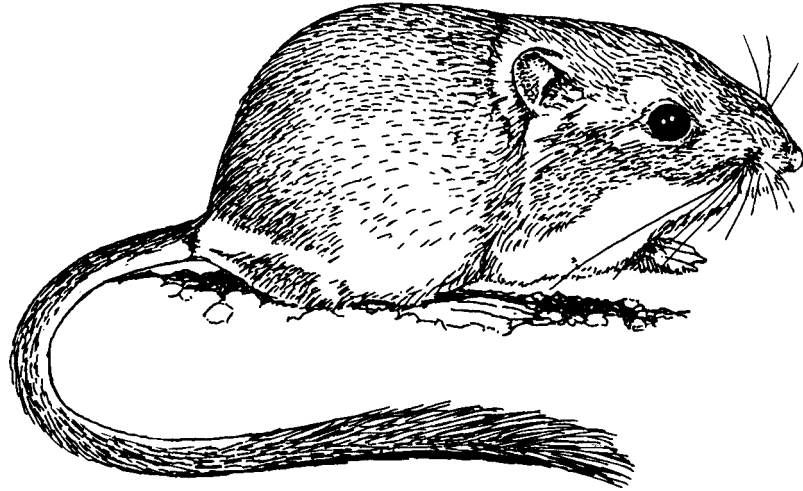


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KANGAROO RATS

Fig. 1. The Ord's kangaroo rat, *Dipodomys ordi*



Damage Prevention and Control Methods

Exclusion

Rat-proof fences may be practical only for small areas of high-value crops.

Cultural Methods

Plant less palatable crops along field edges and encourage dense stands of rangeland grass.

Repellents

None are registered.

Toxicants

Zinc phosphide.

Fumigants

Aluminum phosphide and gas cartridges are registered for various burrowing rodents.

Trapping

Live traps.

Snap traps.

Other Methods

Use water to flush kangaroo rats from burrows.

Identification and Range

There are 23 species of kangaroo rats (genus *Dipodomys*) in North America. Fourteen species occur in the lower 48 states. The Ord's kangaroo rat (*D. ordi*, Fig. 1) occurs in 17 US states, Canada, and Mexico. Other widespread species include the Merriam kangaroo rat (*D. merriami*), bannertail kangaroo rat (*D. spectabilis*), desert kangaroo rat (*D. deserti*), and Great Basin kangaroo rat (*D. microps*).

Kangaroo rats are distinctive rodents with small forelegs; long, powerful hind legs; long, tufted tails; and a pair of external, fur-lined cheek pouches similar to those of pocket gophers. They vary from pale cinnamon buff to a dark gray on the back with pure white underparts and dark markings



PREVENTION AND CONTROL OF WILDLIFE DAMAGE — 1994

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Animal and Plant Health Inspection Service
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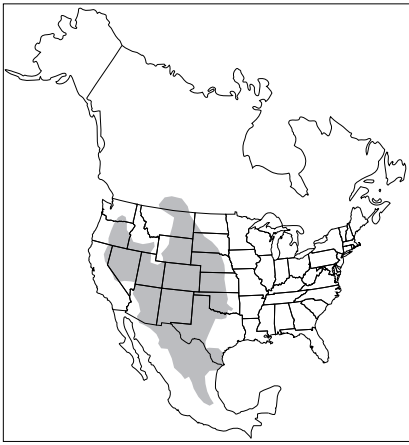


Fig. 2. Distribution of Ord's kangaroo rats in North America.

on the face and tail. The largest, the giant kangaroo rat (*D. ingens*), has a head and body about 6 inches (15 cm) long with a tail about 8 inches (20 cm) long. The bannertail kangaroo rat is approximately the same size, but has a white-tipped tail. The other common species of kangaroo rats are smaller. The Ord's kangaroo rat has a head and body about 4 inches (10 cm) long and a tail about 7 inches (18 cm) long.

Habitat

Kangaroo rats inhabit semiarid and arid regions throughout most of the western and plains states. The Ord's kangaroo rat is the most common and widespread of the kangaroo rats (Fig. 2). Several other species are located in Mexico, California, and the southwestern United States. They generally are not found in irrigated pastures or crops, but may be found adjacent to these areas on native rangelands, especially on sandy or soft soils. They also invade croplands under minimum tillage in these areas, particularly areas under dry farming.

Food Habits

Kangaroo rats are primarily seed eaters, but occasionally they will eat the vegetative parts of plants. At certain times of the year they may eat insects. They have a strong hoarding habit and will gather large numbers of seeds in their cheek pouches and take them to

their burrows for storage. This caching activity can cause significant impact on rangeland and cropland. They remove seeds from a large area, thus preventing germination of plants, particularly grasses, in succeeding years. Since these rodents do not hibernate, the seed caches are a source of food during severe winter storms or unusually hot summer weather. Kangaroo rats are quite sensitive to extremes in temperature and during inclement weather may remain underground for several days.

