

Controlling Nuisance Moles

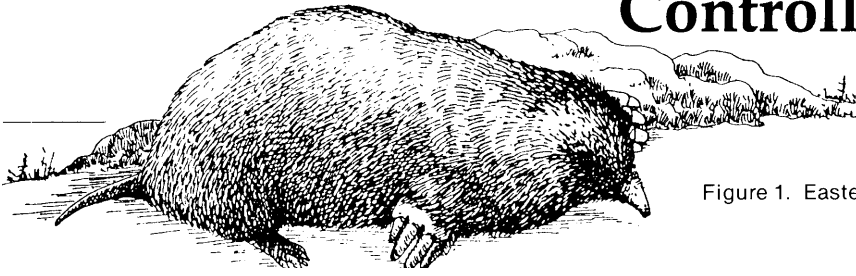


Figure 1. Eastern mole

Moles are small mammals that spend most of their lives in underground burrows (Figure 1). They are similar in appearance and size to shrews and meadow mice and may occupy the same habitat. They are seldom seen by humans; when seen, they are frequently mistaken for mice or shrews. Only one species—the eastern mole—lives in Kansas. The most conspicuous features of the mole are the greatly enlarged paddle-like forefeet and prominent toenails, which enable the mole to literally swim through the soil. The legs are strong, the neck short, and the head elongated. Moles lack external ears and their eyes are so small that at first glance they appear to be missing.

lawns, gardens, golf courses, pastures, or other grass and turf areas.

The upheaved ridges of mole tunnels make lawn mowing difficult. Since the roots are disturbed, grass may turn brown and unsightly (Figure 2). Moles rarely eat flower bulbs, ornamental, or other vegetative material while tunneling, but plants may be physically disturbed as moles tunnel in search of animal organisms in the soil. Mole activity may indirectly damage vegetation, but their feeding on insects and other soil organisms is beneficial.

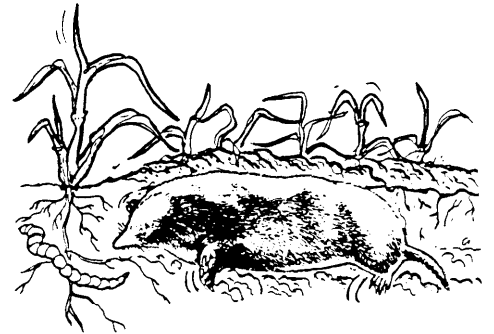


Figure 2. Moles “swim” through soil, often near the ground surface. In doing so, they may damage plants by exposing roots to drying.

A mole's fur is soft and brownish to grayish with silver highlights. When brushed, the fur offers no resistance in either direction; this enables the mole to travel either backward or forward within burrows.

Moles may be found in woodlands, grasslands, and lawns. They construct extensive underground passageways—shallow surface tunnels for spring, summer and fall, and deep, permanent tunnels for winter use. Nest cavities are located underground, connecting with the deep tunnels.

Moles have high energy requirements. They actively feed day and night at all times of the year. They feed on mature insects and snail larvae, spiders, small vertebrates, earthworms, and occasionally take small amounts of vegetation. Earthworms and white grubs are favorite foods.

Moles prefer loose, sandy loam soils and avoid heavy, dry clay

soils. Mole activity in lawns or fields usually shows up as ridges of upheaved soil created where the runways were constructed as the animals moved about foraging for food. Some of these tunnels are used as travel lanes and may be abandoned immediately after being dug. Mounds of soil called molehills may be brought to the surface of the ground as moles dig deep, permanent tunnels and nest cavities.

Moles breed in late winter or spring and have a gestation period of about four to six weeks. Single annual litters of two to five young are born in March, April, or May. Young moles are born naked and helpless, but growth and development occur rapidly. About four weeks after birth, the moles leave the nest and fend for themselves.

Moles in the natural environment cause little damage. They are seldom noticed until their tunneling activity becomes apparent in

Shrews and meadow mice frequently use mole tunnels as runways and travel lanes. Shrews, like moles, are insectivorous and eat little vegetation. Meadow mice eat a wide variety of vegetative matter and may damage plant life. The general similarity in color and appearance of moles, shrews, and meadow mice and their tendency to associate in the same habitat and runways make it essential to understand differences in their habits and to know how to identify each species in the event it becomes necessary to control them.

DAMAGE PREVENTION AND CONTROL METHODS

The mole seems to possess a natural shrewdness and ability to sense danger and can be somewhat challenging to trap.

