Mating Disruption in the Orchard and the Packing House

Chuck Burks

Navel orangeworm (NOW)

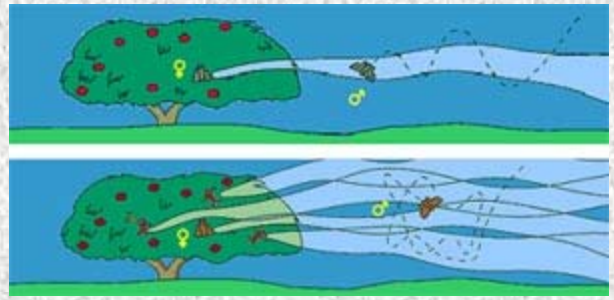
Indianmeal moth (IMM)

Mating disruption for control of navel orangeworm and Indianmeal moth

- Detection and monitoring
- Efficacy
- Life history

Mating disruption: neurological and behavioral mechanisms

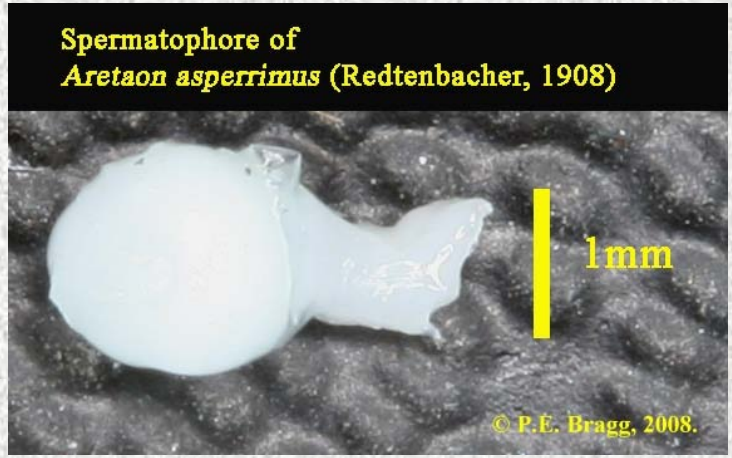
- Neurophysiologic effects
  - adaptation
  - habituation
- Camouflage
- Point source competition (false trails)
- Imbalanced sensory input

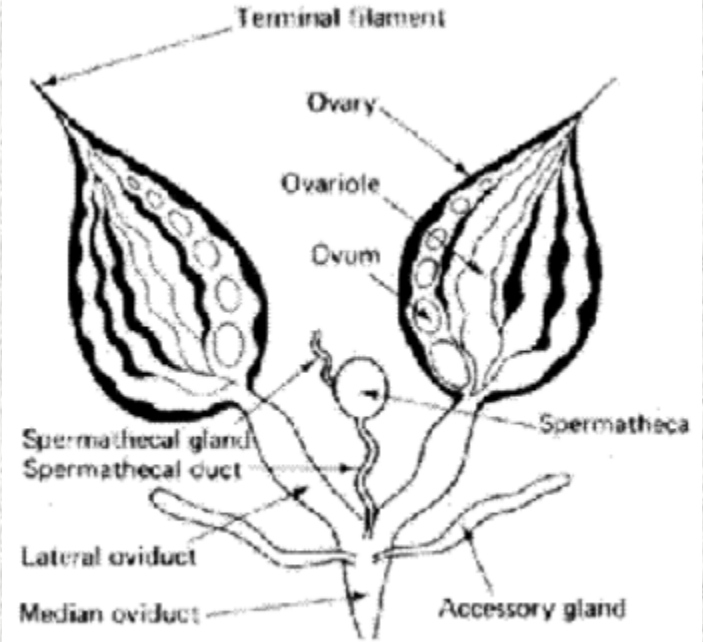


<u>IMM Blend</u>:
Z9E12-14:Ac
Z9E12-14:Ald
Z9E12-14:OH
Z9-14:Ac
Z11-16:Ac

Mating disruption: life history and agronomic aspects

- Multiple mating
- Age of (first) mating
- Dispersal
- Relationship between abundance and damage





Female reproductive organs.

Mating disruption: practical aspects

Single-female dose?

