

Summary of Damage Prevention and Control Methods

POCKET GOPHERS



Figure 1. Plains pocket gopher. Photo by Ron Case.

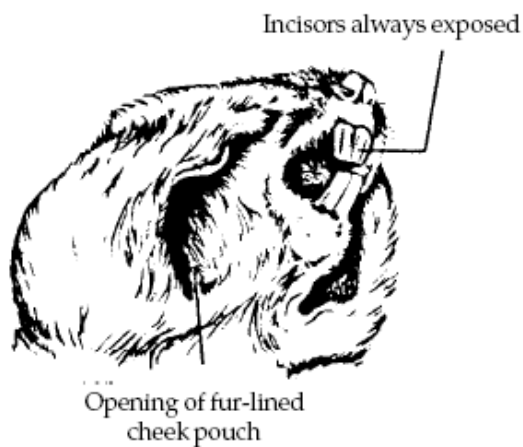


Figure 2. Pocket gophers get their name from the pouches on the sides of their head. Image by PCWD.

OBJECTIVES

1. Describe basic pocket gopher biology and behavior
2. Identify pocket gopher signs
3. Explain different methods to control pocket gophers

HABITAT MODIFICATION

Rotate to annual crops

Apply herbicides to control tap-rooted plants for 2 consecutive years

Flood land

Rotate or cover crop with grasses, grains, or other fibrous-rooted plants

EXCLUSION

Small wire-mesh fences may provide protection for ornamental trees and shrubs or flower beds

Plastic netting to protect seedlings

Protect pipes and underground cables with pipes at least 3 inches in diameter or surround them with 6 to 8 inches of coarse gravel.

FRIGHTENING

Nothing effective

REPELLENTS

None practical

TOXICANTS

Zinc phosphide

Chlorophacinone

FUMIGANTS

Aluminum phosphide and gas cartridges

SHOOTING

Not practical

TRAPPING

Various specialized body-grip traps

Baited box traps

SPECIES PROFILE

IDENTIFICATION

Pocket gophers are so named because they have fur-lined pouches outside of the mouth, one on each side of the face (Figure 1 and 2). These pockets, which are capable of being turned inside out, are used for carrying food. Pocket gophers are fossorial (burrowing) rodents that spend nearly their entire lives underground. Thus, they are seldom seen.

Several mammals are confused with pocket gophers because of variations in common local terminology. For example, in the southeastern US, pocket gophers are called “salamanders” (derived from the term sandy moulder), while the term “gopher” refers to a tortoise.

PHYSICAL DESCRIPTION

Pocket gophers are medium-sized rodents ranging from 5 to nearly 14 inches long. Adult males are larger than adult females. Pocket gophers have small external ears and small eyes. As sight and hearing are severely limited, gophers depend on the sense of touch. The vibrissae (whiskers) on their faces are sensitive to touch and assist pocket gophers while traveling about in their dark tunnels. The tail is sparsely haired, serves as a sensory mechanism to guide backward movements, and is important in thermoregulation (control of body temperature).

Their fur is fine and soft. Color is highly variable and ranges from nearly black to pale brown to almost

white, but generally align with soil coloration. The great variability in size and color of pocket gophers is attributed to their low dispersal rate and limited gene flow, resulting in adaptations to local conditions.

Thirty-five species of pocket gophers, represented by 5 genera occupy the western hemisphere. Fourteen species and 3 genera exist in the US. The major features differentiating these genera are the size of their forefeet, claws, and front surfaces of their chisel-like incisors. Southeastern pocket gopher (*Geomys pinetis*) is the only species occurring in Alabama.

Geomys (Figure 3) have 2 grooves on each upper incisor and large forefeet and claws. Southeastern pocket gophers (*G. pinetis*) exhibit various shades of brown, depending on soil color, and range from 9 to 13.3 inches long.

Other genera mentioned in this document include *Thomomys* and *Pappogeomys*.



Geomys

Figure 3. Characteristics of *Geomys* genus pocket gophers, including doubly-grooved incisors, large front feet, and large claws. Image by PCWD.

