



# Controlling Pocket Gophers in New Mexico

Guide L-109

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This publication is scheduled to be updated and reissued 4/09.

## IDENTIFICATION

Pocket gophers are burrowing rodents, so named because they have fur-lined cheek pouches outside of the mouth, one on each side of the face. These pockets, which can be turned inside out, are used to carry food. Pocket gophers are powerfully built in the forequarters and have a short neck; the head is fairly small and flattened. The forepaws are large-clawed. Gophers have small external ears, small eyes, and lips that close behind their large incisors, all adaptations to their underground existence.

The pocket gopher's tail is sparsely haired and serves as a sensory mechanism that guides the gopher while moving backward through its tunnel system. The whiskers on its face are also sensitive, and help the pocket gopher while traveling about in its darkened tunnel.

Pocket gophers are medium-size rodents ranging from about 5 to nearly 14 inches long (head and body). Adult males are larger than adult females. Their fur is fine and soft, and highly variable in color. Colors range from nearly black to pale brown to almost white. The great variability in size and color of pocket gophers is attributed to their low dispersal rate and, thus, limited gene flow, resulting in adaptation to local conditions.

Several other small mammals are sometimes confused with pocket gophers. Pocket gophers can be distinguished from other mammals by their telltale signs, as well as by appearance. Pocket gophers leave soil mounds on the surface of the ground. The mounds are usually fan-shaped, and tunnel entrances are plugged, keeping intruders out of burrows.

Ground squirrels are often mistaken as pocket gophers. Ground squirrels have open holes leading to their tunnel system, and are often seen outside their holes. Pocket gophers spend almost all their time in their sealed tunnel systems, and are seldom seen on the surface.

## HABITAT

A wide variety of habitats are occupied by pocket gophers. They occur from low coastal areas to elevations above 12,000 feet. Pocket gophers are also found in a wide variety of soil

types and conditions. They reach their greatest densities on fertile, light-textured soils with herbage production, especially when that vegetation has large, fleshy roots, bulbs, tubers, or other underground storage structures.

Soil depth and texture are important to the presence or absence of gophers. Shallow soils may be subject to cave-ins, and will not maintain a tunnel. Tunnels are deeper in sandy soils where soil moisture is sufficient to maintain the integrity of the burrow. A less apparent requirement is the need for fresh air and exhaled gases to pass through the soil to and from the gopher's tunnel. Light-textured, porous soils with good drainage allow for good gas exchange between the tunnel and the atmosphere. Soil with a high clay content, or those that are continuously wet, diffuse gases poorly and are unsuitable for gophers.

## FOOD HABITS

Pocket gophers feed on plants in three ways. They may go to the surface, venturing only a body length or so from their tunnel opening to feed on aboveground vegetation. They may feed on roots they encounter when digging. They frequently pull vegetation into their tunnel from below. Pocket gophers eat forbs, grasses, shrubs, and even small trees. They are strict herbivores, and any animal material in their diet appears to be accidental. Alfalfa apparently is one of the most nutritious foods for pocket gophers.

## GENERAL CHARACTERISTICS

Just as cheek pouches are used to identify pocket gophers, their fan-shaped soil mounds are characteristic evidence of their presence. Typically, there is only one gopher per burrow system. Obvious exceptions are when mating occurs and when the female is caring for her young.

Pocket gophers use their claws and teeth while digging. Soil, rocks, and other items loosened by digging are kicked away from the digging area with their hind feet. Then the gopher turns over, making sort of a somersault in its burrow,

and uses its forefeet and chest to push the soil out of its burrow.

Burrow systems consist of a main burrow, generally 4 to 18 inches below and parallel to the ground surface, with a variable number of lateral burrows off the main. These laterals end at the surface with a soil mound or, sometimes, with only a soil plug. There are also deeper branches off the main burrow, which are used as nests and food caches. Enlargements along the main tunnel are usually feeding and resting locations. Nest chambers have dried grasses and other grass-like plants formed into a sphere. Some parts of a burrow may be as deep as 5 or 6 feet. The diameter of a burrow is about 3 inches, but varies with the body size of the gopher. A single burrow system can contain up to 200 yards of tunnels. The poorer the habitat, the larger the burrow system required to provide sufficient forage for its occupant.

