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Wildlife Damage Management Series



Pocket Gophers

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Jack H. Berryman Institute
Utah Division of Wildlife Resources
Utah Department of Agriculture and Food
USDA/APHIS Wildlife Services

Quinney Professorship for Wildlife Conflict Management
Utah State University Extension Service and College of Natural Resources
Department of Fisheries and Wildlife

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Pocket gophers are medium-sized fossorial (burrowing) rodents, which have external fur-lined pouches located on the outside of their mouths. They use the pouches to carry food, hence the name “pocket” gopher. There are 35 species of pocket gophers in North and South America. Pocket gophers are sometimes confused with moles because of their similar burrowing activities. Moles, however, are smaller and lack cheek pouches.

Pocket gophers have yellowish-colored incisor teeth. These incisors are always exposed even when their mouth is closed (Figure 1). Pocket gophers vary in length from 6 to 13 inches. The color of their fur ranges from light brown to almost black. As with most fossorial mammals, pocket gophers have poor eye sight which is compensated by other well developed senses. They have short, hairless tails which are very sensitive and used to guide them when moving backwards in a tunnel.



Figure 1. The pocket gopher.

They have large whiskers (vibrissae) which are sensitive to movement and can be used to guide their movements even in the darkest tunnels. Their forefeet are equipped with long claws.

Utah is inhabited by two species of pocket gophers, the Northern pocket gopher (*Thomomys talpoides*), and the Botta’s pocket gopher (*Thomomys bottae*). The Northern pocket gopher is found in the northern part of Utah, where the Botta’s is located from the central and southern parts of the state.

BIOLOGY AND BEHAVIOR

Pocket gophers are best identified by their external cheek pouches and the soil mounds they leave behind as evidence of their tunneling or burrowing activities. Mounds are fan-shaped and the entrance is sealed by a soil plug. The mounds are created when the gophers move excavated soil to the surface when tunneling.

Pocket gophers use their long powerful claws and teeth for digging their burrows. As with all rodents, their incisors grow continuously and require constant gnawing or filing to keep them at a manageable length. Soil, rocks, and other items loosened by digging are moved away with their hind feet, then bushed to the surface with their chest and forefeet.

Burrow systems consist of a main tunnel from 4 to 18 inches below the surface with a number of lateral tunnels branching off from the main tunnel (Figure 2). Lateral tunnels end at the surface where the soil mound is created. Pocket gophers usually construct one nest and a number of food cache chambers in

deeper tunnels which branch off from the main tunnel. A nest chamber also is lined with vegetation. Nest chambers and food caches have been found as deep as 5 to 6 feet below the surface. Tunnel widths vary according to the size of the pocket gopher, but most average about 3 inches in diameter.

A burrow system is typically multi-branched. During the breeding season a male's burrow may be more linear since its sole purpose is to intercept a female's burrow. A single pocket gopher may construct as many as 300 soil mounds in a year while moving over 4 tons of soil. Burrows are continually changing, with old tunnels being sealed off and new ones excavated. A single tunnel system may consist of as much as 200 yards of tunnels. Generally, the poorer the habitat the longer the tunnels must be to meet food needs. Pocket gophers are highly territorial and will vigorously defend their tunnels from intruders. There is typically one pocket gopher per tunnel system, unless the female has a litter or it is the mating season.

Pocket gophers are active all year long. When snow is present they will tunnel in the snow. Soil from below ground burrowing is pushed up under the snow. When the snow melts,

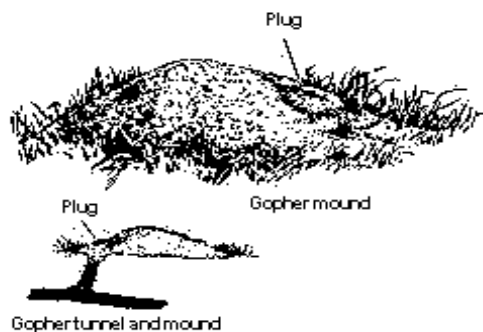


Figure 2. Pocket gopher mound and its relation to tunnel.

the soil casts (tubes) that are left behind provide evidence of their winter burrowing activities.

Pocket gophers reach sexual maturity the following spring after they were born. Females generally have only one litter a year. Litters are born from March to June. In warmer climates females may have 2 or more litters. Each litter may consist of 1 to 13 young with 3 or 4 being average. Gestation is typically 18 or 19 days with 51 days being the maximum reported.

Pocket gophers eat only plant materials such as forbs, grasses, shrubs and trees (herbivores). They eat roots that are exposed by their tunneling as well as above ground vegetation. Alfalfa and dandelions roots are preferred foods for pocket gophers.

