Guide to Pocket Gopher Control in Montana

MONTGUIDE MT 200009
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Pocket gophers are the burrowing rodents that leave soil mounds on the surface of the ground. Often confused with ground squirrels and other small mammals, pocket gophers can be distinguished by their telltale signs as well as by their appearance.

To add to the confusion, many people in Montana call ground squirrels "gophers." Unlike ground squirrels, which 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. The mounds they create are usually fan shaped, and tunnel entrances are plugged, keeping intruders out of burrows.

Pocket gophers can cause considerable damage to agricultural land and underground features such as utility cables and irrigation pipe, but there are several effective ways to control and prevent the destructive results of their prolific burrowing.

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

Fig. 1 Pocket gophers are found throughout Montana.

incisors: all adaptations to their underground existence (figure 1).

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

Pocket gophers are medium-sized rodents ranging from about five to nearly 10 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. This great variability in size and color is attributed to adaptations to local conditions that result from a low dispersal rate which limits gene flow.

Habitat

Pocket gophers occupy a wide variety of habitats. They occur from low coastal areas to elevations above 12,000 feet. They are also found in a wide variety of soil types and conditions, reaching their greatest densities on fertile, light-textured soils with vegetation, especially when that vegetation has large, fleshy roots, bulbs, tubers or other underground structures.

Soil depth and texture are important to the presence or absence of gophers. Tunnels are deeper in sandy soils where soil moisture is sufficient to maintain the integrity of the burrow. Shallow soils may be subject to cave-ins, and will not maintain a tunnel. Light textured, porous soils with good drainage allow for good gas exchange between the tunnel and the atmosphere. Soils 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 above-ground 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, even small trees. They are strict herbivores and any animal material in their diet appears to be accidental. Alfalfa is apparently 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 exception are when mating occurs and when the female is caring for her young.

The pocket gopher digs with its claws and teeth and kicks soil, rocks and other items away from the digging area with its hind feet. Then the gopher turns over 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 ground and parallel to the 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.

Some parts of a burrow may be as deep as 5 or 6 feet. Deeper branches off the main burrow are used as nests and food caches. The diameter of a burrow is about 3 inches, but varies with the body size of the gopher. Enlargements along the main tunnel are usually feeding and resting locations. Nest chambers have dried grasses and other grasslike plants formed into a sphere. 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 one to three mounds 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. It constitutes a home range of up to 700 square yards which the inhabitant rigorously defends against intruders.

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 to 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. These predators include weasels, coyotes, and several snakes including bull, and rattlesnakes.

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 the sickle bars used in 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 Montana by federal or state law.

Damage Prevention and Control Methods

Exclusion

Because of the expense and limited practicality, exclusion is of little use. Fencing of 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-inch hardware cloth will do. Cylindrical plastic netting placed over the entire seedling, including the bare root, reduces damage of newly planted forest seedlings significantly.

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.

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 gophers, the bait must be placed in their tunnel systems by hand or by a special machine known as a burrow builder.

When using toxicants BE SURE TO FOLLOW ALL LABEL DIRECTIONS.

The most widely used toxicant is strychnine alkaloid (0.31 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 nontarget 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.

Anticoagulants are now available for pocket gopher control. The only registered product is 0.005% (active ingredient) chlorophacinone (RoZol). Follow label instructions when using. Chlorophacinone is only registered for hand baiting and it is not a restricted-use pesticide.

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 some of these methods is 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 (figure 2.).

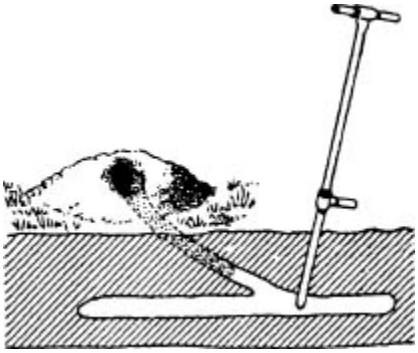

Fig. 2. Right way of using runway probe

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 (figure 3.).