SPECIES RANGE

Pocket gophers are found only in the Western Hemisphere. They range from Panama in the south to Alberta in the north.

Southeastern pocket gophers (*G. pinetis*, Figure 4) are found in northern and central Florida, southern Georgia, and southeastern Alabama. Southern pocket gophers (*T. umbrinus*, Figure 4) range primarily in Central America, but occur in extreme southwestern New Mexico and southeastern Arizona.



Figure 4. Range of the southeastern pocket gopher (dark) and southern pocket gopher (light) in North America. Image by PCWD.

VOICE AND SOUNDS

Pocket gophers rarely are seen or heard. They may squeal when caught in traps.

TRACKS AND SIGNS

Pocket gophers leave mounds of soil on the surface of the ground. The mounds usually are fan-shaped and tunnel entrances are plugged, keeping various intruders out of burrows.

Pocket gopher mounds can be distinguished from mole mounds by their shape (Figures 5 and 6). Mole mounds are round and conical because moles push the soil directly above where it falls evenly in all

directions. In contrast, pocket gophers approach the soil surface at a 45° angle so the mound has a tear drop shape. Pocket gophers in colder climates also create what are called hollow tubes of soil called “casts” (Figure 7). These tubes can be seen in spring following a winter with significant snow fall.

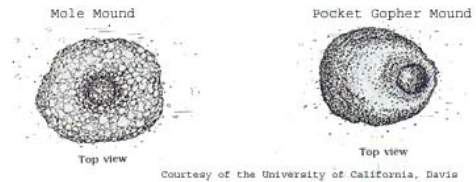


Figure 5. Top view comparison of mole mound (left) with pocket gopher mound (right). Image by University of California-Davis.



Figure 6. Side view comparison of mole mound (left) with pocket gopher mound (right). Image by University of California-Davis.



Figure 7. Casts are made by pocket gophers beneath snow. Photo by Ron Case.

GENERAL BIOLOGY

Pocket gophers are fossorial (live below ground surface) rodents that feed on the roots and stems of various plants.

REPRODUCTION

Reproduction varies greatly among species of pocket gopher. Female plains pocket gophers have one litter per year of three to four young. Yellow-faced pocket gophers can have three litters per year. Young of all species are nursed to maturity (typically 2 months).

BEHAVIOR

Burrowing activity typically increases in the spring when surface soil begins to thaw, and in the fall when pocket gophers prepare for winter.

HABITAT

A wide variety of habitats are occupied by pocket gophers. They occur from low coastal areas to elevations in excess of 12,000 feet.

Pocket gophers are found in a wide variety of soil types and conditions. They reach their greatest densities on friable, light-textured soils with good plant production, especially when that vegetation has large, fleshy tap roots, bulbs, tubers, or other underground storage structures.

Soil depth and texture is critical to the presence or absence of gophers. Shallow soils may be subject to cave-ins and thus will not maintain a tunnel. Tunnels are deeper in very sandy soils where soil moisture is sufficient to maintain the integrity of the burrow. Atmospheric and exhaled gases must diffuse through the soil to and from the gopher's tunnel. Light-textured, porous soils with good drainage allow for good gas exchange between the tunnel and the atmosphere. Soil with high clay content or highly hydric diffuse gases poorly and are unsuitable for gophers.

Pocket gophers sometimes occupy rocky habitats, with no more than 10% rocks in the top 8 inches of soil. Pocket gophers burrow around rocks greater than 1 inch in diameter, but smaller rocks frequently are pushed to the surface.

Soil depth is important in ameliorating temperatures. Soil less than 4 inches deep is too warm during summer. Shallow tunnels also may limit the presence of gophers during cold temperatures, especially if an insulating layer of snow is absent.

FOOD HABITS

Pocket gophers feed on plants in three ways: (1) feeding on roots that they encounter when digging; (2) going to the surface, venturing only a body length or so from their tunnel opening to feed on aboveground vegetation; and (3) pulling vegetation into their tunnel from below.

