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Controlling Pocket Gophers in Arkansas

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Figure 1. Baird's pocket gopher lives almost its entire life underground having clawed front legs and fur-lined cheek pouches. Photo by Guy Cameron, University of Cincinnati.

Pocket gophers dig tunnels, make mounds and eat vegetation that can cause problems for homeowners and agriculture producers alike (Figure 1). Pocket gophers are burrowing rodents which get their name from their fur-lined external cheek pouches, or pockets, they use for carrying food and nesting materials. Sometimes called "salamanders" in south Arkansas, they are not to be confused with amphibians. This term is believed to have originated from another local name, "sandy mounders."

Pocket gophers are recorded in 35 of 75 Arkansas counties and are generally found in the southern half and western third of the state, with a finger extending into Arkansas' central portion. A population occurs in counties near the western border along the north and central portion of the state.

Of the 18 species of pocket gophers found in North America, only Baird's pocket gopher (*Geomys breviceps sagittalis*) and Ozark pocket gopher (*Geomys bursarius*) are reported in Arkansas (Figure 2). The Ozark pocket gopher is an isolated subspecies of the plains pocket gopher, with a limited range in the southwest third of Izard County in the Ozark Mountains of north-central Arkansas. Only an estimated 3,500 individuals were discovered in 2004. The Ozark pocket gopher is considered a species of greatest conservation need in the state.

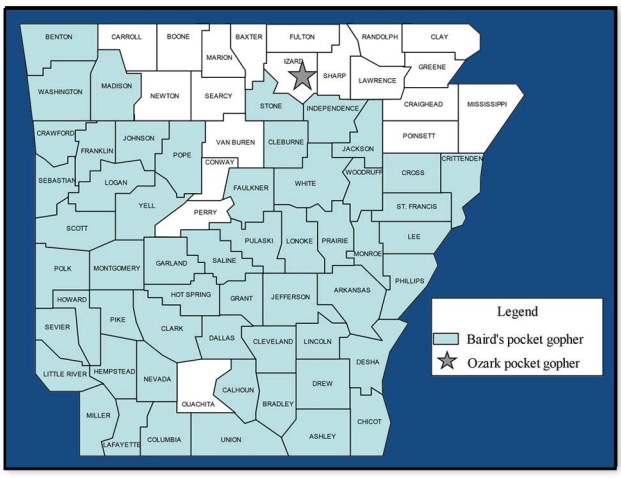

Figure 2. Distribution of Baird's pocket gopher and Ozark pocket gopher in Arkansas. Source: Elrod et al. 1996b & Blake Sasse, Arkansas Game & Fish Commission.

Identification and Life History

Baird's pocket gophers are 6-14 inches in length, with short ears and a tail from 2-4 inches and little hair. They are well-equipped for a digging, tunneling lifestyle with their powerfully built forequarters, large-clawed front paws, short fur that doesn't cake in wet soils, small eyes and ears, and highly sensitive facial whiskers that assist with moving in dark tunnels. A gopher's lips also are unusually adapted for their lifestyle. They can close them behind their four large incisor teeth to keep dirt out of their mouths when using their teeth for digging.

Male gophers are larger than females. They live solitary lives except during the breeding season (starting in late January) and while females care for their young. After a gestation period of four to five weeks, females produce a litter of three to four young on average in March and April. In south Arkansas, females may produce another litter in July or August. Young leave in

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search of their own territory soon after they are weaned. Gophers reach puberty at about three months of age, and these females may produce a litter before the end of the breeding season. Because of their protective underground existence, predators are thought to have little effect on populations, except perhaps Ozark pocket gophers because of their small population size. Predators include owls, hawks, snakes, foxes, weasels, coyotes, dogs and cats. The maximum lifespan is five years.

