MOLES

Integrated Pest Management for Home Gardeners and Landscape Professionals

The mole (*Scapanus* spp.) is a small, insect-eating mammal. Contrary to a commonly held belief, it is not part of the rodent family. In California, moles inhabit the Sierra Nevada, the coastal range mountains and foothills, as well as the entire coastal zone. They are not usually found in the dry southeastern regions of the state or in much of the Central Valley except for moist areas where the soil is rich in humus, such as riverbanks.

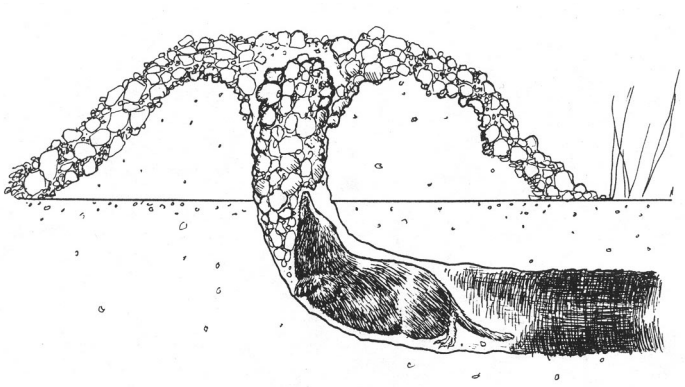

Figure 1. Mole in underground tunnel showing cross section of mound above soil surface.

Moles live almost entirely underground in a vast network of interconnecting tunnels (Fig. 1). They frequently create shallow tunnels just below the surface where they capture worms, insects, and other invertebrates. They can eat some roots, bulbs, and other plant material, but generally the greatest problem caused by moles is their burrowing, which dislodges plants and dries out their roots. In lawn areas, the mounds and ridges resulting from their burrowing are unsightly and disfiguring.

BIOLOGY AND BEHAVIOR

Moles have cylindrical bodies with slender, pointed snouts, and short, bare, or sparsely haired tails. Their limbs are short and spadelike. Their eyes are poorly developed and their ears are not visible. The fur is short, dense, and velvety. Moles have one litter of three or four young during early spring.

Mounds and surface runways are obvious indicators of the presence of moles. The mounds are formed when moles push soil up to the surface from underground runways (Fig. 2). The excavated soil may be in small chunks, and single mounds often appear in a line over the runway connecting them.

Surface feeding burrows appear as ridges that the mole pushes up by forcing its way through the soil. Some of the surface runways are temporary. More permanent tunnels are deeper underground and are usually about 2 inches in diameter and 8 to 12 inches below the surface. Moles are active throughout the year, although surface activity slows or is absent during periods of extreme cold, heat, or drought.

LEGAL STATUS

The California Fish and Game Code classifies moles as nongame mammals. If moles threaten growing crops or other property, the owner or tenant may control the moles using any legal means.

MANAGEMENT

Moles can cause significant problems in landscape or garden areas, especially in turf. Because mole damage can be unsightly, makes lawn maintenance difficult, and destroys valuable plants, the number of moles that can be tolerated is usually quite low, sometimes even zero. As soon as you see an active mound or surface runway, initiate appropriate control actions. Once you have controlled damage, establish a system to monitor for reinfestation.

Several methods of control are available, but no simple method has proven fail-proof, so it may be necessary to use a combination of techniques.

Trapping

Trapping is the most universally applicable and dependable method of mole control. Several different kinds of mole traps are available at hardware stores, nurseries, or directly from the manufacturer. Keep in mind that the best mole traps differ from those for pocket gophers; very few traps are effective for both animals.

Understanding mole behavior helps improve the way you set your traps. To be effective, the trap must be set to

PEST NOTES Publication 74115

University of California
Agriculture and Natural Resources

May 2004

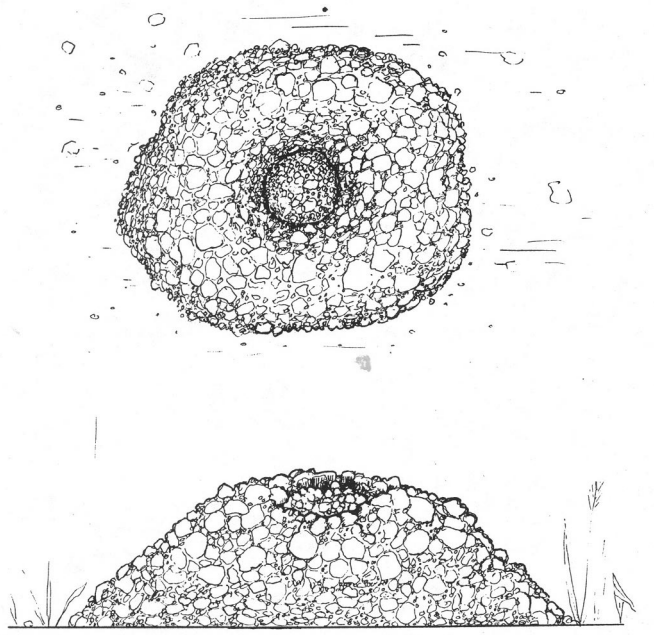

Figure 2. Top and side views of mole mound.

catch the mole underground. When a mole's sensitive snout encounters a foreign object in the burrow, the mole is likely to plug off that portion and dig around or under the object. Therefore, traps should be set to straddle or encircle the tunnel, or be suspended above it.