LEGAL STATUS

Pocket gophers are not protected by federal or Utah state law. As such, they can be controlled when causing damage.

CONTROL

IDENTIFICATION OF DAMAGE

Because pocket gophers spend most of their time under ground, the best way to identify their presence is fresh soil mounds. Pocket gophers have been responsible for damage to underground utility cables and irrigation pipes, direct consumption and destruction of plants with their soil mounds, and changes in plant species composition when the soil mounds create an opportunity for weed seeds to germinate. Trees are damaged by gophers when stems are girdled and clipped, roots are pruned, and roots become exposed due to tunneling. Gopher mounds damage mowing equipment. Also, soil brought to the surface is easily eroded. Tunnels in irrigated fields can divert water causing a loss irrigation water. Tunnels in earth banks and dams can cause these structures to weaken resulting in water loss due to seepage or the complete loss of the structure. Badgers burrowing activities as they pursue pocket gophers can also increase causing even more damage if densities are high.

A survey of Utah alfalfa growers concluded that about 83% of alfalfa producers experience pocket gopher damage to their crop. Thus, pocket gophers may have the greatest economic impact on Utah alfalfa producers. Pocket gophers damage alfalfa hay by eating the plant's tap roots and then soil mounds will reduce plant vigor when other plants are buried.

POCKET GOPHER DAMAGE IN URBAN AREAS

Although pocket gophers can cause significant damage on Utah farms and ranches, they also can cause damage to lawns and gardens in urban areas. Frequently, this damage is greatest in new subdivisions or other areas where undeveloped tracts of land dominated by weeds occur.

EXCLUSION

Exclusion of pocket gophers can be very costly and is usually impractical for most farms and ranches where populations are high. However, barriers can be used effectively to valuable ornamental trees and shrubs around homes, gardens, and nurseries. A mesh (1/4-1/2 inch) fence, buried about 18 inches can be effective at protecting gardens, flower gardens, and plant nurseries. Plastic cylindrical netting placed over the entire seedling can be used to help reduce damage to newly planted trees and shrubs.

HABITAT MODIFICATION

Habitat modification techniques use knowledge of pocket gopher habits and feeding behavior to reduce or eliminate damage. The techniques include the use of resistant crop varieties, crop rotation, flood irrigation, and cultivated buffer strips in urban and rural areas.

Crop Varieties

Alfalfa plants with a single tap root are more prone to reduced vigor due to gopher damage than alfalfa with several tap roots. Also, gophers in alfalfa fields with fibrous roots have smaller home ranges and therefore gopher impact may be reduced in these areas.

Crop Rotation

Rotating an alfalfa crop with a grain crop will significantly alter pocket gopher habitat. The root systems of grains do not produce sufficient food supplies for gophers making it impossible for them to survive year round.

Flood Irrigation

The use of flood irrigation can reduce suitable gopher habitat. Water will fill their tunnels drowning the rodent or forcing them to the surface, thus increasing predation on displaced gophers. Leveling any high areas in a field will increase the effectiveness of flood irrigation by eliminating any potential refuges.

Buffer-Strips

Cultivating and planting a 50 foot buffer-strip of grains are grass around alfalfa fields and in urban and rural areas may create unsuitable habitats for gophers. This buffer strips can reduce damage lawns, gardens, plant nurseries, and high-value crops since the shallow rooted grains and grasses provide little food for foraging pocket gophers. In addition, periodic deep cultivation will destroy or expose existing or new tunnel systems.

REPELLENTS

No repellents have proven effective for controlling pocket gophers. Sonic or electromagnetic devices sold commercially also have not proven to be effective.

TRAPPING

Trapping can be extremely effective on a small scale to remove any pocket gophers that remain after a control program, eliminate new infestations, reduce pocket gopher populations to acceptable levels, or eliminate pocket gophers from lawns and gardens in urban and rural areas. Pocket gophers are best trapped during spring or fall when they are most active. For trapping to be the most effective the main tunnel of an active burrow system needs to be located. Active tunnels can be found by locating a freshly-made soil mound. A metal probe or a shovel can be used to probe the fan-shaped plug side of the mound to locate the main tunnel. Trapping in the main tunnel

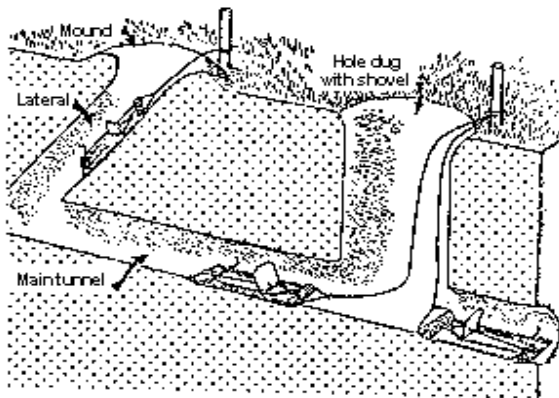


Figure 3. Trap placement in lateral or main pocket gopher tunnels. Note that traps are staked.

