

University of California  
Division of Agricultural Sciences

**PROJECT PLAN/RESEARCH GRANT PROPOSAL**

Project Year 2008 Anticipated Duration of Project 5 years

Project Leader C.Pickel, J.Grant,  
Location Sacramento Valley and San Joaquin Co.

Cooperating Personnel S. Welter, B. Krueger, R. Buchner, and J.Connell  
Project Title Using aerosol pheromone "puffers" for area-wide suppression of Codling Moth in walnuts, year 4.

Keywords codling moth, mating disruption, integrated pest management, pesticide reduction.

Commodity(s) Walnuts Relevant AES/CE Project No.

**Problem and its Significance:**

Codling moth (CM) is the primary target for broad-spectrum insecticides in walnuts, so adoption of alternative pest management technologies could greatly reduce growers' use of these insecticides. In addition, recent water and air quality issues have caused DPR to reevaluate both pyrethroids and pesticides that contain volatile organic compounds, possibly leading to use restrictions and cancellations of some insecticides commonly used for CM control in walnuts. These regulatory actions increase the pressure for reliable, environmentally sustainable pest management programs, as does the May 2005 detection of Lorsban in the Feather River which was attributed to walnut spray applications. With the use of a pheromone mating disruption program, insecticide sprays to control CM could be reduced to one or none per season.

Recent pheromone mating disruption (PMD) research and implementation efforts have suggested that aerosol pheromone puffers are a more economical and possibly more effective delivery system than sprayable formulations in walnuts. Sprayable formulations, at 4-5 applications per season, are prohibitively expensive, and correct application timing continues to be a challenge. The puffers require a higher initial investment, but the housing units can be used for at least five years. Puffer assembly and installation is easy to learn, can be completed in a couple of days, and doesn't need repeat applications during the growing season.

Research by Welter and others has shown success with puffers including a long-term area-wide project in Lake County pears. While supplemental sprays were used on a prescribed basis in the beginning of the trial, after 7 years, less than half of the 1000 acre trial required any insecticide spray, a huge reduction from the 4-5 applications necessary when using conventional insecticides. The success of the program in pears was based on aggressive use of insecticides in the first year to reduce CM populations, then in the following years, the supplemental treatments would be switched to less effective, but more selective, insecticides or stopped completely. Similar treatment protocols are showing promise in walnuts. This proposal continues, for the fourth year, the field-testing of pheromone aerosol puffers on a large scale (area-wide) over several years with additional trial areas added each year as more growers want to learn to use this technology.

### **Objectives:**

Validate and refine the techniques for large-scale pheromone mating disruption to control CM in walnuts over several years.

1. Demonstrate pheromone application technology with an emphasis on “area-wide” control over multiple years using aerosol puffers at the rate of one unit per 2 acres. Continue trials in Glenn and Butte Counties, expand acreage in San Joaquin County, and add a trial site in Tehama County. Monitor weekly for signs of codling moth damage and population increases. Over time, the need for supplemental sprays should be decreased or eliminated.
2. Field test new PMD materials for naval orangeworm control.
3. Assist with and demonstrate the use of monitoring for CM damage for growers who are interested in implementation of PMD. Encourage neighboring growers to install pheromone puffers to take advantage of the large area of CM suppression.

### **Plans and Procedures:**

At or before the first CM biofix, puffers will be deployed in a grid arrangement at the rate of 1 puffer per 2 acres using Suterra’s recently improved cabinet design. The layout of the puffers will be based on current understanding of distance and direction of aerosol movement in relation to the predominant wind direction at each site. However, the number of units will allow enough redundancy such that mechanical failure of a particular unit will be offset of overlapping plumes. The treated areas will be monitored with traps using at least two different types of lures and examining dropped nuts as well as nuts in the canopy. Given that the benefits of the areawide project include regional suppression, data collected from weekly monitoring will be shared on a collective basis such that larger flight patterns can be observed. These data are either shared by fax, email, or personal communication. The treatment blocks will be evaluated at harvest to determine damage to the crop. The pheromone dispersal devices (“puffers”) will be checked at least once during the season for mechanical integrity.

The objectives above can be accomplished using the existing framework of the walnut Pest Management Alliance which is based on long term participation and input from growers, Pest Control Advisors, Farm Advisors, UC and USDA researchers, EPA and Ca DPR, Walnut Marketing Board, and pheromone producers and suppliers. Cooperating growers are available in both the Northern San Joaquin Valley and the Sacramento Valley. Specifically, growers have committed to several years of trials with the aerosol puffers in Glenn County (185 acre site) and in San Joaquin County (560 acre site). In 2007, a 200 acre site in Butte County was added, and 2008 will include a site in Tehama County and the San Joaquin site will increase acreage with the inclusion of neighboring growers. These plots would be in place for three-to-five years to ensure control in a long-term setting.

Funding is requested to cover the salaries of project coordinator and field assistants to monitor trials, collect data, and write reports. The funds will be split between San Joaquin Co. and Sacramento Valley.

**BUDGET A: SACRAMENTO VALLEY, Carolyn Pickel**

Funding Source	BUDGET REQUEST	Budget Year
Salaries and Benefits		
Postdocs/RA's	_____	\$ _____
SRA's	_____	\$ <u>10,000</u>
Lab/Field Assistance	_____	\$ _____
Subtotal	Sub 2	\$ <u>10,000</u>
Employee benefits	Sub 6	\$ <u>4,000</u>
	SUBTOTAL	\$ <u>14,000</u>
Supplies and Expenses	Sub 3	\$ <u>0</u>
Equipment	Sub 4	\$ <u>0</u>
Travel	Sub 5	\$ <u>1,000</u>
	<b>TOTAL A 2008</b>	\$ <u>15,000</u>

Department account number \_\_\_\_\_

	_____	Date _____
	Originator's Signature	
COOPERATIVE EXTENSION	County Director _____	Date _____
	Program Director _____	Date _____
AGRICULTURAL EXPERIMENT STATION	Department Chair _____	Date _____
LIAISON OFFICER	_____	Date _____

**BUDGET B: SAN JOAQUIN VALLEY, Joe Grant**

Funding Source	BUDGET REQUEST	Budget Year
Salaries and Benefits		
Postdocs/RA's	_____	\$ _____
SRA's	_____	\$ _____
Lab/Field Assistance	_____	\$ <u>11,000</u>
Subtotal	Sub 2	\$ <u>11,000</u>
Employee benefits	Sub 6	\$ <u>2,000</u>
-	SUBTOTAL	\$ <u>13,000</u>
Supplies and Expenses	Sub 3	\$ <u>0</u>
Equipment	Sub 4	\$ <u>0</u>
Travel	Sub 5	\$ <u>2,000</u>
	<b>TOTAL B 2008</b>	\$ <u>15,000</u>
<b>GRAND TOTAL (Budget A + Budget B)</b>		<b>\$ <u>30,000</u></b>

Department account number \_\_\_\_\_

	_____	Date _____
	Originator's Signature	
COOPERATIVE EXTENSION	County Director _____	Date _____
	Program Director _____	Date _____
AGRICULTURAL EXPERIMENT STATION	Department Chair _____	Date _____
LIAISON OFFICER	_____	Date _____