

COMPLETED PROJECT REPORT

Project Title: Laboratory efficacy studies with bromethalin pelleted and grain baits on California ground squirrels

Research Agency: National Wildlife Research Center

Principal Investigator: G. McCann

Budget: \$12,000

Background:

Bromethalin is registered in the U.S. at 0.01% for commensal rodent control. The Vertebrate Pest Control Research Advisory Committee, interested in expanding the registration to include field and rangeland rodents, funded a series of laboratory tests to determine if bromethalin was effective and had potential to control California ground squirrels (*Spermophilus beecheyi*).

Objectives:

To determine the minimum bromethalin concentration producing 100% mortality. After the first test, the focus was modified to determine if the 0.01% concentration was capable of producing >70% mortality.

Summary:

For the first test 29 ground squirrels were captured in California and shipped to the test facility in Denver, Colorado. They were placed on a 3-day, no choice feeding study with 0.01%, 0.03%, and 0.10% pelleted bromethalin bait. Each animal was given 10 g of bait daily. Three of 9 ground squirrels (33%) offered the 0.01% baits died within 3 days. Mortality was 80% for animals offered 0.03% baits and 100% for animals offered 0.10% baits. The total bromethalin ingested by the animals at each concentration averaged 3.39 mg/kg (0.01%), 4.37 mg/kg (0.03%), and 7.86 mg/kg (0.10%).

In a second test, 88 ground squirrels were captured in California and sent to Denver. Sixty animals were randomly selected for a 3-day, no-choice feeding test with control (0.00%), 0.01%, and a 0.03% pelleted bromethalin baits. The quantity of bait given each animal was increased to 20 g of bait daily. Mortality was 25% for the 0.01% concentration and 65% for the 0.03% concentration. The total of bromethalin ingested by the animals averaged 3.84 mg/kg (0.01%) and 4.16 mg/kg (0.03%).

The third and final test was conducted in the new NWRC labs in Ft. Collins, Colorado. Bromethalin formulated on oat groats was used instead of pelleted baits. This test was a 3-day,

no-choice, feeding test with a control group of 12 animals, and 3 other groups of 12 animals, one group each on 0.01%, 0.03%, and 0.10% bromethalin concentrations. Each animal was given 20 g of bait daily. Mortality was 17% for the 0.01% bait, 25% for the 0.03% bait, and 75% for the 0.10% bait. No control animals died. The total bromethalin ingested by concentration averaged 4.42 mg/kg (0.01%), 2.81 mg/kg (0.03%), and 7.37 mg/kg (0.10%).

These data suggest that: 1) pelleted bromethalin bait has potential for controlling California ground squirrels, 2) the minimum concentration producing the maximum mortality is approximately 0.07%, and 3) maximum mortality is approached when California ground squirrels consume a mean of 6.72 mg/kg of bromethalin in a single feeding. The tests also suggest that despite being in the lab and on a 12 hour light:dark cycle, the squirrels may still have exhibited seasonal preferences for the baits, as would have been the case if they were free-ranging. Poor bait acceptance in Tests 2 and 3, possibly resulting from these seasonal preferences, may have confounded the results and prevented a full evaluation of the potential of bromethalin.