General Biology, Reproduction, and Behavior

Kangaroo rats breed from February to October in southern desert states. The breeding period is shorter in the northern states. The gestation period is approximately 30 days. Reproductive rates vary according to species, food availability, and density of rodent populations. Females have 1 to 3 litters of 1 to 6 young per year. The young are born hairless and blind in a fur-lined nest within the tunnel system. Usually, the young remain in the nest and tunnel for nearly a month before appearing aboveground.

Only a few females will breed after a prolonged drought when food is in short supply. Most females will bear young when food is abundant, and some young females born early in the season will also produce litters before the season ends.

All kangaroo rats build tunnels in sandy or soft soil. The tunnel system is fairly intricate, and consists of several sleeping, living, and food storage chambers. The extensive burrowing results in a fair amount of soil being brought up and mounded on the ground surface. These mounds can be mistaken for prairie dog mounds, particularly when observed on aerial photographs. They may vary in size but can be as large as 15 feet (4.5 m) across and up to 2 feet (60 cm) high.

Kangaroo rats are completely nocturnal and often plug their burrow

entrances with soil during the day to maintain a more constant temperature and relative humidity. They are often seen on roads at night, hopping in front of headlights in areas where they occur.

Kangaroo rats often occur in aggregations or colonies, but there appears to be little if any social organization among them. Burrows are spaced to allow for adequate food sources within normal travel distances. Spacing of mounds will vary according to abundance of food, but well-defined travel lanes have been observed between neighboring mounds.

When kangaroo rats are locally abundant, their mounds, burrow openings, and trails in vegetation and sand are conspicuous features of the terrain. Both the number of burrows and individuals per acre (ha) can vary greatly depending on locality and time of year. There are usually many more burrow openings than there are rats. Each active burrow system, however, will contain at least one adult rat. There could be as many as 35 rats per acre (14/ha) in farmlands. In rangelands, 10 to 12 rats per acre (4 to 5/ha) is more likely. Kangaroo rats do not have large home ranges; their radius of activity is commonly 200 to 300 feet (60 to 90 m), rarely exceeding 600 feet (183 m). They may move nearly a mile (1.6 km) to establish a new home range.

Damage and Damage Identification

Historically, kangaroo rats were considered to be of relatively minor economic importance. They have come into direct conflict with human interests, however, with large-scale development of sandy soil areas for sprinkler-irrigated corn and alfalfa production. A primary conflict develops at planting time when kangaroo rats dig up newly planted seeds and clip off new sprouts at their base. Damage is more severe when population densities are high. Smaller populations apparently are able to subsist on waste grain and damage is not as apparent. Since kangaroo rats are

primarily seed eaters, they find irrigated fields and pastures a veritable oasis and feed extensively on waste grain after harvest.

Kangaroo rats have foiled attempts to restore overused rangelands. Their habit of collecting and caching large numbers of grass seeds restricts the natural reseeding process. In semiarid rangelands, activities of kangaroo rats can prevent an area from making any appreciable recovery even though the area received complete rest from live-stock grazing for 5 years or more. Reducing livestock grazing is not enough. As long as kangaroo rats remain in an area, they will restrict the reestablishment of desirable forages, particularly native grasses.

Legal Status

Most kangaroo rats are considered nongame animals and are not protected by state game laws. Certain local subspecies may be protected by regulations regarding threatened and endangered species. Consult local authorities to determine their legal status before applying controls.

Attention!! Five kangaroo rat species currently are listed as endangered by the US Fish and Wildlife Service. They are found mostly in California and include the Fresno kangaroo rat (*D. nitratoides exilis*), giant kangaroo rat (*D. ingens*), Morro Bay kangaroo rat (*D. heermanni morroensis*), Stephens' kangaroo rat (*D. stephensi* including *D. cascus*), and Tipton kangaroo rat (*D. nitratoides nitratoides*). Persons working in California, southern Oregon, south central Nevada, and western Arizona should have expertise in identifying these species, their mounds, and the ranges in which they likely occur.

Damage Prevention and Control

Exclusion

Exclusion is most often accomplished by the construction of rat-proof fences and gates around the area to be protected. Most kangaroo rats can be

excluded by 1/2-inch (1.3-cm) mesh hardware cloth, 30 to 36 inches (75 to 90 cm) high. The bottom 6 inches (15 cm) should be turned outward and buried at least 12 inches (30 cm) in the ground. Exclusion may be practical for small areas of high-value crops, such as gardens, but is impractical and too expensive for larger acreages.

Cultural Methods

Alfalfa, corn, sorghum, and other grains are the most likely crops to be damaged by kangaroo rats. When possible, planting should be done in early spring before kangaroo rats become active to prevent loss of seeds. Less palatable crops should be planted along field edges that are near areas infested with kangaroo rats.

High kangaroo rat numbers most often occur on rangelands that have been subjected to overuse by livestock. Kangaroo rats usually are not abundant where rangelands have a good grass cover, since many of the forbs that provide seeds for food are not abundant in dense stands of grass. Thus, changes in grazing practices accompanied by control programs may be necessary for substantial, long-term relief.

