

# Evaluation of Assail for Control of Codling Moth

## Principal Investigators:

Lucia G. Varela, UCCE Sonoma County & Statewide IPM Programs  
Chuck Ingels, UCCE Sacramento County  
Robert Van Steenwyk, UC Berkeley

## Abstract

### Introduction

Due to the implementation of the Food Quality Protection Act (FQPA), Penncap-M registration was terminated and the Guthion registration was modified on pears. As the EPA implements the FQPA, it is anticipated that the agency will mandate further restrictions on OP insecticides. The termination of Penncap-M and the restrictions on Guthion combined with resistance in codling moth (CM) have caused a paradigm shift to occur in pear pest control. Pear pest management now relies on mating disruption for CM control, supplemented with an OP (Guthion or Imidan), pyrethroid (Danitol) or reduced risk insecticide (Confirm or Success). Control of codling moth using mating disruption was shown to be efficacious through the Pest Management Alliance (PMA) Project. The reduced usage of OP insecticides has caused a substantial decrease in pear psylla (PP) and two-spotted spider mite (TSSM) pest pressure that allows for more benign pest control methods. However, the reduced usage of OP insecticides has also caused a substantial increase in damage from a number of other secondary pests such as true bug (lygus, stink and boxelder bug) and oblique-banded leafroller (OBLR). Also, despite the efficacy of CM mating disruption, supplemental CM control with insecticides is often necessary. Confirm, Intrepid, Dimilin or Success are not highly effective substitutes for OP insecticides in mating disruption programs. It is hoped that Danitol and Assail will provide more efficacious replacements for OP insecticides. The identification and continued evaluation of new unregistered insecticides that meet FQPA standards are needed for CM control. It should be noted that the registration of new insecticides is due in part through support of CPAB/PPMRF. There is a need to implement existing technology while pursuing new more environmentally and economically sound pest management strategies for the future. We propose to compare Assail with OP insecticides in orchards under CM mating disruption.

### Objectives:

To implement OP-free pest program using a newly registered reduced-risk insecticide (Assail) and to evaluate its effect on secondary pear pests.

### Plans and Procedures

This study was under the supervision of Chuck Ingels (Sacramento Delta) and Lucia Varela (Mendocino County).

An OP-Free pest management implementation project was conducted in the Sacramento Delta and in Mendocino County. For this study we chose orchards having a documented codling moth population (based on previous year's information). In each region, two treatments were evaluated in 4 orchards in Sacramento and 5 orchards in Mendocino using a matched pair design. The two treatments were an OP-free program (Assail) and a standard OP program (Guthion, Imidan). Each treatment was replicated by orchard and each plot was at least 10 acres. Treatments were applied using the grower's air-blast orchard spray equipment. All orchards, except one orchard in the Sacramento Delta, were under CM pheromone disruption using hand-applied dispensers. Isomate C-TT pheromone ties were applied at 200 ties/acre in early April (pheromones were not applied in orchard #2 in Sacramento Delta). In the Sacramento Delta each treatment (Assail and Guthion) were sprayed on the same day at the 1 A and or 1 B CM flight peak (Table 1). The non-mating disrupted orchard (orchard #2) received an Imidan spray timed for the second generation, according to trap counts. In Mendocino County each treatment (Assail or Guthion) was sprayed on the same day at the 1B peak. A second supplemental insecticide was needed at the 2A peak (Fig. 3). Given that it was late in the season and for fear of flaring up mites, the Guthion treatment was substituted with a Danitol spray. All Assail treatments were done at 3 oz/acre + 1% oil, Guthion treatments at 3 lb /acre and Danitol at 20 oz/acre. All orchards received an Agri-Mek application in the spring following standard practices.

Table 1 – Assail and Guthion Spray Timing in 4 Orchards in the Sacramento Delta and 5 Orchards in Mendocino County.

	Spray Dates	
Sacramento Delta	Assail/Guthion	Assail/Imidan
Orchard 1	May 1	
Orchard 2	May 30	June 16
Orchard 3	June 5	
Orchard 4	May 29	
Mendocino County	Assail/Guthion (1B peak)	Assail/Danitol (2A peak)
Orchard 1	June 4	July 5
Orchard 2	June 4	July 5
Orchard 3	June 4	July 5
Orchard 4	June 4	July 5
Orchard 5	June 4	July 5

CM populations were monitored using at least two traps placed for each treatment in both portions of the orchard. One trap was baited with 1 mg; the other with 10 mg pheromone lures.