Pocket gophers are herbivorous and feed on a wide variety of vegetation using their sense of smell to locate food. Most commonly they feed on roots and fleshy portions of plants they encounter while digging. Gophers consume any edible plant material including vegetation, roots, bulbs and tubers, grasses and seeds, forbs, tree roots, bark and legumes with palatable roots. Annual crops including grains and annual grasses are not ideal habitat for gophers because their shallow, fibrous root systems do not provide a good food source.

Signs and Activitiy

Both gophers and moles commonly burrow just beneath the surface leaving a raised ridge to mark their path. For the most part, gophers remain underground in their burrow system, although they are sometimes seen feeding at the edge of an open burrow, pushing dirt out of a burrow, or moving to a new area. When feeding aboveground, they venture only a body length or so from their tunnel opening. Burrow openings used in this manner are called "feed holes." You can identify them by the absence of a dirt mound and by a circular band of clipped vegetation around the hole. Gophers also will pull entire plants into their tunnel from below.

Figure 3. A typical gopher mound is horseshoe or crescent shaped when viewed from above.

Mounds of fresh soil are the best sign of a gopher's presence. Gophers form mounds as they dig tunnels and push the loose dirt to the surface. Typically, fresh mounds are described as horseshoe, crescent, or u-shaped (Figure 3), 12 to 18 inches wide and 4 to 6 inches high. Their hole is often plugged with dirt and therefore not visible. A depression in the mound usually indicates the location of the plugged hole.

Mole mounds are sometimes mistaken for gopher mounds. Mole mounds, however, are circular and have a plug in the middle that might not be distinct; in profile they typically are volcano-shaped and round when viewed from above. For more information about moles, see *Controlling the Eastern Mole*, FSA9095.

One gopher can create several mounds in a day. In non-irrigated areas, mound building is most pronounced during spring or fall when the soil is moist and easy to dig. In irrigated areas such as lawns, flower beds and gardens, digging conditions can be optimal year-round, and mounds can appear at any time. Gophers don't hibernate and can be active all hours of the day even when fresh mounds are not visible.

Pocket gophers live in a burrow system that can cover an area that is 200 to 2,000 square feet. The burrows are about 2½ to 3½ inches in diameter. Feeding burrows usually are 6 to 12 inches below ground, and the nest and food storage chamber can be as deep as 6 feet. Short, sloping lateral tunnels connect the main burrow system to the surface. Gophers create these while pushing dirt to the surface to construct the main tunnel.

Damage

Pocket gophers often invade yards and gardens, feeding on many garden crops, ornamental plants, vines, shrubs, and trees. A single gopher moving down a garden row can inflict considerable damage in a very short time (Figure 4).

Figure 4. These sweet potatoes were gnawed by pocket gophers. Courtesy Stephen Vantassel, icwdm.com and USDA APHIS Wildlife Services.

Besides plant damage, gophers and their tunneling can result in other problems. Gophers are reported to gnaw and damage plastic water lines and lawn sprinkler systems. Their tunnels can divert and carry off irrigation water, which leads to soil erosion. Mounds on lawns interfere with mowing equipment and ruin the aesthetics of well-kept turfgrass. Horses can be harmed when legs are caught in holes created by pocket gophers.

Legal Status

The Arkansas Game and Fish Commission's Wildlife Code classifies pocket gophers as nongame mammals. The owner or tenant of the premises can remove pocket gophers when they cause property damage (including garden and landscape plants, crop or pasture damage) using traps. It is illegal to use poisons, toxins, and fumigants for wildlife control in Arkansas. Such products for gopher control may be legal in other states and readily attainable but are illegal to apply in Arkansas. Toxicants can harm children, pets, and other non-target wildlife. Even where legal, fumigants have not proven effective because pocket gophers are known to plug tunnels and escape.

The Ozark pocket gopher is a rare subspecies of the Baird's pocket gopher and is considered a species of special concern. Residents living in the vicinity of the Ozark pocket gopher are encouraged to use nonlethal traps for capturing and relocating this rare subspecies. A description of a nonlethal trap is included in this fact sheet.