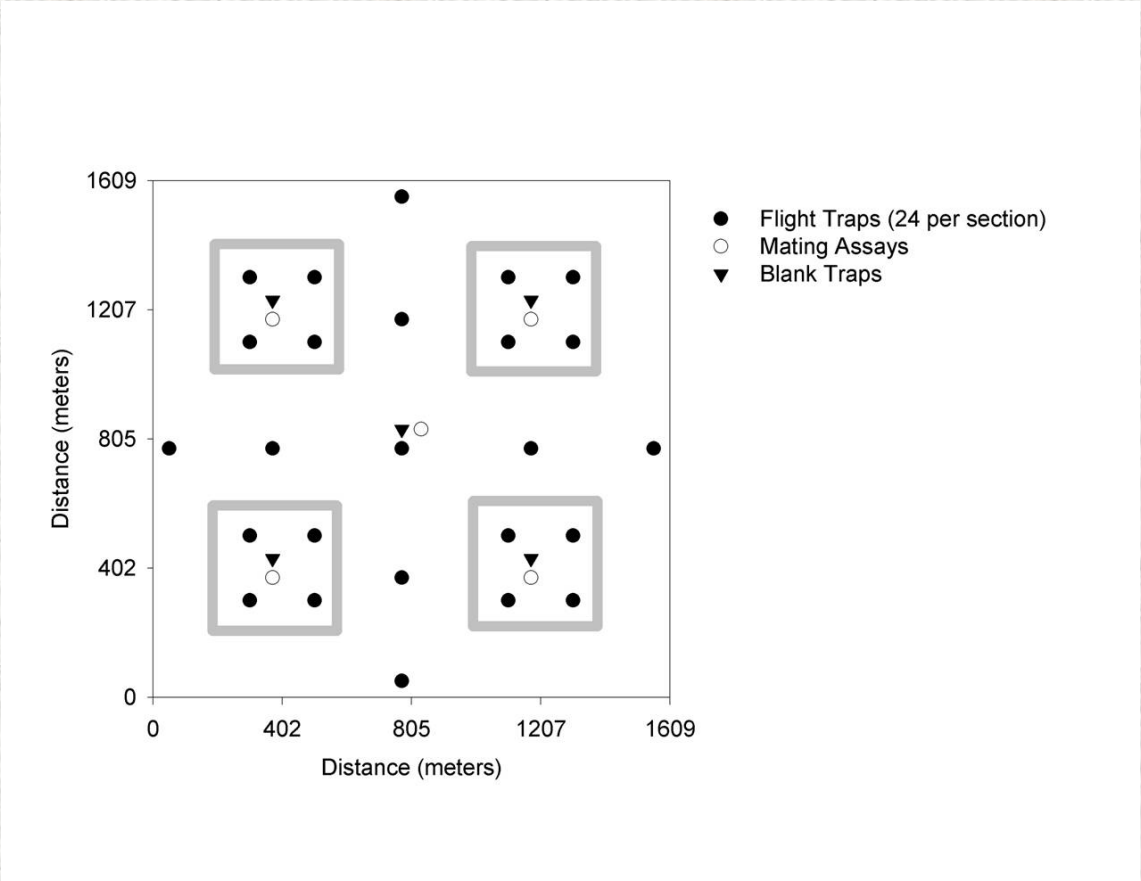
Tests of performance of mating disruption