One thousand fruit were examined for CM damage in each of four quadrants in each 10-acre block at two times: 1) at the end of the 1<sup>st</sup> CM generation (late June), and

just before harvest (mid to late July). In addition, 1,200 fruit from each block were examined for damage in late August.

Spider mites and pear psylla was evaluated monthly in both portions of the orchards by collecting and brushing leaves. In the Sacramento Delta 150 leaves per block were collected and brushed on July 13. In Mendocino County 100 leaves per block were collected and brushed on June 19 and July 31. Information was provided to the grower and PCA weekly.

## **Results**

In the Sacramento Delta CM moth trap counts were low through the entire season at all orchards, and there were no clear differences between treatments (Figs. 1 and 2). The only damage from codling moth and other worm species was 2 CM strikes in the Assail block of one orchard at the end of the 1<sup>st</sup> generation. No damage was found at the harvest or post-harvest examinations. Only 2 spider mites (European red) were found in the Assail block of one orchard and 1 spider mite was found in the Guthion block of another orchard. Without untreated control blocks, and with very low CM trap counts, it was not possible to determine the relative efficacy of Guthion vs. Assail in this district. Spider mite counts were also very low, so there is no indication that the use of Assail causes spider mite outbreaks.

In two orchards (4 and 5) in Mendocino County, CM populations were very high, as measured with traps baited with 10 mg lures (figure 4). Traps baited with 1 mg lures caught only 2 moths in the Assail plot of orchard 4 in early September. In orchards 4 and 5, damage was also high at harvest (Table 2). In the 5 orchards in Mendocino County, there was no significant difference between treatments. In the two orchards where populations were very high, either treatment did not provide adequate control. In the 3 other orchards where populations were low, both treatments gave the same level of control. Spider mite populations were very low at the two dates sampled. Spider mite populations might have been suppressed by the 1% oil that was included with the Assail treatment. In these trials neither Assail nor Guthion use early in the season caused spider mite population outbreaks.

Table 2. – Percent Codling Moth Damage during the Pre-Harvest Sample (8/4/03) in two treatments (2 Assails vs Guthion + Danitol), in Five Orchards in Mendocino County.

Orchard	% CM damage	
	2 Assail Sprays	1 Guthion + 1 Danitol Spray
1	0.13	0.00
2	0.00	0.00
3	0.60	0.00
4	5.40	6.00
5	2.20	3.80

### Conclusions

We were unable to measure the efficacy of Assail versus OP supplemental insecticide treatments when CM populations were low. At high CM population levels, two Assail treatments gave the same control or better as one Guthion + one Danitol treatment. In these cases, damage at harvest was above the commercial acceptable threshold.

Fig. 1 - 2003 Mean Trap Counts - Sacramento  
Total for Season (1mg)

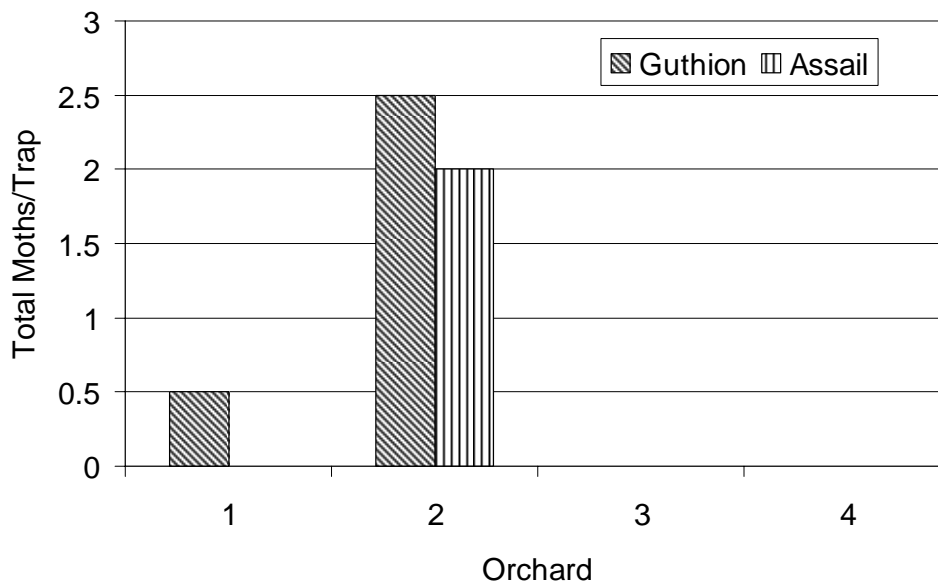


Fig. 2 - 2003 Mean Trap Counts - Sacramento  
Total for Season (10 mg)

