Western IPM Center

Project Report Form

How to submit: Please submit your completed report electronically, as an attached Microsoft Word file, to Jane Thomas at jmthomas@tricity.wsu.edu. If you have questions, contact Linda Herbst, (530) 752-7010. **Content:** Reports should follow the outline below and include responses to as many of the questions listed in Attachment A as are relevant to your project. *These are guidelines.* Provide your readers with enough detail that someone who is not familiar with your project can understand what you were trying to achieve, how you went about it, and what you accomplished, but please keep it concise.

A. Report Data

Date: 08/28/2009
Reporting Period: 01/04/07-31/03/08
Report Type (please check one):
☐ Progress Report ☒ Final Report

B. Grant Data

- Grant Agreement #: K009607-OR7
- Title: Developing a monitoring strategy for voles in agriculture
- Grant Type: research project
- Lead investigator:
  - Name: Jennifer Gervais
  - Title: Assistant professor, courtesy faculty
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- Team members (name, title, institution):
- State(s) involved: OR

C. Nontechnical Summary. An overview of the project, briefly outlining the problem(s), how your project addresses them, and your results, *written to a lay audience.* (500 words)

Voles are a difficult crop pest for growers to manage because of their wide fluctuations in numbers. Voles typically exist at lower densities that do not cause substantial damage, but at times their populations build to levels that cause widespread crop losses. If control measures are undertaken before voles begin to build rapidly, population peaks may be either averted or lessened, with a corresponding decrease in crop losses. The goal of this project was to test various methods of monitoring vole population density by measuring their sign such as burrow entrances and runways. If farmers had a reasonably simple, precise way of determining vole numbers, they could monitor populations and begin taking steps to control them early in the growth phase of an outbreak. I tested line transect and quadrat survey methods, and for each type of survey, I tested whether counting holes, runways, droppings, or cut or grazed vegetation gave a reasonably good idea of how many voles were present. I also trapped the voles in the study enclosures to estimate population size. Although the first night of trapping gave a good indication of how many voles were present, none of the other methods performed well, particularly in situations where the grassland was mowed earlier in the season. Only monitoring population size through periodic trapping appears to have any utility of the methods tested in this study for improving IPM for voles in grass seed production systems.

D. Objectives and Progress. List your objectives and describe your progress for each objective.

The objective of this project was to develop an easy-to-use monitoring technique for growers that would help them determine when populations had reached levels that could be damaging if not controlled. The methods I evaluated were designed to be easy to implement by anyone with little training, and used only materials that would be readily available. The methods tested had limited utility in grassland plots that were not mowed because of poor precision. None of the methods showed any consistent relationship with the voles' actual population size in plots that had been mowed, which were most similar to fields of grass grown for seed.

E. Outputs. List your project's outputs, which might include publications, information, data, meetings held, attendance at meetings held, etc.

The results of this work are currently in review for publication in a peer-reviewed journal, Northwest Science. An article was published in the 2007 edition of Seed Production Research Reports, a publication of research focusing on issues in grass seed production systems that is read by growers, extension personnel, and researchers. In addition, an article was prepared for the Linn County, OR extension publication, and the results disseminated informally to extension agents and to Oregon Department of Agriculture personnel as well as growers in the region. A presentation was also made at the February 2008 meeting of the Oregon Chapter of the Wildlife Society, "Indexing vole populations in agricultural and old field settings". It was judged the runner up for best presentation at the conference.

F. Impacts and Potential Impacts. The "impacts" and "potential impacts" sections of your report will help the Western IPM Center highlight the value of IPM research and education by detailing the real-world impacts of Center-funded projects. We will use the information in news articles, reports, and informational brochures to showcase the impacts of projects that our program supports. *See Attachment A at end of form for questions to assist you in describing the impacts of your project.*

1. Impacts. Describe any impacts of your work. ***Impacts*** are specific changes in condition for those affected by your work. Impacts include adoption of technology, creation of jobs, reduced cost to the consumer, less pesticide exposure to farmers, access to more nutritious food, and a cleaner environment and healthier communities.

The greatest impact of this research has been the demonstration that the common practice of counting holes to determine vole population size is highly unreliable, and should not be used as the deciding factor in whether or not to apply a poison bait. This may both lessen the frequency that rodenticides are used unnecessarily, and the frequency that vole population growth is being monitored for but missed because an unreliable cue is being used.

2. Potential impacts. Describe your project's potential impacts. ***Potential impacts*** are the ways that your project's outputs could directly lead to changes in condition that will unfold in the future.