Virgin-baited trap

Mating assay

NOW Egg trap

Mating disruption and navel orangeworm abundance: PFC, 2003-2004



2003

4 almond ranches

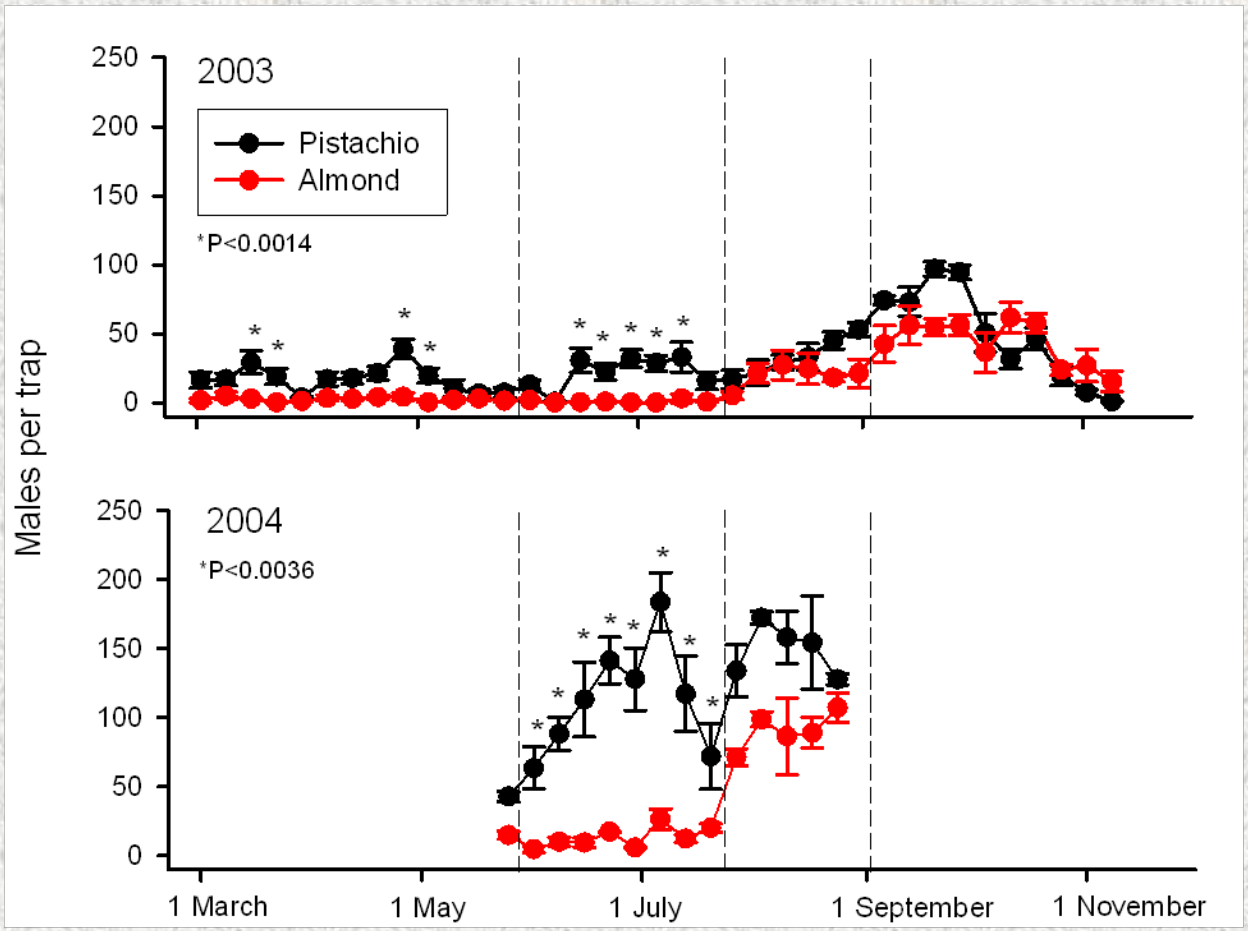
4 pistachio ranches

2004

3 almond ranches

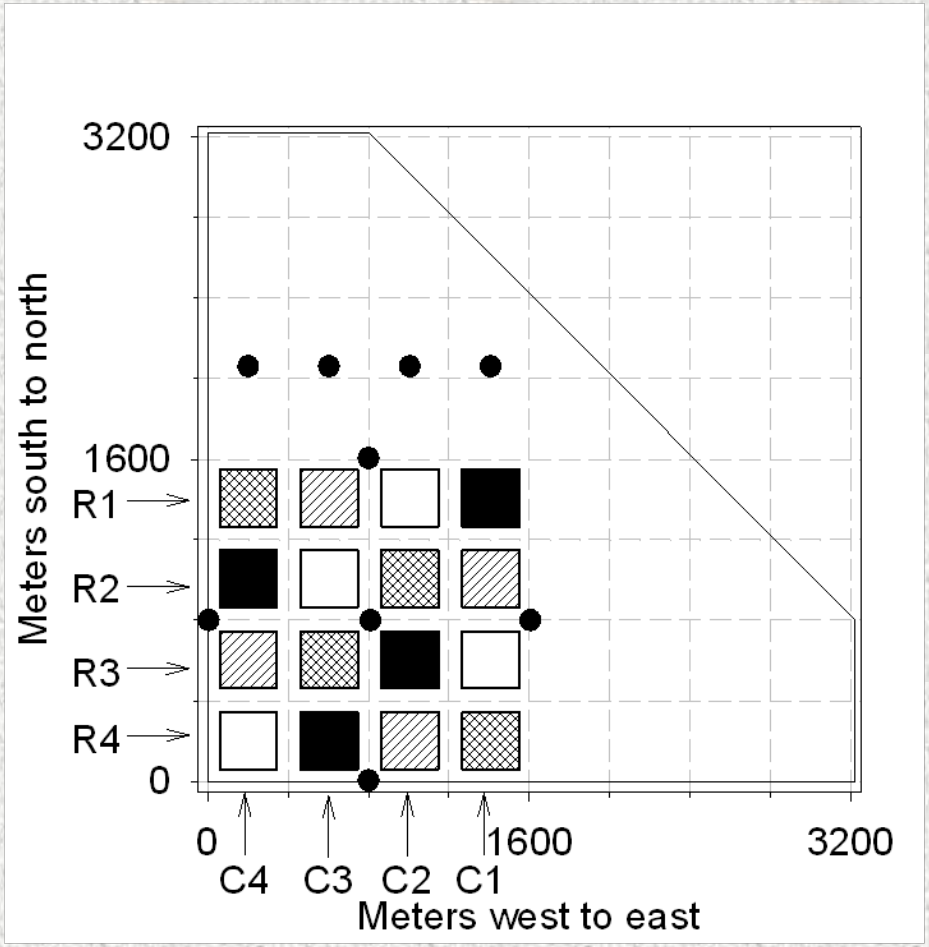
3 pistachio ranches

Abundance of navel orangeworm, 2004 and 2004



Burks et al. (2008) Experimentalis et Applicata 129: 66-76

PFC Latin square 2004



Trap Type/Location	Males per trap per week (26 weeks)
Outside	49.50
Between	1.69
Non-MD	5.48
Mating disruption	0.01

