

## Moles and Their Control

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The NebGuide describes moles and their habitat and provides recommendations for their control, including the use of traps, food reduction, repellents, fumigants, and toxic baits.

The eastern mole (*Scalopus aquaticus*) is a burrowing mammal, not a rodent, found throughout Nebraska. Moles are well adapted for a life of digging. They lack external ears and have tiny eyes concealed beneath their fur. Their front feet are wider than they are long (Figure 1). Webbed toes support strong claws and their palms turn outward. The paddle-like forelimbs move laterally, enabling moles to “swim” through the soil.



Figure 1. Eastern mole, *Scalopus aquaticus*.

Sometimes people confuse moles with pocket gophers (Figure 2) because both build mounds of soil. Neither is seen very often and their stocky body types and powerful forequarters are somewhat similar. The two species, however, are not closely related. They differ in structure, behavior, and type of damage they cause. Moles have small, sharp incisors and canine teeth that are used for catching and eating grubs and earthworms. Gophers are rodents and have large incisors, like squirrels and mice, that are used for gnawing. They primarily eat plant parts. Moles build small, conical-shaped mounds (usually less than 1 foot in diameter) by pushing soil out of vertical tunnels. Gophers build relatively large, fan-shaped mounds (greater than 1 foot in diameter) by pushing soil out of inclined tunnels.

### Mole Facts

Moles have short, velvet-like fur that varies in color from gray to brown. A fully grown mole is 4 to 6 1/2 inches long,

not including its short tail. Adults weigh 3 to 5 ounces. The eastern mole has a long naked snout with nostrils that open upward. Moles have a voracious appetite and can eat 70-100 percent of their weight daily. They feed while burrowing just below the surface of the ground where their preferred foods, including insect grubs, adult insects, and earthworms, are abundant. Plant parts are eaten only occasionally.

Moles live alone, but burrow systems of several moles may connect. Burrowing occurs year-round, peaking during warm wet months. When making feeding tunnels near the surface, moles may burrow up to one foot per minute. A single mole can create an extensive network of burrows. Moles tend to burrow along structures, fence lines and walkways. Therefore, one animal can be responsible for considerable damage to a lawn or garden.

Breeding takes place in February and March; young are born 42 days later. Females produce one litter of four or five young per year. Young are independent of their mother at one month and reach sexual maturity in one year.

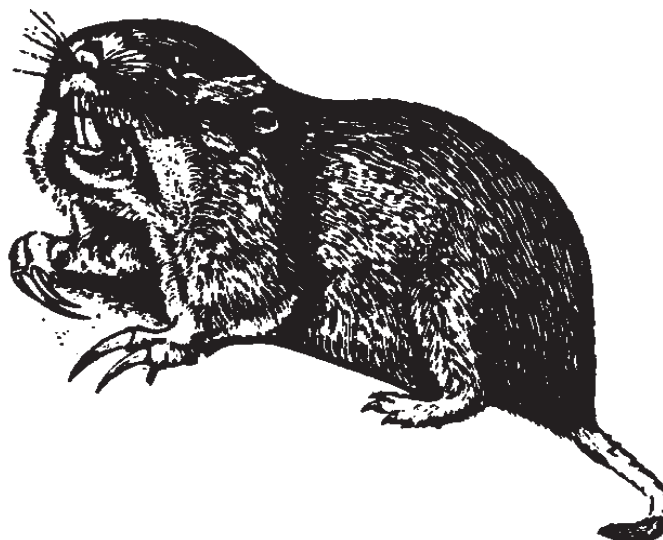


Figure 2. Plains pocket gopher, *Geomys bursarius*.

In the Great Plains, moles exist only where habitat is suitable. Quality habitat for feeding and construction of permanent runways must be available for moles to become numerous. They rarely exceed a density of three moles per acre. Permanent burrows and nests are usually located in

areas protected by trees, stumps, fence rows, buildings, or sidewalks. Although moles may tunnel anywhere, feeding grounds often are shaded by trees, with cool, moist soils near the surface. Burrows that are made while searching for food tend to wander in no apparent direction and appear on the soil surface as raised ridges (Figure 3). Small mounds are created when moles burrow deep or tunnel under solid objects such as tree roots or sidewalks.



Figure 3. Raised ridges made by moles while searching for food.

### Economic Importance

Moles are often more of a nuisance than an economic pest. Mounds and surface burrows interfere with mowing and mole activities may disturb root systems and kill grass. Occasionally, mole damage in golf greens, fairways, cemeteries, and commercial turf is economically significant. Although moles feed on beneficial invertebrates as well as lawn pests, they rarely affect the populations of either. Moles seldom eat roots, bulbs, or other plant materials.

The maze of burrows created by moles may provide cover and travel lanes for many species of small mammals. Voles (*Microtus* spp.), deer mice (*Peromyscus* spp.) and house mice (*Mus musculus*) can live and travel in these underground corridors. By enhancing the habitat of other pests, moles may be indirectly responsible for damage that these rodents cause to bulbs, seeds, and garden plants.

