

COMPLETED PROJECT REPORT

Project Title: Evaluation of baiting duration and bait station density for deer mouse control in almonds

Research Agency: University of California, Davis

Principal Investigator: T. Salmon

Budget: \$44,603

Background:

The Vertebrate Pest Control Research Advisory Committee has funded 2 projects to evaluate deer mouse (*Peromyscus* spp.) control in almonds. The 1st, from February - December 2002 (contract no. 01-0530) attempted to develop and evaluate elevated bait stations placed in the crotch of the almond trees. The 2nd study, from January - June 2003 (contract no. 02-0725), addressed bait acceptance. Both studies included laboratory observations of deer mice using the bait stations and efficacy trials in Fresno County almond orchards.

In both studies laboratory observations indicated deer mice readily climbed simulated almond trees and entered the bait stations to consume the grain within. Consumption of the clean oat groats appeared normal suggesting that the design features of the bait stations and placement in the tree did not deter feeding.

Results from the 1st field efficacy trial in July 2002 were disappointing, with reductions in activity at 2 sites of 28% and 72%. Acceptance of the diphacinone grain bait was poor; consumption averaged only 0.6 gm and 3.2 gm per bait station at the 2 study sites over a 2-week period. We attributed the poor bait acceptance to a preference by the deer mice to feed mainly, perhaps exclusively in the summer, on the maturing nuts in the almond trees.

The 2nd field efficacy trial conducted during the late winter - early spring of 2003, included bait acceptance tests that clearly identified a "time window" to initiate baiting, namely when the orchard came into bloom. Bait consumption during the trial was very good, averaging 69 gm/bait station during the 2-week trial. However, despite much improved bait acceptance, efficacy based on an activity index was only 21%.

Objectives:

We will conduct an additional efficacy test in 1 orchard during the winter of 2004 - 2005. The last field test in 2003 identified the time of year when bait should be applied. However, questions still remain concerning the duration of baiting and the spacing between bait stations, e.g., the 2-week deployment without refilling empty stations may not have been long enough nor provided enough bait, and the bait stations at 1 for every 3rd tree may have been spaced too

widely, resulting in too few stations deployed. We predict that an earlier start of baiting, refilling empty stations, and baiting for a longer period, will result in higher efficacy.

Summary:

Deer mice (*Peromyscus* spp.) are a serious pest in almonds in portions of the San Joaquin Valley of California. Broadcast anticoagulant bait is used to control deer mice, but is prohibited in areas where the endangered giant kangaroo rat (*Dipodomys ingens*) occurs, leaving growers with no practical means of control. The Vertebrate Pest Control Research Advisory Committee funded 2 projects to evaluate deer mouse control in almonds. The 1st study in 2002 tested the feasibility of elevated bait stations. The 2nd study identified a “time window” to initiate baiting. In both studies efficacy was not acceptable (>30%). This study examined 2 factors to improve efficacy, duration of baiting and bait station density.

The study site consisted of two 80-ac blocks of almonds near the town of Cantua Creek in Fresno County, California. We established 2 treatment plots and 1 control plot. We initiated field work in February 2005 with periodic checks of the orchard for deer mouse feeding activity in the crotch of the almond trees. The first feeding activity was observed on 17 March, at which time the bloom was finished and the trees were leafed out. Thereafter, the number of trees with sign increased steadily to the 1st week of April, with sign in 74% of the trees.

The field efficacy trial consisted of 1-week pretreatment period, 6 weeks of treatment with 0.005% diphacinone on oat groats, and a 1-week posttreatment period. The 2 treated plots included 860 trees on plot 1 (T1), 651 trees on plot 2 (T2), and 486 trees on the control (nontreated) plot. We deployed 95 bait stations on T1 in a grid pattern of every 3rd row and 3rd tree within a row. We deployed 144 stations on T2 in a grid pattern of every 2nd row and 2nd tree within a row. Each station was filled with 100 gm of bait. We refilled or replaced bait stations as needed. Based on activity indices, efficacy was 75.1% on T1 and 61.5% on T2. Consumption of diphacinone bait on T1 averaged 56.4 ± 39.1 SD gm/station on T1 and 43.5 ± 30.9 SD gm/station on T2.

Based on this study, bait stations should be deployed at the time of or up to 1 month after the 1st signs of mouse feeding in the trees occurs (during or shortly after the bloom). Bait stations should be deployed for at least 6 wk in a grid pattern of every 3rd row and 3rd tree within a row. This baiting strategy gives almond growers a viable control technique in areas where the endangered giant kangaroo rat occurs.

Final Update: 03/01/06