PROJECT REPORT

Project Title: Winter evaluation deer mouse bait station.

Research Agency: University of California - Davis

Principal Investigator: Terrell Salmon

Budget: $14,136.00

Summary/Abstract of Final Report:

Deer mice (Peromyscus spp.) have been identified as a serious pest in almonds in portions of the San Joaquin Valley of California. Broadcast anticoagulant bait is normally 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 (VPCRAC) funded a project from February - December 2002 (contract #01-0530) to develop and evaluate a bait station placed in the crotch of an almond tree to control deer mice. The study reported low efficacy and concluded poor bait acceptance was a factor. A subsequent study was funded and undertaken in the winter and spring of 2002 - 2003 to determine if bait acceptance and efficacy could be improved.

We observed captive-bred deer mice interact with a commercially available bait station in an observation chamber and in simulated almond trees in an outdoor pen. We videotaped mouse activity in the pens and measured food consumption. We conducted 3 bait acceptance tests and a field efficacy trial from January - May 2003 in an almond orchard near Cantua Creek, Fresno County, California. We used an activity index based on sign left in the crotch of almond trees to estimate efficacy.

Observations of mice in the observation chamber revealed that 12 of 13 mice entered the bait station, with the time to 1st entry ranging from 43 sec to nearly 9 min. For 239 entries, the time spent in the station ranged from 1 sec to >27 min and averaged 40 sec ± 165 SD. Review of videotapes from the outdoor pen revealed that the mice readily climbed almond tree stumps and entered the bait stations to feed. The males and females made 53 and 41 entries and exits, respectively, during 1-hour videotaping sessions. Consumption of clean grain over a 2-day period was 4.2 and 3. 0 gm/day for the males and females, respectively. Feeding behavior appeared normal and food consumption was not inhibited by the bait stations.

We conducted 3 bait acceptance tests: for 14 days from 28 January - 11 February, for 6 days from 4 - 10 March, and for 5 days from 18 - 23 April. We observed a trend from poor to excellent acceptance of clean grain from the 1st trial (0.6 gm ± 0.8 SD grain consumed/station) to the last trial (39.3 gm ± 14.8 SD grain consumed/station). We attribute this to orchard

phenology, with the onset of bloom in March resulting in a resumption of foraging in the trees by the mice.

The field efficacy trial consisted of 1-week pretreatment period, 2 weeks of treatment with 0.005% diphacinone on oat groats, and a 1-week post treatment period. The treated area included 1158 trees and the control (nontreated) area had 435 trees. We deployed bait stations filled with 100 gm of bait or clean grain in a grid pattern of every 3rd row and 3rd tree within a row, 120 stations for the treated plot and 48 stations on the control plot. Based on activity indices, efficacy was 21%. Consumption of diphacinone bait on the treated plot averaged 68.6 gm/station ± 26.6 SD for the 2-week treatment period. Consumption of clean grain on the control plot averaged 92.6 gm/station ± 1.3 SD for the 2-week treatment period.

Despite good bait consumption, efficacy of 21% was low and not acceptable. Possible reasons for the poor efficacy include: 1) the 2-week deployment was not long enough, 2) the bait stations, at 1 for every 3rd tree, were spaced too widely resulting in too few stations deployed, 3) the mouse population was too large given the limited time of deployment and/or the spacing pattern of the bait stations for the treatment to be successful, and 4) the poisoned mice were replaced by new mice, e.g., reproduction outpaced or kept up with mortality from baiting.

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