Pocket gophers eat forbs, grasses, shrubs, and trees. They are strict herbivores: any animal material in their diet is from incidental ingestion.

Alfalfa and dandelions are some of the most preferred and nutritious foods for pocket gophers. Generally, *Thomomys* prefer perennial forbs, but they also will eat annual plants with fleshy underground storage structures. Plains pocket gophers primarily consume grasses, especially those with rhizomes, but they prefer forbs when they are succulent in spring and summer.

LEGAL STATUS

Pocket gophers generally are not protected by federal or state law.

DAMAGE IDENTIFICATION

DAMAGE TO STRUCTURES

Damage caused by gophers includes destruction of underground utility cables (Figure 8) and irrigation pipes. Gopher tunnels in ditch banks and earthen dams can weaken these structures, causing water loss by seepage and piping through a bank or the complete loss or washout of a canal bank.



Figure 8. Utility cables gnawed by pocket gophers. Photo by UNL.

DAMAGE TO LIVESTOCK AND PETS

Pocket gophers do not harm other animals, although their feeding activities may cause competition between them and grazing livestock.

DAMAGE TO LANDSCAPES

The part of the plants pocket gophers consume varies seasonally. Gophers use above-ground vegetation during the growing season, when the vegetation is green and succulent. Height and density of vegetation at this time of year may offer protection from predators, reducing the risk of short surface trips. Roots are the major food source (Figure 9). Gophers damage trees by stem girdling and clipping, root pruning, and possibly root

exposure caused by burrowing. Trees and shrubs may be clipped just above ground level, primarily during winter under snow cover. Damage may reach up to 10 feet aboveground. Pocket gophers also clip seedling roots. Pocket gopher activity should be considered when forbs and trees fail to thrive. Affected plants will be either missing or sustaining severe damage to the roots. Pocket gophers alter habitat through direct consumption and smothering of forage by earthen mounds and change in species composition on rangelands by providing seedbeds (mounds) for invading annual plants. Gopher mounds dull and plug sicklebars when harvesting hay or alfalfa, and soil brought to the surface as mounds is more likely to erode. In irrigated areas, gopher tunnels can channel water runoff, causing loss of surface irrigation water.



Figure 9. Fruit tree root gnawed by a pocket gopher. Photo by UNL.

HEALTH AND SAFETY CONCERNS

Pocket gophers are not known to be a significant threat to the safety of humans or animals. Pocket gophers have very strong jaws and sharp incisors (front teeth) so avoid getting bit when handling trapped gophers. Always wear gloves when controlling gophers.

Pocket gophers carry various parasites but their potential threat to humans is thought to be low.

DAMAGE PREVENTION AND CONTROL METHODS

INTEGRATED PEST MANAGEMENT

TIMING, ECONOMICS, AND METHODS

Pocket gophers can be controlled effectively whenever new mounds are being constructed. Most trapping and use of toxicants occurs during spring and fall when pocket gophers are actively building their mounds.

Botta's pocket gophers at a density of 32 per acre decreased the forage yield by 25% on foothill rangelands in California, where the plants were nearly all annuals. Plains pocket gophers reduced forage yield on rangelands in western Nebraska 21% to 49. Alfalfa yields in eastern Nebraska were reduced as much as 46% in dry land and 35% in irrigated alfalfa. Losses of 30% have been reported for hay meadows.

HABITAT MODIFICATION

Crop Varieties. Large tap-rooted plants may be killed or the vigor of the plant greatly reduced by pocket gophers feeding on the roots. Varieties with several large roots rather than a single taproot suffer less when gophers feed on them. In addition, pocket gophers in alfalfa fields with fibrous-root systems

may have smaller ranges, which would reduce their impact on yield.

Crop Rotation. When alfalfa is rotated with grain crops, the resultant habitat is incapable of supporting pocket gophers. The annual grains do not establish large underground storage structures, so there is insufficient food for pocket gophers to survive year-round.

Grain Buffer Strips. Plant 50-foot buffer strips of grain around hay fields to provide unsuitable habitat around the fields and minimize immigration of gophers.