Cultural Methods and Habitat Modification

In practice, packing the soil with a roller or reducing soil moisture may tend to reduce the desirability of the habitat to moles. Because moles feed largely on insects and worms, the use of certain insecticides to control these organisms may reduce the food supply of moles, causing them to leave the area. However, before leaving the area the moles may increase their digging in search of food, thereby possibly increasing damage to turf or garden areas.

If you wish to try discouraging moles by beginning a control program for white grubs, contact your local Extension agent for a recommended procedure.

Repellents

The repellent Thiram is federally registered for protecting bulbs from mole damage.

Mothballs or moth flakes occasionally are suggested as mole repellents. When placed into the moles' runways, they are reputed to cause the mole to leave. There is little information to substantiate their effectiveness.

Toxicants

There are a number of difficulties in poisoning moles. Since moles normally do not consume grain, poison grain baits are seldom effective. One poison is federally registered for use against moles. The toxicant is zinc phosphide. Ready-to-use grain baits containing this ingredient are often sold at nurseries or garden supply stores.

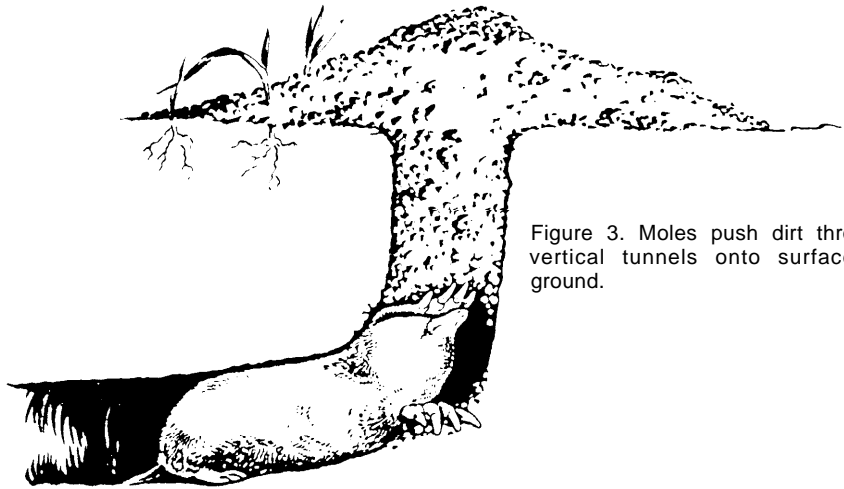


Figure 3. Moles push dirt through vertical tunnels onto surface of ground.

Fumigants

Fumigants are also federally registered for use against moles. They are aluminum phosphide, calcium cyanide, and gas cartridges.

Most of these are Restricted Use Pesticides. These fumigants would have the greatest effectiveness if the material were placed in the deep burrows of the mole, not the surface runways. However, golf course owners report moles can be repelled from surface tunnels. Since state pesticide registrations vary, check with your local Extension Service office for information on toxicants and repellents legal in your area. Care should be taken when using chemicals and the label instructions should be read, understood, and followed.

Mole activity as seen by people are of two kinds—raised ridges or surface tunnels and mounds. These raised ridges or surface tunnels are unique to moles. No other animal leaves these kinds of evidence of its presence. However, mole activity is often confused with pocket gopher activity, especially if people are not familiar with these animals, both of which are present in Kansas.

Moles leave conical-shaped mounds on the surface of the ground. These usually are not

numerous. Most often these mounds contain coarse soil containing clods. These mounds are constructed as shown in Figure 3. The mole pushes this soil to the surface, especially when digging deep runs. These deep runs lead to a nest or provide tunnels for use in the winter. In the construction of these mounds, the mole pushes the soil up through the center of the mound much like a volcano is constructed.

The site of these mole mounds would be a good place to use fumigants, since these mounds are believed to signify deep runs or nest areas.

People often confuse pocket gopher mounds with mole mounds. The pocket gopher is a rodent and has different feeding habits from a mole. Traps designed to catch moles will not normally catch pocket gophers or vice versa.

So, it becomes very important to correctly identify which animal you have in the damage situation. In some areas, both animals occur in the same place.

