

COMPLETED PROJECT REPORT

Project Title: Anticoagulant baiting strategies for voles in artichokes.

Research Agency: University of California - Davis

Principal Investigator: Salmon

Budget: \$80,336.00

Summary:

Objective 1 - Acute LD50 trial: The LD50 was determined to be 35.3 mg/kg (+ 4.1 SE). This value is much higher than other reported figures. There was a great deal of variability in susceptibility to chlorophacinone. There was no correlation between dose and response, suggesting resistance.

Objective 2 - Using LD50 results, evaluate potential baiting strategies: It was calculated that 4.24 bracts treated with chlorophacinone would be required to obtain a 50% mortality rate. However, assuming resistance may be present in the vole populations, then that value will vary depending on how much exposure a particular population has had to chlorophacinone bait.

Objective 3 - Zinc phosphide bract bait feeding trials: Based on cage and pen trials, the authors found the ZnP bract bait proved very effective, producing 100% mortality. The tests demonstrated the fast acting nature of ZnP and that voles consumed enough to kill them before developing an aversion to the ZnP.

Objective 4 - 0.01% vs. 0.005% chlorophacinone oil bract bait: Formal tests comparing the 2 different strengths of bait were not undertaken. Originally, this test was driven by EPA's intention to drop the 0.01% formulation. However, after the start of the project, EPA decided to retain the 0.01% formulation, thus no formal tests or comparisons were undertaken.

Objective 5 - Verifying baiting strategy and practicality: The authors conducted cage and pen trials using 0.01% chlorophacinone-treated bracts. The cage trials, conducted in the lab, resulted in mortality rates ranging from 25% to 80% in Castroville voles. An interesting finding from the cage trials was that there was no correlation between the number of bracts given to an animal group and bait efficacy. The groups that received 12 - 14 bracts vs. 3 - 4 bracts did not have higher mortality, even when more bait was consumed. The authors suggest the presence of resistance and that the variability in resistance between animals is high. The pen trials, conducted outdoors, gave mortality rates of 76% to 90%, markedly higher than for the cage trials.

Concluding Recommendations: The possibility of resistance to chlorophacinone in the Castroville vole populations has created a major obstacle for pest management in artichoke

fields. Increasing the amount of bait used to control voles or increasing treatment frequency might temporarily lower pest numbers but surviving animals would produce populations with even higher levels of chlorophacinone resistance. Therefore, implementing a method that uses over-baiting of a substance, for which there is already some level of resistance, could lead to a complete inability to control pest numbers. An alternative suggestion would be to alternate between a high application of chlorophacinone and an application of ZnP. The efficacy results from our ZnP feeding trials suggest that it may be a promising solution but at the present time there is no approved ZnP bait registered for use in artichoke fields. The results of the ZnP feeding trials conducted in lab cages and in outdoor pens suggest that 0.5% ZnP artichoke bracts would be suitable bait, but the use of ZnP on bracts for voles in artichokes has yet to be included on the ZnP label.

Last Updated:

02/24/09