Control Options

With a little training, trapping is the most successful option for controlling pocket gophers in Arkansas. Some investment of time and equipment is required. Trapping success depends on a number of factors including trap type, number of traps, density and distribution of gophers, soil and weather conditions, size and gender of the pocket gopher and trapper experience. Trapping can be effective against small numbers of gophers but is labor intensive. As such, trapping is relatively expensive over large acreages, but reportedly offers greater control than poison baits in states where legal. In Arkansas, trapping can occur year-round, and tends to be most effective during the breeding season or when young animals are dispersed. Breeding season is from late January through August in Arkansas, with litters born in March and April, and again in July or August in southern Arkansas.

Where flood irrigation or tilling is feasible, some gopher control may occur. Neither repellents nor frightening devices using sounds or vibrations have proven effective. Following is a detailed discussion about trapping and other methods.

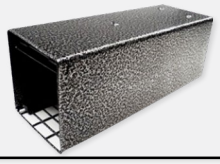
Trap Types

Humane trapping and removal is the best control method available for pocket gophers. Nonlethal trapping and relocation is recommended where Ozark pocket gophers are present. (A design for nonlethal traps is also described in this publication.) Several types of gopher traps are available commercially (Table 1). The most common type is a two-pronged pincher trap such as the Macabee, Cinch, or Gophinator. These are triggered when the gopher pushes against a flat, vertical pan. Another popular type is the choker-style box trap. The pincher trap design was developed 100 or more years ago. The popular Macabee™ was developed in 1900. Black Hole™ and Cinch™ were patented in 1909, and the Death Klutch 1™ in 1917.

Studies comparing effectiveness of trap types have yielded varying results (Table 2). No particular pocket gopher trap is better than the others, with each having its advantages and disadvantages. Pipas et al. (2000) compared the efficiency of the Macabee™ , Cinch™, and Blackhole Rodent™. The Cinch had the highest capture efficiency (41.7 percent), followed by the Macabee™ (27.7 percent) and Blackhole™ (18.3 percent). Contract trappers used by the USDA Forest Service (Smeltz 1992) removed approximately 80 percent of gophers from 400 ha reforestation unit with a 10-person crew. They used 20 trap sets per 0.4 ha and caught about five pocket gophers per 0.4 ha using Macabee traps.

In a Utah study, Macabee™ traps were statistically more effective in terms of animals caught per animal visits to the trap, but Macabee™ traps were tripped or plugged more than Death Klutch 1™ and Cinch™ traps. Frey and Nelson (2015) suggested Macabee™ traps did not capture larger adult animals as effectively, and therefore were causing some animals to become trap shy and

Table 1. Examples of pocket gopher traps.

Trap Name	Image*	Description	Price*
Macabee™		Commonly used and popular trap.	**$7.95**
Gophinator™		Manufacturer claim - reduce trap avoidance by walking on dirt rather than a wire on its approach. Trap draws gopher into a pivot point resulting in higher success than other traps.	**$8.49**
Death Klutch (DK-1)		Manufacturer claim – unique trap is popular among government agencies and wildlife control professionals.	**$5.95**
Cinch trap™		Order to size of animal being captured (moles or small gopher, or regular gopher).	**$14.95**
Black hole™		Manufacturer claim – most effective gopher trap available. Easy to set, inexpensive, reusable, fast and effective.	**$18.95**
Black box		Manufacturer claim – easy to use and set. Leave light hole open to bring gopher into trap to plug the hole.	**$16.25**
DK-2 Gopher Getter™		Recommend leaving light hole open to bring gopher into trap to plug the hole.	**$12.50**
GopherHawk®		Use probe (stored inside wedge) and wedge to place set in hole. Reduces excavation necessary for setting other trap types. Requires favorable soil conditions for effective trap placement.	**$36.95**
Gopher tunnel live trap		Live trap for partial or complete burial for capture.	**$69.00**

*Images and prices are from Wildlife Control Supplies, www.wildlifecontrol-supplies.com, except for the tunnel live trap from Gophers Unlimited. Costs are current as of date of publication.

