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Rodent Mining Engineers

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Abstract:

Colorado's seldom-seen pocket gophers are getting some attention from the National Wildlife Research Center. Researchers are attempting to improve management of gophers in agricultural areas. Although the gophers' tunnel building may damage harvest equipment, their activities enrich soils over time.

Colorado's seldom-seen pocket gophers are getting some attention from the National Wildlife Research Center. Researchers are attempting to improve management of gophers in agricultural areas.

**BY DR. RAY
STERNER**

RODENT MINING ENGINEERS

Although the gophers' tunnel building may damage harvest equipment, their activities enrich soils over time.





Four species of gophers are found in Colorado. Pictured is a plains pocket gopher.

COLORADO'S POCKET GOPHERS

It was still dark when I arrived at my “stand” in area 37 south of Kremmling that fall morning of 1988. Two hours later, I could see steam rising from the Blue River. A hunter’s moon was setting over the Gore Range’s rugged peaks.

“Ah, this is what it’s all about,” I thought, “Who cares if ‘old white butt’ doesn’t show?”

Just then, as I looked down at my boots, the nearby soil began undulating. Soon a small, blunt-nosed critter poked its tiny claws upwards. This marked my first encounter with a pocket gopher — Colorado’s premier mining engineer and the scourge of Bill Murray’s movie, “Caddy Shack.”

Since that incident, I have come to know this rodent quite well. Research efforts at the USDA’s National Wildlife Research Center on the Foothills Campus of Colorado State University have afforded numerous opportunities to capture, observe and track these rodents. Efforts are aimed at the development of new methods for managing pocket gophers in agricultural settings with research of potential in-soil repellents a priority.

Yes, this stocky, small, short-legged, blunt-nosed rodent is not appreciated by many farmers or ranchers. The animals’ mound-building activity decreases forage, damages harvest equipment and weakens water impoundments; of course, these same activities decrease soil compaction, increase moisture retention and aid humus deposition. The problem boils down to the fact that the costs required for soil enrichment are out of sync with farmer/rancher economics.

Although labeled simply “gopher” by many, the name pocket gopher comes from the distinctive, outward-folded, fur-lined cheek pouches (pockets) that serve as food-transport units during foraging. Pocket gophers are herbivores, coming above ground on summer nights to clip, eat and cache forbs or grasses, but surviving easily underground on roots, tubers and cached-plant material in winter.

Four species of pocket gopher make Colorado home: northern, plains, valley (Botta’s) and yellow-faced (Mexican or chestnut-faced). Each varies in physical features and lives in somewhat different ecosystems of the state. The northern, being the smallest (3.5-5 ounces.; 6.5-9 inches) and most ubiquitous, has adapted to the high shrubland, montane and subalpine areas of mainly the western counties. Members of this species will vary greatly in color from dark brown to yellowish brown to yellowish gray.

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Pocket gophers are named for their distinctive, outward-folded, fur-lined cheek pouches.



Coyotes, badgers, snakes, weasels and owls prey on gophers. Pictured is a long-tailed weasel checking on the author’s whereabouts.

Pocket gophers spend nearly their entire lives underground.



The plains gopher (6-11.5 ounces; 7-12 inches) inhabits the high prairie and grasslands of eastern Colorado; their pelage varies from light brown to reddish brown. The valley species (4-7.5 ounces; 8-10 inches) is found extensively throughout the southwestern U.S., and their range extends into the high, semi-arid areas of our southwestern and some southern counties. Coloration of the valley gopher varies from shades of yellowish to reddish brown. Yellow-faced gophers (5.5-12.5 ounces; 9.5-12 inches) are found solely in southeastern grasslands, mainly counties along the Arkansas River drainage. As implied, their yellowish cheeks are distinctive.

Pocket gophers are fossorial, meaning they burrow — an understatement because individuals of all species spend essentially their entire life (probably less than 5 years at most) beneath ground in darkened tunnel systems. Counter to expectations, gophers do not hibernate; their runs and nests benefit from somewhat stable subterranean temperatures.