Repellents

There are no registered repellents for kangaroo rats.

Toxicants

Zinc Phosphide. At present, 2% zinc phosphide bait is federally registered for the control of the bannertail, Merriam, and Ord's kangaroo rats in rangeland vegetation and noncrop areas. Some states may also have Special Local Needs 24(c) registrations for zinc phosphide baits to control kangaroo rats.

Zinc phosphide pelleted rodent bait was tested on kangaroo rats in New Mexico (Howard and Bodenchuk 1984). Levels of control were much lower than those for 0.5% strychnine oats, but higher than for 0.16% strychnine oats. Zinc phosphide applied in June produced the highest percentage of control. Zinc phosphide is advanta-

geous because it is thought to present little or no hazard of secondary poisoning to small canids and a low hazard to other nontarget wildlife.

Carefully read and follow all label instructions. Zinc phosphide is a Restricted Use Pesticide for retail sale to and use by certified applicators or persons under their direct supervision, and only for those uses covered by the applicator's certification.

Fumigants

There are no fumigants registered specifically for kangaroo rats. Aluminum phosphide and gas cartridges are currently registered for "burrowing rodents such as woodchucks, prairie dogs, gophers, and ground squirrels."

Trapping

Live Traps. Trapping with box-type (wire cage) traps can be successful in a small area when a small number of kangaroo rats are causing problems. These traps can be baited successfully with various grains, oatmeal, oatmeal and peanut butter, and other baits. One problem is the disposal of kangaroo rats after they have been trapped. They usually die from exposure if they remain in the trap for over 6 hours. If the rats are released, they should be taken to an area more than 1 mile (1.6 km) from the problem site. The release site should provide suitable habitat and be acceptable to everyone involved. Do not release kangaroo rats in areas where landowners do not want them.

Snap Traps. Trapping with snap traps is probably the most efficient and humane method for kangaroo rats. Mouse traps will suffice for smaller animals, but Victor® "museum specials" or rat traps are needed for larger kangaroo rats, particularly the bannertail. Successful baits include whole kernel corn, peanut butter and oatmeal, and oatmeal paste, which are placed on the trigger mechanism. Place traps near, but not inside, the burrow entrances or along runways between mounds. Check traps each day to remove dead kangaroo rats. Reset tripped traps and replace baits that

may have been removed by ants or other insects. Do not use whole kernel corn when large numbers of seed-eating songbirds are in the area.

Other Methods

If kangaroo rats from only one or two mounds are causing the problems, and water is available, they may be flushed from their burrows and either killed or allowed to go elsewhere. Collapse the mounds after the kangaroo rats have been driven out. This not only levels the surface but also allows you to detect burrow reinvasion by other kangaroo rats. Use caution when flushing burrows with water or trapping kangaroo rats. The burrow entrances are sometimes used by rattlesnakes seeking to escape heat and direct sunlight during hot days. Even on warm days, rattlesnakes may be found near mounds since kangaroo rats are a source of food for them.

Economics of Damage and Control

Wood (1969) found that Ord's kangaroo rats eat about 1,300 pounds (585 kg) of air-dried plant material per section per year in south central New Mexico based on average (medium) densities. He also reported an additional 336 pounds (151 kg) of air-dried plant material per section per year consumed by bannertail kangaroo rats in the same area under average (medium) population densities. These data were for arid rangelands and could be higher if the populations of

either species were denser. This forage loss (3 Animal Unit Months [AUMs]) is currently valued at \$6 to \$12 per section in New Mexico.

Bannertail kangaroo rats stored 2.9 tons (2.6 mt) of plant material per section per year in their burrows. Furthermore, production of grasses on rangelands in excellent condition were reduced by 10.6% (or 12 AUMs) by denuding of areas in the vicinity of kangaroo rat mounds. These estimates do not include the loss of regeneration of desirable grasses due to seed consumption.

In areas that are being farmed for production of pasture or commercial crops, densities of kangaroo rats could become much higher than those reported by Wood (1969). These higher densities, coupled with higher crop values, could conceivably produce losses greater than \$100 per acre (\$250/ha).

The cost of controlling kangaroo rats can be quite high if labor-intensive methods are employed. Of course, the cost per mound will be higher when controlling a few mounds rather than larger numbers. Trapping is the most costly method; toxicants the least costly. The cost of the traps varies greatly, depending on the size, number, and kind of traps used. Live traps cost more than snap traps. The cost of toxic baits is relatively low on a per-mound basis. Labor costs are reduced when large areas are treated with toxic grain baits using a four-wheel, all-terrain cycle.

Information on specific control techniques and limitations can be obtained from your local extension agent or extension wildlife specialist. In addition, personnel from state wildlife agencies or USDA-APHIS-ADC can provide information on control measures available in your area.

Acknowledgments

Figure 1 by Emily Oseas Routman.

Figure 2 adapted by the author from Burt and Grossenheider (1976).

For Additional Information

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