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Managing Mole Problems

Eastern Mole (*Scalopus aquaticus)*

Moles are remarkable animals known for how they are specialized for life underground. They are seldom seen by humans and are often mistaken for pocket gophers, mice, or shrews. In fact, the mole is not closely related to any small mammal except the shrew, both belonging to the mammalian order Insectivora. Moles often come into conflict with homeowners when they burrow in yards.

Identification:
Moles are not rodents and do not have characteristic rodent features like large, sharp front teeth. Rather, they have sharp, pointed teeth (like a cat) used for catching and eating grubs and earthworms. The mole's most remarkable features are its adaptations for life underground. It has greatly enlarged "paddle-like" front feet and enlarged toenails uniquely adapted for digging. Mole fur is short, soft, and velvety, and when brushed, offers no resistance in either direction. These two adaptations let moles literally "swim" forward and backward through soil.

Other adaptations for this life include a cylindrical shaped body, a long, tapered snout, and eyes and ears so tiny they almost appear to be missing. The hind legs are very small enabling the mole to turn with ease in a narrow passage. Fully grown moles measure 4-7½ inches long complete with a very short tail. Fur color varies from black to brownish, to grayish with silver highlights.

Mole facts and biology:
The Eastern mole (*Scalopus aquaticus)* and the star nosed mole (*Dylura cristata)* are the two most common moles in New York, and can be found in a variety of habitats dominated by loose, well drained soil. Moles are found in suburban lawns, cemeteries, golf courses, pastures, meadows, woodlands, sandy soils near streams, and light loamy soils. Since they are adapted for life underground, they construct extensive underground tunnels, using two types: shallow surface ones in the spring, summer and fall, and deep permanent ones used year round as the main

avenues of travel. Nest cavities and "home" areas, 6 inches in diameter and lined with vegetation, can be found 12-18 inches beneath the soil surface and connect deep tunnels.

Moles are antisocial, solitary animals (they live alone except to breed). In late April or early May after a 45-day gestation period, 2-to-5 large, hairless, helpless young are born in the underground nest chamber. They are about half grown at 5 weeks and leave the nest to fend for themselves. They become sexually mature in one year.

Researchers studied the Eastern mole and found they are active any time of the day but most active from 4 to 7 a.m. and 6 to 9 p.m., all year. Moles must be very active to meet high energy requirements. In fact, they can burrow as fast as 1 ft/minute. High energy mole food comes as grubs, earthworms, beetles, beetle larvae, insects and insect larvae, snails, and spiders. Moles eat small amounts of plant parts only occasionally. Its appetite is almost insatiable, and captive moles eat constantly as long as suitable food is put in the cage. If captive moles do not get suitable nourishment, they die within several hours. Thus, one mole can be responsible for considerable damage to a lawn or garden.

A mole typically travels 1/5 acre. No more than 3 to 5 moles live on each acre and 2 to 3 is a more common number**.** Thus one mole will usually use more than one person's yard, and for effective control, several neighbors need to cooperate. Moles live 3 to 4 years in the wild. Predators like fox, skunk, owl, and even dogs and cats kill and eat moles. One method of control may be to get a good dog.

Burrowing and Tunneling:

As mentioned previously, moles create shallow and deep tunnels. It is the only animal that will create a surface tunnel. These tunnels are usually temporary feeding burrows. Some may be used as travel lanes, while others may be traveled infrequently or abandoned immediately after being dug. Surface tunnels are more abundant after a warm rain, or during the spring and fall when moles are actively searching for insects or earthworms. Underground tunnels are often very deep, and the only evidence that they exist may be mounds of soil (mole hills) pushed up to the surface. They are used as highways leading from cavities to feeding areas and are used most during hot, dry, or very cold weather when earthworms and insects move deeper into the soil.

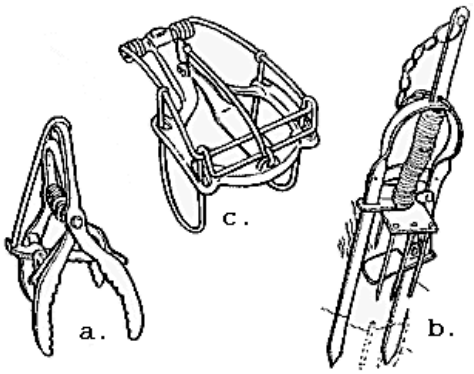
Controlling Mole Damage:

The first step in controlling moles is to actually determine if the mole is the culprit. Because moles are insectivores, they do not routinely eat garden seeds and bulbs, although they are often blamed. The real culprits are probably voles, white-footed mice, or house mice. If your garden had runways in it, the moles are looking for insects and earthworms.