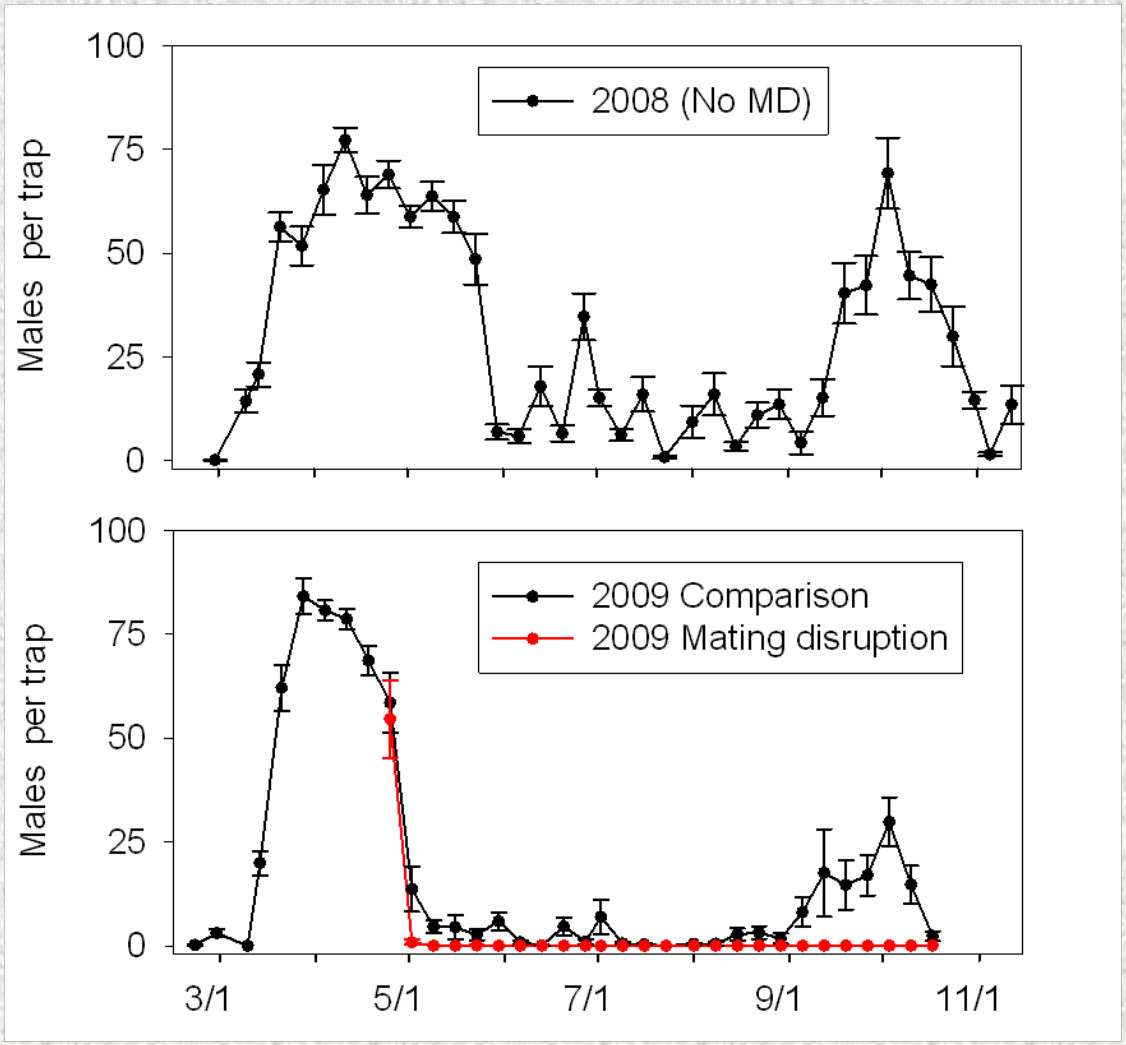
2003: “Peripheral placement” shown ineffective

