

# Western Regional IPM Grants Research/Extension Accomplishments Report

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INSTRUCTIONS: PLEASE PROVIDE ONLY THE ESSENTIAL COMPONENTS OF ACCOMPLISHMENT WHICH ARE:

1. A CLEAR IDENTIFICATION OF THE PROBLEM/ISSUE ADDRESSED BY THE RESEARCH/EXTENSION.
2. A CONCISE EXPLANATION OF HOW THE RESEARCH/EXTENSION ACHIEVEMENT CONTRIBUTED TO THE SOLUTION OF THE PROBLEM/ISSUE BEING RESEARCHED.
3. THE IDENTIFICATION OF OTHER BENEFITS RESULTING FROM THE RESEARCH/EXTENSION, EVEN IF UNPLANNED.
4. PLEASE ATTACH A SUMMARY OF THE PAST YEARS PROGRESS, ONE PAGE MINIMUM.

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CONTACT: Ed Peachey

PROJECT NUMBER: ORE00258

TELEPHONE: 541-740-6712

PROJECT TITLE: Effect of Primary Tillage Sequence, Insecticides, and Weed Seed Placement on Seed Predator Conservation, Efficacy, and Weed Emergence

PRINCIPAL INVESTIGATOR: Ed Peachey

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INSTITUTIONAL ADDRESS: Research Office, Oregon State University, 312 Kerr Admin. Bldg., Corvallis, OR 97331-40

CO-PIs or TEAM MEMBERS: Carol Mallory-Smith, Rick Boydston

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THE PROBLEM, ISSUE, OR REASON FOR CONDUCTING THE RESEARCH/EXTENSION:

The goal of this project is suppression of summer annual weed populations in vegetable row crop systems through development of cropping systems that conserve seed predators and enhance weed seed predation. Summer annual weeds continue to trouble row crop producers, even though producers have access to many weed management tools. Regulation of seed density over time has been erratic. Herbicides, tillage, and cultivation are commonly used to bridge the gap between the number of weeds that are expected to emerge and weed control objectives. These weed control practices often produce unintended consequences such as herbicides loss to ground water and soil erosion. Effective regulation of soil weed seed banks with biologically based strategies is essential to the long-term success of sustainable, integrated weed management programs in food systems.

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THE SINGLE MOST IMPORTANT ACCOMPLISHMENT OR BENEFIT RESULTING FROM THIS RESEARCH/EXTENSION:

The research is producing the data needed to develop agricultural systems that will maximize biological suppression of weed populations. Weed seed predation is expected to play an important role in weed seed mortality, yet very little is known about the processes in agricultural systems that regulate the activity and density of weed seed-eating ground beetles, or the agricultural practices that control their fate. Although in the initial stages of the project, we are confident that we can structure crop rotations that will enhance the abundance of weed seed-eating ground beetles in vegetable cropping systems. Enhanced beetle densities should correlate directly to fewer surviving weed seeds.

**ADDITIONAL BENEFITS, SUCH AS:**

SOCIAL BENEFITS – Consumers expect high quality food with low risk of exposure to pesticides. Increased weed seed predation will enhance weed control efforts and reduce the need for additional intervention. Coupled with other integrated practices, herbicide use

should decrease, resulting in assured food quality.

**ECONOMIC BENEFITS** – Enhanced seed predation should result in the need for fewer weed management inputs, but will need to be balanced against additional inputs that may be required to enhance seed predator density.

**ENVIRONMENTAL BENEFITS** – Fewer weed management activities will translate directly to a reduced potential of herbicide loss to groundwater or soil erosion.

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**PLEASE SUBMIT A HIGH RESOLUTION DIGITAL IMAGE REPRESENTATIVE OF YOUR RESEARCH/EXTENSION PROJECT THAT WE CAN USE TO HIGHLIGHT YOUR PROJECT!**

When you have completed this form, return to both:

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**THIS FORM WAS COMPLETED BY:**

Ed Peachey, Assistant Professor Senior Research  
(Name and Title)

Pictures



Ed Peachey explains the function of the enclosures that cover seed stations and the project objectives at the project site at the University Research Farm in Corvallis Oregon.



Direct-seed plots at the Corvallis site in the fall of 2007 with landscaping fence to prevent movement of ground beetles.



Time lapse camera placed over a seed station in a tall fescue field in 2006 (pitfall traps are located in the background), and one image from a time lapse movie of a ground beetle visiting a seed station with Powell amaranth seeds.



Alysia Greco and Martin Hstand planting weed seeds in plots.



Alysia Greco placing weed seeds on seed predation stations in grower fields.



Pitfall traps and seed predation stations located in a corn field in the Willamette Valley.