

Control of Leafrollers using Pheromones

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Justification

- ◆ Organophosphate (OP) primary control for pandemis and obliquebanded leafroller
- ◆ OP control of leafroller control negates benefits of codling moth mating disruption
- ◆ FQPA has restricted OP alternatives for leafroller
- ◆ Leafroller controls compatible with CM mating disruption are essential

Leafroller Pheromone Research

- ◆ Leafroller mating disruption studied since early 1990s
- ◆ This poster discusses two pheromone dispensing technologies:
 - Hand applied dispensers (Isomate LR, Pacific Biocontrol)
 - Micro-encapsulated sprayable pheromone (3M Canada)

Materials and methods

◆ Hand-applied dispensers

- Two dispenser types tested at 4 locations in 1999, 2000
 - Isomate LR80- 80 mg of pheromone at 400 d/a applied twice
 - Isomate LR250- 250 mg of pheromone at 200 d/a applied once

◆ Sprayable leafroller pheromone

- Active ingredient was Z-11 tetradecyl acetate
- Tested at two rates during both generations at three locations
 - Rates were 20 and 40 gm/acre
 - One application/flight in 1999 and two/flight in 2000

◆ Monitoring

- Pheromone traps used to monitor male moth activity
- Food bait traps used to monitor male and female moth activity
- Female moths dissected to determine proportion that mated
- Larval densities measured by shoot samples
- Fruit injury assessed at harvest

Stemilt

Derrick Carlson

Sprayable LR Pheromone

Fuji

8-12' tall



Control (no pheromone)	Low Rate 20 g AI/acre	High Rate 40 g AI/acre
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10 acres

