COMPLETED PROJECT REPORT

Project Title: Evaluation of jackrabbit control systems

Research Agency: University of California Davis

Principal Investigator: T. Salmon

Budget: $60,845

Background:

Black-tailed jackrabbits (*Lepus californicus*) are common and occur throughout California. Jackrabbits damage a variety of crops including alfalfa, hay, cotton, vegetable crops, small orchard trees and young grapevines. Participants at the 1996 Outreach Meetings held by VPCRAC in Fresno specifically identified jackrabbits as damaging to carrots, young trees, irrigation hoses, and as a hazard on airport runways. Despite its' status as a serious pest, the jackrabbit has received practically no attention from researchers. There have been no published studies evaluating jackrabbit control techniques nor any significant control advances in the last 25 years.

We have a unique opportunity on the University of California Davis (UCD) campus to evaluate jackrabbit control techniques. A 2-acre field next to our laboratory could serve as an large, outdoor pen for rabbits and as a site to test control techniques.

Objectives:

1) To develop the methods to capture, maintain and care for wild jackrabbits held in a 2-ac enclosure.
2) To evaluate the following jackrabbit control techniques:
    a. Bait stations - evaluate designs that allow access by jackrabbits but minimize access by non-target birds.
    b. Traps - compare different live-trap designs.
    c. Fencing- compare different fence types and heights.

Summary:

Black-tailed jackrabbits (*Lepus californicus*) damage a variety of crops including alfalfa, hay, cotton, vegetable crops, small orchard trees and young grapevines. There have been no published studies evaluating jackrabbit control techniques nor any significant control advances in the last 25 years. The objectives of this study were to: 1) develop the methods to capture and care for wild jackrabbits held in a 2-ac enclosure, 2) evaluate bait station designs that would allow access by jackrabbits but minimize use by non-target birds, 3) evaluate different types of fencing to exclude jackrabbits, and 4) determine the effectiveness of different live traps for

jackrabbit control.

The study site was a 2-ac field on the University of California Davis campus, in Yolo County. In August - November 2003 we constructed a rabbit-proof fence around the 2-ac field and provided feeding stations and cover suitable for jackrabbits. In February 2004 we conducted a rabbit drive on ~135 ac of fields and drove 20 to 23 rabbits into the fenced field.

Bait stations - We conducted standardized bird counts to determine likely nontarget species and numbers present in the rabbit field. In March 2004 we began 3 12-day tests using 4 A-frame bait stations, each provisioned with 250 gm of clean oat groats in a food bowl. We measured consumption and replenished the grain twice a day to cover 2 activity periods, from dusk till dawn (nighttime) and from dawn till dusk (daytime). We videotaped activity 24 hr/day at each station and reviewed the tapes on a monitor in the lab. We recorded the species using the bait stations, time of use, and the particular bait stations used. We evaluated the bait stations in 3 phases. In Phase 1 we provided clean oat groats and attached curtains over the A-frame openings on 2 of the stations. In Phase 2 we provided clean oat groats but used curtains on all 4 stations. In Phase 3 we provided blue-dyed oat groats (to simulate anticoagulant grain bait) instead of plain oat groats and used curtains on all 4 stations. Rabbits fed from the bait stations in all 3 phases of testing. In Phase 1, when given the choice, rabbits fed more (603 vs. 164 feeding sessions, and 2149 vs. 406 minutes) from the open stations than the stations with curtains, respectively. In Phase 2, when all 4 stations were fitted with curtains and there was no other choice, rabbits fed from all the stations and in a more equally distributed pattern of use between the 4 stations compared to Phase 1. In Phase 3, when offered only blue-dyed oat groats, the rabbits fed from all of the stations. Total number of minutes spent feeding in the stations for Phases 1 - 3 was 2555 min, 2417 min, and 2805 min, respectively. We conducted 61 bird counts between December 2003 to April 2004 and observed 32 species. Five species of birds using the stations consisted of crowned sparrows and corvids. During Phase 2, the crowned sparrows, which are migratory, left. Results for birds using the bait stations differed from the rabbits. In Phase 1 none of the birds used the stations with curtains. The birds fed in the open stations 541 times for 542 minutes in Phase 1. In terms of minutes corvid use dropped 86% (542 to 73 minutes) from Phase 1 to 2. Jays and crows never used the bait stations with curtains in Phase 2; all recorded use of the stations with curtains in Phase 2 was attributable to magpies. Corvid use fell another 44% (73 to 41 minutes) from Phase 2 to 3 with the introduction of the blue-dyed grain. From Phase 1 to 3 there was a 92% decrease in the time spent feeding in the stations.

