since 1950, when the provincial rat control program was established. Norway rats are well known to be extremely destructive creatures. The economic losses they cause to stored and infield crops, the destruction of property and their effects on human health have been widely documented for decades.

Losses caused by rats can be divided into three categories:

- losses to food stuffs – consumption and contamination
- damage caused by gnawing and tunnelling
- disease transmission

### Life history

The Norway rat is a shy, secretive and primarily nocturnal animal (Figure 1). It seeks shelter not so much to keep warm but to hide from enemies including other rats. A rat shelter can be almost any object rats can crawl under including planks, plywood, buildings or structures resting on the ground.

Once secure, rats will quickly seek food. The diet of a Norway rat is remarkable; it can survive on a wide range of food items from domestic garbage, rotten meat and fish, stale grain, greenfeed and straw to fresh fruits and vegetables, packaged foods, sugar and candies.



Figure 1. Norway rats

Following about a 3 week gestation period, 12 to 18 rats are born to a female rat that can be as young as 8 weeks of age. A Norway rat can produce up to 12 litters per year. Male rats are sexually mature at approximately 90 days of age. Norway rats may live up to 18 months in the wild.

It has been estimated that, under ideal conditions, a single pair of Norway rats could produce 15,000 offspring in 1 year.

### Identification

**Weight** – An adult male Norway rat weighs an average 450 grams (1 pound); females weigh slightly less.

**Length** – Average length of an adult Norway rat, body only, (from nosetip to base of tail) is 18 to 25 centimetres (7 - 10 inches).

**Color** – The Norway rat has a wide range of colors from reddish to greyish brown or completely black on the back and sides. The underparts are tinged with grey to a buff or yellowish-white. White, spotted and “laboratory” rats are only color variations of the Norway rat.

**Feet** – Both front and hind feet of a Norway rat are small, delicate and pink (Figure 2).



Figure 2. Detail of front and hind feet

**Eyes** - In comparison to other rodents, Norway rats possess small eyes, which are shiny black.

**Nose** - The nose is somewhat blunt, pinkish and inconspicuous.

**Ears** - The ears of a Norway rat do not reach the eyes as in most other rat species (Figure 3).

**Tail** - The most distinguishing feature of true rats is the tail (Figure 4). The Norway rat's tail is cylindrical, tapering and nearly hairless. The hairs on the tail are short and bristlelike and grow out from well defined hairline ridges along the entire length of the tail.

The length of tail is about 15 to 22.5 centimetres (6 - 9 inches) and is **always** shorter than the body.



Figure 3. Detail of ears and eyes of the Norway rat

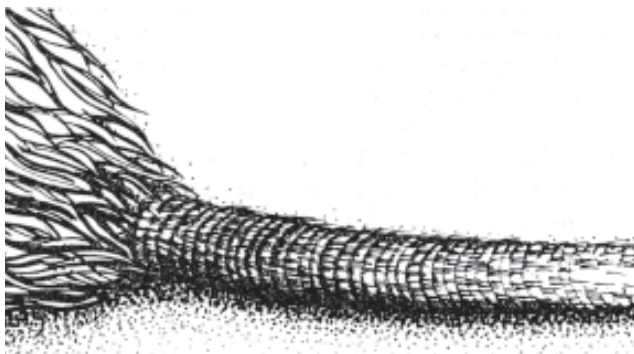


Figure 4. Detail of the tail of the Norway rat

## Recognizing rat presence

### Burrows and runways

The cylindrical burrow entrance of a Norway rat in soil or in straw or hay bales measures about 5 to 7.5 centimetres (2 - 3 inches). Unlike native rodents, the burrow entrance of a rat is clean of debris and excavated soil particles.

Rats leave well beaten trails about 5 centimetres (2 inches) wide from their nest areas to food and water sources. Rats often dig lengthy travel runs under objects such as bales, planks, granaries, plywood and even idle machinery to move from area to area.

### Wall and floor holes

The average size of the circular-shaped rat hole in walls and floors is 5 to 7.5 centimetres (2 - 3 inches) in diameter, but can be considerably larger, depending upon the material. Rats will make holes in walls or floors soon after invasion; wall holes are usually just inches above the floor. Holes in floors are generally close to walls or undersupporting skids or poles.