10 acres

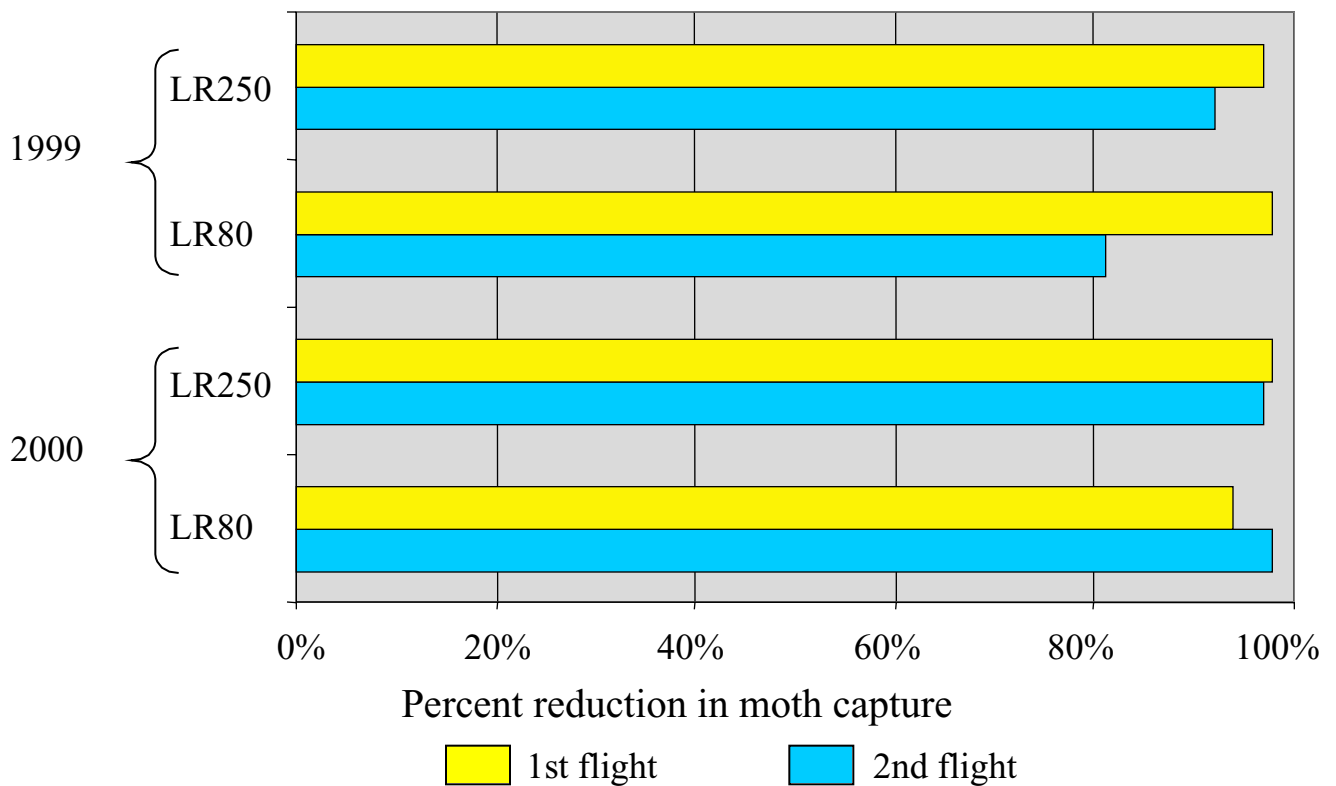
10 acres

Isomate OBLR/PLR 80 mg	Control (no LR pheromone)	Isomate OBLR/PLR+ 250 mg	Isomate CM/LR Twin Tube 460 mg
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10 acres

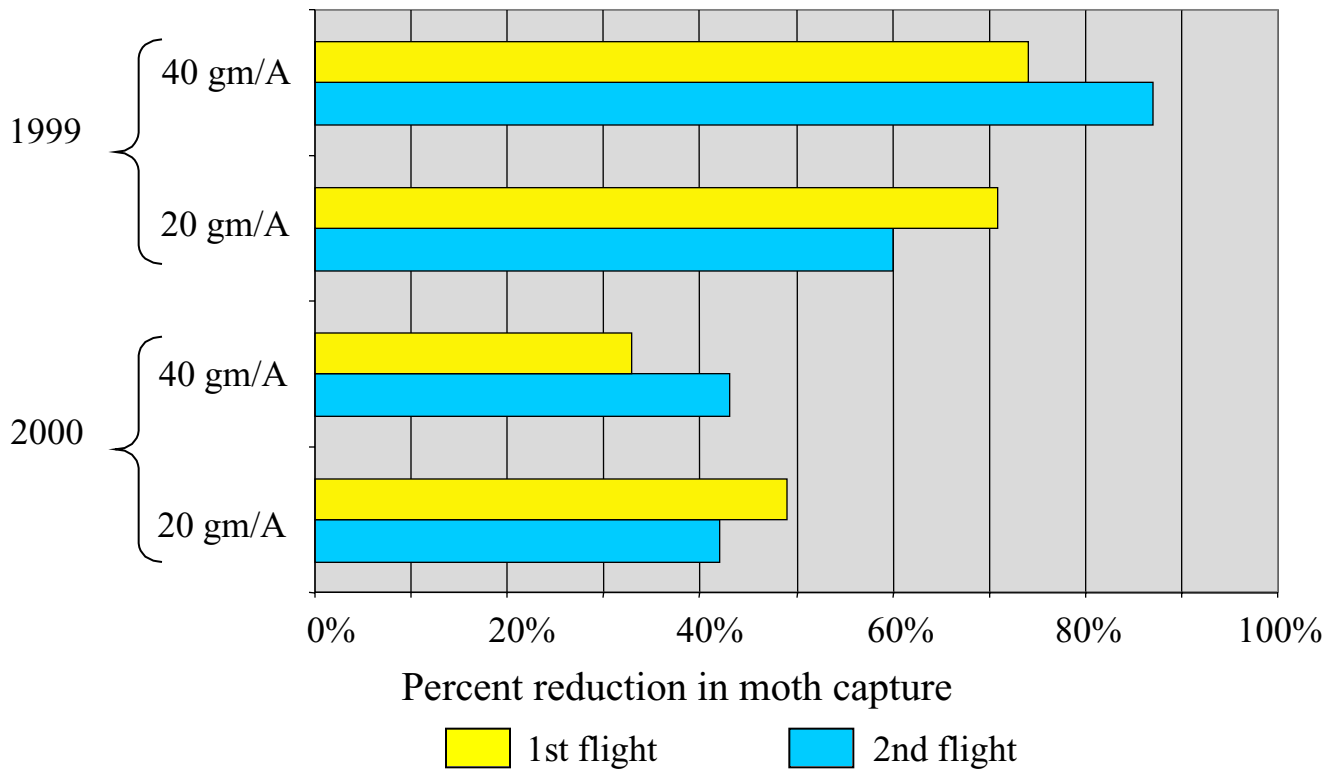
Results: Hand-applied dispenser treatments

Figure #1. Percent reduction of leafroller moth capture in pheromone traps relative to the untreated plot



