

# Walnut Marketing Board's 2006 Strategy

## Strategic Approach

The walnut Pest Management Alliance (PMA) is a broad-based implementation project designed to encourage adoption of reduced-risk pest management programs in walnuts statewide. The focus of this project is to demonstrate economical reduced-risk management strategies on walnuts and to improve communication and cooperation among the different groups involved. The PMA project has evolved into a broader program than originally envisioned with individual researchers working closely with the PMA in the areas of codling moth and walnut blight. This research feeds directly into the PMA project, allowing the PMA project to better focus on testing and demonstration that are near term. Several factors have increased the prospects for development of reduced risk practices for codling moth, which is the primary target for broad-spectrum insecticides in walnuts. These factors include the documentation of resistance to the most commonly used insecticides, the development of newer pheromone application technologies such as sprayable pheromone and puffers, and the development of new, more selective insecticides that can help provide control without disruption of naturally occurring biological control.

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### Progress on 2005 Activity 1

*At this time, we anticipate developing multi-tactic pheromone based management systems that target both long-range communication by codling moths using aerosol pheromone puffers as well as the short-range processes for mate location that are still under investigation.*

In 2005, the walnut Pest Management Alliance (PMA) tested two different tactics for the application of pheromone-mating disruption (PMD): sprayable pheromone and aerosol puffers. The sprayable formulation was used at 5 ai Suterra CheckMate CM-F sprayable codling moth pheromone per acre, but applied with a custom-made ULV applicator. The applicator is ATV-mounted and can be driven up to 6-7 mph through rough or wet field conditions. It applies the same amount of pheromone material, but using less than a gallon of spray solution per acre. This application technique is thought to more closely simulate the highly concentrated "point source" pheromone distribution of hand-applied dispensers. A boom-mounted nozzle sprays a straight stream into the upper half of the tree canopy. The stream is "pulsed" so as to deliver pheromone solution to tree canopies only; the stream is shut off momentarily between trees to avoid the material falling to the ground between trees. The primary measure of success of any reduced-risk pest management program is control of crop damage, especially in comparison to the grower's standard spray program. Data collected from five CM-F trial locations, three in the Sacramento Valley and two in the northern San Joaquin Valley, were pooled and analyzed with each site considered a replication. Across all sites, both conventionally and ULV-applied pheromones provided codling moth (CM) damage suppression equal to grower standard treatments and superior to that achieved in untreated areas. Overall, this

trial showed that CM-F treatments were the same as the grower standard with fewer insecticide applications. This shows CM-F can be integrated into a codling moth management program.

Also new in 2005, two long-term area-wide trials, one located in the San Joaquin Valley and the other in the Sacramento Valley, were started using aerosol pheromone puffers over large areas of contiguous walnuts. The puffers have been shown to work in walnuts on a smaller scale, but the long-term population reduction of codling moth should work best when covering a large area. The results of these trials will be measured by comparing codling moth damage, trap catches, and reduction of insecticides from year to year. The area wide aerosol puffer trials completed their first year of the project with less than 0.6% CM in 180 acres in the Sacramento Valley site and 2.8% CM in 564 acres in the San Joaquin Valley site. The aerosol puffer units are hung high in the tree canopy and are designed to emit pheromone all season. While the initial purchase of the units is high, the year-to-year costs are less than sprayable pheromone.

The grower/cooperators at both of these sites are enthusiastic about integrating aerosol puffers into their pest management program. The PMA plans to continue the aerosol puffer trials for up to four more years to demonstrate the long term population reduction and less reliance on pesticides that have been seen in other crops such as pears. In the next few years these trials will rely less and less on pesticide inputs, with the 2005 data acting as a baseline for the comparison of damage data from year to year and a documentation of pesticide reduction in each block.

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## Activities for the Coming Year

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### Activity 1

We are continuing our efforts to validate and refine the techniques for large-scale pheromone mating disruption to control CM in walnuts over several years. Specific objectives for 2006 include:

1. Validate pheromone application technology required for control of codling moth with an emphasis on “area-wide” control over multiple years. Continue existing trials in the San Joaquin and Sacramento Valleys 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. Monitor damage to the crop with surveys of dropped nuts and nuts in the canopy. Over time, the need for supplemental sprays should be decreased or eliminated.
2. Field test new pheromone application technologies that have a high potential for use in walnuts.
3. Assist with and demonstrate the use of monitoring for CM damage for growers who are interested in implementation of pheromone mating disruption.