system is more successful than setting traps in the lateral tunnels. One trap should be placed into each end of the tunnel to catch the gopher coming from either direction (Figure 3). Trapping success may be enhanced by leaving the hole open to let in sun light to attract the gopher. Others have better success by covering the excavated hole with plywood or other suitable material. Traps should be secured by wire or chain to reduce the chance of predators taking them away or a pocket gopher carrying them into the tunnel. A small flag can be placed near the trap site to help relocate the traps. If the traps have not been visited within a 48 hour period then move the traps to a new location. After an animal is caught the traps can be removed and reset at another fresh soil mound.

TOXICANTS

Several rodenticides for controlling pocket gophers have been registered with the federal government and are in current use. Strychnine alkaloid (0.25 to 0.5% active ingredient) and zinc phosphide (2%) on grain baits or pellets are registered for controlling pocket gopher damage. Both toxicants are restricted-use pesticides, and can only be used by certified applicators. (Contact your local Utah State University county extension agent for certification requirements.)

Strychnine is only registered for below ground use. Most gophers will be killed within the first week after bait application. When using strychnine, closely follow label instructions. Be sure that any spilled or unused bait is removed from the treatment site and stored according to label instructions. Wet and damp ground causes the bait to decompose rapidly. Thus, more bait may need to be applied after a rain storm or irrigating.

Anticoagulant baits (Chlorophacinone and Diphacinone) are also registered for pocket gopher control. These are the same chemicals used in common rodent poisons. Diphacinone comes in a paraffin block that will last longer than grain bait and will also poison any new gophers which come into the burrow system.

Hand Baiting

A common method used to apply pocket gopher bait is hand-baiting. This method is time consuming, therefore it is only practical for small areas or new infestations. Once an active burrow system has been identified by presence of fresh soil mounds, the applicator can either use a shovel or a specially made hand bait-dispenser or probe to locate a tunnel. When the tunnel has been located, a tablespoon of bait is placed into the tunnel far enough so that it will not be covered when the hole is sealed (Figure 4). For best results, bait every burrow system in two or three locations. The hand baiting method can be used in any soil condition.

Mechanical Burrow Builder

The burrow builder system is a tractor-drawn machine which excavates gopher sized tunnels and at the same time dispenses the bait at set intervals (Figure 5). When a gopher discovers a new tunnel system it will investigate, find the bait, and take it to its own burrow to be stored and eaten later.

The burrow builder is very effective for use on large areas. When using a burrow builder, it is recommended that the burrows be excavated to depths determined from active gopher tunnels and artificial burrows placed 20-25 feet apart. In most

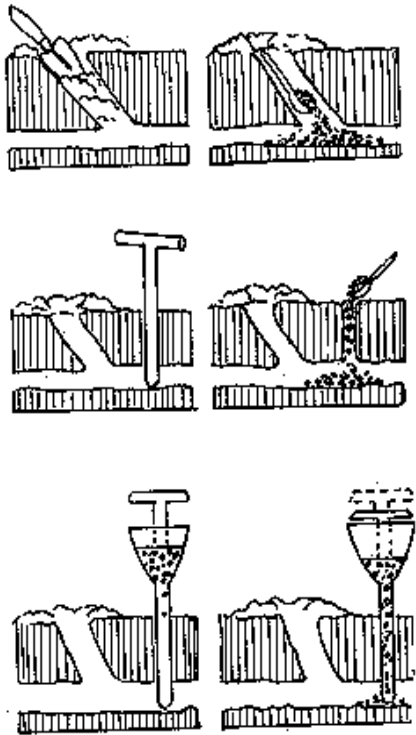


Figure 4. Methods of applying gopher bait by hand or with a probe.

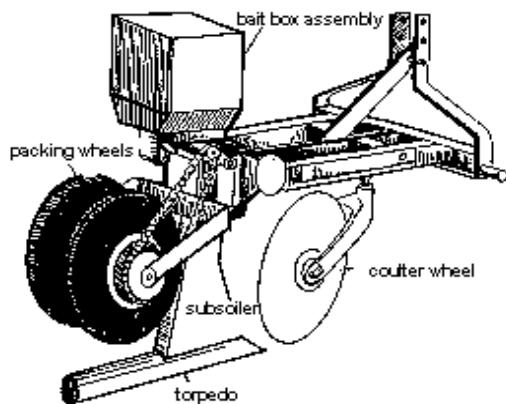


Figure 5. The "burrow-builder" machine may be used to control pocket gophers on large acreages.

cases an artificial burrow depth of 9-10 inches is desirable. Soil conditions should also be considered when using the burrow builder. If the soil is too wet or too dry the machine will not be effective.

