Range Rodent Control by Plane

cereal bait scattered by plane at rate of one pound or less per acre prior to seeding effectively controls range rodents

W. E. Howard, B. L. Kay, J. E. Street, and C. F. Walker

Where sizable acreage is involved, aerial control of range rodents has several advantages over hand application of cereal baits.

Application of poisoned grain by any custom agricultural aircraft assures that the bait will be well scattered and—while effective in controlling small rodents—there is no danger of poisoning deer, sheep or cattle regardless of what rodenticide is used. However, the kernels should be dyed a brilliant color to insure the safety of birds.

Aerial application of the bait can be done in the early spring when rodents are more easily controlled, and there is no worry about rain idling a large ground crew. Also, it is probably cheaper by air—if the area is large and the terrain rugged—and there is less chance of applying excessive amounts of bait, because one pound or less per acre is usually adequate.

A few years back, rangeland seeding was done any time during the summer, but now it is common practice to defer range seeding as near as possible to when fall rains are due. This reduces the length of time the seeds are exposed to depredations by rodents, birds and ants before germination occurs. But if there is a moderate or high density of small rodents it is usually worthwhile to control these pests prior to seeding whether the seeds are broadcast or drilled, because rodents dig for seeds and also eat grass and legume seedlings.

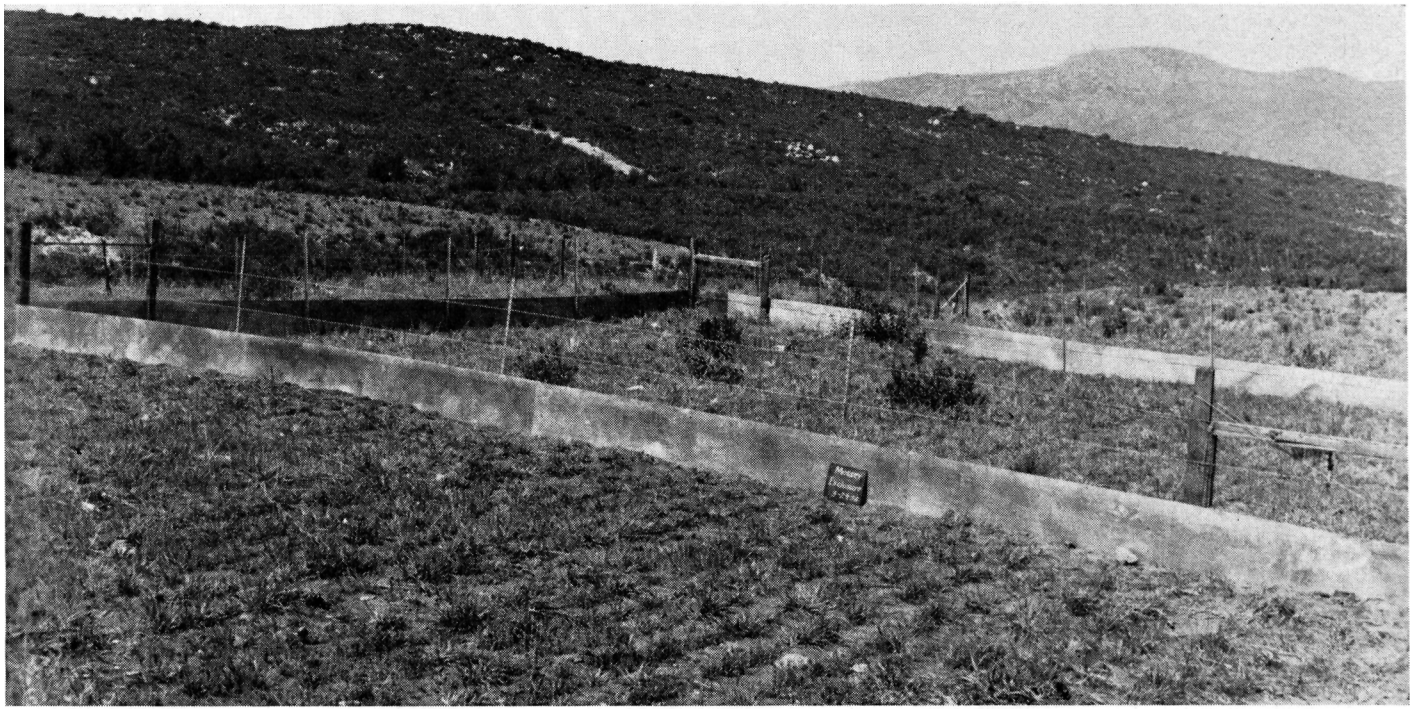
Two aerial experiments—one in San Diego County and one in Modoc County—were limited to the control of white-footed mice or deermice, kangaroo rats, harvest mice, pocket mice, and ground squirrels. Pocket gophers were not a problem in either study area, fortunately, because they cannot be controlled by broadcasting small amounts of bait.

