

CONTROLLING PROBLEM POCKET GOPHERS AND MOLES

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Two small mammals, pocket gophers and moles, spend most of their lives underground and can cause a lot of concern and frustration to people above-ground. The pocket gopher and mole, while engaging in their daily activities, leave their telltale marks on lawns and gardens, on golf courses, parks, cemeteries, and on alfalfa fields and rangelands. Sometimes they damage irrigation canals and dikes and chew into underground cables. They can also create root damage to young trees.

People in direct contact with pocket gophers and moles need to weigh their economic losses against the cost of control before they declare war!

While the burrowing activities of pocket gophers and moles can be irritating, the effects are not all bad. Their digging allows the subsoil brought to the surface to weather. This helps build the topsoil. Body waste and plant materials stored underground also add to soil fertility. Water that drains into the burrows carries with it solvents that help break up subsoil particles and rock masses below. Snow melts more slowly on porous ground than on hard-packed soil, so water remains longer in the looser soil.

Once control efforts start they must remain a part of the overall management plan for a long time to come. Reduced populations of pocket gophers and moles can be expected to gradually move into an area when control measures are relaxed. Once you decide to undertake control procedures, it is important for successful control that you understand some facts about moles and gophers.

The skull of a mole is similar to that of a coyote, while the gopher skull is typical of a rodent. Moles are insectivores--they primarily eat earthworms. Gophers are rodents--they are strictly vegetarians.

Moles and gophers also leave different visible sign of their presence. It is important to learn how to distinguish mole sign from gopher sign because control measures are different for each. Moles leave circular mounds on the surface of the ground as they push the earth to the surface with their front paws through the center of the mound.

These underground mammals "swim" through the soil much the same way a person using the breast stroke swims in water. The mole pushes the dirt with its shoulders and up and outward with its paws. In so doing this type of digging, the moles leave heaved ridges from near-the-surface tunnels they make as they hunt their food supply of earthworms, grubs and other insect larvae.

Because they need lots of food--from 25 to 100 percent of their body weight daily--moles range over large areas. The home range of moles is over 20 times as large as that of pocket gophers.

Pocket gophers leave numerous large earth mounds. They push the earth up in lateral burrows that are about 15 inches away from and usually at right angles from their main underground tunnels located about 10 inches below the surface.

Because gophers are larger and dig in a different way, their mounds will be more numerous and more closely spaced than mole mounds. It's been estimated that each gopher will transport $2\frac{1}{4}$ tons of soil to the surface each year.

Counting the number of mounds--especially during the active spring and fall months--is not a reliable way of taking a gopher or mole census. Both moles and pocket gophers are active year round and both live alone except during the spring mating season. Experts believe that 7 to 10 pocket gophers per acre is an abundant population; while 2 to 5 moles per acre is a lot of moles!

If you should catch a glimpse of an Eastern mole--the only species found in the Great Plains--it will be about 5 inches long and weigh about a quarter of a pound. The velvet-like fur will vary in color from nearly black to silvery-gray. The mole has an elongated snout-like nose, small eyes with no external openings, and no external ears. Its front feet are large and modified for digging.

Moles are more numerous in the eastern Great Plains states because they prefer to work in moist, loamy, or sandy soils. They find it hard to survive in heavy clay, stony, gravelly, or dry soils.

The Eastern mole has just one litter a year of 2 to 5 young. The breeding season is in the spring.

The appetite and feeding habits of moles give them their bad name. Even though the mole is a principal aerator and mixer of topsoil, his burrowing can disfigure lawns, golf courses, and other grassy areas. If mice and shrews also use the mole passageways, they may destroy plant seeds, roots, and bulbs.

Plains, Northern, and Southern varieties of the pocket gopher are found in the Great Plains. An adult Plains gopher, the most common variety found in this area, tips the scales at about a pound and measures 10 inches long. His short fur is usually a light brown color all year.

Pocket gophers have only one litter of 3 to 9 young per year--between April and July. Females reproduce when they are one year old.

Pocket gophers take their name from their pocket-like cheek pouches. The gopher, a strict vegetarian, stuffs these pouches with the roots and plant clippings gathered near the burrows. These foodstuffs are carried to an underground chamber and stored for later winter meals.

Pocket gophers cause the greatest economic damage for farmers when they infest alfalfa fields. They eat the roots of some plants and cover other aboveground plants with their dirt mounds. Besides killing some plants, their activities force farmers to raise siclebars on their mowing machines to avoid dulling the mower blades. This further reduces hay yields. Pocket gophers also create problems in range and grasslands with soil from their burrows. This disturbance allows weeds to take over in these areas, thus reducing grass available for grazing cattle.

