

MU Guide

Controlling Nuisance Moles

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Moles are small mammals that spend most of their lives in underground burrows. They are seldom seen by humans. When seen, they frequently are mistaken for mice or shrews. The eastern mole (*Scalopus aquaticus*) is the only species that lives in Missouri. It is found throughout the state (Figure 1).

The most conspicuous features of the mole are its greatly enlarged, paddlelike forefeet and prominent toenails, which enable it to “swim” through the soil. Moles have strong legs, short necks and elongated heads. They lack external ears, and their eyes are so small that at first glance they appear to be missing.

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

Moles prefer moist, sandy loam soils in lawns, gardens, pastures and woodlands. They generally avoid heavy, dry clay soils. They construct extensive underground passageways — shallow surface tunnels for spring, summer and fall; deep, permanent tunnels for winter use. Nest cavities are located underground, connecting with the deep tunnels.

Because moles have high energy requirements, they have large appetites. They can eat 70 to 80 percent of their weight daily. They actively feed day and night at all times of the year. Moles feed on mature insects, snail larvae, spiders, small vertebrates, earthworms, and occasionally small amounts of vegetation. Earthworms and white grubs are preferred foods.

Mole activity in lawns or fields usually shows up as ridges of upheaved soil. The ridges are created where the runways are constructed as the animals move about foraging for food. Burrowing activity occurs year-round, but peaks during warm, wet months. Some of these tunnels are used as travel lanes and may be abandoned immediately after being dug. Mounds of soil



Figure 1. Eastern mole.

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

Moles often are more of a nuisance than a financial liability. The ridges of their tunnels make lawn mowing difficult. Since the roots are disturbed, grass may turn brown and unsightly (Figure 2). Moles rarely eat flower bulbs, ornamentals 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.

Shrews and meadow voles frequently use mole tunnels as runways and travel lanes. Shrews, like moles, are insectivorous and eat little vegetation. Meadow voles eat a wide variety of vegetative matter and may damage plant life. Moles, shrews

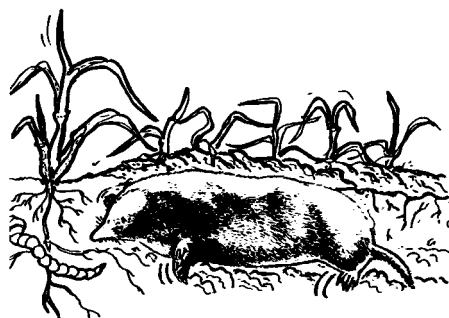


Figure 2. Moles “swim” through soil, often near the ground surface. They may sometimes damage plants by exposing roots to drying.

and meadow voles can be similar in appearance. Because of this, and since they often share the same habitat, you should know how their habits differ so that you can identify each species in case it becomes necessary to control them.

Mole activity

The mole activity people usually see is of two kinds — raised ridges or surface tunnels and mounds. These raised ridges or surface tunnels are unique to moles. No other animal leaves this evidence of its presence. However, mole activity often is confused with that of the pocket gopher, which also is found in Missouri.

Moles leave cone-shaped mounds on the surface of the ground. These usually are not numerous. Most often these mounds contain coarse soil and earth clods.

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 or during the hot times of the summer. In building these mounds, the mole pushes the soil up through the center, much as a volcano is formed.

People often confuse pocket gopher mounds with mole mounds. Pocket gophers are rodents and have different feeding habits than moles. Traps designed to catch moles usually will not catch pocket gophers, or vice versa. Therefore, it is important to correctly identify which animal you have in the damage situation. In some areas, both animals exist in the same place.

The pocket gopher does not construct raised ridges or surface tunnels. Pocket gophers dig two kinds of tunnels — one about 5 to 8 inches under the surface and other deeper tunnels that may go down several feet below the surface.

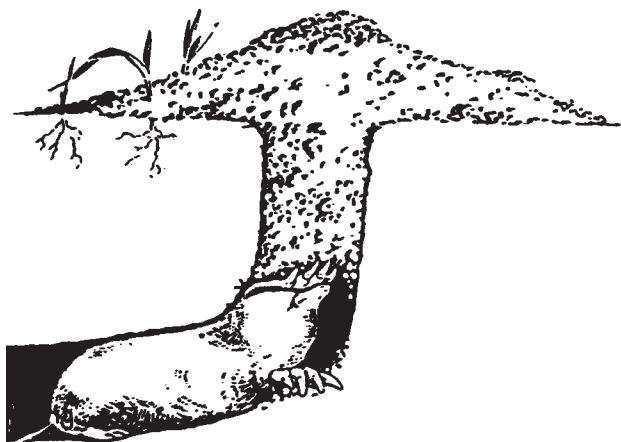


Figure 3. Moles push dirt through vertical tunnels onto the surface of the ground. Mole mounds are good places to use fumigants, since they are believed to mark deep runs or nest areas.