The rate of mound building is highly variable. Estimates include an average of 1 to 3 per day up to 70 mounds per month. This activity brings a large amount of soil to the surface.

The tunnel system tells us much about its inhabitant. The system is rigorously defended against intruders, and constitutes the home range of the pocket gopher, which may be up to 700 square yards.

Litter sizes range from 1 to 10, but average 3 to 4. In some portions of their range where two litters are born each year, litter size is usually smaller, averaging about two. The breeding season also varies, but births typically occur from March through June. The gestation period is 18 or 19 days.

Densities reported for various pocket gophers are highly variable. Densities of 6 to 8 per acre are considered high density. Average life span of gophers appears to change inversely with population density.

Many predators eat pocket gophers. Some predators pursue the gopher in its tunnel system (weasels, perhaps spotted skunks, and several snakes including bull and rattlesnakes). When pocket gophers encounter snakes or other threats, they typically react by assuming a threat posture with the mouth open, vocalizing with panting sounds, and raising the front of the body slightly with their claws extended forward. This behavior usually chases away other gophers in the tunnel. If the intruder is a snake, many strikes bounce off the gopher's incisors and claws. The gopher may try to block the intruding snake with a wall of soil.

## DAMAGE

Damage caused by gophers includes destruction of underground utility cables and irrigation pipe, direct consumption and smothering of forage by earthen mounds, and change in species composition on rangelands by providing seedbeds (mounds) for invading annual plants. Gophers damage trees by stem girdling and clipping, root pruning, and, possibly, root exposure caused by burrowing. Gopher mounds dull and plug sicklebars when harvesting hay or alfalfa, and soil brought to the surface as mounds is more likely to erode. In irrigated areas,

gopher tunnels can divert water, causing loss of surface irrigation water. Gopher tunnels in ditch banks and earthen banks can hasten soil erosion and water loss.

## LEGAL STATUS

Pocket gophers are not protected in New Mexico by federal or state law.

## DAMAGE PREVENTION AND CONTROL METHODS

### Exclusion

Because of the expense and limited practicality, exclusion is of little use. Fencing highly valued ornamental shrubs or landscape trees may be justified. The fence should be buried at least 18 inches. The mesh should be small enough to exclude gophers; 1/4-inch or 1/2-inch hardware cloth will do. Cylindrical plastic netting placed over the entire seedling, including the bare root, significantly reduces damage of newly planted forest seedlings.

### Cultural Methods and Habitat Modification

These methods take advantage of knowledge of the habitat requirements of pocket gophers, or their feeding behavior, to reduce or eliminate damage.

**Crop varieties.** In alfalfa, large taprooted plants may be killed or the vigor of the plant greatly reduced by pocket gophers feeding on the roots. Varieties with several large roots rather than a single taproot suffer less when gophers feed on them.

**Crop rotation.** When alfalfa is rotated with grain crops, the habitat is incapable of supporting pocket gophers. The annual grains do not establish large underground storage structures, and there is not enough food for pocket gophers to survive year round.

**Grain buffer strips.** Planting buffer strips of grain around hay fields provides unsuitable habitat around the fields and can minimize immigration of gophers.

**Flood irrigation.** Irrigating fields by flooding can greatly reduce habitat suitability for pocket gophers. Water can fill a gopher's tunnel, causing the gopher to drown or flee to the surface, where it is vulnerable to predation. This method's effectiveness can be enhanced by removing high spots in fields that may serve as refuge for the gopher during irrigation.

### Repellents

There are no registered repellents available for pocket gophers, other than granular formulations of moth crystals (naphthalene and paradichlorobenzene), which are not effective. Noise-making devices and plants reported to repel pocket gophers have not been proven effective.

## Toxicants

To poison pocket gophers, the bait must be placed in their tunnel systems by hand or by a special machine known as a burrow builder. See figure 1 for steps to locate tunnel systems.

When using toxicants **be sure to follow all label directions.**

The most widely used toxicant is strychnine alkaloid (0.25 to 0.5% active ingredient) on grain baits. Zinc phosphide (2%) is less effective than strychnine for gopher control. Strychnine acts rapidly and gophers sometimes die within an hour after consuming a lethal dose. If the label has directions for use with a burrow builder machine, then it is a restricted-use pesticide.