### Controlling Damage

Before starting a management program, determine the significance of the damage. During moist conditions, turf may re-root when tunnel ridges are pushed downward.

### Food Reduction

It is occasionally suggested that if grubs are eliminated from an area, moles also will disappear. Grubs, however, make up only a portion of a mole's diet. During dry periods, moles are known to frequent well-irrigated lawns just for moisture. Thus, moles often are present even in grub-free yards. If all the earthworms, grubs, and other soil-borne animals in a lawn are eliminated by repeated insecticide applications, moles may be forced to seek other areas. Before moving on, however, moles may increase foraging and burrowing activity for several weeks. The use of soil insecticides is an expensive approach with no immediate reduction of damage and little likelihood of

long-term control. In the process, soil insecticides may cause the loss of beneficial soil invertebrates and may be a hazard to songbirds and other desirable wildlife.

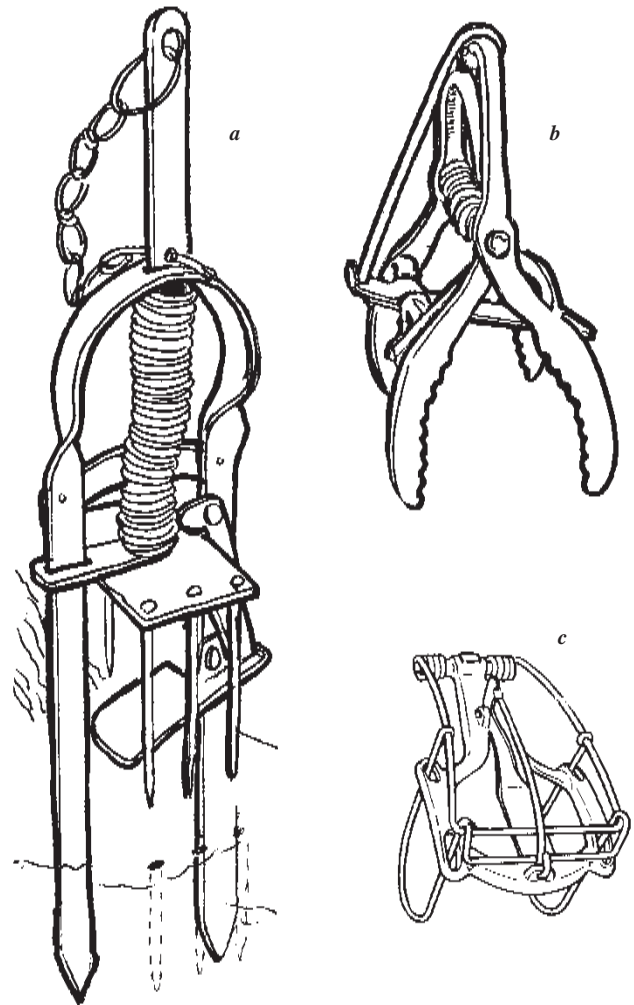


Figure 4. Mole traps (a) Victor® (harpoon), (b) Out O' Sight® (scissor-jaw), and (c) Nash® (choker-loop).

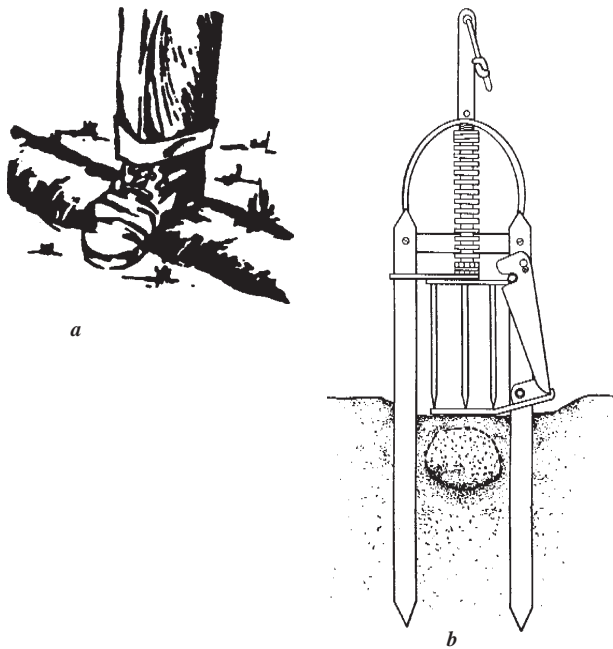
### Mole Barriers

A physical barrier can be installed to prevent moles from entering a given area. Barriers offer long-term protection, but are only practical for small areas and unique situations. Barriers can be constructed of 36-inch wide aluminum sheeting or 1/4-inch mesh galvanized hardware cloth. Bury to a depth of 24 to 30 inches and allow 6 inches to extend above the ground surface.

### Trapping

Trapping is the most effective and practical means for controlling problem moles. Success is highest in spring and fall, especially after rains. In winter and summer, burrows are deeper in the soil and more difficult to locate.