Unlike the mole, the pocket gopher constructs many mounds. These mounds are of finely sifted soil. Sometimes they can be rather large, but most often they contain about one-half gallon of soil. The pocket gopher digs a main tunnel, then a lateral side tunnel to create the mound, thus getting rid of soil accumulated in digging the underground tunnels.

Figure 4 shows side views of a mole mound and a pocket gopher mound. Remember, you need to use the right trap for the right animal — a mole trap for a mole and a pocket gopher trap for a pocket gopher.

Damage prevention and control techniques

The mole seems to possess a natural shrewdness and ability to sense danger. This trait makes moles a challenge to trap.

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

Diazinon used at a rate of one pound active 4 percent granules, or 40 pounds per acre on lawns and around gardens, has been a recommended insecticide for controlling white grubs, thus reducing burrowing activity of moles that seek them for food. The future availability of Diazinon remains in question. Contact your University Extension center for recommended procedures when using insecticides. The user should follow all pesticide precautions and restrictions on the label.

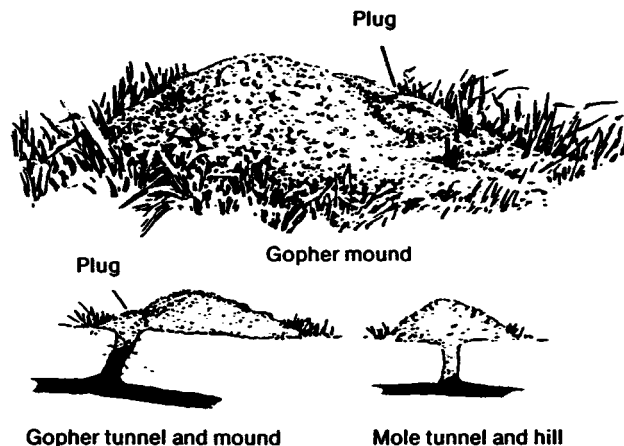


Figure 4. Comparison of a gopher mound and a mole hill.

Repellents. The repellent Thiram is federally registered for protecting bulbs from mole damage. Mole-Med[®], a registered mole repellent with castor oil as the active ingredient, has been shown effective in potentially preventing eastern mole damage to lawn under certain circumstances. In using any repellent, follow directions and application rates provided on the package label. Also be aware that using any repellent for controlling moles has limitations and may not eliminate damage or effectively control the problem.

Mothballs or moth flakes occasionally are suggested as mole repellents. When placed in the mole's runways, they are said to cause the mole to leave. But 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, seeds or nuts, poison 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.

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 are much more effective if the material is placed in the deep mole burrows, not the surface runways.

Since state pesticide registrations vary, check with your University Extension center 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.

Traps

Trapping is the most successful and practical method to get rid of moles and eliminate damage.

There are three excellent mole traps on the market. Each of these, if properly handled, will give good results. These traps each depend on the same mechanism for releasing the spring.

A broad trigger-pan springs the trap as the mole upheaves the depressed portion of the surface burrow over which the trap is set. The brand names of these traps are: Harpoon mole trap, Out O' Sight and Nash (choker loop) mole trap (Figure 5).

The Harpoon trap has sharp spikes that impale the mole when driven into the ground by the spring. The Out O' Sight trap has scissorlike jaws that 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 take advantage of the mole's natural habits. The mole springs the traps by following its natural instinct to reopen obstructed passageways. Another advantage

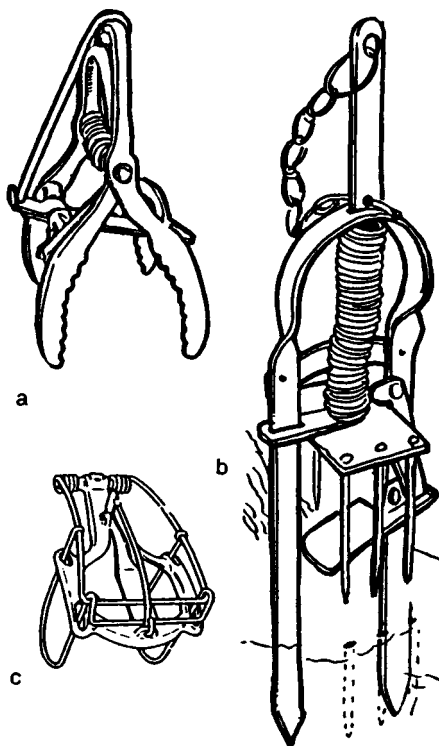


Figure 5. Different mole traps available include (a) Out O'Sight (scissor-jawed), (b) Harpoon, and (c) Nash (choker loop).