Moles are undeterred by soil blocks in the tunnel, which occur naturally from cave-ins, and will continue digging through them rather than around them. The upward pressure of the mole's body or the movement of soil against a triggering plate springs the trap.

Moles are active throughout the year and can be trapped at any time. Before setting mole traps, determine which runways are currently in use. Moles dig a system of deep tunnels that are more or less permanently used as well as a network of surface runs used for feeding. Some of the surface tunnels are only temporary so they may not make a good trap set. Moles are more likely to be trapped in the deep runways, which they reuse almost permanently.

To determine where moles are active, tamp down short sections of surface runways and mounds. Observe these areas daily and retamp any raised sections, making note of the areas of activity. The selection of a frequently used runway is very important to the success of your control efforts. Set traps at least 18 inches from a mound and only in those runways used frequently by the mole. You can locate deeper tunnels by probing between or next to a fresh mound with a pointed stick, slender metal rod, or gopher probe. When the earth suddenly gives way, the probe has probably broken through the burrow.

Mole traps are fairly expensive, so most people tend to buy only one. Although one trap may solve the problem, increasing the number of traps will increase the speed and overall success of the trapping program. In California, two major types of mole traps are most commonly used. These are the harpoon type and the scissor-jaw type. Moles have sometimes been caught with certain pincer-type gopher traps set in mole runways, but these are rarely as effective as the harpoon or scissor-jaw mole traps. Trap manufacturers often provide detailed instructions which should be followed carefully.

Set the scissor-jaw trap in the mole's main underground tunnel, which is usually 8 to 12 inches below the surface (Fig. 3). Using a garden trowel or small shovel, remove a section of soil slightly larger than the trap width (about 6 inches). Build a plug of soil in the center of the opened runway for the trigger pan to rest on. Moist soil from the opened tunnel or from a nearby fresh mound can be squeezed together to build the plug. With the safety catch in place, set the trap and wedge it firmly into the opened burrow with the trigger placed snugly against the top of the soil plug. Now scatter loose soil onto the set trap to about the level of the top of the tunnel. This excludes light from the opened burrow and probably makes the mole less suspicious of the plugged tunnel. Release the safety catch, and the trap is completely set. The harpoon trap will work in the deeper tunnels if you set it on a soil plug as described for the scissor-jaw trap. It can also be set on the surface over an active runway ridge that has been pressed down under the trigger pan.

Repellents

Many home remedies have been suggested to solve mole problems. These remedies include placing irritating materials such as broken glass, razor

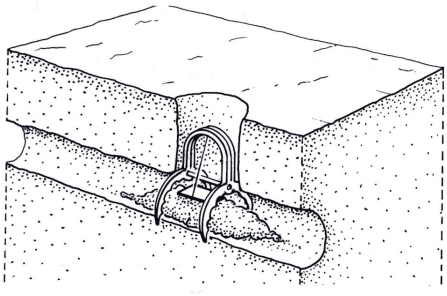

Figure 3. Scissor-jaw trap placed in mole's main tunnel.

blades, thorny rose bush branches, bleach, mothballs, lye, castor oil, and even human hair in the burrow, in an effort to drive moles away. Frightening devices such as mole-wheels, vibrating windmills, and whistling bottles are also commonly recommended in garden literature as repellent techniques. Some garden literature advises using the gopher/mole plant (*Euphorbia lathyris*) as a repellent. Various electrical soil-vibrating and/or sound-producing devices are frequently advertised for mole control, but their effectiveness is not supported by research. None of these approaches has proved successful in stopping mole damage or in driving moles from an area. Commercially available mole repellents have little data to prove that they are effective.

Toxic Baits

Because the mole's main diet consists of earthworms and insects, poisoning with baits is rarely effective. However, a new gel-type warfarin anticoagulant bait that is squeezed directly into the tunnel has been marketed and shows some promise; only time will tell.

Other Control Methods

Some gardeners have found that moles can be detected by watching for "moving" ridges which appear when moles are digging surface runs. If you can see such movements, try using a shovel or other garden tool to dislodge and dispatch the animal.

Installing underground fencing like that used for the control of pocket gophers may provide temporary relief, but with this animal as well, the fences will not last for long. Wire mesh baskets will prevent the moles from heaving planted bulbs out of the ground, and wire mesh bottoms in raised beds will totally exclude moles.

People who have tried flooding moles out of an area or fumigating the tunnels with smoke/gas cartridges have had little success, but it may be worth trying if the effort is persistent. In theory, if moles are deprived of their food supply, they will move to other areas. Insecticide treatments to control soil insect pests may result in less food for moles. Such insect control programs must be done according to label instructions. However, this method is unlikely to effectively control moles.

COMPILED FROM

Salmon, T. P., D. A. Whisson, and R. E. Marsh. In press. *Wildlife Pest Control Around Gardens and Homes*. 2nd ed. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 21385.

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

AUTHORS: T. P. Salmon, D. A. Whisson, and R. E. Marsh
TECHNICAL EDITOR: M. L. Flint
COORDINATION, DESIGN AND PRODUCTION: M. Brush
ILLUSTRATIONS: Figs. 1 & 2: UC ANR Publication 21385, *Wildlife Pest Control Around Gardens and Homes*, 2nd ed.; Fig. 3: UC ANR Publication 3351, *Integrated Pest Management for Strawberries.*

Produced by IPM Education and Publications, UC Statewide IPM Program, University of California, Davis, CA 95616-8620

This Pest Note is available on the World Wide Web (http://www.ipm.ucdavis.edu)

This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Pest Management.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.