In San Diego County heavily rolled oat groats were used as bait. In Modoc County the bait was whole oats. All bait was dyed yellow as a protection for birds. In both operations bait consisted of three ounces of 1080 poison per 100 pounds of grain. Poison 1080 was selected because the primary objective of the experiments was to test the effectiveness of strip poisoning by airplane. The choice of 1080 avoided the risk of upsetting the experiments by using a poison that might have poor bait acceptance by rodents. But other poisons can be used.

To learn what propensity a kangaroo rat has for gathering seeds, 300 grams of rose clover seeds were scattered in a room that has 500 square feet of concrete floor space. One kangaroo rat from the San Joaquin Experimental Range was released in the room. It ate on the average of between 3,400 to 3,600 seeds per day. During one night the rodent cached an additional 16,000 seeds—59.4 grams. This means that on the night of peak activity the kangaroo rat must have picked up about 20,000 individual rose clover seeds which equals one pound per week.

A custom agricultural aircraft with a large grain hopper was used in these tests. Usually the pilot will not be able to see the small amount of bait released, because the hopper has to be practically closed. Therefore, a trial pass or two over a ground observer at the beginning of operations is essential to check on the amount of grain applied. The desired dosage is an average of three to four

A rodent-free enclosure recently established in San Diego County. A dense stand of chamise is shown on the unimproved range in the background, band seeded area in the foreground.



It is essential that the pilot make one or more trial passes over a ground observer to make sure the dosage averages only about three or four kernels per square foot. The photo shows an unimproved sage brush range in Modoc County.

kernels per square foot near the center of the swath.

In the San Diego test three flaggers were used in treating a 600-acre area. Bait was flown on in strips. The flaggers moved 50 yards for each swath. Signals from the flagger to the pilot were necessary to indicate more or less bait, out of bait, and other instructions.

A kangaroo rat trapped on the treated area—35 days after the treatment—had 12 kernels of the bait in its pouches. When these kernels were bio-assayed, they proved to be no longer toxic, probably because of the six inches of rain that had fallen in the interval. If a water proof grain bait can be developed, it may be possible to use even less bait, and have it remain effective for a longer period of time.