Tunnel systems vary in size and design as a function of species, soil composition, population density, forage availability and probably a host of other factors yet unidentified. Nevertheless, if you're in the field and find their telltale mounds of excavated soil (about 2 feet long by 1 foot wide by 1 foot high) or cup-size "feeder plugs" of freshly packed dirt (about 2.5 inches in diameter, flush with ground surface), you can bet that the ground below has been undermined with perhaps a 60- by 40-foot network of runways, nests and caches. Systems vary in size by species with the larger gophers generally having larger systems. Mr. or Mrs. Gopher has probably retreated to a nest chamber because your footsteps announced your presence. Approximately 70 percent of tunnels will be less than 18 inches beneath your feet, but these foraging runways will connect with deeper nest chambers and food caches that are about 3-6 feet down (some can go to 12-15 feet deep).

The animals are energetic, checking

and sealing (plugging) the tunnel system regularly to prevent intrusions by predators or to define a neighbor's system. They will fiercely protect their system from others of the species (except during reproduction in March-June), with older males probably causing high mortality among dispersing gophers during August-September as the young animals try to find their niche. Above-ground dispersal, if attempted, increases exposure and is believed to yield high predation. Some scientists theorize that dispersal involves the young moving only a short distance to the periphery of the mother's tunnel system, then walling off a territory of their own. They remain in these plugged, side tunnels until older animals die or get "bumped off" (or

they themselves become victims of predators or older gophers).

Although it's rare to view gophers above ground, your best chance of seeing one is to locate a set of their telltale mounds, then plan a walk or hike there at dusk. Keep your eye out for dark, fresh, excavated soil, and possibly an open feeder or tunnel. If you find these signs, stop for awhile and watch for small movements at the opening, possibly some flicks of dirt. Be patient, it could take you several outings to see one; I can count on my fingers the number of sightings that I have made, despite hours in the field.

Pocket gophers are a keystone in Colorado's biotic web. This was obvious to me during a field study last summer near Wellington, in eastern Larimer County. After obtaining a scientific collection license from the Division of Wildlife, colleagues and I live-trapped 20 northern pocket gophers in a quarter section, irrigated alfalfa field having center-pole, rotating irrigation. We affixed small (less than .1-ounce) radio transmitters to the anesthetized animals, released them back into their burrows, then monitored the nearest ground surface location to the

transmitter four times daily for three weeks. The work was part of efforts to assess the use of capsicum oleoresin (hot chile pepper) as an in-soil repellent.

Many mornings, as I approached the site, I noticed a resident Swainson's hawk sheepishly riding the center-pole irrigation system, just waiting for the next "Happy Meal" to come into view. Similarly, on a cloudy morning midway through the tracking efforts, a long-tailed weasel showed up. It spent several hours hop-scotching among mounds, opening a few tunnels, and then nervously entering and re-entering these holes while both feverishly digging out the plug and yet periodically returning above ground to keep a wary eye on my whereabouts. But perhaps

I noticed a resident Swainson's hawk sheepishly riding the center-pole irrigation system, just waiting for the next "Happy Meal" to come into view.

the best story of all involves the mysterious movements of gopher No. 11 (a 5-ounce female). At dusk on the third day of transmitter locations, this trans-

mitter could not be detected. Up until that time, she showed typical, less than 20-yard excursions — foraging bouts, tunnel maintenance — from the point of capture. A more extensive search of the area the next morning yielded a detection some 70 yards northeast of the original capture and release site. A strong signal was monitored there for two days, before returning to near the original capture location for eight hours on Day 6. Next, the transmitter was located about 65 yards northwest of the capture site; it stayed there for another 12 hours. Finally, on the morning of Aug. 26, a signal was detected as moving westerly down the implement road along the edge of the alfalfa field. Soon the source of the signal was sighted — a 3-foot-long bullsnake. It veered into an adjacent cattle pasture and disappeared into a small hole. This was the final signal detection; I lost both gopher No. 11 and a \$100 transmitter. □

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