Rabbits exhibited crepuscular and nocturnal feeding periods. Most rabbit feeding occurred from 1700 to 0600 hr. Corvids exhibited a diurnal feeding pattern, with feeding limited to the daylight between 0500 to 2000 hr.

Fencing - We conducted a 12-day test each for 3 different types of fences: portable electric fencing, poultry wire fencing, and plastic fencing. We set up an A-frame feeding station with 2 bowls of oat groats. After the rabbits had a well-developed habit of using the station, we installed ~80 ft of test fence around 3 sides of the station. On the 4th side we installed a 20-ft section of 4-ft high, 1-inch mesh poultry wire fencing which we assumed the rabbits would not breach. We installed 4 cameras and videotaped the food bowl and the 3 sections of the test fence

24 hr/day. We measured consumption from the food bowls twice a day as described above for the bait stations. We reviewed the tapes and recorded the species using the bait stations, the number of approaches to the fences and the number of feeding bouts at the food bowls. No rabbits breached the electric fence or the poultry wire fence during the periods when the fences were closed and/or powered on. Jackrabbits chewed through the plastic fence on the 3rd night of exposure and thereafter resumed feeding from the food bowls.

Trapping - We evaluated 2 different cage traps (Havahart™ 32" X 10.5" X 10" and Tomahawk™ 42" X 15" X 15"), and a pen trap, which was designed to be self-operating. We placed 2 each of the cage traps on rabbits trails in the field and constructed the pen trap at the intersection of 2 rabbit trails. We left the traps open for 18 days and prebaited to acclimate the rabbits to the traps. We began trapping in July 2005 and ran all traps concurrently for a total of 14 days. We checked each trap twice daily and recorded the catch of target and nontarget species by trap and time period. We released trapped rabbits outside the fenced field. We caught 5 rabbits within the 1st 24 hr and by day 14 caught 24 of the 26 adult-sized rabbits known to be in the field. The majority of rabbits (54%) were caught in the double-door Tomahawk traps while 33% of the rabbits were caught in the single-door Havahart traps. The catch rate for the 2 double-door traps combined was 0.46 rabbits/trap day *vs*. 0.29 rabbits/trap day for the 2 single-door traps combined. Most rabbits (79%) were caught between 1600 hr in the afternoon to 0900 hr the next morning. We caught 3 rabbits in the pen trap, but only as a result of flushing them as we checked the cage traps. Otherwise, the pen trap did not function as self-operating trap. Nontarget species caught in the traps included magpies, jays, and ground squirrels.

Management considerations - Additional research is required to determine if the A-frame bait station can be initially deployed with curtains and toxic grain bait, or if prebaiting (no curtains and clean grain) must be undertaken 1st. Fencing can be an effective control technique on areas where anticoagulants cannot be used (e.g., organic crops) and where immediate or non-lethal control is desired. The use of plastic fence for jackrabbit control is not recommended. Jackrabbits can be caught in cage traps. The use of cage traps requires trapping over an extended period and will not provide immediate control. Trapping with cage traps may be best employed as an ongoing, secondary control technique, where a slow reduction in the population is acceptable.

Final Update:
03/01/06