Weed Control. Control forbs, which frequently have large underground storage structures, by chemical or mechanical means, to minimize damage by *Thomomys* to rangelands and possibly orchards and shelterbelts. The method is less effective for plains pocket gophers as they can survive on grasses. Warm-season prairie grasses have large root-to-stem ratios and these food sources are adequate for *Geomys*.

Flood Irrigation. Irrigate fields by flooding to greatly reduce habitat suitability for pocket gophers. Water can fill gopher tunnels, causing occupants to drown or flee to the surface, making them vulnerable to predation. The soil may become so damp that it becomes sticky. This will foul the pocket gopher's fur and claws. As the soil becomes saturated with water, the diffusion of gases into and out of the gopher's burrow is inhibited, creating an inhospitable environment. The effectiveness of this method can be enhanced by removing high spots in fields that may serve as refuges during irrigation.

Damage-Resistant Plant Varieties. Tests of several provenances of ponderosa pine showed that some have natural resistance to gopher damage.

EXCLUSION

Exclusion is of little use because of the expense and limited practicality. The use of fences around highly valued ornamental shrubs or landscape trees may be justified. The fence should be buried at least 24 inches with an additional 6-inch skirt bent to the exterior of the enclosure. The fence also must extend 1 foot aboveground to prevent gophers from entering at the ground level. The mesh should be small enough to exclude gophers: 0.25-inch or 0.5-inch hardware cloth will suffice. Cylindrical plastic netting placed over the entire seedling, including the bare root, can significantly reduce damage to newly planted forest seedlings.

Buried utility cables and irrigation lines can be protected by enclosing them in various materials, as long as the outside diameter exceeds 2.9 inches. Pocket gophers can open their mouths only wide enough to allow about a 1-inch span between the upper and lower incisors. The recommended diameter presents an essentially flat surface to most gophers. Cables can be protected in this manner whether they are armored or not. Soft metals such as lead and aluminum used for armoring cables are readily damaged by pocket gophers if the diameters are less than the suggested sizes.

Buried cables may be protected from gopher damage by surrounding the cable with 6 to 8 inches of coarse gravel. Pocket gophers usually burrow around gravel 1 inch in diameter, whereas smaller pebbles may be pushed to the surface.

FRIGHTENING DEVICES

No frightening devices are known to be effective for controlling pocket gophers.

REPELLENTS

The plants known as caper spurge, gopher purge, or mole plant (*Euphorbia lathyris*) and the castor-oil plant (*Ricinus communis*) have been promoted as

gopher repellents, but evidence of their effectiveness is lacking. These plants are not recommended as they may be invasive and are poisonous to humans and pets. High concentrations of capsaicin have been shown to reduce pocket gopher gnawing and feeding. Unfortunately, their effectiveness in field conditions has not been demonstrated and no products are registered. Castor oil or other bitter or aromatic oils such as wintergreen can be effective in small areas or to save a particular tree or plant. Animal byproducts such as fish emulsion, blood meal and feces also have been known to be effective in smaller areas.

TOXICANTS

Several rodenticides currently are federally registered and available for controlling pocket gophers. These products are “Restricted Use Products” and require certification to buy and use in Alabama through the Alabama Department of Agriculture and Industries. Zinc phosphide (2% active ingredient) is less effective than strychnine for gopher control. Chlorophacinone, an anticoagulant, is formulated as a pellet. Toxic bait must be placed in gopher tunnel systems by hand or by a special machine known as a burrow builder. Underground baiting for pocket gopher control presents minimal hazards to nontarget wildlife, either by direct consumption of bait or by eating poisoned gophers. Toxic bait spilled on the surface of the ground may be hazardous to ground-feeding birds such as mourning doves.

Do not use gopher baits in mole tunnels. Moles eat insects and earthworms and will push baits to the surface. The main drawback to grain baits is their high susceptibility to decomposition in damp burrows.

Hand baiting is the practice of opening the burrow system with a metal rod and placing bait in the burrow. A hand-operated bait dispenser probe (Figure 10) can be used to more quickly dispense bait in burrows. Although hand baiting is more time-

consuming than probing, it leaves no doubt that the bait is delivered into the tunnel system.



