

Moles

Townsend's mole, *Scapanus townsendii*; Pacific mole, *Scapanus orarius*

Host/Site

Moles inhabit moist, highly organic soils throughout western Washington and Oregon, as well as isolated areas of central and eastern Washington and Oregon. Their need for soft soil to tunnel in and sources of worms and grubs makes them frequent pests of cultivated turf and some landscape plantings. They disrupt roots and deposit heaps of cast-out earth on lawns at any time during the year but most often in spring and fall. Moles do not commonly eat plants, but their tunnels provide runs for voles, rats, mice, and pocket gophers, which do damage vegetation. The presence of moles generally indicates that the soil is moist, not overly compacted, and biologically active, including the presence of earthworms.



Cast-out soil indicates mole activity.
Photo by Ken Steffenson

Identification/Appearance

Moles are mammals of the order *Insectivora* (insect-eaters). They have velvety, blue-black to gray fur. Their body construction suits their habitat, since most of their life is spent underground in burrows. They are provided with a sleek skeleton, narrow snout, small ears covered with folded skin, eyes small and shielded, and front feet provided with digging tools (claws large, strong, and outward-pointing). Two different species of moles are most commonly found in the Pacific Northwest, Townsend's mole (*Scapanus townsendii*) being the largest at 8 to 9 inches long.

Two other pests may damage landscapes in ways that can be confused with mole damage. Pocket gophers (*Thomomys talpoides*) create tunnel systems in order to collect roots, bulbs, and other plant parts. They're uncommon in much of western Washington except in southern Puget Sound and in western Oregon. Mountain beaver (*Aplodontia rufa*), a rodent native only in parts of the Northwest and found nowhere else in the world, lives in deep 6-inch wide sloped burrows and eats on the surface, breaking off pieces of plants and sometimes carrying them back to the burrow, where they may line them up on the ground to dry out.

Life Cycle

Moles live for approximately three years, producing one litter per year in the spring, with an average of three young per litter. Young are born from late March to early May, spend one month in the under-

ground grass-lined nest, and emerge nearly full grown. Except for the mating period, these mammals are generally solitary. Moles remain active throughout the year, alternately eating and sleeping, plus spending several hours daily in tunneling and burrow repair. During spring, greater tunneling activity occurs while male moles search for mates. They do not hibernate, staying year round in their network of runways and burrows. Moles are well adapted to their natural habitat and are important participants in forest ecology, removing insects from soil. They eat earth-

worms, grubs, and other soil-dwelling insects. Moles also turn the soil, mix the lower mineral soils with the upper organic layers, and improve soil aeration. The presence of moles, as the top predator in their realm, is an indicator of a healthy ecosystem. Their teeth, small incisors, aren't made to tear roots or tubers but are ideal for pulling prey into pieces. Townsend's mole, however, can ingest some vegetation. Tunnel systems require considerable energy to create and if abandoned by one mole population may be recolonized by others.

Natural Enemies

Various predators hunt moles in the wild. Owls and hawks, skunks, coyotes, and other animals can snatch them during periods when they are traveling above ground or are otherwise temporarily exposed. Domestic dogs, particularly those with burrowing instincts, do hunt moles. Their efforts range from definite kill to simply bothering the mole's habitat. Cats will also hunt moles, occasionally successfully. None of these predators can be counted on for complete elimination of pest moles, but they can keep the population reduced and harassed.

Monitoring/Action Threshold

Visible mole damage includes "molehills" of cast-up soil from burrows, ridges and raised areas above tunnels, and plant root disruption. Major runways ranging in depth from 2 inches to 20 inches often follow fence lines or sidewalks and may lead to water sources. Average runway depth is about 6 inches below ground level. Some mole damage may be tolerated, and the damage is likely to be far less noticeable in hot, dry weather. Moles are often greater nuisances during the spring mating season.

(continued/over)



The Green Gardening Program is a program of Seattle Public Utilities to promote alternatives to lawn and garden chemicals. Funded by the Local Hazardous Waste Management Program in King County.

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The amount of damage acceptable in turf depends on the landscape purpose. A lawn prominently sited or vital to the landscape's aesthetic appearance will require mole management more than a more casual turf. Moles don't specifically kill turf, but their tunnel can disrupt root growth and cause decline. The effort required to achieve adequate mole control in turf can be considerable if populations are high and conditions favorable. If the landscape's location causes moles to be a consistent, recurring problem, consider redesign to remove turf and substitute more mole-tolerant plantings. Moles do provide some benefits and shouldn't be needlessly killed.

Cultural/Physical Controls

Repellents: Dealing with moles has some resemblances to managing deer. Humans have tried many repellents over time, most of them intermittently successful or completely unsuccessful. Stuffing tunnels with sharp thorny branches, human hair, ground glass, or using the supposed mole-repellent plant *Euphorbia lathris* — none of these work. If the area has workable soils, the moles just move over. Moles won't eat chewing gum and avoid laxatives, even if chocolate flavored. Some supposed repellents, such as automotive exhaust, mothballs, or drain cleaner are toxic or dangerous to humans and other garden dwellers without specifically removing the mole. Castor oil mole repellents (e.g. Mole-Med) are available, but results are inconclusive so far.

Flooding runs with water: Spring rains and flooding will sometimes cause moles to leave their runs. Flooding, if undertaken in spring, can reduce mole populations by killing the young moles which cannot escape their nests. Flooding may work if the tunnels and runs are confined to a small area but is no use in a wide-spread set of runs which cannot be filled with water. To attempt this, open a molehill, poke the hose in, and flood for at least 15 minutes. Adults will be able to leave and move on even with the flooding.

Stomping runs: The natural desire to stomp runs can help to monitor mole activity, since moles will clear out the fallen soil. This isn't a method of eliminating moles because they will often move back into the area, attracted by softened soil, but if the population departs, consider stomping. Stomping down and filling in runs can help to prevent new mole colonies from moving into the old tunnels and will also eliminate their use as underground passages by other damaging pests such as voles. Large rocks placed near plants that are frequently undermined can cause moles to reroute tunnels elsewhere.

Barriers: Hardware cloth (1/4 inch wire mesh) buried in an "L" shape, 8 inches deep, will keep tunneling moles out of flower beds. This barrier is best incorporated into new beds.

Trapping: Traps do work, particularly a properly set scissors trap. Trapping is the most effective choice for mole control when it becomes necessary. Trapping is a temporary solution, however. If nothing is done to change the habitat conditions, other moles will return. Since the November, 2000 passage of Initiative I-713, however, making trapping illegal in Washington state, legality of scissors-type mole traps awaits a court test which has not yet occurred.

Chemical Controls

Baits: Grain or corn-based baits are generally not well taken by moles. A bait based on anti-coagulants using chlorophacinone (Mole Patrol or RCO Mole Bait) is registered for use in Oregon and Washington for use on lawns, golf courses, and other turf areas. It's hazardous if consumed by children or pets and often quite ineffective.

Zinc phosphide and strychnine baits are highly toxic and should be avoided. EPA has determined that a single swallow of zinc phosphide baits can be fatal to a small child. Zinc phosphide baits may also injure or kill predatory birds or mammals. Most strychnine baits are restricted-use pesticides, and those that aren't may be used only below ground.

Although it may seem sensible to drive off moles by killing their supply of food, earthworms are beneficial and there are no registered pesticides legal to use on them. The practice of spreading diazinon (a broad-spectrum organophosphate pesticide) puts out a chemical that kills birds, attacks beneficial insects, and can result in water pollution, threatening fish with its runoff. Killing earthworms with insecticide isn't legal, and it's also not an effective method for controlling moles.

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