Underground baiting for pocket gopher control with strychnine presents minimal hazards to non-target wildlife, either by direct consumption of bait or by eating poisoned gophers. Poison bait spilled on the ground surface may be hazardous to ground-feeding birds such as mourning doves.

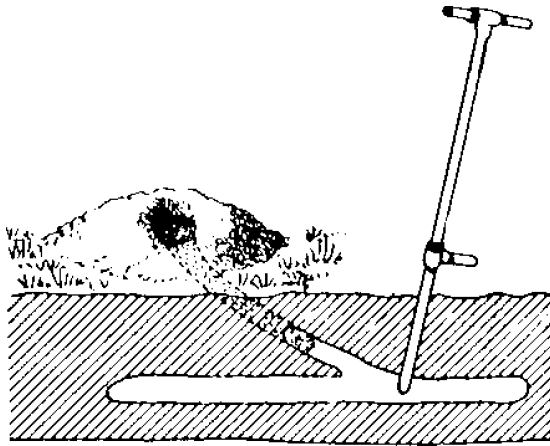


Figure 1. Correct way to use runway probe.

**Hand baiting.** Bait can be placed in a burrow system by hand by using a special hand-operated bait dispenser probe, or by making an opening to the burrow system with a probe.

With a commercially made reservoir-type bait probe dispenser, a button is pushed when the probe is in a burrow, and a metered dose of bait drops into the burrow. Care should be taken to avoid pushing the probe down into the floor of the tunnel, which would greatly reduce the possibility of the gopher finding it. If you do not have a bait dispensing probe, a rod can be used to make an opening from the surface of the ground to the burrow. Place about a tablespoon of bait down each of two or three openings. This is much quicker than digging open the burrow tunnel. It is recommended, for best control, to dose each burrow system in two or three different places. Be sure to cover the probe holes with a sod clump so the pocket gophers do not cover the bait when attracted to the opening in their burrow.

## Locating the Main Runway

The key to the efficient and effective use of these methods is usually locating the main burrow system. The main runway generally is found 12 to 18 inches away from the plug on the fan-shaped mounds. Push a 1/4-inch solid rod into the ground to locate the main burrow, which will be 6–12 inches deep. As you push the rod into the ground, it will become easier to push when the tip enters the runway.

## Mechanical Burrow Building

The burrow builder delivers bait underground mechanically so large areas can be economically treated for pocket gopher control. This machine is tractor-drawn and is available in a standard hydraulically operated unit or a three-point hitch model (fig. 2).

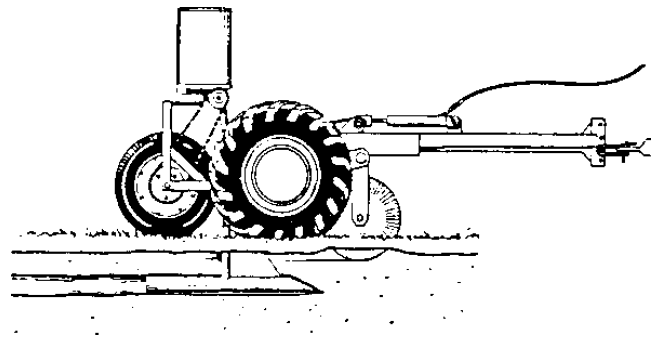


Figure 2. A tractor-drawn mechanical burrow builder machine can be used to control pocket gophers. It automatically dispenses poison bait into the artificial burrow it creates.

The device consists of a knife and torpedo assembly that makes the artificial burrow at the desired soil depth, a coulter blade that cuts roots of plants ahead of the knife, a seeder assembly for bait dispensing, and the packer wheel assembly to close the furrow behind the knife. The seeder box has a metering device for dispensing various poison baits at desired rates.

The artificial burrows should be constructed at a depth similar to those constructed by gophers in your area (generally 6 to 12 inches). The artificial burrows may intercept the gopher burrows or the gophers may inquisitively enter the artificial burrows, gather bait in their cheek pouches, and return to their burrow system to eat the bait. Artificial burrows should be constructed when the ground is moist, spaced at 20- to 25-foot intervals.

