

TURFGRASS TRENDS

ANIMAL INSTINCTS

Ground Squirrel Control on Golf Courses

By Jim Knight, Ph.D.

Because ground squirrels are primarily meadow and grassland rodents, golf courses provide an especially attractive habitat for them. Unused portions of golf courses often provide a reservoir of ground squirrels, which become problems whenever dispersing juveniles settle on groomed portions of the property. Damage from ground squirrels on golf courses includes damage to turf and bunkers from the squirrels' feeding and burrow digging activity.



There are more than a dozen species of ground squirrels. The Richardson, shown here, is among the most common.

Life history and biology

The United States is home to more than a dozen species of ground squirrels. They are found in every region of the country except in the Southeast. Franklin ground squirrels are found in the eastern part of the northern Great Plains; Richardson ground squirrels in the western Great Plains; Washington ground squirrels in the Northwest; Columbian ground squirrels in the northern Rockies; and Townsend ground squirrels in Nevada and Utah.

The thirteen-lined ground squirrel is the most widely distributed, with a range that extends from Alberta, Canada in the North to Texas in the South and from central Ohio in the East to Colorado in the West.

Ground squirrels live in extensive underground burrows with many entrances. They hibernate during the winter and store large quantities of food in burrow caches. They

begin hibernation early, and some species in drier areas go into hibernation in August.

Males become active in early spring, one to two weeks before females do, and breeding takes place immediately after females emerge from their burrows. After a 28-day gestation period, two to 14 young are born. Densities of ground squirrels

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can range from two to 20 or more per acre.

It is important to know the difference between ground squirrels and pocket gophers, which are found throughout most of the same range. Although these two species look very different, there is some confusion, because ground squirrels are sometimes called “gophers.”

Pocket gophers not only look different from ground squirrels, they also behave differently. Whereas pocket gophers spend 99 percent of their lives underground feeding on roots and tubers, ground squirrels feed above ground. And while pocket gophers plug their tunnel entries tightly with soil, ground squirrels have open entrances to their tunnel systems. Also, ground squirrels look like common tree squirrels, while pocket gophers have cheek pouches and external incisors and look more like short-tailed rats.

Ground squirrels are not protected in most states. There are, however, species or subspecies that are protected in some areas. For example, the northern and southern Idaho ground squirrels are a Species of Concern; and Iowa, Pennsylvania and Missouri require special permits before controlling ground squirrels. It is best to check with your state wildlife agency before implementing control programs.

Control

Superintendents often ask whether they should try to reduce the ground squirrel population or eliminate it. It makes more

economic sense to eliminate the population. Ground squirrels, with an average litter size of 10 and a maturity age of about 10 months, are very productive. One female can have offspring resulting in over 100 progeny in just three years.

But despite the large brood, the juvenile mortality rate is about 85 percent. Most of that mortality occurs in late summer, when the mother drives her offspring out of her burrow. The offspring die of exposure, starvation and predation, among other things. However, if a nearby population has been reduced, the multitude of burrows available results in extremely high juvenile survival and any reduction in population is immediately offset. The extra effort to eliminate the local population will result in a smaller chance of reinfestation.

Because of the above-mentioned dispersal behaviors of ground squirrels, it is wise to cover burrows after control programs are completed. The ground should be revegetated so the area will be less likely to attract disseminating young animals.

Individual or small populations of ground squirrels can be controlled with traps. For most golf course problems this may be the most practical method of control. Body-gripping (also known as Conibear) traps can be placed over the hole, and all entrances to a burrow system should be covered. Several to dozens of the No. 110 size traps should be used so trapping can begin on one side of the colony and progress across the area. The traps should be staked to prevent scavengers from dragging them off. Body-gripping traps are available at hardware stores and online.

Fumigants can be used in small areas of ground squirrel infestations if the soil is dense and moist. If soils are loose and dry, the gas will dissipate before it can effectively be concentrated in the system. Gas cartridges and aluminum phosphide are fumigants registered for ground squirrel control.

Gas cartridges have a fuse that is lit and then placed in the hole. All entrances must be plugged so the gas can be forced to dissipate through the burrow system. The ground squirrels then die of asphyxiation.

