Utah IPM Mini-Grant Final Report

PROJECT TITLE: **Comparing Different Methods of Controlling Townsend's Ground Squirrels in Irrigated Crop Ground**
LOCATION OF PROJECT: Beaver County, Utah
TOTAL GRANT AWARD: $9,126.80
PRINCIPAL INVESTIGATOR: Mark Nelson
CO-PRINCIPAL INVESTIGATOR: Nicki Frey
PROJECT DURATION: July 1, 2014 – June 30, 2015

Summary of Project:

We researched 2 methods to control grounds squirrels in irrigated agriculture (alfalfa); baiting and trapping. We compared broadcast zinc phosphide baiting to the use of bait stations. We also compared 3 types of traps (tubes, cage, and repeat) to determine their effectiveness. There was no difference in the number of ground squirrels detected between fields treated with broadcast bait and those treated with bait stations. The effectiveness of using traps to remove ground squirrels was extremely poor. Tube traps were more successful than the other two methods. Future research should focus on the precise timing of methods with biological activities, targeting bait station use, bait, and other applications during months that ground squirrels are active.

Objectives of Project:

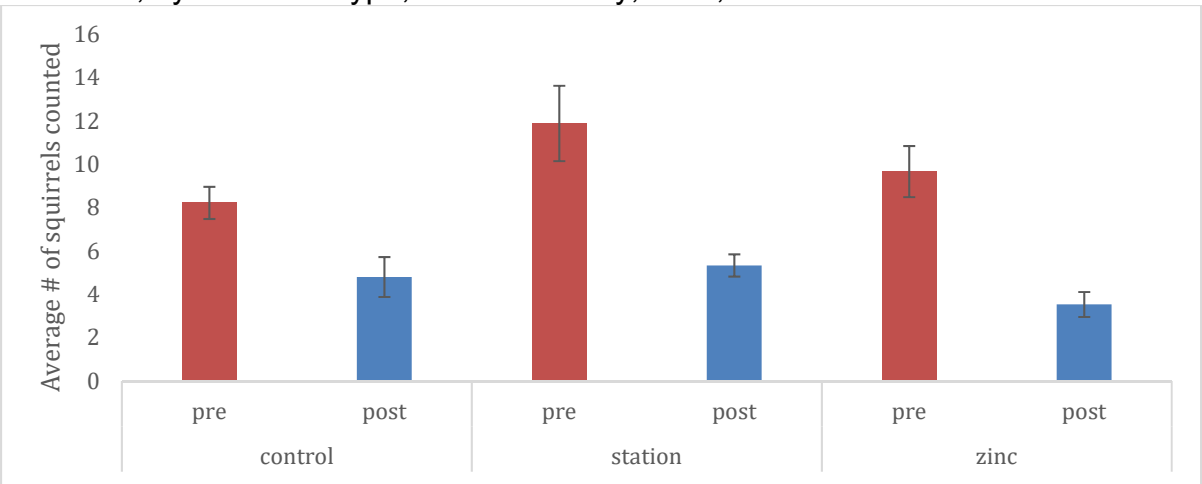
1. To train Beaver County farmers impacted by ground squirrels about integrated pest management approaches to Townsend Ground Squirrels in irrigated crop ground.
2. To compare the effectiveness of different rodenticides registered in Utah and traps in field trials to control ground squirrels.
3. To determine a best management practice for controlling ground squirrels in Beaver county and train a collaborative community of farmers in Beaver County to implement these practices.

Results of Project:

We selected 3 alfalfa fields in Beaver County, Utah in which to conduct our research. The first portion of our study consisted of comparing the current pre-bait/bait method of ground squirrel control with using zinc phosphide. In each field, we selected 3 distinct populations of ground squirrels. The home range size of ground squirrels is <70 meters, thus we considered colonies >150 meters from another colony as a separate entity. We randomly selected which colony would receive each treatment or control. Each field had one replicate of control, bait, and zinc phosphide. Once a week, for 6 weeks prior to treatment we

observed each colony and counted the number of squirrels we saw. We then applied treatment and observed the colonies for 5 more weeks.