Research on Pocket Gopher Trap Types					
	Frey and Nelson (2015)	Vantassel et al. (2014)	Baldwin et al. (2013)	Pipas et al. (2000)	Proulx (1997)
Highest Lowest	Macabee™ Death Klutch 1™ Cinch™ (3" medium)	No difference: Macabee™ and Death Klutch 1™	Gophinator™ Macabee™	Cinch™ Macabee™ Black Hole™	ConVerT™ Black Hole™ Guardian™ Victor Easyset™

Table 2. Summary of studies which compare gopher trap types in field demonstrations. For each study, trap types are listed from highest to lowest in performance.

reduce the effectiveness of the control program. Baldwin et al. (2015) recommends adding a cable restraint to the front of Macabee™ traps to keep larger individuals from escaping capture.

Baldwin et al. (2013) found the Gophinator™ was more effective in his trap comparison study. Baldwin reported covering the hole left by setting the trap increased their ability to capture heavier (presumably experienced adult) gophers. Some trappers recommend leaving a dime size opening at the trap set or leaving the trap uncovered entirely for light to enter so the gopher will become ensnared when attempting to plug the hole. At least two studies indicate no significant difference in capture rates between covered and uncovered trap sets.

Pipas et al. (2000) reported the Cinch™ (48 percent) had the highest capture efficiency, far above the Macabee™ (28 percent). Both Pipas et al. (2000) and Frey and Nelson (2015) indicated Cinch™ traps were more difficult to set because of a large baseplate. Frey and Nelson (2015) suggested setting Cinch™ traps in lateral tunnels to increase their effectiveness. Another suggests setting traps in lateral tunnels is (a) quicker and easier, (b) can be more effective than setting traps in main tunnels during certain times of the year and (c) is effective for removing more experienced gophers. This is counter to others who recommend lateral tunnels are less used by gophers , thus setting a trap in lateral tunnels decreases the odds for capture.

A current focus of pocket gopher control is on improved trapping techniques and training to increase efficiency. Training and trapper experience is an important factor for successful gopher control. Baldwin (2014) reported novice gopher trappers became proficient with only three days' experience using the Gophinator™ and attained up to 94 percent efficiency compared to an expert trapper. Novice trappers received a 30-minute training session about how to use a probe to locate a fresh pocket gopher tunnel and appropriate trap setting techniques. Trappers were taught to dig into an active main tunnel, place traps into all branches of the tunnel and stake traps down with wire flags. Trap sets were placed in each separate burrowing system as evidenced by visually surveying mound-clusters occurring approximately 20 feet apart. Each mound cluster was assumed to have one gopher since they are generally solitary. Traps were left overnight and evaluated the next morning as to whether the trap-set was (1) a capture, (2) sprung or plugged or (3) no action.

Trapping Tips

Identifying active tunnels is key to effective trapping. Probes (Figure 5) are used for detecting gopher tunnels and can be purchased commercially or constructed from a pipe and metal rod. A 10 to 12 inch screwdriver can also serve as a probe where soils are compact. Insert the probe in the ground about half way between the freshest mounds. When the probe enters a gopher's tunnel, there will be a sudden, noticeable drop of about 2 inches. Note that inactive tunnels can feel similar to non-filled tunnels when probing. Pocket gophers often back-fill old tunnels with loose soil they remove while excavating new tunnels. An experienced trapper can discern this difference, which improves chances of success.

Figure 5. A soil or garden probe is a valuable tool for detecting tunnels when setting gopher traps.

Finding an active main tunnel for setting traps is recommended to improve the odds of capturing a gopher, though some trappers prefer setting traps in lateral tunnels. You might have to probe repeatedly to locate the gopher's main tunnel, but your skill will improve with experience. If fresh mounds are located on a slope, the tunnel is probably located on the uphill side of the mound.