Toxicants registered for ground squir-

A small population of ground squirrels can sometimes be controlled with body-gripping traps.





rel control include anticoagulant and single lethal-dose baits. Anticoagulant baits cause internal hemorrhage and require that an animal ingest them multiple times for the baits to be effective. After initial placement of anticoagulant baits, a second treatment is required two to three days later.

But anticoagulant baits are more readily eaten by ground squirrels, because the squirrels like the way they taste. The risk to non-target animals is reduced because of the need for multiple feedings. To maximize success and to ensure safety, be sure to read and follow label directions.

Timing of ground squirrel control is very important, especially when using toxicants. Timing may be the most critical factor affecting success. When using toxicants, the target period for control is early spring. Begin control as soon as possible after both the males and females have emerged.

After green-up occurs, the grasses and forbs are much more palatable than grain, and ground squirrels will be reluctant to

accept baits. Additionally, control measures prior to the birth and emergence of young ground squirrels will be much more efficient.

Anticoagulant baits such as Rozol are readily accepted by ground squirrels when hand-placed near the burrow entrance. These baits cause internal hemorrhage, so multiple feedings are required. Plan to treat when several days of dry weather are expected so a second treatment can be placed two to three days after initial treatment.

Zinc phosphide, a restricted-use pesticide, is a single lethal-dose poison. One feeding with it is enough to kill ground squirrels. However, because zinc phosphide is distasteful, it is necessary to prebait the area with clean, untreated oats to ensure the squirrels will readily accept the poisoned grain.

Distribute the poisoned bait two to three days after pre-baiting. When mixed with moisture in a ground squirrel's mouth or stomach, phosphine gas is produced and causes rapid death. It is important that the ground is dry

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For large populations, hand placement of toxicants is an economical method of ground squirrel control.

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when the zinc phosphide is placed.

Use of bait stations also is a practical control method on golf courses. Place approved anticoagulant baits, such as Ramik Green, in containers and distribute them throughout the area to be controlled. Space bait stations about 65 yards apart along borders or fences. Ground squirrels are then able to eat the bait throughout the day.

Bait stations can be made from three, 24-inch-long pieces of three-inch PVC or drain field pipe. Connect the pieces with a tee and cover the upright part of the tee with a removable cap. Stand the station upright and attach it to a fence post or posts driven into the ground.

Remove the cap and fill the tube with bait labeled for bait stations. Ground squirrels enter the bait station through the horizontal pipes and eat the bait, which is made available as it drops down from the capped vertical pipe.

Remember, anticoagulant baits must be eaten continuously for a three- to five-day period in order to be effective. If the bait stations are allowed to go empty, the toxicant will not work. Be sure to keep the bait station filled and to follow all label directions on the rodenticides.

Live traps can sometimes be used to remove a very small number of ground squirrels. In golf course situations, this may be desirable when the ground squirrels are near the clubhouse or some other public place. The small 5x5x18-inch traps work well and are available online. I recommend baiting with peanut butter that is coated with rolled oats.

When an animal is live trapped, there is often a desire to release the animal at a distant location. Research has shown this may not be a desirable, nor a humane, option. If a ground squirrel is released, it will normally try to return to its home.

Ground squirrels often die of exposure, starvation or predation. Releasing a ground squirrel with an existing colony will not work, because the resident animals will drive it away.

Drowning is one humane way to dispose of live-trapped ground squirrels. But shooting ground squirrels is not usually safe or practical on golf courses and is seldom an effective method of control. Shooting is expensive and time consuming and causes the animals to quickly become cautious. At best, shooting reduces the population only until late summer, when juveniles repopulate the vacated burrows.

Propane-exploding devices have been advertised to control ground squirrels. They are intended to fill the burrow system with propane and then ignite it to kill the rodents. The resulting explosion is certainly satisfying and some operators have reported some degree of control. Because the devices are expensive, it is usually difficult to demonstrate they are an economically efficient method of ground squirrel control.

Other methods have been proposed to control ground squirrels. Ultrasonic devices have not proven to control, disturb or displace ground squirrels when tested in unbiased research trials. Flooding the tunnel system with water from a hose will sometimes force the squirrel from a burrow if the burrow system is not extensive and soils are heavy. Avoid flooding burrows that are adjacent to foundations or structures that may be damaged by water.

Gumballs have been reported to clog the intestinal track of ground squirrels. Most of the claims are anecdotal, and although individual ground squirrels may nibble on gumballs, there is no evidence populations will consume enough to result in reliable control.

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