Figure 10. Gopher probe with automatic dispenser. Photo by University of Nebraska-Lincoln.

The key to efficient and effective use of these methods is locating the burrow system. The main burrow generally is found 12 to 18 inches away from the plug on the fan-shaped mounds (Figure 11). Dig 12 to 18 inches away from the plug. When the main burrow is located, place a rounded tablespoon of bait in each direction. Place the bait well into each tunnel system with a long-handled spoon and then block off each tunnel with sod clumps and soil. Bait blocks also are applied in this manner. If there is a

detectable opening near the bait, a pocket gopher may cover the bait with soil as it plugs the opening.

Pocket gophers normally travel all portions of their burrow system during a day.

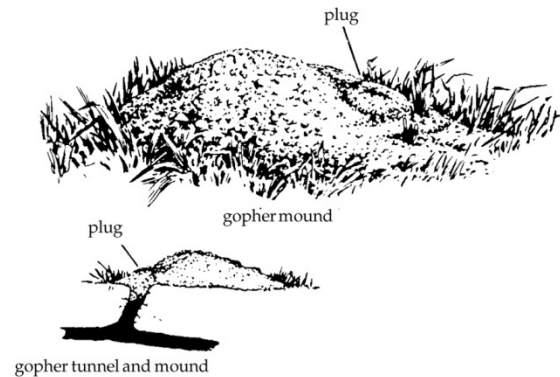


Figure 11. Diagram of a pocket gopher mound, plug, lateral tunnel, and main tunnel. Image by PCWD.

Place a probe for pocket gopher tunnels where you expect to locate the main burrow as described above. You will know you have located a burrow by the decreased friction on the probe. With a reservoir-type bait probe dispenser (Figure 12), a button is pushed when the probe is in a burrow and a metered dose of bait drops into the burrow. With the burrow probe (without a bait reservoir), make an opening from the surface of the ground to the burrow. Place the amount of toxicant required by the label down the probe opening. This method is much quicker than digging open the burrow tunnel. Cover the probe hole with a soil plug so that the pocket gopher does not cover the bait when attracted to the opening in its burrow. Greater doses of chlorophacinone or other locally registered anticoagulants are recommended in each burrow. Since some gophers poisoned in this manner die aboveground, the area should be checked periodically for 10 to 14 days after treatment. Dead gophers found should be disposed of according to label instructions.

Mechanical Burrow Builder. A burrow builder delivers bait underground mechanically, so large

areas (greater than 2 acres) can be economically treated for pocket gophers. It is tractor-drawn and available in hydraulically operated units or 3-point hitch models. For information on using this device consult <http://icwdm.org>.

FUMIGANTS

Federally registered fumigants include aluminum phosphide and gas cartridges with various active ingredients. These products are “Restricted Use Products” and require certification to buy and use in Alabama through the Alabama Department of Agriculture and Industries. These fumigants usually are not very successful in treating pocket gophers because gases move too slowly through tunnel systems. Unless the soil is moist, the fumigant diffuses through the soil and out of the gopher tunnel.

SHOOTING

Shooting pocket gophers is not practical.

TRAPPING

A variety of specific traps are available for the lethal control of pocket gophers. All of them are effective and the decision of which kind to use depends on the size of pocket gophers in your area, personal preference, and cost.

For effective trapping, the first requisite is to find the tunnel. The procedure will vary depending on whether traps are set in the main tunnel or lateral tunnels (Figures 12 and 13).

To locate the lateral tunnels, find a fresh mound and with a trowel or shovel, dig several inches away from the mound on the plug side. The lateral may be plugged with soil up to a few feet. However, fresh mounds usually are plugged only a few inches.