Gopher control is frequently recommended to improve deteriorated rangeland. However, reducing the pocket gopher population alone will not produce much change on rangeland. To be effective, control usually must be followed by use

of such management practices as reseeding, deferred grazing, or changes in grazing and land use patterns.

When control methods are necessary, people may hope that natural predators will help. Or they may try such approaches as poisons, fumigants, flooding, exclusion and traps. Both gophers and moles share several natural enemies, such as snakes, weasels, coyotes, badgers, hawks, and owls. Domestic dogs and cats may join in the chase near homes and farmsteads. But these natural predators can only slow down the rate of population increase, especially if other survival factors are favorable.

Some people report good control by using poison bait for mole control such as peanuts. Others report no control. There is little published University research that report on poison peanuts as an effective mole control approach. Others have reported some success in both pocket gopher and mole control using a fumigant. This method is generally unsatisfactory because of the extent of the burrow systems, leakage into the soil and burrowing mammals often plug their burrow. Flooding moles out of their burrows by using a garden hose is another method tried. Again results are inconclusive.

Sheet metal, small mesh wire or concrete should extend two feet above and two feet below the ground to exclude moles and/or pocket gophers. This is an expensive procedure and is warranted only when damage is quite costly.

Setting a trap in a mole surface tunnel is a more effective control device. Mole trapping is more an art than a science. Mole traps are powerful so read the trap instructions carefully. Exercise caution to avoid injuries when setting and handling the traps.

There are currently two types of traps recommended for use in mole damage control. One is the scissor type; the other is the harpoon type.

It's a good idea to use more than one trap. In most cases the homeowner may need to set up to 5 traps. Trapping success usually runs around 20% per night of the traps set. In larger areas, such as a golf course, 25 to 100 traps may be needed to reduce the mole population and so that immigration and reproduction can be overcome.

Choosing a place to set the trap involves looking for a place where the mole surface tunnel travels in a straight line for some distance. Moles use these travel lanes more often than the winding tunnels. Both the harpoon and scissor traps work on the same principle. The mole is not necessarily suspicious of dirt blocking its tunnels since they are often caved in because of animals stepping on them.

As the mole moves through the tunnel it will reconstruct damaged areas. Therefore, it is important that the trigger of the trap is positioned correctly so that it intersects the area of the former tunnel. To check on which tunnels moles are using, smash down the tunnels at several points and mark on a map. Then recheck these places the next day to see where the mole has been active and raised the ridges back up.

After choosing a place to set the harpoon trap, push the trap into the ground so that the trigger pan rests snugly on the depressed ridge and the two pointed supports straddle the runway evenly.

Make sure that neither leg of the harpoon trap is inside of the mole tunnel. If the mole's sensitive nose encounters anything foreign in its runway, the animal will often back up and burrow around or under the obstruction. It is a good idea to set the harpoon trap off once or twice after the trap is in place to insure that there will not be obstructions in the way of the tines. After resetting, release the safety catch. The trap should then be left in place and checked once every 12 hours. If the trap is set off, pull the trap up. Sometimes it is a good idea to dig under the place where the trap was set because the impaled mole sometimes is left in the ground when the trap is pulled up.

The scissor trap employs the same principles as just explained for the harpoon trap. However, this trap can be used down in the deeper mole burrows or in the surface mole burrows as well.

The success of both kinds of mole traps depends on building a firm plug of soil in the center of the tunnel for the trigger to rest upon. In the case of the scissor trap be sure the jaws of the trap will close quickly. In some heavy clay soils this means a track should be prepared for the jaws to travel through to insure quick closure. For your own protection, leave the safety catch "on" while handling this trap as you set it in place. Dig out a portion of the mole runway, wide enough so that the scissor trap can be placed in the gap.

After you locate the runway passage, dig below the floor of the runway about an inch or two so that the jaws of the trap can encircle the burrow. Place the set trap in the opening. Remove the trap and fill in the gap with loose soil. Then pack the soil in the place where the trigger will rest. Put the trap back in place with the trigger snugly against the top of the dirt plug. Before removing the safety catch, tap the back part of the trigger down. This causes the trap to have a "hair trigger." This is important to the success of this particular type of mole trap. Remove the safety catch as the last step. Then mark a map with the locations of all traps so you can quickly find them again. Traps can be spray painted in order to be more visible.