The pocket gopher does not construct raised ridges or surface tunnels. The pocket gopher digs two kinds of tunnels—one about 5 to 8 inches under the surface

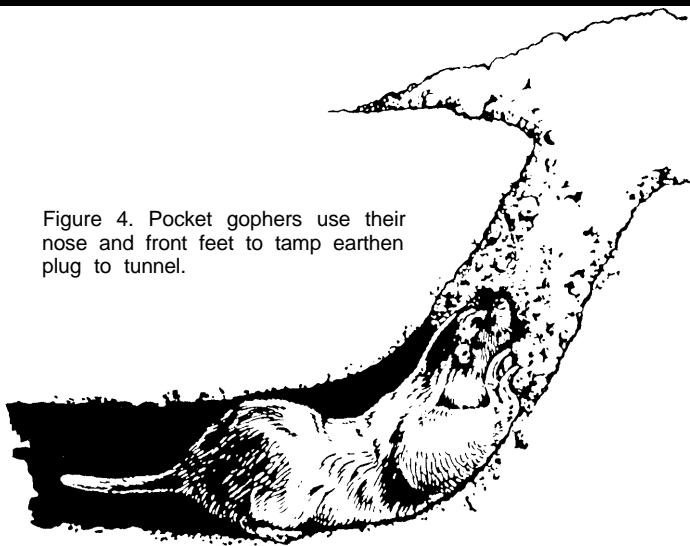


Figure 4. Pocket gophers use their nose and front feet to tamp earthen plug to tunnel.

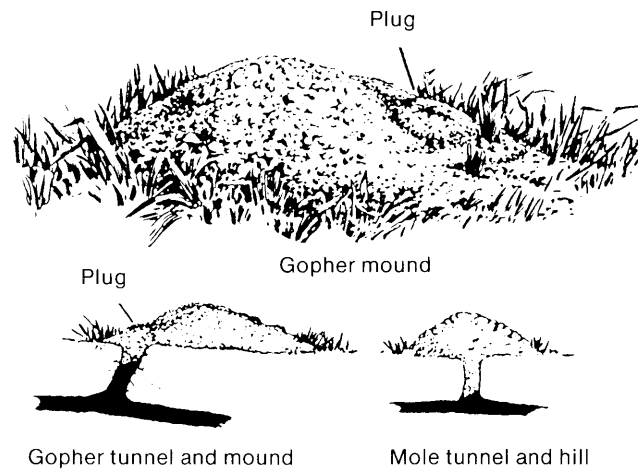


Figure 5. Comparison of gopher mound and mole hill.

and other deeper tunnels that may go down several feet below the surface. Unlike the mole, the pocket gopher constructs many mounds. These mounds are of finely sifted soil. Sometimes these mounds might be rather large, but most often contain about a half gallon of soil. In Figure 4, the readers can see how the pocket gopher builds these mounds. The pocket gopher digs a main tunnel then digs a lateral side tunnel to create the mound, thus getting rid of soil accumulated in digging the underground tunnels.

In Figure 5, see a side view of both a mole mound and a pocket gopher mound. Remember you need to use the right kind of trap for the right animal—a mole trap for a mole and a pocket gopher trap for a pocket gopher.

Traps

Trapping is the most successful and practical method of getting rid of moles.

There are three excellent mole traps on the market. Each of these, if properly handled, will give good results. These traps each depend upon the same mechanism for releasing the spring. A broad trigger-pan triggers the trap as the mole upheaves the depressed portion

of his surface burrow over which the trap is set. The brand names of these traps are: Out O' Sight, Harpoon mole trap, and Nash (choker loop) mole trap (Figure 6). The Harpoon trap has sharp spikes which impale the mole when driven into the ground by the spring. The Out O' Sight trap has scissor-like jaws which close

firmly across the runway, one pair on either side of the trigger-pan. The Nash trap has a choker loop that tightens around the mole's body.

These traps are well suited to moles because they capitalize on the mole's natural habits. They can be set without exciting the animal's suspicions by entering or introducing anything into its burrow, and they are sprung by the mole in following its natural instinct to reopen obstructed passageways.

Success or failure in the use of these devices depends largely on the operator's knowledge of the mole's habits (see Figures 12 and 13, page 6) and of the mechanism of his trap.

To set a trap properly, select a place in the surface runway where there is evidence of fresh work and where the burrow runs in a straight line. A satisfactory way to place the trap is to dig out a portion of the burrow, locate the tunnel, and replace the soil, packing it firmly beneath where the trigger-pan of the trap will rest.