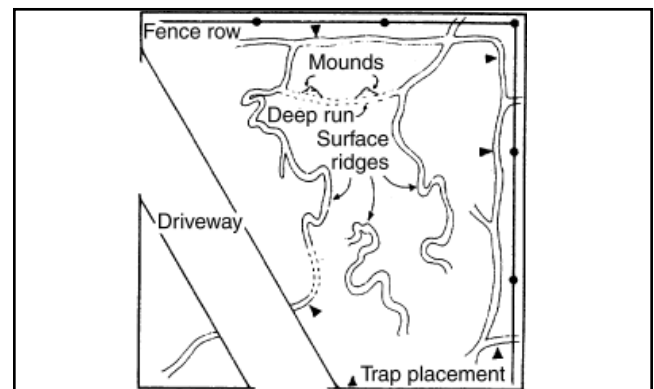


Figure 6. A network of mole runways in a yard. The arrows indicate good locations to set traps. Avoid the twisting surface ridges and do not place traps on top of mounds.

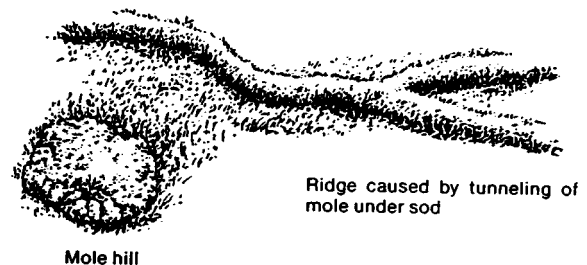


Figure 7. Mole sign.

of the traps is that they can be set without arousing the animal's suspicions, since you do not have to enter or put anything into its burrow.

The success or failure of these traps depends largely on the operator's knowledge of the mole's habits (see Figures 6 and 7) and the trap mechanism.

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. To place the trap, 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 the runway (Figure 8c). The trigger-pan should just touch the earth where the soil is packed down. Now release the safety catch. Do not step on 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 8a and 8b. After setting this trap, secure it with a safety hook with its jaws forced into the ground. It should straddle the runway (Figure 9a) until the trigger-pan touches the packed soil between the jaws. The points of the jaws are set about an inch 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 9b) 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 10). This is the last and most important step. Release the safety hook. Be careful when handling these traps.

In setting a choker trap, it usually is necessary to dig a hole across the tunnel. Make it a little deeper than the tunnel and just the width of the trap (Figure 8b). A garden trowel is useful 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 11). 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 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.

If a trap fails to produce after two days, it can mean (1) the mole changed its habits and is no longer using the runway, (2) the runway was disturbed too much, or (3) the trap was improperly set and the mole

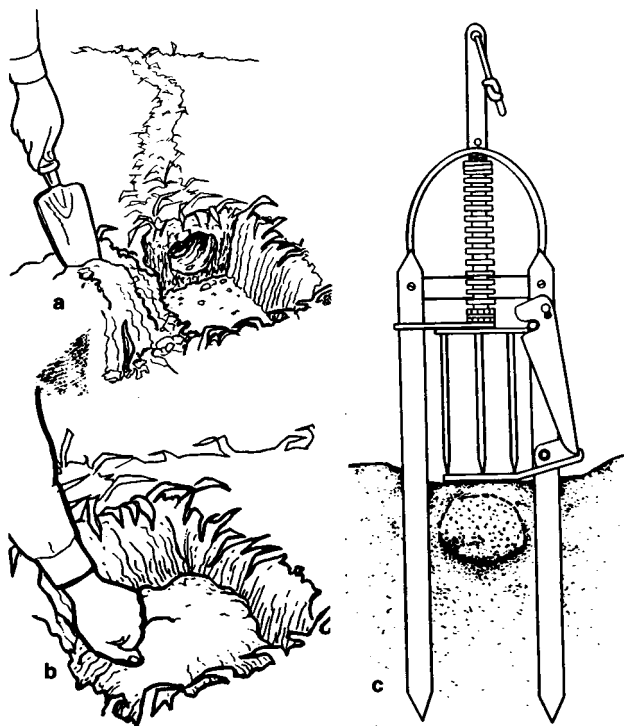


Figure 8. (a) Excavating a mole tunnel is the first step in setting a trap. (b) Replace the soil loosely in the excavation. (c) The harpoon-type trap is set directly over the runway so that its supporting stakes straddle it and its spikes go into it when tripped.