Recommended application rates of 1 to 2 pounds per acre of 0.3 to 0.5% strychnine alkaloid grain should provide an 85 to 95% reduction in the gopher population. The burrows are generally spaced at 20- to 25-foot intervals when the ground is moist. Burrow builders can be borrowed from district offices of USDA-APHIS Animal Damage Control in Albuquerque (761-4640), Roswell (623-3310), and Las Cruces (527-

6980). It is important to follow directions provided with burrow building machines.

### Fumigants

Federally-registered fumigants include aluminum phosphide (Fumitoxin, Phostoxin®), carbon disulfide, carbon tetrachloride, and gas cartridges with various active ingredients. Fumigating is successful in treating pocket gophers only when the soil is moist so diffusion of the gas is minimized.

### Traps

Trapping is a good way to control pocket gophers on small areas, and to remove remaining animals after a poisoning program.

There are two general types of pocket gopher traps: spring traps (Macabee®, Victor®, or Death-Klutch 1) and box traps (Death-Klutch 2). Trapping can be done year-round because gophers are always active, but a formidable effort is required for trapping when the soil is frozen. Trapping is most effective when gophers are pushing up new mounds, usually in spring and fall.

Although some success can be had by trapping lateral runways, greater success will usually be achieved by trapping in the main runway (fig. 3).

After locating the main runway, a small hole should be dug (a post-hole digger works fine) and all dirt should be removed from the tunnel. A trap should be placed in each direction and attached to a stake at the surface with a cord or wire.

A piece of plywood or cardboard is placed over the hole and dirt is packed around the edges. Do not prevent all light from entering the tunnel. The gopher will be caught by trying to block a small amount of light with soil. However, if too much light enters the tunnel, the gopher may push out a large amount of soil to block the light. This may spring the trap and let the gopher escape.

Check the traps daily and leave them in place for a day or two after you catch a pocket gopher. If a trap is not sprung within 48 hours, move it to a new location.

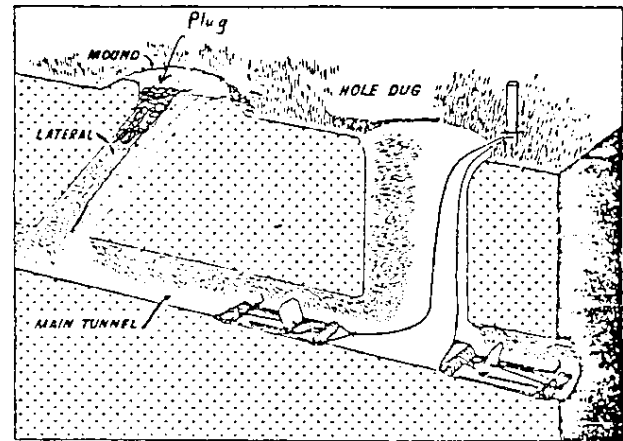
Traps are available in hardware stores, from irrigation district offices throughout New Mexico, and through USDA-APHIS (see Mechanical Burrow Building for office locations).

### Other Methods

In flower gardens or other areas where landscape disturbance is not desirable, some success has been achieved by flooding pocket gophers out with water from a garden hose. The hose is inserted into the lateral tunnel and water is poured into the tunnel system until the gopher is flushed out. This method can only be used in new tunnel systems, and only where other damage from the water will not be a factor.

Fumigating of pocket gopher holes with gasoline, propane, or exhaust from an automobile has been reported but **is not**

**recommended** because of safety hazards. These methods could result in serious explosions or the placement of toxic fumes in undesirable areas.



**Figure 3. Trap placement in main pocket gopher tunnels. Note that traps are staked. After the traps are in place, the hole is covered with plywood and sealed with soil.**

### BENEFIT OF POCKET GOPHERS

Although, in many cases, the damage caused by pocket gophers is the overriding factor, the benefits of pocket gophers should be recognized. Some of these are:

- increased soil fertility by adding organic matter such as buried vegetation and fecal wastes.
- increased soil aeration and decreased soil compaction.
- increased rate of soil formation by bringing sub-soil material to the surface of the ground, subjecting it to weatherization.
- increased water infiltration.

### ACKNOWLEDGMENTS

Much of the information presented here was adapted from R.M. Case and B.A. Jasch (1994) in *Prevention and Control of Wildlife Damage*, Great Plains Agricultural Council, University of Nebraska, Lincoln, NE.

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Reprinted March 2005

Las Cruces, NM  
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