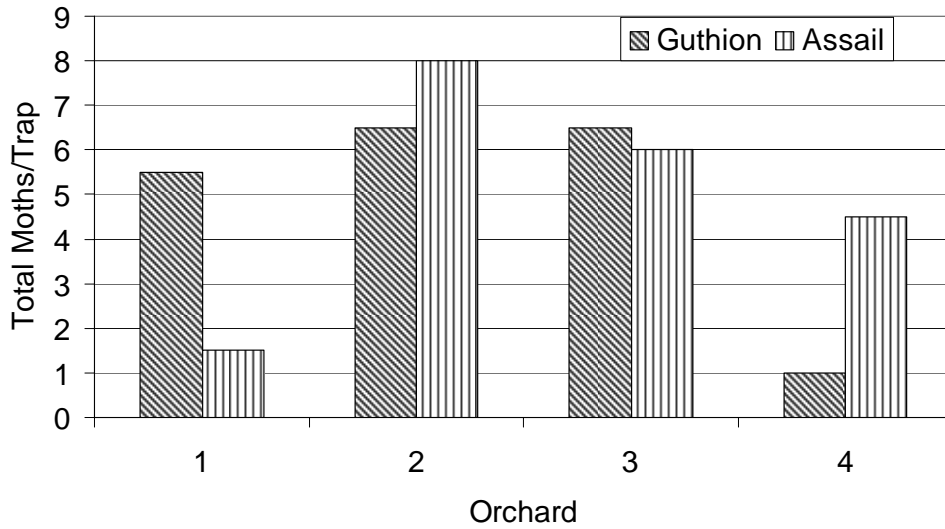


Fig. 3 - Trap counts in 10 mg traps in 5 orchards in Mendocino County

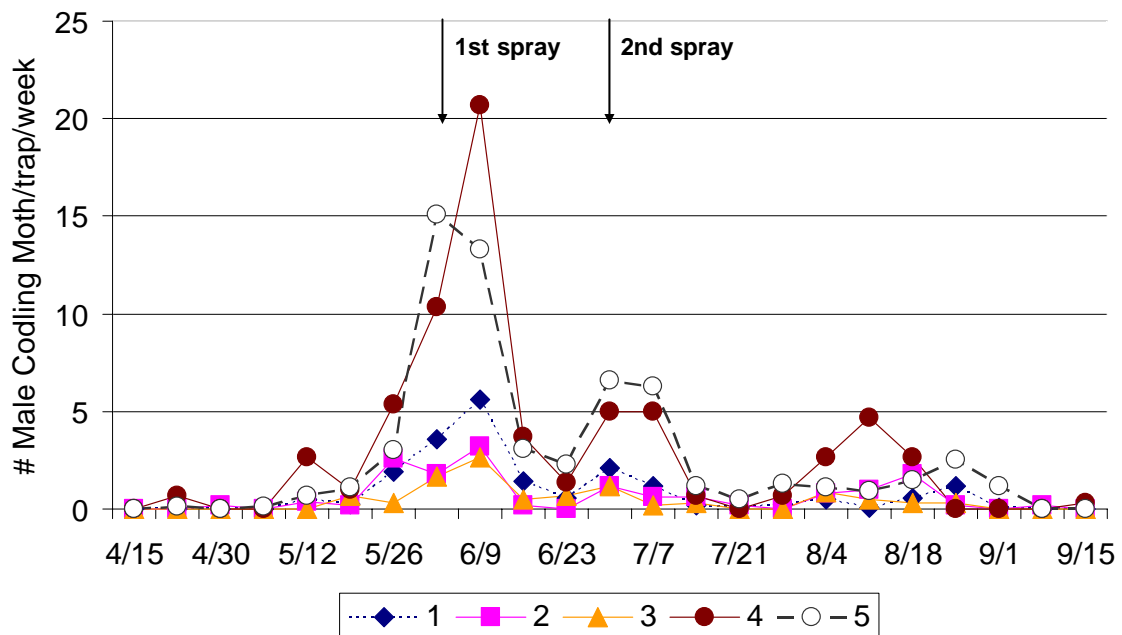


Fig. 4 - 2003 Total Mean Trap Counts for the season in Mendocino County (10 mg lures)

