

A farm in Briggsdale, Co., that was part of the mammal survey area.



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# Rodent Hunt

By Dr. Ray Sterner

**A** sunless, yellow-red glow lit up the eastern horizon at 5 a.m. that July morning as I drove my pick-up out of Ault on Colorado 14. The window was down, and the cool morning air swirled through the cab – a contradiction of the impending heat that was now just three hours off. For 10 minutes, I rode past irrigated farmsteads, then on to a mix of shortgrass prairie and pastureland. Another 15 minutes brought me to the southern edge of the Pawnee Grasslands. A pronghorn stared at me from a small depression on the undulating plain.

This is part of Colorado's Piedmont, an approximately 28,000-square mile northeastern and east-central area of the state at the base of the Rocky Mountains. Here, elevation rises gradually from a low of about 3,500 feet to a high of about 6,000 feet as the Piedmont stretches west from towns such as Sedgwick, Cope, Genoa and Hartman to Fort Collins, Golden, Colorado Springs and Pueblo. Northern towns include Hereford,

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Live traps are set in wheat fields for small mammals.



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Deer mouse





Western harvest mouse

Grover, New Raymer and Sterling, while Avondale, La Junta and Lamar dot the southern edge.

The Piedmont can be a harsh place with oppressive hot summers and frigid winters, sporadic droughts, unexpected flash floods, irksome high winds, dangerous tornadoes (typically 40-60 per year) and life-threatening blizzards. It is a land where "only the hardy need apply." Immigrant and even native Coloradans often describe it as a bland, uninteresting landscape as compared to the forest-covered, mountainous, subalpine and alpine ecosystems in the western three-fifths of the state. Still, as any *Outdoors* reader knows, all ecosystems afford uniqueness and beauty – you just have to look harder to find it in some systems than in others.

I was heading to Briggsdale that summer day in 2000 – a small farming and ranching community, with its collection of grain elevators, former Grange Hall, newly built schoolhouse and six dozen or so frame houses and once-thriving businesses. My purpose: to survey small mammals, including rodents and squirrels, at the Dryland Agroecosystem Project Site south of town. As a scientist at the United States Department of Agriculture's National Wildlife Research Center on the Foothills Campus of Colorado State University, I was cooperating with Dr. Gary Peterson and other University scien-

tists to document possible risks posed to crops by small mammals.

The Dryland Project is a multi-year research effort to identify no-tillage or reduced-tillage, non-irrigated crop types and practices that will improve yields and soil characteristics in eastern Colorado. Left uncultivated, this is shortgrass prairie made up of blue grama, western wheatgrass, buffalo grass, prickly pear cactus, yucca shrub, plus other plant varieties, and laced with riparian stream flows. When cultivated, winter wheat has worked well here, as long as it is left idle biannually (alternated as fallow) to restore sufficient moisture for the next cycle. Alternative dryland crops and rotation schemes are being studied as a way to reduce soil erosion and soil-moisture loss, but to increase soil-moisture storage via increased soil carbon and nitrogen retention. The Project began in 1986 (1999 at Briggsdale) and has involved annual experimentation since then. Currently, research is conducted at each of six sites near Briggsdale, Sterling, Akron, Stratton, Lamar and Walsh. Briggsdale represents perhaps the biggest challenge, receiving only 13.7 inches of precipitation annually and virtually 50 percent of this amount during the past several drought years.

Running a small mammal survey is really grunt work; it's not too mentally challenging. Its scientific merit is gained from the documentation of numbers and diversity of animals that wander into the 3-by-3-by-10-inch live traps for a dab of peanut butter and rolled oats or simply for exploration. Generally, multi-trap grids, having 10-yard equidistant spacing, are laid out at random locations in a given area. Of course, a Division of Wildlife animal collection permit is required for such activities. Traps are opened at dusk, then checked and closed the next morning. Modern animal welfare regulations require that traps be closed or else checked frequently during periods of excessive heat or cold; and, a small wad of polyfil is made available to sustain captured animals during cooler nighttime temperatures.

In the current surveys, 18, 12-trap grids were set up in different crops for four repeated nights (one session involved only two nights due to a snowstorm) on four repeated occasions. A July, September, April and July session completed the year-long series. This converted to a possible 3,024 trap sets, with 2,796 that seemed to work properly (92 percent). Captured ani-



mals were weighed, measured, checked for gender and reproductive condition, then marked and released.

Only 63 animals were caught for all of these efforts (a 2 percent overall capture frequency), but 39 of these were also recaptured several times. These involved four species – deer mouse, thirteen-lined ground squirrel, western harvest mouse and northern grasshopper mouse. Although many readers will tend to gloss over differences in the traits of these rodents, be aware that each is unique (if not readily discernible in size, coloration, density or reproduction, then at least in dentition) and fills a special niche in Colorado's Piedmont.

By far, deer mice were the most prevalent animals caught, accounting for 56 (89 percent) of the initial animals and 38 (97 percent) of the recaptured ones. These recaptures are sometimes termed "trap happy" mice – the segment of the population that seems to enjoy either the peanut butter and oats or the free physical exam. Such animals show up night after night, managing to get caught repeatedly. They differ from one-time animals that are fast learners, don't appreciate the handout or being handled and pay a single visit to the trap, as well as trap shy rodents and squirrels that avoid live traps altogether. (We know these exist, because you can usually get additional unmarked mice with pitfall traps or snap traps.) I suspect that this high incidence of trap happy mice reflected the harsh drought conditions that existed during the surveys – any alternative protein probably took on special significance in 2000-2001.



