

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: 8/21/2009

Reporting Period: 1/01/2005 to 6/30/2008

Report Type (please check one):

Progress Report Final Report

B. Grant Data

- Grant Agreement #: W-07-08 (Proposal number?)
- Title: Walnut Pest Management Alliance: Outreach and Implementation of Pheromone Mating Disruption.
- Grant Type: Outreach and Implementation
- Lead investigator:
 - Name: Carolyn Pickel
 - Title: Associate Director AG IPM, Statewide IPM Program.
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- Team members (name, title, institution): Joe Grant, San Joaquin County Farm Advisor, University of California. Steve Welter, University of California-Berkeley
- State(s) involved: CA

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)

This is an Outreach and Implementation project. Initially funded by the California Department of Pesticide Regulation, the Walnut Pest Management Alliance's (PMA) primary goal was to move walnuts from a chemical based IPM program to a pheromone IPM program. After 10 years of research and field validation, the PMA's focus is adoption and implementation of a pheromone based IPM program for codling moth (CM). The PMA has demonstrated several new pheromone application techniques that are efficacious and economical. The PMA implementation project emphasizes reducing pesticides commonly used on walnuts that affect water quality and outreach and implementation of economical reduced-risk walnut production. Codling moth, being a key pest in walnuts is the primary target for broad-spectrum insecticides (Strand et al, 2003). Development of reduced risk practices for CM management could greatly reduce growers' use of these insecticides. In addition, the detection of Lorsban in the Feather River in May 2005, attributed to walnut spray applications for first generation codling moth plus the loss of guthion and more restrictions on Penncap-M will only increase the pressure for alternative technologies, as does increasing CM resistance to the most commonly used insecticides. With the use of a pheromone mating disruption (PMD) program, insecticide sprays to control CM could be reduced to one or none per season depending on population levels.

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

1. Implement pheromone application technology required for control of codling moth with an emphasis on "area-wide" control using aerosol puffers at the rate of one puffer unit per 2 acres. Monitor codling moth populations to watch for population increases and to determine spray timings.

Progress: After several years of successful demonstrations, adoption is increasing from 3,000 acres using CM puffers in 2008 to 10,000 acres of CM puffers in 2009.

2. Demonstrate pheromone application technologies that have a high potential for use in walnuts, such as Hercon micro-flakes applied by helicopter.

Progress: As of 2009, aerosol puffers appear to be the most economically feasible pheromone application method in walnuts, especially over large acres and multiple years. The Hercon product needs more efficacy and efficacy of application method research. Other dispensing methods continue to be investigated which may decrease cost and/or increase ease of application.

3. Assist with and demonstrate the use of monitoring for CM damage for growers who are interested in implementation of pheromone mating disruption. Encourage neighboring growers to install pheromone puffers to take advantage of the large area of CM suppression.

Progress: On-going outreach and training in the use of the "Combo" lure to more accurately monitor CM activity in or near orchards with pheromone mating disruption. Acreage with puffers increases after growers see successful implementation in neighboring orchards (see objective 1).

4. Continue the Walnut Pest Management Alliance Team structure and momentum for implementation and outreach of research-based IPM strategies. The partners in this project are the Walnut Marketing Board, CA Dept. of Pesticide Regulation, UC Cooperative Extension, UC and USDA Researchers, industry leaders, PCA's, and California walnut growers. The project design is created by the PMA Advisory Team with input from end users (such as growers, PCA's, and industry personnel), the Advisory Team is able to adjust the direction of the project to include current concerns about reduced risk pest management in walnuts.

Progress: Now called the Walnut PMA & Entomology Working Group, the partners meet at least once yearly to present results, discuss current walnut entomology issues, and plan research and demonstrations for the next year.

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

Meetings and Presentations, see Attachment #1.

Publications:

Welter S, Pickel C, Millar J, Cave F, Van Steenwyk R, Dunley J. 2005. Pheromone mating disruption offers selective management options for key pests. *Cal Ag* 59(1):16-22.

Steinmann K, Zhang M, Grant J, Pickel C, Goodhue R. 2008. Pheromone-based pest management can be cost-effective for walnut growers. *Cal Ag* 62(3):105-110.

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.

With 243,000 acres of walnuts in California using more than 350,000 pounds of cholinesterase-inhibiting pesticides in 2007, the pheromone mating disruption program is a very valuable alternative in the drive to reduce the reliance on these pesticides. Management of codling moth with conventional pesticides generally requires three to five applications for control over the whole season. Each acre that is managing codling moth with PMD may need only one or zero sprays of insecticide. For example, an acre under PMD could potentially remove 2 pounds of chlorpyrifos (Lorsban) and 3 pounds of azinphos-methyl (Guthion) from the total pesticide load in the soil and water. Continuing this example, the aerosol puffers demonstrations in 2009 cover more than 2,000 acres and could reduce chlorpyrifos use by 4,000 pounds and reduce azinphos-methyl use by 6,000 pounds.

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.

When the walnut industry fully implements a pheromone-based system, there is a potential to reduce broad-spectrum pesticide use by 60 – 75%. A major goal of this project is to validate IPM strategies which are economically realistic as well as effective. Demonstration of techniques which are similar in cost to conventional pesticides enhances sustainability. Pest management methods used in this project can be replicated by walnut growers in any location without the need of external funding.

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:

Field discussion; use of pheromone puffers for codling moth management. Pictured are Gary Enos (grower), Tom Larsen (Suterra LLC), Bill Carriere (grower), Christeen Abbott (Suterra LLC), Bill Krueger (Glenn County Farm Advisor).

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

Sara Goldman Smith
UC-IPM

Photo #2 description:

Puffer unit hung in walnut tree with rope.

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

Sara Goldman Smith
UC-IPM

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:

Document #2 description:

Document #3 description:

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?