Higbee and Burks (2008) J. Econ. Entomol. 101: 1633-1642

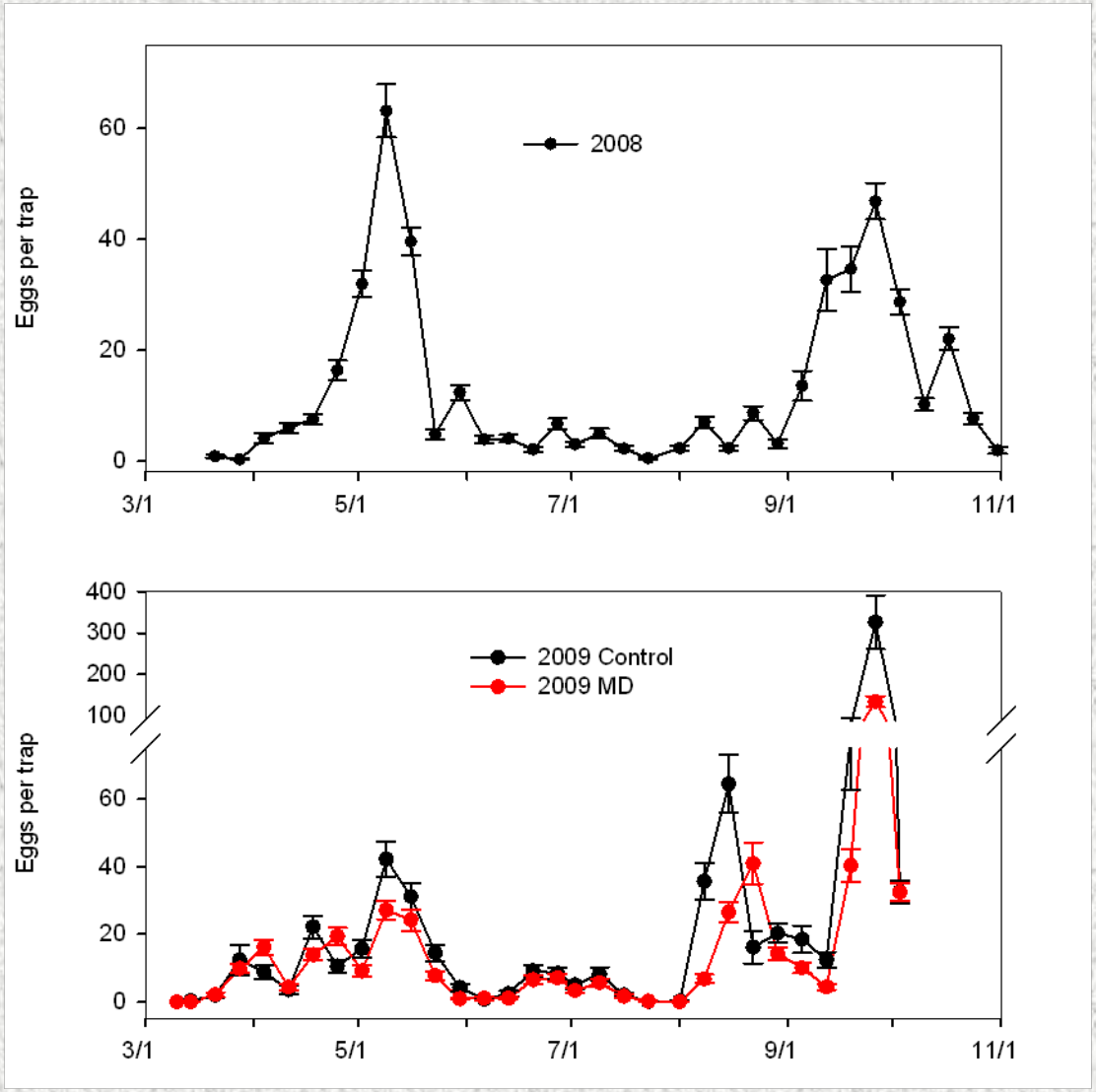
Mendota NOW MD Demonstration Project

- Different region
- Different almond varieties
