COMPLETED PROJECT REPORT

Project Title: Deer mouse bait station.

Research Agency: University of California - Davis

Principal Investigator: Salmon

Budget: $29,114.00

Summary:

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 objectives of this study were to design and test in the laboratory a disposable, spill-resistant, bait station for deer mice, field test and evaluate the bait station in almond orchards, and develop guidelines and handling procedures for field workers to minimize hantavirus exposure.

We obtained 20 captive-bred deer mice and observed them interact with prototype bait stations in an observation chamber and in the crotch of simulated almond trees in outdoor pens. We used cameras and videotape to record mouse activity in the pens and we recorded food consumption. We conducted a field efficacy trial in July 2002 in 2 almond orchards, Meyers Block 3 and Cantua, both in Fresno County, California. We used an activity index based on sign left in the crotch of almond trees to estimate efficacy. We reviewed the literature and current recommendations available from the internet regarding hantavirus and worker safety.

Observations of mice in the observation chamber revealed that the mice would enter and feed in the prototype bait stations. Review of 315 hr of videotapes from the pens revealed that the mice readily climbed the almond tree stumps and entered the bait stations to feed. The mice were distinctly nocturnal, being most active from about 2020 hr through 0530 hr, with virtually no activity during the daylight hours. Use of the bait stations averaged up to 39 entries/mouse/night. The average daily consumption of clean grain per mouse for males was 2.6 gm (SE = 0.39, range = 1.1 - 3.6 gm) and for females was 2.2 gm (SE = 0.26, range = 1.4 - 3.0 gm). Feeding behavior appeared normal and food consumption was not inhibited by the bait stations.

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. Each study area included a treated area of 1150 trees and a control (nontreated) area of 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, 119 stations for treated plots and 47 or 48 stations on the control plots. Based on activity indices, efficacy was 72% at Meyers Block 3 and 33% at Cantua. Consumption of diphacinone bait on the treated plots averaged 0.6 and 3.2 gm/station for the 2-week treatment period at Meyers 3 and Cantua, respectively. Consumption of clean grain on the control plots averaged 1.2 and 5.1 gm/station for the 2-week treatment period at Meyers 3 and Cantua, respectively. Consumption of clean grain did not approach levels recorded in our pen tests. These findings suggest poor bait acceptance. We speculate that almonds were preferred over oat groats, and that bait acceptance might improve if the grain bait was offered during the winter or early spring when the availability of almonds supply would be much reduced.

We developed hantavirus safety guidelines based on a strategy of minimizing contact by field workers with any surface or material with a high potential for contamination. The design and use of the bait station in the field, including one-time use, no refilling, and clear plastic to facilitate monitoring were a significant factors in reducing handling to a minimum. The guidelines include information on hantavirus symptoms and routes of transmission, deployment, monitoring, removal and cleanup of bait stations, and disposal of unused bait.

Last Updated:

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