### Gnawing

Rats must chew continuously to wear down incisor teeth (front teeth) that grow an amazing 5 to 10 cm (2 - 4 inches) per year. Most often, rats will chew materials close by such as plywood, structural woodwork, plastic panelling, frozen ground and even concrete.

### Droppings

Rats produce up to 25,000 droppings per year, so they can usually be detected if they have been present for even a short time. Rat droppings are blunt at both ends and the shape and size of an olive pit, measuring 1.25 to 1.5 centimetres (.5 - .75 inches), and shiny black (Figure 5). Droppings fade in time and soon turn to grey-white.



Figure 5. Actual size of mice droppings (left) versus rat droppings (right).

### Nests and caches

Norway rats are ground dwellers, so their nests and caches are built on or below ground level. The nest of a rat can consist of almost any material, usually food remains and other available items such as paper, straw, cardboard, rags or shredded plastic bags. Rats may hoard and cache food, which may or may not be eaten.

## Odors and smudges

The distinctive, musky odor of rats can be easily detected, particularly if rats are confined to a small area. The oily hair of a rat leaves noticeable smudge marks on trails or hole entrances. The combination of oily hair, dust and dirt results in obvious dark-stained surfaces.

## How to control rats

Rat infestations can be prevented by any of three methods: food source removal, rat shelter removal, rat proofing

**Food source removal** – Because rats are capable of eating almost anything, it is important to remove all possible food items such as garbage, empty food containers, spilled grain or feed. Do not give rats a chance – **Remove any and all food items.**

**Remove rat shelter** – Rats can and will make any object their temporary or permanent home as long as they can crawl underneath. Until a rat can seek out permanent cover, it will use any flat object lying on the ground including tires, planks, square bales, etc.

**Rat proofing** – By elevating farm outbuildings, protecting doorways and windows, utility connections and other openings to barns, sheds, granaries, warehouses and industrial structures, rats can be successfully turned away from potential shelter. Efficient rotation of stored grain or forage bales will also discourage rat activity.

## Active rat control measures

### Use of poisons

The most common and most effective rat bait used today is anti-coagulant bait that causes death in one to three days by painless internal bleeding.

Pre-mixed Warfarin rat bait in rolled oats or in concentrated form for water baiting are the most suitable rat baits for Alberta. They are also one of the safest rat baits in use today. Warfarin rat bait may require several feedings to produce death.

Newer rat baits such as bromodialone and brodifacoum require only a single feeding to kill rats, but are less safe to non-targets, such as pets and livestock, than Warfarin. The newer baits still require up to three days of consumption to kill rats. For safety reasons, only Warfarin rat bait should be used near occupied buildings.

Use appropriate baits. Always use dry bait (Warfarin rolled oats) where moisture or water is available and water bait

(Warfarin water soluble bait) in dry conditions. Rats can obtain daily moisture requirements from solid foods such as grain, greenfeed and even packed and covered garbage.

First aid and antidote treatment appear on all rat bait containers.

### Baiting strategies

Proper placement of rat bait will ensure maximum results.

- Place bait where only rats will find it.
- Place bait in all potential rat habitat.
- Keep fresh bait out at all times.
- Set bait in obvious rat habitat such as bale stacks, under granaries, barns, shelters, silage pits, abandoned buildings, nuisance grounds and garbage facilities.

### Rural and farm baiting strategies

Always place rat bait in bales while building the stack. Baits will be easier for rats to find and therefore more effective if placed among the bales. Also, bait does not have to be covered or protected when placed as the stack goes up.

However, bait can be placed after the bale stack is completed. Set bait under protective cover such as plywood, sheeting or in clean empty pails set on their side around the outside of the stack at several locations. Set out 1 bag of bait for every 10 to 20 large round bales stacked. To discourage rats, leave a 1 metre space between each round bale, and do not keep bales for more than 1 year.

Buildings on skids or poles can be baited by placing bait under the structure between the skids. Bait can also be set between double walls or false floors. To encourage bait consumption, open the bait bag and spill some bait for rats to find quickly.