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The deer mouse is a small (3-4-inches trunk; 1 ounce), ubiquitous, largely granivorous (seed eaters), nocturnal rodent, usually having an orangish-colored back, white underbelly and large, erect-standing ears (hence the name). The species inhabits all but wetland ecosystems in Colorado. Female deer mice have multiple litters of about five young (2-8) annually, and some data suggests that these mice become pregnant year-round in eastern Colorado.

Although it may sound contradictory, the no-till farmland near Briggsdale is a correlate of a preferred habitat for these deer mice. Even reduced tillage produces disturbed soil and shifted debris; this displaces other rodents and allows the deer mouse to move in, especially in wheat stubble. In any event, disturbed habitats are often an attraction for this animal following the emigration of other rodents. Core or home areas for this rodent vary between about 0.1 and 10.0 acres, depending upon a host of density, habitat, meteorological and competition factors. Larger numbers of deer mice seem to be inversely related to the size of core areas. Moreover, wheat stubble is well known to cause larger movements than more dense debris such as downed corn stalks; and, stormy, dark nights produce more movement than calm, dry, moonlit nights. While the prevalence of deer mice in my surveys concurs with their widespread distribution throughout every county in Colorado, the Briggsdale Site yielded extremely low trapping success (10-20 percent is common).

During the 1990s, deer mice became

notorious as the primary reservoir for Hantavirus Pulmonary Syndrome. A small mammal survey reported for the Four Corners region showed

that about 30 percent of 813 trapped mice were seropositive for hantavirus. As of last August, Colorado had reported 28 of the 327 human cases of the disease in the U.S., with most of these linked to the 1992 outbreak. Three-fourths of all cases have occurred in residents from rural areas, and the cleaning of mouse fecal and urine-wetted materials in closed, or seasonally opened, buildings has been a concern for transmission.

Three thirteen-lined ground squirrels managed to get caught, with one of these returning for a second visit. This sand-colored, diurnal ground squirrel (4-6-inches trunk; 3-9 ounces) is easily recognized by its distinctive alternating dark and light bands that run down its back. It occurs throughout the Piedmont and the High Plains but not the western part of the Raton Section (only eastern Las Animas and Huerfano counties). It prefers shortgrass ecosystems or otherwise mowed, grassy areas and roams core areas of between three and 30 acres. This squirrel is a hibernator (generally November through April) and an omnivore (eats both plant and animal material, invertebrates and vertebrates, including baby rabbits and birds). I really think that this squirrel was numerous in the survey area, but the closing of traps shortly after sunrise until just before sunset precluded more of them from being captured.

Two western harvest mice were caught; neither was trap happy. This species could easily be mistaken for the deer mouse, but it is smaller (2.5-3.5 inches trunk; 0.5 ounces). It too is granivorous and nocturnal, but the coloration is more brownish than orangish, and the ears are not as pronounced. Western harvest mice are thought to have 2-5 litters annually between May and October of about four young each, and I am unaware of any evidence suggesting year-round breeding for this rodent. Core areas usually vary between 0.75 and 8 acres, with densities less than about five per acre maximum. This mouse is especially linked with riparian drainages and longer-grass areas of the Piedmont, but its preference for seeds and grains makes winter wheat fields prime habitats. Unlike the deer mouse, the western harvest mouse is not found in montane, subalpine, or alpine ecosystems. Both of these captures were in traditional

winter wheat and fallow habitat.

Finally, two northern grasshopper mice were marked and released. This is Colorado's rodent with "attitude." Stocky of build (3.5-4.5 inches trunk; 1.0-1.8 ounces), with bulgy eyes and a stubby white-tipped tail, this guy is the *T. rex* of the rodent world. Almost 90 percent of its diet consists of grasshoppers, beetles and other mice or voles. Again, while some might mistake it for a deer mouse, the immature and older animals have grayish coloration, while the mature adult appears more cinnamon brown than the orangish-brown-haired deer mouse.

As you might expect, the behavior, reproduction and activity of this animal differ somewhat from other rodents. First, due to the carnivorous diet the grasshopper mouse often stinks, giving off an irritating, acid-like odor. Second, unlike most polygamous rodents, the grasshopper mouse is considered monogamous. Both the male and female help provision young, and produce two or three litters of about four pups during mainly the summer months. Core areas often vary between three and 10 acres, with low densities of only one or two animals per core area. This mouse is especially linked with shortgrass prairie or pastureland; rocky and marshy sites seem to be avoided. Preferred core areas also involve eroded, vegetation-free, sandy spots; these are used for dust rolls. Both of the two mice caught near Briggsdale were in traditional winter wheat and fallow habitat near a gravel roadway that had sandy runoff areas.

In conclusion, I doubt that these small mammals pose serious economic issues for farmers in Colorado's Piedmont. Densities are generally too low. The sporadic high winds in this region, coupled with the relatively low precipitation, retard vegetative debris accumulation and afford little cover to support high densities of these rodents and squirrels. This is a key difference between most habitat types available in the Piedmont versus the High Plains. These animals are also part of Colorado's biotic web. They afford a key food source for the fox, coyote, hawks, owls and other predators that roam and soar over this uplift to the Rockies. □

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