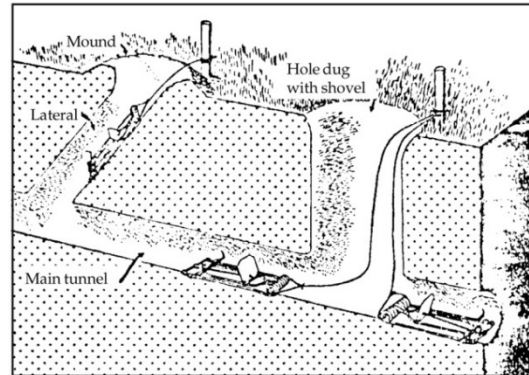


Figure 12. Diagram of Macabee-style traps set in a lateral tunnel (left) and main tunnel (right). Image by PCWD.

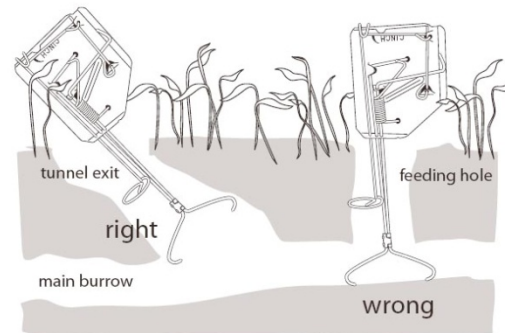


Figure 13. Diagram of Cinch-style traps set in the tunnel of the pocket gopher. Image by Thomas Wittman.

You may have to experiment with trap type and placement. Some trappers leave tunnels completely open using traps that work on surface lateral tunnels (box trap or Cinch trap). Others close off the tunnel completely with sod or a piece of wood or plastic after they place traps in the lateral and main tunnels. Mark trap locations with engineering flags and anchor with a surveyor’s flag and wire or chain to prevent removal by predators. Never use string or rope to secure traps; pocket gophers can gnaw through them.

Trapping is most effective in spring and fall when gophers are pushing up new mounds. New mounds are darker, taller, and the soil does not clump. Soil tends to clump more as it gets older. If a trap is not visited within 48 hours, move it to a new location. Winter trapping, when feasible, will lower the spring breeding population.

CAGE TRAPS

Pocket gophers can be caught by homemade cylinders (PVC pipe). The trigger end may be capped with 0.25-inch hardware mesh or sheet metal. Construct the door with 50-gauge metal or flat bar. The door needs to be rigid and secure the majority of the opening to prevent escapes. Traps may be activated by gravity or rat-sized snap traps. Baited cage traps may be effective for capturing pocket gophers. Select traps at least 12 inches long. Only allow light to enter from the bait end and cover the rest of the trap so it is dark.

BODY GRIPPING TRAPS

Body-grip traps typically are not baited, but some trappers place lettuce or alfalfa behind the trap to lure the pocket gopher. If safety is a concern place a 0.5-inch plywood board over the hole to prevent someone from twisting an ankle in the hole or accidentally encountering the trap. Place excavated soil around the edges to make the hole dark to the pocket gopher.

HANDLING

RELOCATION

Relocation of pocket gophers is not recommended.

TRANSLOCATION

Translocation of pocket gophers is not recommended.

EUTHANASIA

Pocket gophers can be euthanized with carbon-dioxide.

DISPOSAL

Refer to Volume 1 of the National Wildlife Control Program and your state regulations regarding carcass disposal.

ACKNOWLEDGMENTS

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RESOURCES

KEY WORDS

Wildlife, wildlife control, damage management, nwco, gopher, pocket gopher

ON-LINE RESOURCES

<http://pcwd.info>

<http://icwdm.org>

QUESTIONS FOR REFLECTION

1. Why is the term “gopher” problematic?
2. A client is worried that the mounds in the back yard contain a threat to her children. How would you respond?

DISCLAIMER

Implementation of wildlife damage management involves risks. Readers are advised to implement the safety information contained in Volume 1 of the National Wildlife Control Training Program.

Some control methods mentioned in this document may not be legal in your location. Wildlife control providers must consult relevant authorities before instituting any wildlife control action. Always use repellents and toxicants in accordance with the EPA-approved label and your local regulations.

Mention of any products, trademarks or brand names does not constitute endorsement, nor does omission constitute criticism.