- Remove dirt to accommodate the size of your trap. If the tunnel is too small, some excavation may be necessary before sliding a pincer trap into place. Box traps require more surface excavation than pincer traps, but can accommodate smaller tunnel sizes.
- Tie each trap to a wire flag or stake to facilitate retrieval. Otherwise, a gopher may drag the trap further into the tunnel, making it difficult to find.
- Optionally, place a small dab of peanut butter as bait on the spring of pincer traps, or the back of box traps. Some trappers place bait on the side of the tunnel.
- Set trap triggers and place in tunnel with the triggers facing outward, so that a gopher approaching from either direction will become ensnared (Figure 6). If you find an intersection with multiple tunnels, place a trap in each one a few inches inward into the tunnel. Insert tines first into the tunnel and pointed upwards. Box traps should be placed tightly against tunnel walls.
- Cover the trap hole with turf, dirt clod, landscape cloth, cardboard, shingle, plywood or other material to exclude light. Conversely, some successful trappers prefer to leave pincer trap-sets uncovered to attract gophers since they will plug openings in their tunnel system. Research indicates no difference in success when comparing covered and uncovered pincer traps.

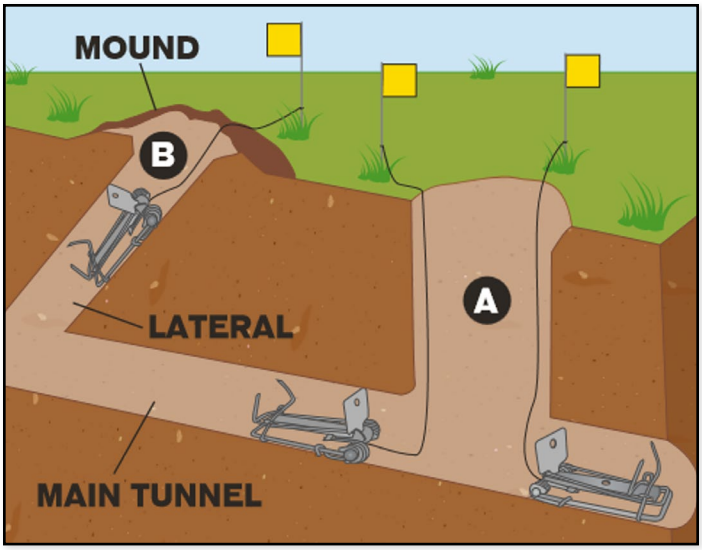


Figure 6. Placement of pincer-style traps in the main tunnel (A) and lateral tunnel (B). Illustration by Chris Meux, University of Arkansas.

Box traps should always be covered since gophers may plug the tunnel without entering the trap.

- If a trap isn't sprung in 24 to 48 hours, repeat probing and find a new tunnel.

Nonlethal Trapping

Live trap-and-release of gophers is an option and recommended in the region where Ozark pocket gophers live. Traps must be checked frequently, and animals released as soon as possible. They do not survive well when trapped for extended periods. Trapping is recommended in spring and fall when gophers are active, and temperatures are moderate to reduce heat induced stress. Set the trap at dusk and check at dawn each day to reduce mortality.

Building a trap. Live traps can be purchased commercially or constructed. The live gopher trap is basically an underground modified box trap using a one-way hinged door that does not require a trigger (Figure 7).

This trap can be made of the following materials (Figure 8):

- Two side pieces of plywood, 5 inches x 16 inches.
- One back piece of plywood, 4 inches x 5 inches.
- One top piece Plexiglas®, 5 inches x 14 ½ inches.
- One bottom piece of ½ inch spacing mesh hardware cloth, 5 inches x 15 inches.
- One Plexiglas® door, 3 inches x 5 inches.
- One piece of plywood top piece to hang door, 3 inches x 5 inches.
- One piece of plywood for door mount, 1 inch x 2 inches.
- One 1-inch hinge.
- Aluminum flashing.
- Wood screws.
- Fast-drying glue, F-26 construction adhesive.

