COMPLETED PROJECT REPORT

Project Title: Baiting strategies for Gophers.

Research Agency: University of California - Davis

Principal Investigator: Salmon

Budget: $99,898.00

Background:

The objectives of this project are as follows:

1. Determine the LD50, acute and chronic, for diphacinone and chlorophacinone. From the data, determine the dose response curve for these 2 materials.

2. Using the LD50 information, evaluate baiting strategies that will minimize applications of these materials.

3. Evaluate potential for chlorophacinone and diphacinone baits for pocket gopher control in agricultural and other settings.

Summary:

A shortened version of the project summary is provided below.

The up-and-down method was used to determine the acute LD50. The acute LD50 of chlorophacinone was 89.4 mg/kg and 61.9 mg/kg for diphacinone. These values are very high and would be unattainable in a field baiting situation. A more appropriate measure of toxicity is the 5-day chronic LD50 determined from a series of baiting trials. These tests yielded values of 5.4 mg/kg/day for chlorophacinone and 7.9 mg/kg/day for diphacinone. Both values would still be difficult to achieve with currently registered bait strengths.

Instead of increasing bait strength, we decided to examine baiting strategies that provided animals with longer durations of feedings. Results from a 14-day offering made with .005% chlorophacinone Rozol Pocket Gopher Bait indicated that 70% control could be achieved with 10 consecutive days of feeding. Subsequent tests with .01`% chlorophacinone and diphacinone baits also approached the 70% threshold after 10 consecutive days. We concluded that gophers need to consume bait for at least 10 days in order to achieve successful population control. This was problematic because bait became moldy after 4 days in conditions very similar to conditions within a gopher burrow. The mold didn't appear to affect palatability of the bait but it probably reduced toxicity.

In December 2003 we conducted a hand-baiting field study to evaluate .01% chlorophacinone bait. Two flood-irrigated alfalfa fields were divided into 11 plots. Five plots were single treatment, 4 were double treatment and 2 were control plots. Two methods were used to monitor gopher activity pre and post-baiting but analysis was dependent on the more accurate open-hole method. Declines in activity on both control plots. Plots were observed, making it difficult to determine the true efficacy of each treatment regime. However, if we ignore control plot variation, neither treatment regime achieved 70% control (single treatment = 50%, double treatment = 47.4%).

Due to poor results obtained in the hand-baiting trial, we did not believe a burrow builder trial would be effective. Therefore, using calibration results and data from our cage trials, we generated theoretical tunnel lengths that would be necessary for a 130-gram gopher to locate enough bait to consume a lethal dose over 5-days and 10-days. Although the necessary tunnel lengths are not excessively long (44.4 ft over 5-days and 31 ft over 10 days), we determined that there were just too many variables to account for. For example, this tunnel length assumes that we have a uniform tunnel with no cave-ins. It also assumes that a gopher finds and consumes every kernel, which is probably not consistent with the foraging behavior of gophers.

All in all, chlorophacinone and diphacinone treated oats are not very efficacious baits for controlling pocket gophers. However, with very limited tools available it is important to maintain the current labels. Their utility might be limited to situations where populations are low and could be incorporated as part of an integrated management program or when other control options are precluded.

Last Updated:

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