Moles play a beneficial role in the management of soil and control of undesirable grubs and insects. Moles are one of nature's small mammals that have worked for a long time in moving soil around. By tunneling and shifting soil particles, moles permit better aeration of the soil, drying out sod, and allow humus (organic matter) to travel deeper into the soil. This tunneling also allows subsoil material to be moved close to the surface where nutrients may be more available to plant roots. Perhaps the mole's greatest crime is the nuisance it creates in lawns and gardens. If you have this problem, then take control measures.

Trapping:
The most effective way to control moles is trapping. Why is trapping so effective and why is it the recommended control option? The answer lies in the mole's unique biological attributes. As mentioned previously, moles are solitary and have a high energy requirement, which dictates a large feeding territory. Thus mole densities are not as great as you might imagine. A single lawn may have only 1 or 2 moles, which means the offending animals can be removed, and the problem solved. In addition, mole reproduction is so low, that areas are not repopulated quickly.

The habit of moles to quickly open and repair damaged runways provides another advantage in trapping. A mole becomes suspicious when it encounters anything unusual in its burrow, but is not suspicious of soil blocking the runway. When it encounters a blockage, the mole immediately pushes its way into the blocked area, reopens it, and continues on its merry way. Specially designed mole traps (pictured below) take advantage of this habit, and moles do not suspect a trap is hidden there. When preparing to trap moles, be aware that moles are sensitive to anything unnatural in their environment. Be careful not to tear up large amounts of soil or destroy sections of burrows when setting a trap. Also, be aware that a poorly set, or incorrectly placed trap is an immediate danger signal to the mole, and will act as a detour for every mole. Trapping moles takes patience and persistence.



Types of Traps:
Three types of traps are currently available, and work well if used properly. The scissor jaw trap (figure a.) kills while grabbing the animal, while the choker type trap (figure c.) has a loop that tightens around the mole's body. The harpoon type trap (figure b.) has sharp spikes which spear the mole as it passes. You can buy these traps at local hardware, Ag Supply, or feed and seed stores.

When and Where to Trap:
Trap site selection and timing are critically important if trapping is to be successful. Because of the difficulty in placing a trap in a deep burrow, most trapping is done on surface burrows. Remember, surface burrows are used most actively during the spring and fall, and immediately after a warm rain. So trap during these periods, because the likelihood of catching the animal is increased.

To be successful, you must also find an active burrow. Active burrows are relatively straight runways that may connect two systems of foraging activity. A burrow system that ends abruptly has probably been abandoned, and a burrowing system that is highly branched, turning back on itself, is probably a foraging burrow, and may be abandoned. In addition, burrows that have numerous mouse holes, or breaks, are probably not being used.

To find a used burrow, tramp down with your foot on each runway. Within 12 to 24 hours, active runways will be repaired. Then you can put a trap in this location. If the trap has not captured a mole in 3 days, the trap was placed in the wrong location, the runway was disturbed too much, the trap was improperly set and the mole detected it, the mole changed its habits and was not actively using the burrow, or you captured all the moles in the general area.

Repellents:
If moles eat bulbs, an aversive taste repellent, Thiram, is available from a varietyof sources, including Ag supply stores, feed and seed stores, and garden shops. Thiram is available as a liquid so you can dip bulbs in it before planting.

Control Methods that are NOT Recommended:
No known "short cuts" or "magic potions" are useful in controlling moles. One of the most common of these surefire remedies has been to place chewing gum in the burrow. Research has shown that doing so has no effect on the moles, even if they eat it. Do not place broken glass, razor blades, rose branches, bleaches, diesel fuel, lye, sheep dip, or human hair down the burrow system to drive the mole away.

Do not use poison peanuts. Remember, moles eat insects and earthworms, not nuts. Poisons are also a danger to family pets or other wildlife. **NEVER USE A PESTICIDE IN A MANNER INCONSISTANT WITH ITS LABELLING**. Failure to comply with all the provided directions may subject you to federal and/or state penalties.

The use of pesticides or insecticides to destroy the mole's food source is also not recommended. If you have a grub problem, contact your local Cooperative Extension Agent for information on treating the problem. Therefore, treat your lawn for a grub problem, not a mole problem.

Some people think that the Castor bean plant, or the mole plant (*Euphorbia lathyris)* repels moles. However, these plants' repellent properties are doubtful. In addition, they are poisonous to humans. Also, because they easily escape cultivation, they may become a problem weed.

Important Things to Remember:
* Trapping is the only effective control method
* Locate active tunnels
* You have fewer moles in your yard than you think, 2 or 3 per acre at most
* Moles have low reproductive rate. Removing a few moles has a great impact on the population.
* Be patient and persistent. Keep moving the trap until you are successful.
* Do not put chewing gum, chemicals, broken glass, or other items down the burrows.

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Mole photo by Roger Barbour courtesy of:
http://atbi.biosci.ohiostate.edu/atbi/species/animals/mammals/micotrotus_pinetorum.html
Mole trap illustrations courtesy of:
http://www.extension.umn.edu/distribution.naturalresources/DD1139.html