- Different growers, situation and practices
- 2008—baseline (no MD)
- 2009—MD and comparison plots

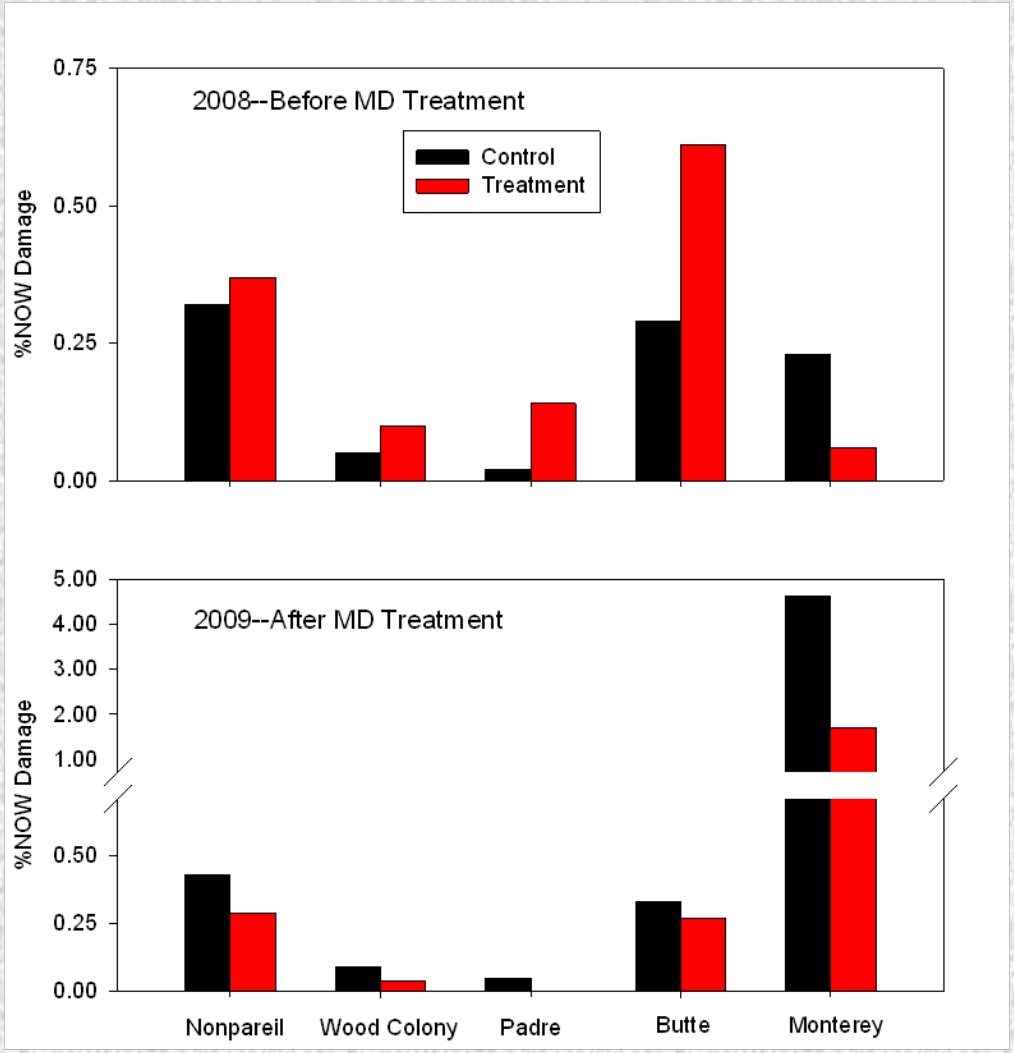
Efficacy of mating disruption at Mendota—males in traps