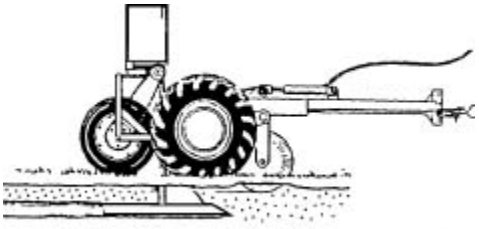

Fig. 3. A tractor-drawn mechanical burrow builder machine can be used to control pocket gophers. It automatically dispenses poison bait into the artificial burrow it creates

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.

Artificial burrows should be constructed at a depth similar to those constructed by gophers in your area. The artificial burrows may intercept the gopher burrows or the gophers may inquisitively enter the artificial burrows, gather bait in the cheek pouches and return to their burrow system to eat it. It is important to follow directions provided with burrow building machines as well as the label instructions on the poison bait.

Fumigants

Federally registered fumigants include aluminum phosphide (Fumitoxin, Phostoxin), carbon disulfide, carbon tetrachloride, and gas cartridges with various active ingredients. Fumigation is successful in treating pocket gophers only when the soil is moist enough to minimize diffusion of the gas.

Traps

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

If a trap has a solid trigger pan, trapping in the main runway will usually achieve greater success (figure 4.). If you trap in the lateral tunnel a gopher will often bury this type of trap without springing it.

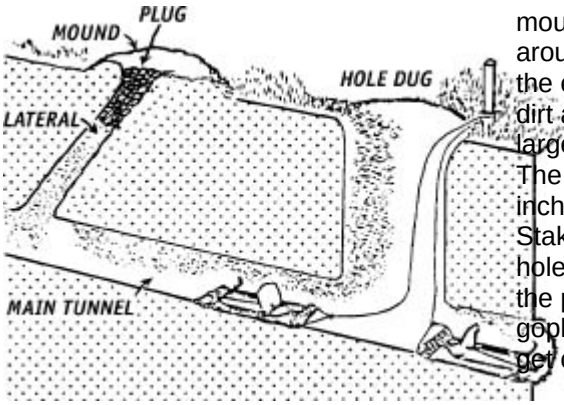

Fig. 4. Placement of a solid pan trap in main pocket gopher tunnel.

After locating the main runway, dig a small hole (a post-hole digger works fine) and remove all dirt from the tunnel. Place traps in each direction and attach them to a stake at the surface with a cord or wire.

Place a piece of plywood or cardboard over the hole and pack dirt around the edges to prevent light or air from entering the tunnel system.

A relatively new trap (figure 5.) has been developed with an open trigger pan, which is triggered by the pocket gopher attempting to plug the hole. This type of trap can by used very effectively in the lateral runway. This eliminates the need to probe and dig to access the main runway.

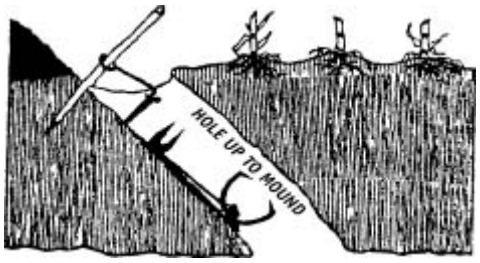

Fig. 5. An open pan trap placed in a lateral runway.

When using a trap with an open trigger pan, you must first locate and open the plug of a fresh mound. Use your finger to poke around and find the softer dirt of the entrance. Clean out the loose dirt and make the opening only large enough to insert the trap. The trap jaws should be 8-12 inches down into the lateral tunnel. Stake the trap. Do not plug the hole. The light and air will attract the pocket gopher. When the gopher tries to plug the hole he will get caught.

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 from hardware and garden supply stores. Open pan traps are available from P-W Mfg. Co. (888-278-2186).

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 a garden hose. Insert the hose into the lateral tunnel and pour water 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.

Fumigation 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.

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 subsoil material to the surface of the ground, subjecting it to weatherization.
- Increased water infiltration

Acknowledgments

Much of the information presented here was adapted from S.E. Hygnstrom (1994) in Prevention and Control of Wildlife Damage, University of Nebraska, Lincoln, NE.

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