Figure 9. (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.

detected it. In any event, move the trap to a new location.

Catching moles 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 onto the surface.

A mole occasionally can be driven to the surface by pouring a stream of water from a hose or ditch into an open burrow for some time. Another method is to bury a three-pound coffee can or a wide-mouth quart glass jar in the path of the mole and cover the top of the burrow with a board (Figure 12).

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 leave.

Suggested remedies have included using 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 "mole plant," or caper spurge (*Euphorbia lathris*), and the castor bean.

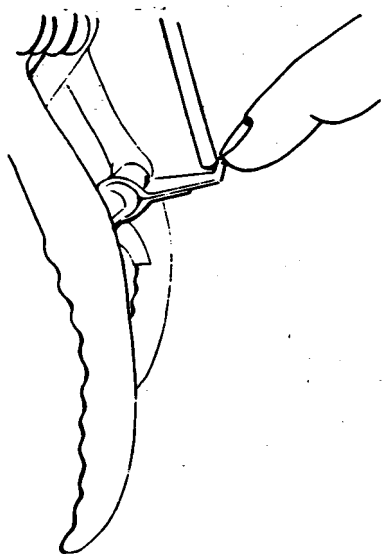


Figure 10. Regardless of the type of mole trap used, set the trigger so it will spring easily. A hair trigger setting on the scissor-jawed trap is shown here.

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.

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 on rodents include stopped 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 and insects. Scientific testing has not confirmed any of these claims.

Unfortunately, there are no "short cuts" or "magic wands" when controlling moles. Some garden experts, frustrated by lack of knowledge about trapping, recommend the use of chewing gum inserted in mole burrows. There is no proof that this is effective and on a trial basis it has proven ineffective.

Economics of damage and control

Before initiating a control program, be sure the mole you are after is truly 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 small mammals, the mole works the soil and subsoil. This tunneling and shifting of soil particles permits 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.

In addition, a large percentage of the diet of moles is made up of white grubs, those scourges of

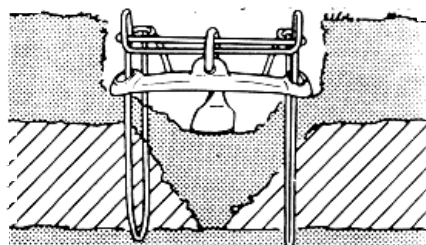


Figure 11. The choker loop trap is set so that the loop encircles the mole's runway.

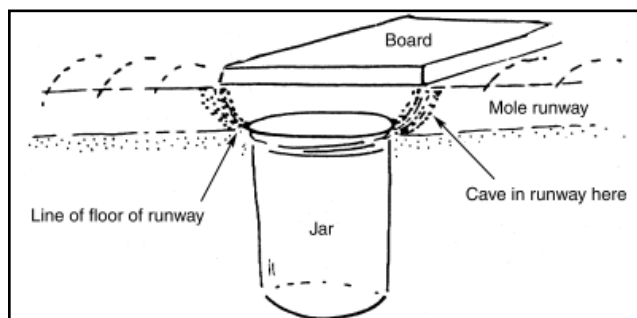


Figure 12. A mole can be captured alive in a pit trap. Be sure to use a board or other object to shut out all light. Cave in the runway just in front of the jar on both sides.

grass and other valuable plant roots. Stomach analyses have revealed that nearly two-thirds of the moles studied had eaten white grubs, with one mole eating as many as 175.

If the individual mole is not out of place, mark it down as an asset and proceed accordingly. If you do have moles where you don't want them, remove the

moles. But if excellent habitat is present and nearby mole populations are high, control will be difficult. Often other moles will move into areas that have become vacant.

Information in this publication is adapted from *Controlling Nuisance Moles*, F. Robert Henderson, Extension Bulletin C-701, Cooperative Extension Service, Manhattan, Kansas.

The University of Missouri intends no endorsement of products named here. Neither does it imply criticism of similar products that are not mentioned.