With the Harpoon trap, raise the spring, set the safety catch and push the supporting spikes into the ground, one on either side of

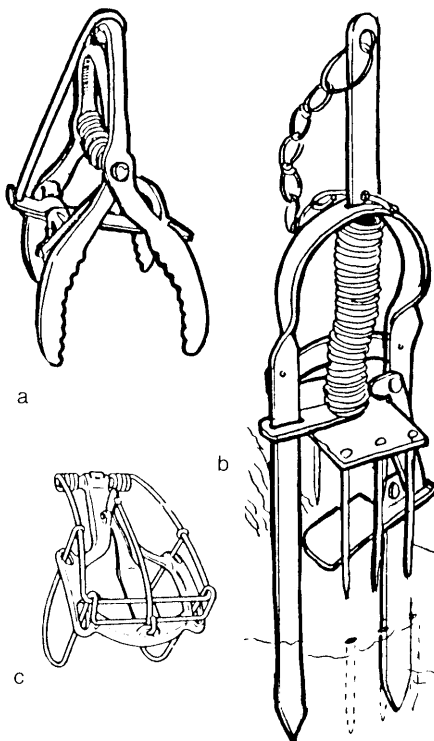


Figure 6. (a) Out O'Sight (scissor-jawed), (b) Harpoon, and (c) Nash (choker loop).

the runway (Figure 7c). The trigger-pan should just touch the earth where the soil is packed down. Now release the safety catch. Do not tread upon or otherwise disturb any other portion of the mole's runway.

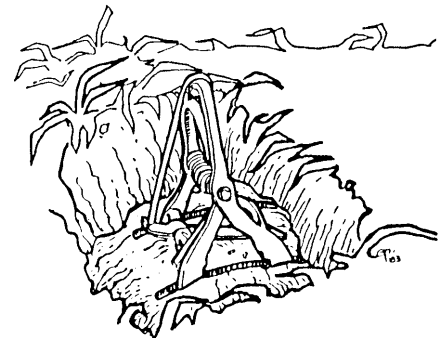
In setting a scissor-jawed trap, dig out a portion of a straight surface runway and repack it with fine soil as shown in Figures 7a and 7b. After setting this trap, secure it with a safety hook with its jaws forced into the ground. It should straddle the runway, Figure 8a, until the trigger-pan touches the packed soil between the jaws. The points of the jaws are set about an inch (2.54 cm) below the mole's

runway, and the trigger-pan should rest upon the portion as previously described.

Take care to see that the trap is in line with the runway so the mole will have to pass directly between the jaws. In heavy clay soils, be sure to cut a path for the jaws (Figure 8b) so they can close quickly. The jaws of this trap are rather short, so be sure the soil on the top of the mole run is low enough to bring the trap down nearer to the actual burrow. Set the trigger on all mole traps with a hair trigger (Figure 9). This is the last and most important step. Release the safety hook. Be careful when handling these traps.



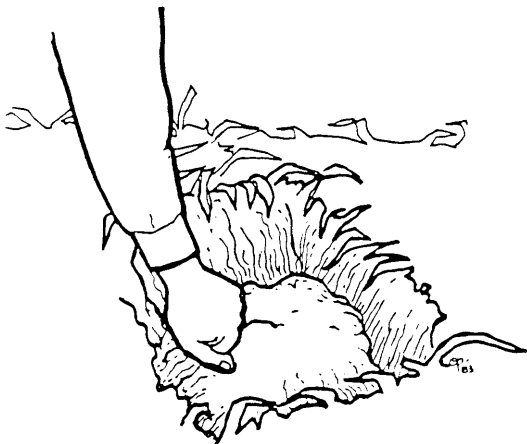
Figure 8. (a) The scissor-jawed trap is set so that the jaws straddle the runway.



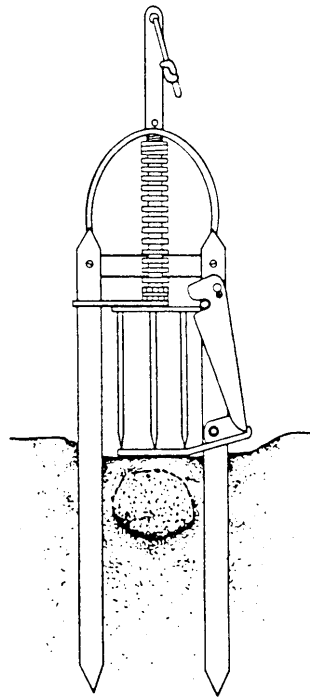
(b) In heavy soils, make a path for the jaws to travel so they can close quickly.



Figure 7. (a) Excavation of a mole tunnel is the first step in setting a mole trap.