The most popular types of mole traps include: the harpoon (Victor® or AnneMissille®), scissor-jaw (Out O' Sight®) and choker-loop (Nash® or Victor®) (Figure 4). Each can produce



**Figure 5. Setting a harpoon trap. Pack down a portion of the surface burrow (a) and push the set trap over the burrow until the trigger-pan rests firmly on the depressed ridge (b).**

excellent results. Mole traps produce quick kills and with reasonable caution, are safe for the user, pets, and wildlife.

Traps are usually set in surface burrows. Some of these burrows are used frequently by moles and others are traveled in only once. Success is highest when traps are set in active burrows. Burrows that are in disrepair or meander around the soil surface most likely are used infrequently. To find frequently used burrows, look for fresh signs and a burrow that either runs in a straight line, connects two mounds, or follows concrete sidewalks or other structures. Avoid twisting surface ridge runs. If in doubt as to whether a burrow is active, flatten a small section with your foot and check it after an hour or two to see if it has been pushed back up.

During dry conditions, irrigate the landscape prior to setting traps. When setting a harpoon trap, flatten the ridge of an active surface burrow and push the trap into the ground until the trigger-pan rests firmly on the depressed ridge (*Figures 5 a, b*). Set and fire the trap several times to clear a path for the harpoons. When setting a scissor-jaw or choker-loop trap, excavate a small portion of a burrow and loosely replace the soil in the excavation (*Figures 6 a, b*). Set the scissor-jaw trap so the jaws straddle the burrow and the choker-loop trap so the loops encircle the burrow (*Figures 6 c, d*). Set traps carefully. Moles are alert to changes in their environment — if a mole detects a poorly set trap, it will simply burrow around it or abandon that burrow. Move traps to a new location if they are not successful in two to three days.

Moles also can be trapped alive. A simple “pit-fall” trap can be installed by burying a two- to five-gallon bucket in the path of an active burrow. The top rim of the bucket should be level with the bottom of the run. Cover the bucket and small portion of the interrupted run with a board. A mole may reopen the run and fall into the bucket. Moles trapped alive can



**Figure 6. Setting a scissor-jaw or choker trap. Excavate a section of the burrow (a) and replace soil loosely in the excavation (b). Set the trap in the loosely placed soil so that the jaws straddle the burrow (c) or choker loops encircle the burrow (d).**

be released in areas with suitable habitat away from where they can cause problems.

## Repellents

Castor oil and castor oil products, such as Mole-Med® or MoleChase®, have shown favorable results in repelling the eastern mole. In one study, Mole Med® successfully reduced mole activity in an area for over 30 days. To be effective, the castor oil product must be thoroughly watered into the lawn. Irrigate the area to be treated with 1/2 inch of water before applying the repellent solution and follow with 1 inch or more of water. Areas that receive extensive irrigation will quickly lose the repellent to leaching. For best results, spray the entire area that is to be protected. Moles will burrow under a perimeter treatment. Homeowners can prepare their own repellent concentrate by mixing 6 ounces of 100 percent unrefined castor oil (refined is suitable, but expensive) with 2 tablespoons of liquid detergent in 1 gallon of water. This mixture, like the commercial product, is diluted at a rate of 1 ounce per gallon of water and applied liberally with a sprayer (covers about 300 square feet). Preliminary studies have shown that granular materials containing castor oil have been less effective than liquid repellents.

Gopher purge (*Euphorbia lathyris*), also known as “mole plant,” has been promoted as a mole repellent, but the effectiveness of this plant is doubtful. Further, gopher purge is poisonous to humans and may become a problem weed. It is not recommended.

## Predators

Domestic cats and dogs that show interest may be effective at catching moles. Some cats and dogs stalk and dig up moles after seeing the movement in the soil; however, they may damage turf.

## Fumigants

Fumigants can be used to successfully control moles in some situations. They are usually ineffective where soils are porous and dry, or where there are extensive feeding tunnels near the soil surface. Aluminum phosphide, a Restricted Use Pesticide, is registered as a fumigant for mole burrows. Gas cartridges, which produce carbon monoxide and carbon dioxide when ignited, are occasionally effective. For best results, place fumigants in deep runways of the burrow system and seal the openings tightly.

## Toxic Baits

A 0.5 percent formulation of strychnine bait is federally registered as a Restricted Use Pesticide for controlling moles. Since moles feed mostly on insects and earthworms, they rarely eat baits. Toxic baits, therefore, are seldom effective. Bait products in the form of a paste have recently entered the homeowner market (ie. Kaput®). We believe more rigorous testing of these products is needed.

## Other Methods

A variety of home remedies have been tried over the years, including: pinwheels, windmills, broken glass, castor beans, used cat litter, kerosene, flooding, cement, and even chewing gum. Unfortunately, no shortcut solutions exist and most home remedies fail. Several electronic devices have been marketed, but none has proven effective. It is best to use proven methods when attempting to control moles.

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

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