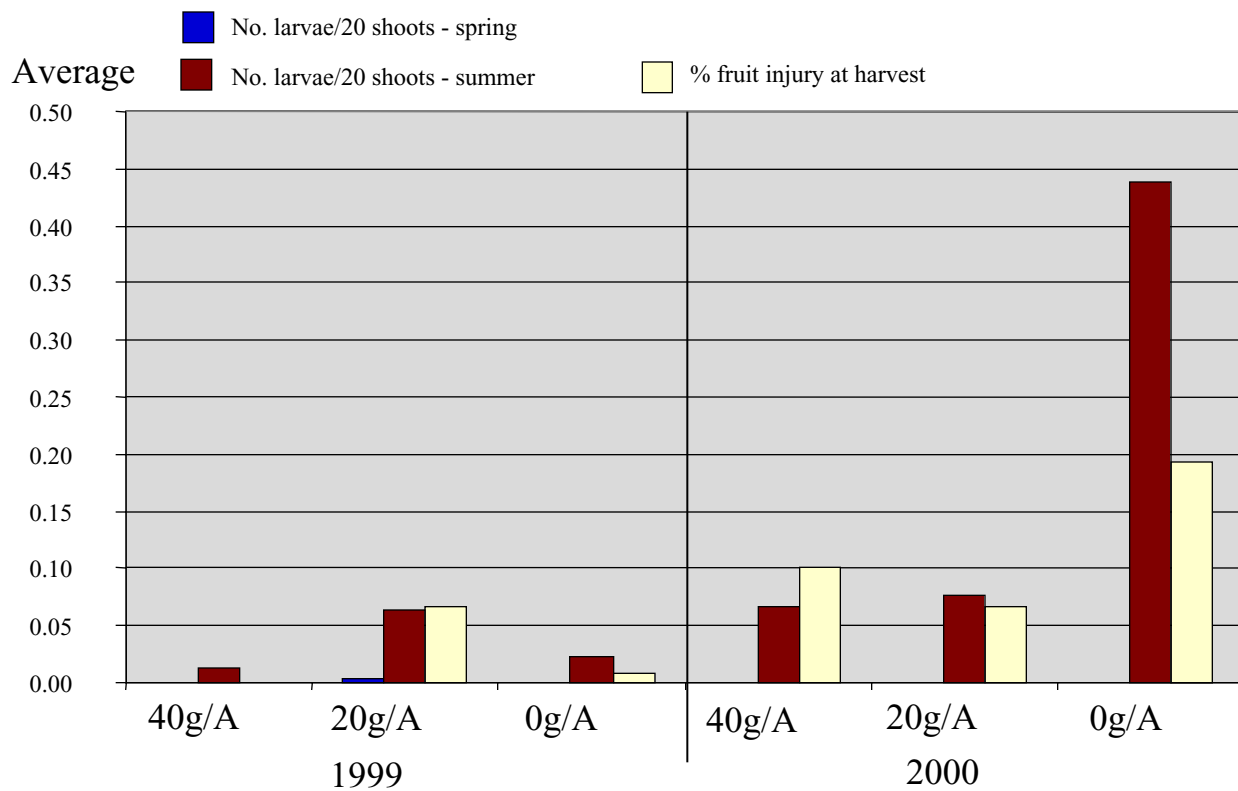
Results: Sprayable pheromone treatments

Figure #2. Percent reduction of leafroller moth capture in pheromone traps relative to the untreated plot



Results: Sprayable pheromone treatments

Figure #3. Average number of leafroller larvae per 20 shoots in spring and summer and % fruit injury at harvest