(b) Replace the soil loosely in the excavation.



(c) The harpoon type trap is set directly over the runway so that its supporting stakes straddle the runway and its spikes will go into the runway when tripped.

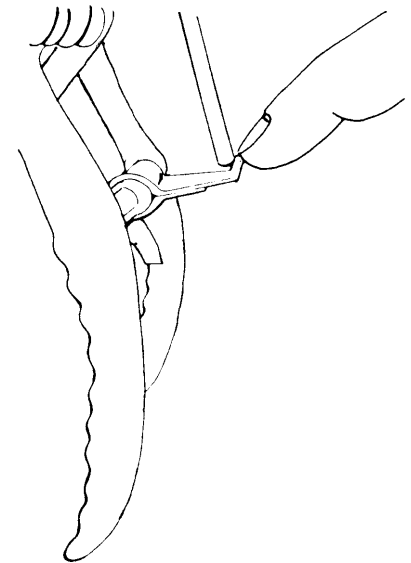


Figure 9. Regardless of the type of mole trap used, set the trigger so it will spring easily. A hair trigger setting on the scissor-jawed trap is shown here.

In setting a choker trap, it is usually necessary to make an excavation across the tunnel. Make it a little deeper than the tunnel and just the width of the trap (Figure 7a). A garden trowel is handy for this. Note the exact direction of the tunnel from the open ends, and place the set trap so that its loop encircles this course (Figure 10). Block the excavated section with loose, damp soil from which all gravel and debris have been removed. Pack the soil firmly underneath the trigger-pan with your fingers and settle the trap so that the trigger rests snugly on the built-up soil. Finally, fill the trap hole with enough loose dirt to cover the trap level with the trigger-pan and to exclude all light from the mole burrow.

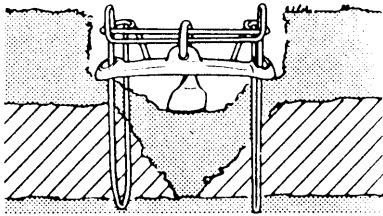


Figure 10. The choker loop trap is set so that the loop encircles the mole's runway.

If a trap fails to produce after two days, it can mean (1) the mole has changed its habits, (2) the runway was disturbed too much, or (3) the trap was improperly set and detected by the mole. In any event, move the trap to a new location.

Catching Alive. If one cares to take the time, moles can be caught at work early in the morning or evening where fresh burrowing operations have been noted. Approach very quietly where the earth is being heaved up. Suddenly strike a spade into the ridge behind the animal and throw the animal out on the surface. If no spade or other suitable tool is at hand, stomp the burrow down behind the mole with your foot and then stomp directly over the mole.

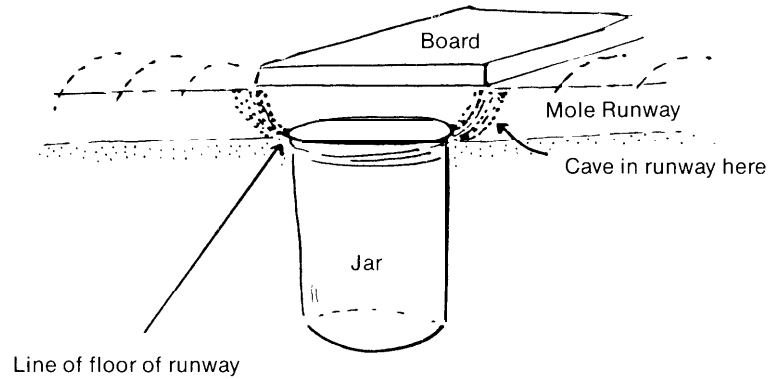


Figure 11. A mole can be live-captured in a pit trap. Be sure to use aboard or other object to shut out all light. Cave in the runway just in front of the jar on both sides.

A mole occasionally can be driven to the surface by permitting a stream of water from a hose or ditch to run into an open burrow for some time. Another method is to bury a three-pound (1.4 kg) coffee can or a wide mouth quart (0.951) glass jar in the path of the mole and cover the top of the burrow with a board (Figure 11).

Other Methods

Nearly everyone has heard of some sure-fire home remedy for controlling animals, especially moles. In this category are the many and varied materials recommended for placement within the burrow system. In theory such things cause the mole to die or at least pack up and leave. Such cures suggest placing broken bottles, ground glass, razor blades, thorny rose branches, bleaches, various petroleum products, sheep dip, household lye, and even human hair. Others include mole wheels, pop bottles, windmills, bleach bottles with wind vents placed on sticks, and other similar gadgets. Though colorful and sometimes decorative, these add nothing to the arsenal of effective mole control methods.