In 2005, all pheromone treated blocks were supplemented with at least one insecticide treatment to ensure high quality nuts at harvest and equally important to guarantee the lower population levels at the start of the project. In 2006, an emphasis will be placed on the reduction of insecticide treatments. The assumption of this project is that the population must be brought down to a density that short-range orientation mechanisms used by codling moth in mating become less effective. Thus, the puffer pheromone program is “asked” to stop only long-range orientation of the moths. The hope is that as the population is brought down, then the prescribed supplemental insecticides are withdrawn and decisions are made based on monitoring data.

The objectives listed above can be accomplished using the existing framework of the walnut PMA. Cooperating growers in both the Northern San Joaquin Valley (560 acre site) and the Sacramento Valley (185 acre site) have committed to several years of trials with the aerosol puffers. These plots would be in place for a minimum of three years to ensure control in a long-term setting. The treatments will be monitored weekly for signs of codling moth damage and population increases. The pheromone dispersal devices (“puffers”) will also be monitored every 2-4 weeks for mechanical integrity depending on failure rates. Monitoring techniques include using a variety of traps, and examining dropped nuts as well as nuts in the canopy. The treatment blocks will be evaluated at harvest to determine damage to the crop.

### **How does this activity reduce pesticide risk?**

The walnut Pest Management Alliance (PMA) continues its efforts to reduce pesticide inputs in California walnuts with a seventh year to demonstrate and extend pest management strategies based on pheromone mating disruption. The PMA has successfully demonstrated codling moth management using pheromone mating disruption in a sprayable formulation applied at very low rates with a conventional orchard sprayer in the past few years. Although this system effectively suppresses codling moth (CM) populations, it has not been adopted by growers due to a perceived high cost and lower efficacy compared to conventional insecticide treatments. The PMA continues to investigate new application technologies for use of pheromone mating disruption (PMD) in walnuts in an effort to improve efficacy and reduce the cost of the program so that walnut growers are willing to switch to a pheromone based mating disruption pest management program.

Two application technologies were tested in 2005 using separate research methodologies. The sprayable pheromone was applied with an Ultra Low Volume (ULV) applicator to find out if codling moth control could be achieved with lower application costs. The ULV-applied CM-F treatments across sites provided codling moth damage statistically similar to grower standard treatments using less insecticides; both ULV and grower standard treatments had significantly less damage than untreated areas. The second approach was to start two long term area wide puffer trials in California.

The walnut PMA group will continue to investigate the use of aerosol puffers and ultra low volume application of CM-F pheromone for CM management in walnuts. These two projects represent a narrower focus towards techniques that are effective as well as economical, therefore more likely to be adopted by growers.

The walnut PMA maintains a strong alliance between the walnut industry, UC researchers, UC farm advisors, BIOS partners, grower cooperators and PCAs. Insight from these partners helps the project to remain current in its focus. Input from end users, such as PCAs and growers, is especially important as we hope to move towards wider adoption of reduced-risk pest management systems.

The alliance has been instrumental in serving as a communication body between all groups interested in reducing the reliance of pesticides in walnuts. The long-term nature of the project provides increased visibility and enhances implementation. A walnut PMA newsletter is inserted into the Walnut Marketing Board's reports that are sent to all growers and handlers providing additional knowledge of the project. Presentations based on data collected from the walnut PMA and knowledge gained from the project are made at regional and county walnut grower meetings organized by the local UC Cooperative Extension Farm Advisors.

**How will you measure the risk reduction gained from this activity?**

Walnut PMA grower surveys will be taken at field meetings, regional implementation team meetings, and farm advisor grower meetings to evaluate adoption for using sprayable pheromone. These results can be compared from each year. The walnut PMA has developed an IPM continuum for walnuts identifying practices from minimum IPM to bio-intensive IPM. This continuum can be used to develop survey questions. Other measures of impact for the walnut PMA program will be the number of growers attending meetings presenting information on the walnut PMA or on walnut IPM, the number of walnut growers reading the walnut PMA insert in industry newsletters, and published reports about the walnut PMA in trade journals. The long-term goal will be to see a 75% reduction of organophosphates and pyrethroids on the 100,000 acres of walnuts that control codling moth. The PMA project would like to see a corresponding reduction by 75% of organophosphates as walnut growers switch to pheromone-based mating disruption for codling moth management.