Monitoring vole burrow density is clearly not a good method of determining changes in activity. This may spur the development of other methods for growers to use that are efficient and cost-effective so that field scouting for voles could become a regular practice. In the interim, growers have become aware that relying on burrow counts in particular may either lead to unnecessary baiting with its associated financial and environmental costs. Although less likely, burrow counts may also lead to underestimates of vole density, leading to crop damage if growers do not bait. Recognition of the limitations of this practice should help reduce unnecessary bait use and reduce risks of economic losses due to vole damage. These results were also disseminated to the conservation community, which in this region is particularly concerned with rare plant conservation and prairie restoration. Voles can be a signifincant threat to restoration efforts or to rare plants, and recognizing the limits of monitoring tools is important to planning when intervention to protect restoration projects or focal plants is needed.

G. Appendices

1. With your report, please attach ***at least two (2) photographs*** that illustrate your project. Please describe the photo and indicate the name and institution of the person who took the photo. (If you submit more than two photographs, please include those additional descriptions and photo credits under "H. Additional Information," below.)

Photo #1 description:

Determining whether an index is working requires that we learn how many voles are actually present. We set up live-trapping grids and used mark-recapture methods to estimate how many voles were actually present in the enclosures that we had used to test the sign indices. Here, we are trapping the voles and recording the tags to identify individuals. This information is used to estimate the vole population size.

Photo #1 credit (photographer's name and institution):

Dan Rosenberg, Oregon State University

Photo #2 description:

Vole burrow with fresh droppings and signs of recent herbivory.

Photo #2 credit (photographer's name and institution):

Jennifer Gervais, Oregon State University

2. Also attach any printed fact sheets or other publications resulting from your work that will enhance our understanding of your project and its impacts. Please provide a

description of each attached publication below.

Document #1 description:

This manuscript is currently in review at Northwest Science. An editorial decision is expected by the end of September.

Document #2 description:

This is the article published in the publication Seed Production Research Reports, which can be located on the internet at http://cropandsoil.oregonstate.edu/seed-ext/publications/research-reports

Document #3 description:

This is the article written for the Linn County monthly extension bulletin, which was published in November 2007.

H. Additional Information

Credit: *Some of the language about impacts and potential impacts was adapted from a PowerPoint presentation by H. Michael Harrington, Executive Director, Western Association of Agricultural Experiment Station Directors, Colorado State University.*

Attachment A

Questions to Help in Reporting Impacts and Potential Impacts

Below are some questions that will guide you in assessing and then describing the impacts and potential impacts of your project. The relevance of each question may vary depending on whether yours is a research or extension project. Please answer as many as you can to the best of your ability, and feel free to describe any additional types of impacts not mentioned below. Remember to identify any potential impacts.

1. ***Innovations in IPM:***
   Are there new IPM practices that have been (impacts) or could be (potential impacts) adopted as a direct result of your project? What is the total number of acres (or homes, schools, greenhouses, nurseries) on which these practices could realistically be implemented?
2. ***Safeguarding human health and the environment:***
   a. Has the project reduced risk (or could it potentially do so) by changing the use of pesticides on farms, in homes, in schools, etc.? For example, could it result in fewer sprays per season or a switch to lower-risk pesticides? If possible, quantify the changes in condition. (Since there is no unanimous definition of *high* and *low risk,* investigators selecting this indicator are asked to categorize the pesticides they are reporting on as *high* or *low risk* according to the particular situation [e.g., lower risk to natural enemies]).
   b. Are there any other impacts or potential impacts on human health or the environment as a result of your project?
3. ***Economic benefits:***
   a. What is (or could be) the economic benefit (e.g., dollars saved) for clientele who adopt IPM strategies and systems you studied? Do you envision potential commercialization or mass production of these systems?
   b. How many clients are satisfied with IPM results (such as improved yield, improved quality of yield, reduced pest populations, more effective pest control, greater preservation of nonpest species)?
   c. Are there other financial benefits that might be realized (potential impact) as a result of your project?
4. ***Implementation of IPM:***
   a. How many IPM strategies and systems have been validated through this project (e.g., through on-farm trials, large plot tests, or other methods used to confirm efficacy)?
   b. How many educational materials were delivered? To whom? And what are the impacts or potential impacts?
   c. What is the number of growers/personnel trained? And what are the impacts or potential impacts?
   d. For a Web site, what volume of traffic and type of use has the site experienced? (For example, number of visitors per day or month; number of page views; number of unique user sessions; change in volume during growing season; average viewing time.) And what are the impacts or potential impacts?
   e. How many more people adopted IPM practices as a direct result of your project, or how many people adopted new IPM practices?
   f. Are there other ways in which your work will result in improved use or increased implementation of IPM strategies in your region or across the West?
5. Has your project or study increased collaboration among stakeholders interested in the development and implementation of improved IPM strategies and systems?