Moles are active during both the night and daylight hours, so you should check your traps twice a day. Some mole tunnels are used only once when they are dug and the mole never returns to them. If a trap is set and not sprung in 24 hours, reset that trap at another location.

If traps are set off but no moles are caught, reset the traps using a more compacted plug under the trigger. Also, set the trap a little deeper. Using several traps in the area for one mole will generally insure your chances of trapping the animal in one day.

Using traps is also an effective method of reducing the pocket gopher population and damage on relatively small areas or following use of poison to keep immigration down. Success depends upon the proper use of the trap. Like mole trapping, gopher trapping is an art.

Currently there are three types of pocket gopher traps used. One is the box trap, the second type is the spring trap and the third type is the Macabee trap.

Other basic equipment needed to trap pocket gophers includes a garden

trowel, a trap stake and wire and some engineering flags.

To start the control process, locate fresh workings of the gopher. To locate the tunnel, push the fresh mound aside and look for the earth plug where the gopher has filled up the lateral tunnel. This can usually be identified by the subsoil which is a different color than the soil on the surface of the ground. With the trowel dig down until you reach the open burrow, usually anywhere from 2 to 16 inches.

Set the trap far back in the tunnel. Loose soil can be used to partly cover the firmly bedded trap. Attach one end of a piece of wire to the trap and the other to a stake. This will keep a wild animal from dragging the gopher and trap off during the night.

Some people cover the burrow entrance so that the size of the opening is reduced and less light reaches the trap. Other people report success by completely covering the burrow entrance.

Mark all of your trapping sites with engineering flags. This speeds up the checking process later. If you open up a lateral tunnel, a tunnel going in one direction, set only one trap. Set two traps--one in each direction--if you open up the main tunnel.

Air rushing into the burrow system will attract the gopher since they instinctively close all open burrows to keep out natural elements. Pocket gophers also travel around their entire burrow system every few hours.

As the gopher checks its burrows or as the gopher tries to plug the opening, it will be caught in the trap. Traps should be checked every four to eight hours.

Repeated misses by a sprung trap or blocked burrows with set traps buried calls for adjustments in the trap and/or trapping procedure.

In situations where pocket gophers are causing damage in large areas such as alfalfa fields, a device called a burrow builder can be used if the soil conditions are right. The machine consists of a corn planter-type feed mechanism, a dish blade, a subsoiler torpedo, and two rubber tires as packers. The burrow builder makes an artificial burrow and at the same time places poison grain at intervals inside this created burrow.

The amount of bait normally used is 2 pounds per acre. The machine is attached to a tractor and pulled back and forth across a field making a series of parallel burrows about 10 inches underground and about 25 feet apart.

The single dose poison is usually affixed to grain sorghum. Be careful to follow label instructions exactly when you use this restricted use chemical. Pick up any bait spilled on the ground to prevent accidental poisoning of other animals.

Soil condition is critical when using the burrow builder. If the soil is not moist enough to hold its shape when compressed in your hand, then the burrow builder should not be used. The grain feed tube system of the burrow builder can easily become clogged. So check the feeder often during use to make sure that the bait is distributed efficiently. Where a large population

of pocket gophers are present, try using a burrow builder once a year in the spring and follow up with a hand applicator or traps.

Many people use a commercial type hand applicator to apply poison grain to individual fresh gopher burrows. Or a person can use a home-made hand applicator by welding a step and a pointed rod to a short length of pipe.

When probing to locate the main burrow when using either of these devices, find the plug where the gopher has filled up the lateral tunnel and left a horseshoe-shaped depression, or plug, on the fresh mound. The main burrow will usually be about 15 inches away from the mound on the same side as the horseshoe depression. You can feel the release of ground friction as the probe drops into the runway. In the case of the commercial applicator, a release of about a tablespoon of poison grain is made by pushing a release button. Or in the event a home-made probe is used, a person can place a small amount of poison into the main burrow.

The durability of the bait in the ground lasts for about 2 to 3 weeks. Springtime and fall are the best times to control gophers with poison. During July and August is the poorest.

Not every mound in the system needs to be baited. Placing the poison in only two or three placed within each system of mounds should control the problem gophers.

Again, we remind you to consider whether the damage and inconvenience caused by moles and gophers warrant a full-scale control program. Once you start you need to follow through in order to achieve the results you want. Re-population depends upon the percentage killed and the proximity of other mole or pocket gopher populations.

Kansas State University, Cooperative Extension Service has a slide set available, as just described in the presentation. This slide set is for sale and would be useful to anyone in the Great Plains area teaching animal damage control regarding the eastern mole or plains pocket gophers.