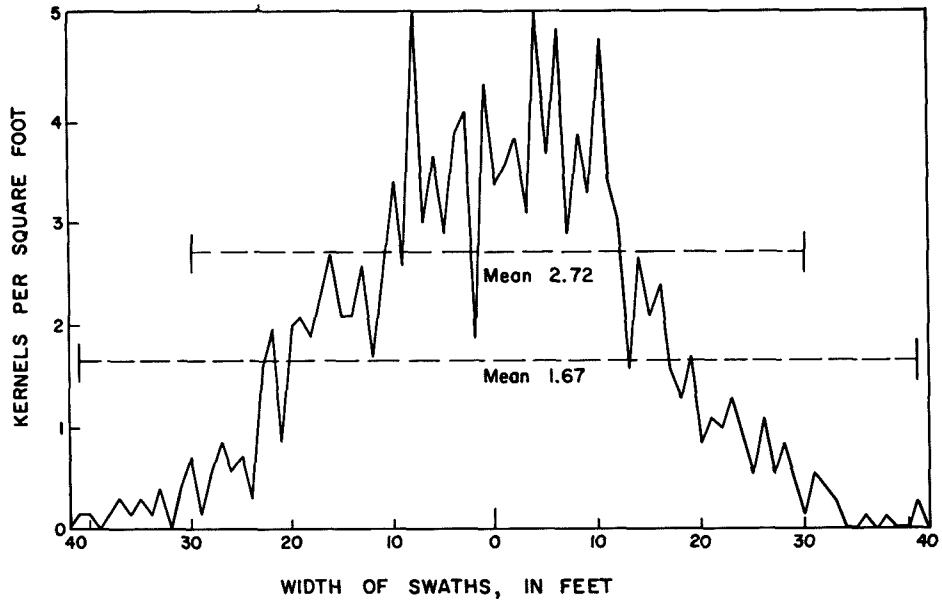
In the Modoc County test only one flagger was used in treating 800 acres. The pilot made five swaths over a 50-acre pasture that had flags staked at the corners. He then flew around that area in larger and larger rectangle strips 50 yards or more apart as indicated by the flagger. This flight pattern reduced manpower and permitted more efficient use of the plane, because no flight time was lost turning around at the end of each run. A later check on the side of the rectangle opposite the flagger revealed that the plane averaged 101 yards between the centers of seven swaths, with the distances ranging from 49 to 146 yards. If the swaths were 20 yards wide, this means that the greatest distance to poison bait from any place between swaths was only 63 yards, and for all but one instance the distance was less than 39 yards. Rodents readily travel such distances during their nightly wanderings.

The effective swath widths were about the same—20 yards—whether the plane flew at 25′ or 100′ elevation.

To determine the distribution of the groats in the San Diego test, a 10′ wide transect was sampled along a dirt road across the 600-acre area. The edges of the swaths were determined by the presence of the first and last kernel found in the transect. Mean swath width was 21.3 yards. Mean number of kernels falling per square foot in the inner 20 yards of each of seven swaths was 2.72. It was 1.67 when based on the maximum swath width of each of the seven swaths.

Aerial application gives better coverage than hand application, and so little bait is put out by plane that no harm is done if a strip should happen to get treated twice. Also, there is little danger of using insufficient bait, as long as grain keeps coming out of the hopper. One-half pound per acre would probably do as good a job as one pound.

Average number of poison oat groats that fell per square foot in a foot-wide transect across seven swaths, San Diego County. Mean number of groats is given for both the total width and for the center 20 yards of the seven swaths.



Walter E. Howard is Associate Specialist in Field Stations, University of California, Davis.

Burgess L. Kay is Assistaint Specialist in Agronomy, University of California, Davis.

James E. Street is Associate Specialist in Agronomy, University of California, Davis.

Charles F. Walker is Assistant Specialist in Agronomy, University of California, Davis.

Farm Advisors Victor W. Brown, San Diego, and Carl W. Rimbey, Alturas; Deputy Commissioner James O. Brodeur and Inspectors Robert J. Buckner and Victor C. Clifton, San Diego; Agricultural Commissioner Loring White, Alturas; personnel of the U. S. Forest Service, Alturas and Descanso; John A. Ludeman, U. S. Fish and Wildlife Service, Sacramento; ranchers Curt Massey, San Diego County, and Rob Flournoy in Modoc County cooperated in the studies reported.

Per cent reduction of rodents resulting from aerial application of baits as was determined by trapping the two treated and the two check areas. The number of days that the rodent census followed the poisoning is also listed.

Location	Number of Rodents Trapped per 100 Trap-Nights[1] Poisoned area	Control	Per cent reduction
Modoc County Sampled 11 days after poisoning ..	0.88	9.3[2]	87[2]
San Diego County Sampled 35 days after poisoning ..	0.75	22[2]	97

1. One trap night equals one mouse trap set for one night. During the past year of the study, 318 mice were caught in 5,338 trap-nights on the two areas. The figures in the table are derived from 98 mice caught in 1,890 trap-nights during the census following the poisoning by airplane.

2. Both poisoned areas formerly supported a much higher population of rodents than the control areas, so this figure actually should be even larger, especially in Modoc County.

3. Reduction would probably have been higher had not the rodents already been effectively controlled in and about the center 50 acres by use of poison bait stations (grain put in one quart service station oil cans) that were left out all winter.