

PROJECT REPORT

Project Title: An Investigation of the Effects of Vitamin K-Rich Plant Food on the Efficacy of Diphacinone on Voles

Research Agency: National Wildlife Research Center

Principal Investigator: Gary Witmer

Budget: \$22,623.00

Background:

Many species of burrowing rodents occur in North America. A number of the species, and in particular, meadow mice (also called voles, *Microtus* spp.), cause substantial losses to agricultural production (Clark 1994, O'Brien 1994). Anticoagulant (chlorophacinone and diphacinone) and acute rodenticides (zinc phosphide) are used to control vole populations, primarily by placing bait in runways near burrow openings, or by spot-baiting or broadcasting over the infested area. Animals require vitamin K in their diet for several reasons, but a very important one is the production of blood clotting proteins. This is why Vitamin K is used as an antidote to anticoagulant poisoning. Voles feed heavily on green vegetation, and some plants (e.g., spinach greens, kale, collards, Brussels sprouts, dandelions) contain high levels of vitamin K. It is important to determine whether or not the green vegetables grown in many parts of California and the natural green vegetation may cause reduced efficacy of anticoagulant rodenticides on voles.

There are two species of voles (*M. californicus*, *M. montanus*) that cause significant agricultural damage in California (Clark 1994). Voles cause damage to pastures and rangelands, orchards and nurseries, and a wide variety of field crops, including alfalfa, grains, clover, potatoes, sugar beets, artichokes, carrots, Brussels sprouts, cauliflower, and tomatoes (Clark 1994, O'Brien 1994). Most species of voles exhibit strong population cycles whereby they reach very high densities (>1,000/ac) every 3-5 years. Severe damage to agricultural and forestry resources occurs at these peak densities (Witmer and VerCauteren 2001, Witmer et al. 2007).

Objectives:

1. Determine if vitamin K-rich plant foods can reduce the efficacy of a major vole control tools (diphacinone and chlorophacinone rodenticides) in some situations.
2. If reduced efficacy does occur, determine actions to remedy or prevent this situation from occurring.

Progress To Date:

To Be Updated.