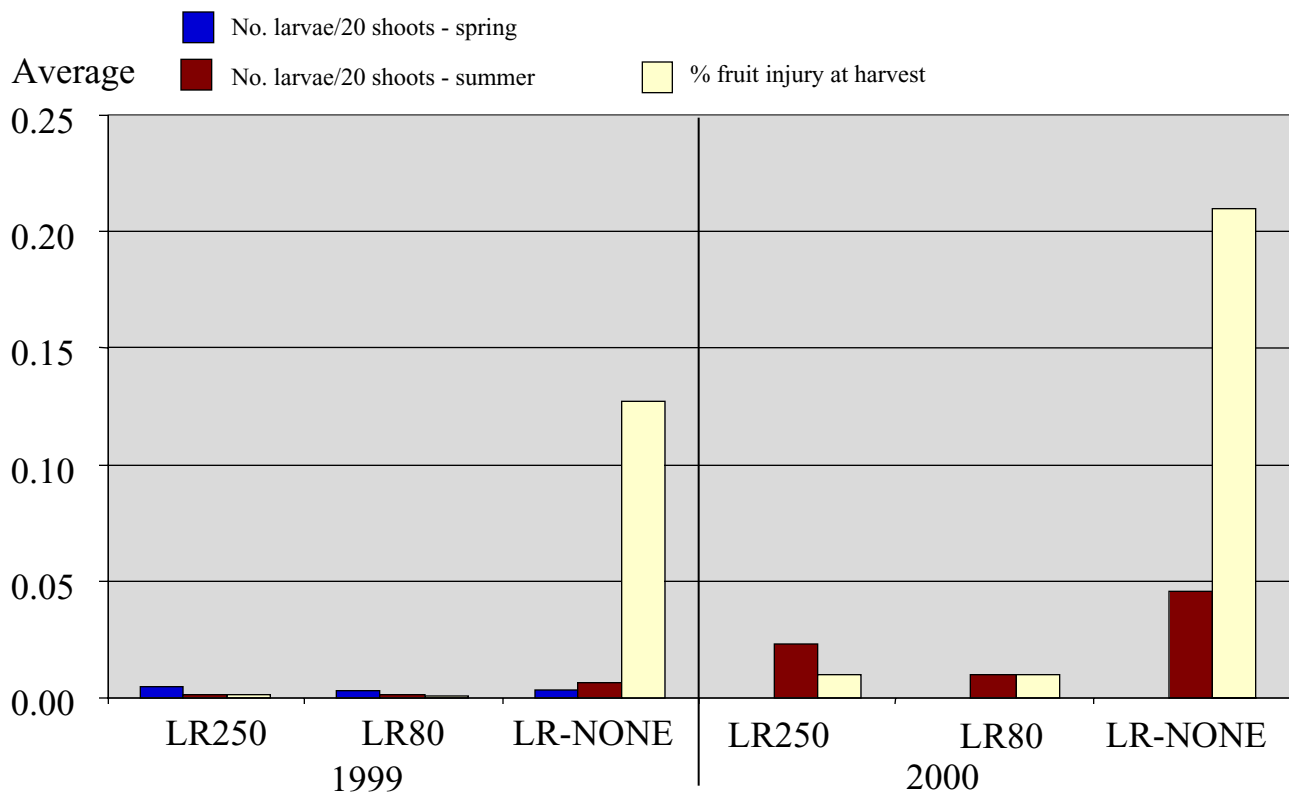


Results- Pheromone baited trap catch

- ◆ Reduction of moth catch relative to untreated control is a measure of disruption
 - A high reduction (>90%) in capture is desirable
- ◆ **Hand Applied dispensers**
 - Average percent reduction in capture consistently above 90% for both rates and both generations
 - No consistent treatment differences noted
 - No consistent difference in efficacy was noted between generations
 - The LR250 treatment had fewer dispensers/acre and required only one application thus would have lower application cost
- ◆ **Sprayable pheromone**
 - Average percent reduction in capture not as great as with hand-applied dispensers
 - Reduction in capture was more with one application in 1999 than with two applications in 2000
 - No consistent rate effect was noted
 - No consistent difference in efficacy was noted between generations

Results: Hand-applied dispenser treatments

Figure #4. Average number of leafroller larvae per 20 shoots in spring and summer and % fruit injury at harvest



Results- Larval densities and fruit injury

- ◆ General reduction in larval densities and fruit injury noted with both technologies
- ◆ There appears to be a cumulative effect of suppressing leafroller populations over time
- ◆ **Hand Applied dispensers**
 - Larval densities and fruit injury were significantly reduced relative to the untreated control in 2000
 - A cumulative effect of pheromone suppression may be noted from 1999 to 2000
- ◆ **Sprayable pheromone**
 - Larval densities and fruit injury were significantly reduced relative to the untreated control in both 1999 and 2000
 - No consistent rate effect was noted

Summary

◆ Hand applied dispensers

- Reduced moth capture >90%
- Reduced larval densities and fruit injury in some locations
- Accumulated effect on leafroller populations over time

◆ Sprayable leafroller pheromone

- Variable suppression of moth capture
- Larval densities and fruit injury reduced at one location
- Rate response noted from 5-40 grams AI/acre
- Method of application (Protec vs. air-blast) did not seem to be important