Figure 7. Homemade live trap for pocket gophers. Illustrated by Chris Meux, University of Arkansas.

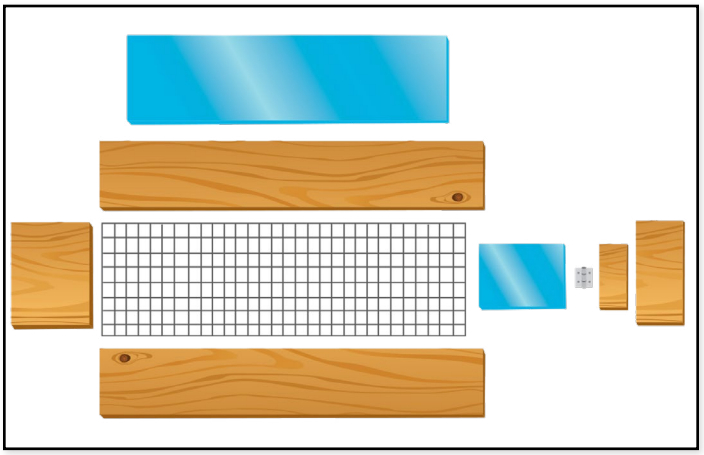


Figure 8. Components of a constructed live trap for pocket gophers. Illustrated by Chris Meux, University of Arkansas.

All plywood in this design is one-half-inch thick. To build trap, attach sides to the plywood back using wood screws. Then attach Plexiglas® top with wood screws and fast-drying glue to the sides and flush with the back of trap, leaving a space in front to attach the door mount. Staple the bottom piece of hardware cloth to the side and back pieces of the trap.

To prepare the door mount, glue the side of the hinge flush to the shorter side of the Plexiglas® door. Glue the other side of the hinge to the center of the 1-inch x 2-inch piece of plywood. Then glue the 1-inch x 2-inch plywood (with hinge and door attached) to the center-front of the 3-inch x 5-inch plywood top mount, such that the door opens inside of the trap. Secure the plywood top piece with the door mount using wood screws into the sides of the trap. Cut aluminum flashing such that it covers the entrance when the trap is sprung to prevent gopher from escaping by pushing door outward or slipping through openings. Tape aluminum flashing around the hasp to prevent small gophers from escaping.

Setting the trap. Identify an active tunnel using a soil or garden probe. When the probe enters a gopher's tunnel, there will be a sudden, noticeable drop of about 2 inches. Repeat until a main tunnel is detected. Insert the trap into the tunnel, or ideally two traps facing outward to capture a gopher entering from either direction. Place the box trap inside the tunnel and wriggle back and forth until dirt comes through the mesh floor. Place dirt on top of the trap. A plywood cover can also be used over the trap to reduce light in the burrow.

If live trapping Ozark pocket gophers, contact your local wildlife biologist with the Arkansas Game and Fish Commission to determine a good location for releasing them. Other gophers should be released within 24 hours outside the boundaries of your municipality.

Habitat Modification

Reducing gopher food sources using either chemical or mechanical methods can decrease the attractiveness of lawns and gardens to gophers. If feasible, remove weedy areas adjacent to yards and gardens to create a buffer strip of unsuitable habitat.

In gardens, crop fields, or pastures with pronounced gopher activity, deep ripping of the soil will destroy gopher burrows and potentially dislocate gophers. When possible, crop rotation is advisable as gophers do not prefer the shallow roots of small grain crops.

Pocket gophers easily can withstand normal garden or home landscape irrigation, but sometimes flooding can drown some and force others from their burrows, making them visible to predators.

Crop Management

Rotating grain crops may help with reducing gopher damage because annual crops do not produce large enough roots to support gophers year-round. Planting 50-foot wide buffer strips of grain around a hay field may provide unsuitable habitat and minimize immigration of pocket gophers into the field.