When baiting silage pits or other fermenting sites, use an all-weather bait such as Dura-Block (bromodialone) or Warfarin Block. Warfarin dry bait may be used; however, care must be taken to ensure the bait does not become moldy or soggy. For best results, place rat bait in properly constructed bait stations (Figure 6).

In high-risk areas, particularly where rats have been found before, permanent bait stations should be set out and maintained to prevent recurring infestations. Permanent bait stations should be made of plywood, sheeting or dressed lumber to contain and protect bait while allowing rats direct and unrestricted access to bait.



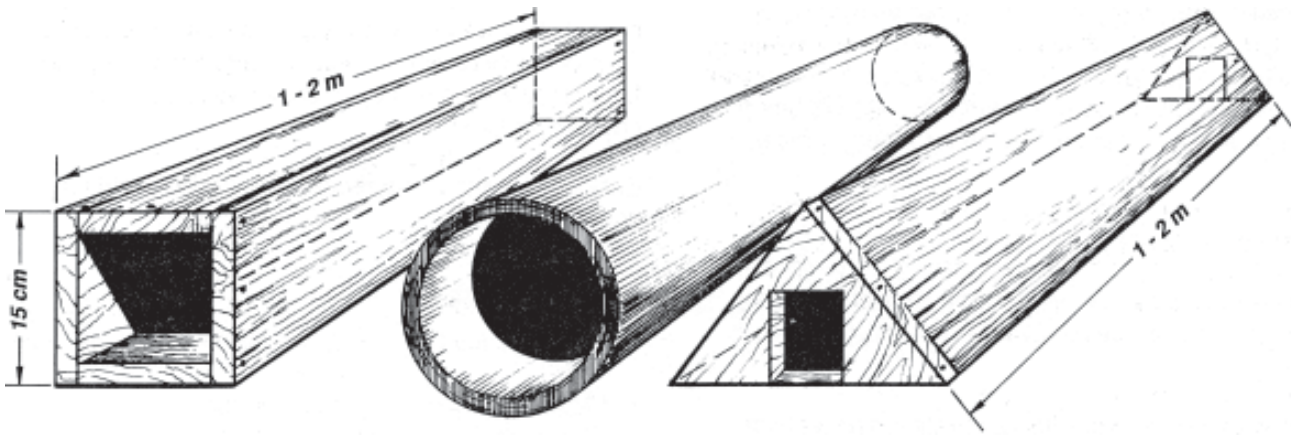


Figure 6. Dry bait stations

During warm weather, prepared water bait should be used wherever possible (Figure 7). Water bait can be presented to rats in several ways, but the most effective is the chick waterer.

A discarded tire makes an excellent water bait station. It should be elevated on one side to allow rats easy access to bait. Always keep water bait stations covered and filled with Warfarin water bait.



Figure 7. Water bait station

### Urban baiting strategies

In urban areas, rats may appear anywhere without any apparent source of conveyance. It is therefore important to have all suspect rodent specimens properly identified.

**Report all suspect rat sightings to the Department of Agriculture, Food and Rural Development or local or municipal authorities for further action.** The Department investigates all sightings to verify identification, establish control measures and determine the possible source of conveyance.

Rat control action usually takes place within a small area near the suspect sighting. Following lengthy transportation, rats usually arrive in poor physical condition, so they seek the nearest shelter. Swift action by everyone can result in quick and successful eradication, which is why immediate reporting of suspect rat sightings is so important.

Warfarin rat bait works best in urban areas because it is safe to use indoors and outside. Other baits have some restrictions. **Read instructions carefully.**

Care must be taken in setting out rat bait to prevent non-target poisoning. Always use recommended bait stations, and attach bait bags with a staple or tack inside the bait station. Inform neighbours where rat bait has been set out the same day bait has been set. Pick up and destroy all unused rat bait containers by incineration, and pick up and destroy all dead rats.

For more information, please contact municipal Agricultural Fieldman, by-law enforcement officers or the Department of Agriculture, Food and Rural Development.

### Prepared by:

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