To determine if soil conditions are suitable for using a burrow builder, pick up a teaspoon of soil and roll it into a ball. If the ball holds its shape, the soil is suitable for using a burrow builder. Burrow builders can be used to form a burrow around

the edge of treated fields to deter any immigrating gophers. (Plans for building a burrow-builder can be found on pages 4 and 5 of this bulletin).

FUMIGANTS

Federally approved fumigants include aluminum phosphide and gas cartridges. Aluminum phosphide is a restricted use chemical and can only be used by certified applicators. Fumigants are usually not very effective at reducing gopher damage as toxicants or trapping, because the gases move too slowly through the burrow system. This may allow pocket gophers to seal fumigant-treated tunnels before being overcome by the gas. Fumigants are best used in damp soil because the gas will diffuse through dry soil.

FOR FURTHER INFORMATION, CONTACT:

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1594 West North Temple
Salt Lake City, UT 84116-3154
(Phone 801-538-4700)

Additional Reading

- Burt, W. H. and R. P. Grossenheider. 1980. The Peterson Field Guide Series. A Field Guide to the Mammals of North America, north of Mexico. Houghton Mifflin Company. Boston. New York.
- Case R. M. and J. A. Bruce. 1994. Pocket gophers in Prevention and Control of Wildlife Damage. Great Plains Agricultural Council Wildlife Resources Committee, University of Nebraska-Lincoln Cooperative Extension Service, Lincoln, NE.
- Messmer, T. A. and S. Schroeder. 1996. Perceptions of Utah alfalfa growers about wildlife damage to their hay crops: implications for managing wildlife on private land. Great Basin Naturalist. 56:254-260.
- Messmer, T. 1988. Pocket Gophers. NDSU Extension Service. North Dakota State University, Fargo, ND.

POCKET GOPHER MANAGEMENT SUPPLIES

TOXICANTS

Anticoagulants (Chlorophacinone and Diphacinone)

B & G Chemicals and
Equipment Co., Inc.
10539 Maybank
Dallas TX 75345-0428
(214) 357-5741
(800) 345-9387
(214) 357-4541 Fax

J. T. Eaton & Co., Inc.
1393 E. Highland Rd.
Twinsburg, OH 44087
(216) 425-7801
(800) 321-3421
(216) 425-8353 Fax

HACCO, Inc.
Box 7190
Madison, WI 53707
(608) 221-6200
(608) 221-6208 Fax

Strychnine and Zinc Phosphide

B & G Chemicals and
Equipment Co., Inc.
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Dallas TX 75345-0428
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(800) 345-9387
(214) 357-4541 Fax

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USDA-APHIS Wildlife
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(208) 236-6922 Fax

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(800) 645-6007
(516) 932-4316

FUMIGANTS

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1500 E. Old 210 Hwy.
Liberty, MO 64068
(800) 223-3684
(816) 781-1043 Fax

Pestcon Systems, Inc.
Box 339
Wilson, NC 27894
(800) 548-2778
(919) 243-1832 Fax

Research Products Co.
Box 1460
Salina, KS 67402-1460
(913) 825-2181
(913) 825-8908 Fax

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Seattle, WA 98124-1325
(206) 889-3400
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South Dakota Dept. of
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Rodent Control Fund
Anderson Bldg.
Pierre, SD 57501
(605) 773-3724 Fax

VanWaters and Rogers
Box 24325
Seattle, WA 98124-1325
(206) 889-3400
(206) 889-4100 Fax

BAIT APPLICATION DEVICES AND MATERIALS

Burrow-Builder

Rue R. Elston Co.
706 N. Weber
Sioux Falls, SD 57103
(605) 336-7716

The Perry Co.
Box 7187
Waco, TX 76714
(817) 756-2137
(800) 792-3246

RCO, Inc.
Box 446
Junction City, OR 97448
(503) 995-8160
(800) 214-2248

Wilco Distributing, Inc.
1215 W. Loral Ave.
Lompoc, CA. 93436
(805) 735-2476

Probes and Bait Dispensers

Eckroat Seed Co.
1106 N. Eastern Ave.
Box 17610
Oklahoma City, OK 73117
(405) 427-2484

Rue R. Elston Co.
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(605) 336-7716

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Anaza, CA 92539
(909) 763-4590

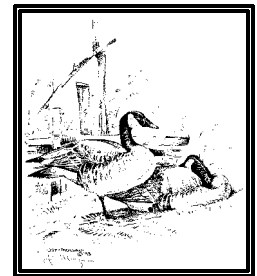
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