Figure 1: The average number of ground squirrels observed before and after treatment, by treatment type, Beaver County, Utah, 2015.



We conducted a Mann-Whitney test for differences. There was an overall decrease in the number of ground squirrels observed in control fields (P = 0.002), zinc phosphide (P = 0.00), and bait stations (P = 0.009) between pre-treatment and post-treatment observations. However, the non-parametric test for differences determined that there was no difference in the number of squirrels seen post-treatment among treatment types (KW = 1.57, P = 0.46; Figure 1)

The second portion of our study was to determine if it was possible to trap ground squirrels once alfalfa has “greened”. We selected 6 study areas within 4 alfalfa fields to conduct this study. In each field, we placed a tube trap, a Tomahawk live box trap, and a Squirrelinator (multiple animal trap). Each trap was baited with apples and peanut butter that had been mixed with zinc phosphide, or cabbage and peanut butter depending on the week. All traps were baited similarly each week. We checked traps every other day, removing dead animals and setting traps. Animals caught in live traps were released; we were trapping such low numbers that this method was acceptable.

Overall the traps performed miserably; this was not too surprising. Existing literature suggested that it would be difficult to traps squirrels when alfalfa was green, however we were hoping we could lure the young offspring. In 48 trap nights, we caught 8 ground squirrels using the tube traps, 5 using live traps and 0 using the Squirrelinator. While we do not have enough non-zero data to make a statistical comparison, it appears that the tube trap is at least somewhat successful. It may be worthwhile to focus on the tube trap in the future and begin experimenting with different baits, timing of rebaiting and other methods to fine-tune the trapping effectiveness.

Evaluation and Impact:

While we were unable to provide information that increases the ability of farmers to manage ground squirrel numbers, this was still a successful project. The methods and study design were strong enough that the results are still illustrative. We are now able to share information with farmers that will reduce error, and reduce ineffective control methods and timing when working to manage ground squirrels.

We are sharing our information with local farmers in January 2016. We will be able to measure a change in knowledge and skills during the growing season of 2016.

Educational Outreach:

We shared the information found during this study at the Ground Squirrel Management Workshop in 2016. We had 65 local landowners attend the workshop. We shared with them the trapping methods, and describe what worked and what did not work. We also explain the biology behind the methods and way we might adjust our working methods to increase effectiveness. We had Dr. Roger Baldwin, Extension Specialist in California that specializes in California ground squirrel and pocket gopher management to present information at this workshop.

We made arrangements for Dennis Hincamp to come down and video tape the Ground Squirrel Workshop. It will be put on the internet for people to view.

Additionally, while outside the 12-month project period, this project is funding partial travel for the PI and CO-PI to attend the Vertebrate Pest Conference in California in 2016. While there they will present the results from their research as well as gain knowledge on other control methods that they can then take back to their constituents in Utah.

Finally, we are preparing a fact sheet on the results of the trapping portion of our study. While trapping wasn't effective, there was some information that could be useful. For example, it is important for farmers to know what didn't work with trapping and therefore save time and money. We have a number of homeowners who live in Milford contact us to see how to control the squirrels and the trapping should work well for them.

Educational Products Produced:

Frey, S. N. January 2016. The biology behind the management of ground squirrels. Presented at the Ground Squirrel Workshop, Beaver County Fairgrounds, Beaver, Utah.

Frey, S. N., and M. Nelson. In preparation. Using Traps to Manage Ground Squirrel Populations. Utah State University Extension Fact Sheet.

Nelson, R. M. January 26, 2016. Comparing ground squirrel control methods. Presented at the Ground Squirrel Workshop, Beaver County Fairgrounds, Beaver, Utah.

Mark Nelson, Project Leader

Nicki Frey, Co-Project Leader