Flood irrigation in leveled fields can control gophers. Wet soil generally prevents escape of gasses in and out of the burrow. Wet soil sticks to their fur and claws.

Repellents & Frightening Devices

No repellents are currently available to protect gardens or other plantings from pocket gophers. Plants such as gopher purge (*Euphorbia lathyrus*), castor bean (*Ricinus communis*) and garlic have been suggested as repellents, but research has not substantiated these claims.

Many devices designed to frighten pocket gophers are commercially available including vibrating stakes, ultrasonic devices, and wind-powered pinwheels. Studies indicate these are ineffective, probably because gophers are habituated through repeated exposure to noise and vibrations from sprinklers, lawnmowers, vehicles and people moving about.

Another ineffective control method is placing chewing gum or laxatives in burrows in hopes of killing gophers or moles.

Exclusion

Underground fencing might be justified for valuable ornamental shrubs or landscape trees, though typically is not practical for large areas. To protect existing plantings, bury 3/4-inch galvanized wire three feet below ground with an additional one foot of mesh below ground bent at a 90-degree angle away from the planting. This will help keep gophers from digging around the fencing boundary. Also extend the fencing at least one foot aboveground to deter gophers moving overland. This method is not perfect, because persistent gophers can burrow below the wire; also, the wire can restrict and damage root growth of trees.

Small areas such as flower beds can be protected by complete underground screening of the bed's sides and bottoms. When constructing raised vegetable or flower beds, underlay the soil with wire to exclude gophers. To protect individual plants, install wire baskets underneath plants when planting. These are available commercially or can be made. Use a light-gauge wire only for shrubs and trees that need protection while young. Leave enough room for roots to grow. Galvanized wire provides the longest-lasting protection.

To protect underground sprinkler systems or utility cables, bury six to eight inches of coarse gravel one inch or more in diameter around lines to deter gophers.

Natural Controls

Because no population will increase indefinitely, an alternative is to do nothing and let the population limit itself. By the time gopher populations level off naturally, they've already caused much damage around homes and gardens.

Relying solely on natural predators might not control gophers to the desired level. Some people have tried attracting barn owls to an area by installing nest boxes. Although barn owls prey on gophers, their habit of hunting over large areas and their tendency to hunt areas with abundant prey make them unreliable for gopher control. When a single gopher, which is capable of causing damage rapidly, invades a yard or garden, typically a gardener can't afford to wait for an owl to arrive. It is better to immediately take effective action, usually through trapping.

Toxicants

Although toxicants are used to control gophers in other states, it is illegal to poison pocket gophers and most wildlife in Arkansas. An exception are commensal rodents (i.e., Norway rats, black rats, house mice), which live around homes, restaurants, storage facilities and other buildings. Toxicants are allowed for purposes of sanitation and human disease prevention. Illegal toxicants include baits and fumigants designed for or having the potential to cause death of wild animals.

Monitoring

Once the pocket gopher population is under control, monitor the area on a regular basis for fresh mounds (Figure 9). Level all existing mounds after the control program, and clean away weeds and garden debris to improve visibility. Pocket gophers can move in quickly from nearby vacant lots, wildlands, or other areas, so damage can reoccur in a short time. Start control actions when they do, rather than allowing the area to repopulate.

Figure 9. After implementing control efforts, continue monitoring for fresh mounds as pocket gophers in surrounding habitat may move in quickly.

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Videos

Pocket Gopher – How to set a Macabee Gopher Trap. University of California Cooperative Etension Service, YouTube video, 48 seconds.

Pocket Gophers – Trap Placement. University of California Cooperative Extension Service, YouTube video, 2:31 minutes.

Pocket Gopher – Finding Tunnel Systems. University of California Cooperative Extension Service, YouTube video, 4:35 minutes.

Pocket Gopher Control. University of Nebraska – Lincoln, YouTube video, 10:50 minutes. NOTE: Use of toxicants for controlling gophers is illegal in Arkansas.

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