

Completed Project Report

Project Title: Development of an Integrated Pest Management Program for Vole Control in Artichokes

Research Agency: University of California - Integrated Pest Management IPM

Principal Investigator: Roger Baldwin

Summary:

Nearly 100% of all artichokes grown commercially in the United States are grown in California. California voles (*Microtus californicus*) are the primary wildlife pest of artichokes. For several decades, chlorophacinone-treated artichoke bracts have been the principal technique used for managing voles in artichokes. However, through repeated use, some voles in the population have developed resistance to chlorophacinone. Therefore, we initiated a project from 2010–2012 to test the efficacy of various different management strategies including removing above-ground vegetation during non-harvest seasons, burrow fumigation with aluminum phosphide, fencing, and several rodenticides. To identify changes in population size before and after treatment, we developed and tested several indexing approaches. We found that using non-toxic wax monitoring blocks as a chewing index was strongly correlated with vole activity ($r = 0.91$, $P = 0.03$). Using this monitoring approach, we determined that removing vegetation and subsequently fumigating burrows with aluminum phosphide substantially lowered vole activity (x=88% reduction). The use of radiocollared voles verified this assessment, as 0 of 20 radiocollared voles were present in artichoke fields after vegetation removal and burrow fumigation. We also used radiocollared voles to determine the permeability of aluminum flashing as a barrier, and found 0 of 10 voles infiltrated the fencing structure. Of the rodenticides tested, chlorophacinone-treated artichoke bracts were most

effective (x=86% reduction) even with resistance present in the population. Our research indicates that effective management starts with vegetation removal and burrow fumigation at the end of the growing season. Fencing can then be erected to keep voles out of artichoke fields upon initiation of regrowth. If voles reestablish within fields, the use of chlorophacinone-treated artichoke bracts is the most effective option for removal. This Integrated Pest Management program should greatly increase efficacy of vole management programs while substantially reducing reliance on rodenticides.