Other cure-alls are the so called "mole plant" or caper spurge,

(*Euphorbia lathris*) and the castor bean. Advertisers claim that when planted frequently throughout the lawn and flower beds, such plants supposedly act as living mole repellents. No known research supports this claim.

In the past few years, several electromagnetic devices or "repellers" have been marketed for the control of rats, mice, gophers, moles, ants, termites, and various other pests. The claimed effects upon rodents include cessation of feeding and reproduction, disorientation, and dormancy or death by dehydration. These same devices were reported to have no harmful effects on domestic livestock, cats, dogs, bees, earthworms, or other "useful" animals or insects.

Laboratory tests have proved no such results. Unfortunately, there are no "short cuts" no "magic wands" when controlling moles. Some garden experts, in their frustrations with not knowing a better method than trapping, recommend the use of chewing gum inserted in mole burrows. There is no proof that this is effective and on a trial basis this has proven ineffective.

ECONOMICS OF DAMAGE AND CONTROL

Before initiating a control program for a mole, be sure that particular mole truly is out of place. The mole plays an important role in the management of soil and of grubs that destroy lawns. One of the most abundant of small mammals, the mole has for ages been working over soil and subsoil. A part of this work is visible at the surface but much of it is not. This tunneling and shifting of soil particles permit better aeration of the soil and subsoil, carrying humus farther down and bringing the subsoil nearer the surface where the elements of plant food may be made available.

A large percentage of the diet of moles is made up of white grubs, those scourages of grass and other valuable plant roots. Stomach analyses show that nearly two-thirds of the moles studied had eaten white grubs. One had performed the astonishing feat of eating 175, another 73, and another 55.

If the individual mole is not out of place, mark it down as an asset and proceed accordingly. If a particular mole or moles are where you do not want them, remove the moles. If excellent habitat is present and nearby mole populations are high, control will be difficult. Often other moles will move into the areas recently vacated.

Acknowledgments

Figures 1 and 2 from Schwartz and Schwartz (1981).
Figures 3 through 9 by Jill Sack Johnson

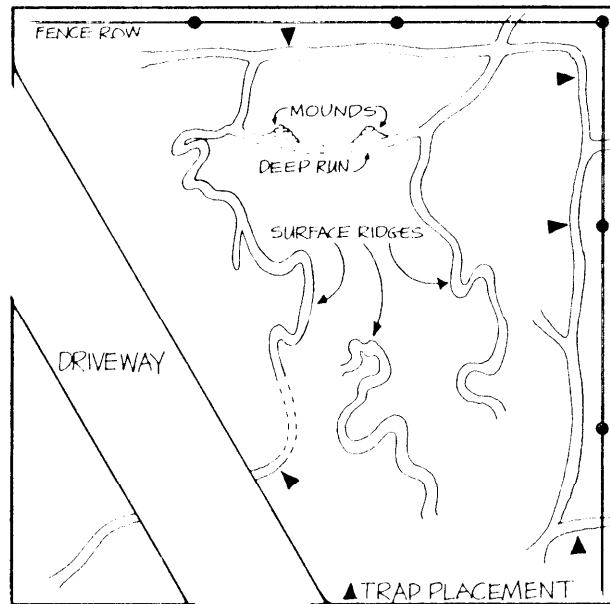


Figure 12. A network of mole runways in a yard. The arrows indicate good locations to set traps. Avoid the twisting surface ridges, and do not place traps on top of mounds.

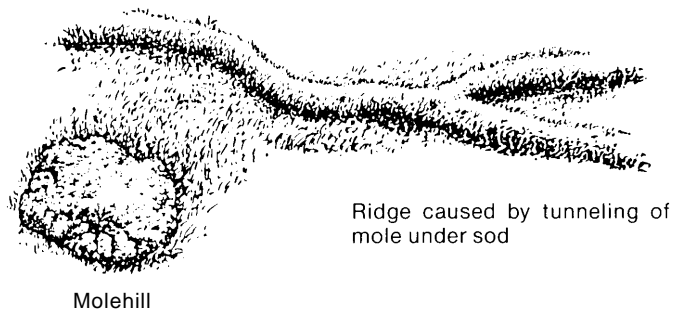


Figure 13. Mole sign.

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