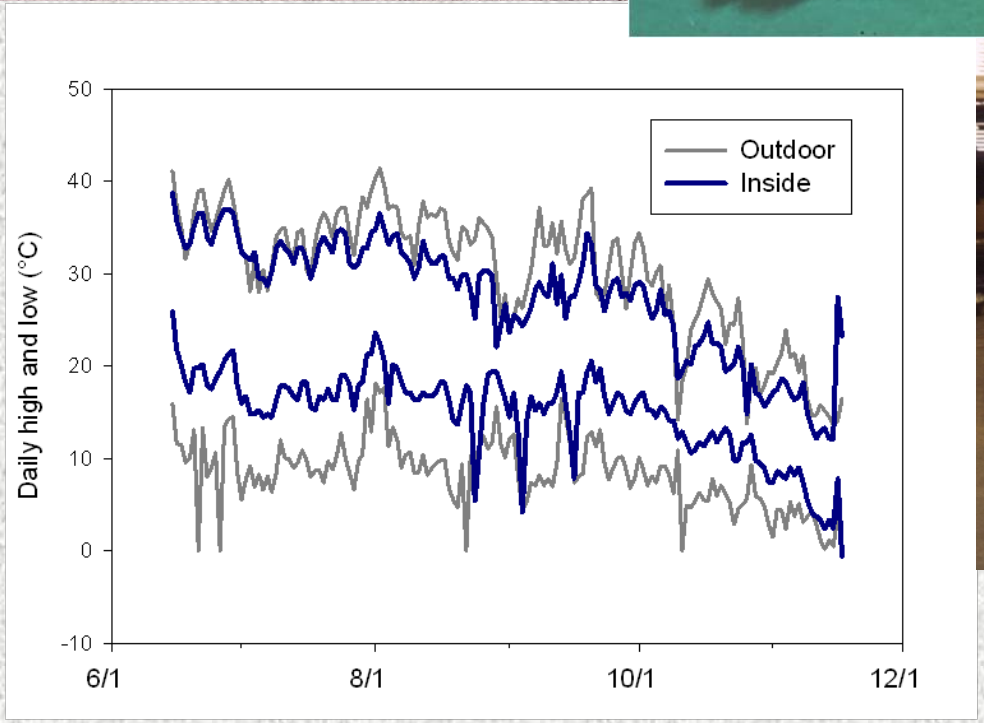
Mendota—effect of MD on NOW eggs



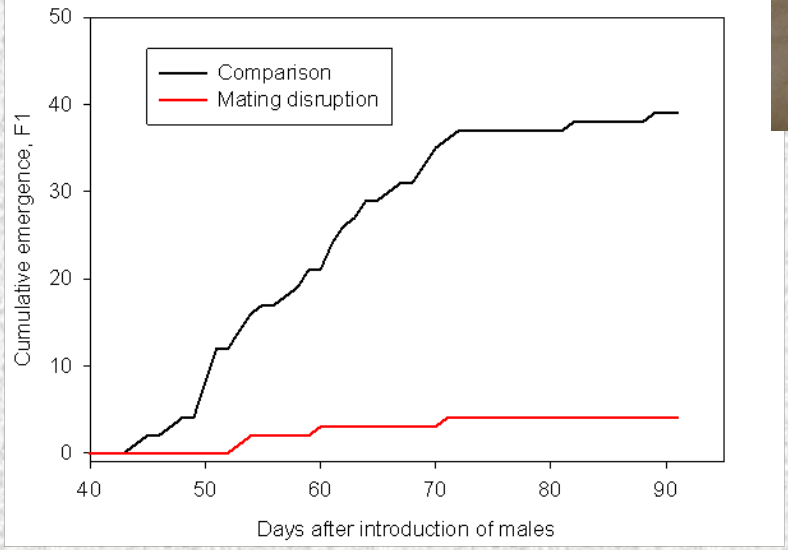
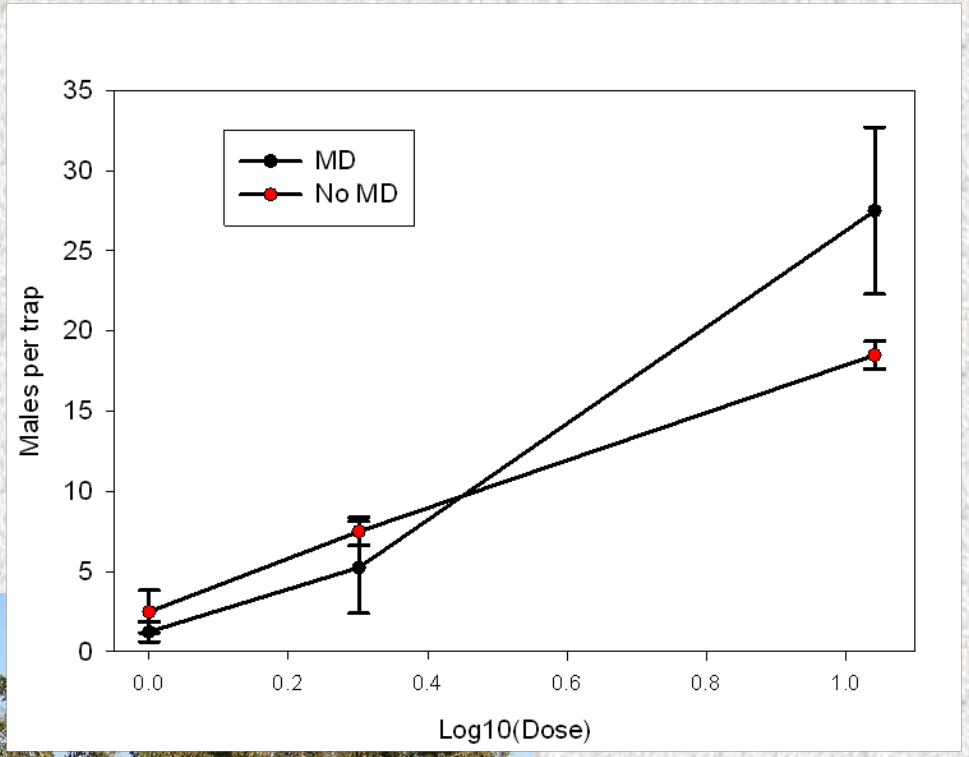
Mendota—effect of MD on NOW damage in almonds at harvest



- 2008 was baseline (no MD)
- MD applied in 2009
- Overall 2008—0.22 v. 0.25% damage (ns)
- Overall 2009—1.07 v 0.39% damage ($P<0.001$)


Outdoor
Inside
Daily high and low (°C)
50
40
30
20
10
0
-10
6/1
8/1
10/1
12/1

Efficacy, CheckMateSPM



Monitoring stored product moths in the presence of mating disruption