University of California Statewide IPM Project

Pheromone Mating Disruption Program in Walnuts - 2005

Carolyn Pickel, UCIPM Advisor and Assoc Director of UCIPM
Pheromone mating disruption products

- Hand applied dispensers
- Sprayables
- “Flakes”
- “Puffers”
- Early ‘90s
Large scale PUFFER trials

- San Joaquin County
  - 4th year: 600 acres (22 blocks)
  - 1st year: 540 acres (10 blocks)
- Glenn County
  - 4th year
  - 180 acres (3 blocks)
- Butte County
  - 2nd year
  - 205 acres (2 blocks)
- Yolo County
  - 1st year
  - 180 acres (4 blocks)
- Tehama County
  - 1st year
  - 2 blocks: 120, 160 acres
- Kings County
  - 1st year
  - 160 acres (2 blocks)

- Population
  - 1x trap low
  - Combo traps high
- Canopy Counts
  - End 1st and 2nd generation
  - 1000 nuts per block
- Harvest damage
  - 500 nuts
San Joaquin County Puffer Trial
Locke Ranch
600 acres

Puffers added in 2007
Codling moth damage at harvest

Locke Ranch Puffer Trial

% CM

- 2005
- 2006
- 2007
- 2008

F1 Tulare
F2 Serr
F3&20 Chandler
F4 Chandler
F5 Serr & Chandler
F6 Tulare
F7 Howard
F8 Serr
F9 Chandler
F9 Serr
F10 Vina/Serr
F12 Serr
F12 Chandler
F13 & F22 Chandler
F14 & 15 Serr
F18 Serr
F19 Hartley
F23 Howard
F24 Vina
F25 Serr
F25 Chandler

ND = Not Determined
2008: 0% CM all blocks except at edges of some blocks

Locke Ranch Puffer Trial
San Joaquin County
T4N R7E

2008

Harvest % CM damage

NO CM SPRAYS
Locke Ranch Puffer Trial, Seasonal Trap Captures, CM-DA Lure
Population decline over time
Locke Ranch, 2005-2008

Total Seasonal Trap captures
COMBO Lure

- 2005
- 2006
- 2007
- 2008

Moths per trap

F1, F2, F3 & F20, F4, F5, F6, F7, F8, F9, F10, F12, F13, F14 & F15, F18, F19, F22, F23, F24, F25
Population decline over time
Locke Ranch, 2005-2008

Total COMBO captures - all farm

<table>
<thead>
<tr>
<th>Year</th>
<th>Total moths/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1262</td>
</tr>
<tr>
<td>2006</td>
<td>1245</td>
</tr>
<tr>
<td>2007</td>
<td>377</td>
</tr>
<tr>
<td>2008</td>
<td>139</td>
</tr>
</tbody>
</table>
Need for supplemental sprays declines over time

CM "treated acres"*
Locke Ranch, Lockeford, Calif.

*Acres in block X CM treatments/block
CM treatments counted as 1.0
Multi-target as 0.5
No puffers in 2008

Trap catches 1X CMDA
Canopy counts 1st 2nd
Harvest % CM
# Supplemental CM sprays
Glenn County Puffer Trial
180 acres
Glenn County Puffer Trial
180 acres

Sacramento River

Vina 110 ac

Tehama 37ac

Chandler 30ac
Glenn CM Puffers
2008 4th year
Damage at Harvest

% CM Damage
% NOW Damage

Carolyn Pickel, 2008
Glenn 2005-2008
Total CM Trap Catches, Combo lure

<table>
<thead>
<tr>
<th>Location</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinas SW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinas NW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinas SE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinas NE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tehamas W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tehamas E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chandlers W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chandlers E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Carolyn Pickel, 2008
Butte puffers
2008 2nd year
Combo Lure Trap Totals

Trap Total 2008
Trap Total 2007

2008 Sprays
• Surround
• GF-120 (WHF)

2007
• NO INSECTICIDE!
Combo Lure CM Trap Totals
Butte Puffers 2007-2008

Number of Moths

2007  2008

24-N  100  150
24-SE  50  100
25-NW  50  100
25-NE  50  100
25-W   50  100
25-SE  300  350
160 Acres
Vinas
80 puffers

Jelly's Ferry
CM Traps
Ashley Harvest 9/18/08
1000 nut sample
No codling moth, .01% NOW

Tehama Harvest 10/01/08
1000 nut sample
No codling moth, .01% nuts NOW
## Canopy Counts County Line 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>Low</th>
<th>High</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/16/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>1/1500 (.06)</td>
<td>1/1214 (.08)</td>
<td>.07</td>
</tr>
<tr>
<td>South</td>
<td>9/1900 (.47)</td>
<td>6/1370 (.43)</td>
<td>.45</td>
</tr>
<tr>
<td>7/25/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>12/2909 (.41)</td>
<td>8/2839 (.28)</td>
<td>.34</td>
</tr>
<tr>
<td>South</td>
<td>14/1466 (.95)</td>
<td>—</td>
<td>.95</td>
</tr>
</tbody>
</table>
CM Puffers 2008
Trap Catches with Combo Lure
At 5 Sites in Sac Valley

Average Moths/Trap/Day

Hang Combo traps high

Carolyn DeBuse, 2008
High vs low-hung Combo Lure Traps in Pheromone Orchard

Sprayed

Carolyn DeBuse, 2008
Colombini Walnut Orchard
Single Puffer "on" Period, 12-hour Cycle
5-Day Cumulative Trap Catch Totals

1000 Sterile Marked Codling Moths Released at Each Black Dot

P

Wind Direction

Welter
Movement of pheromones out of puffer treated orchards

1X Trap captures in Chandleers south of puffer block Yolo County

Carolyn DeBuse, 2008
PUFFERS: WHAT WE KNOW.

- Few to no mechanical failures
- Population suppression achievable in 2-3 years
- Puffers CANS installed before moths fly (3/15 to 4/1)
- Not necessarily a stand-alone program
  - Bring populations down with sprays as needed even in non susceptible varieties
- Orchard edges (Double puffers on edges)
- Best suited to large blocks (>40 acres??)
- Use COMBO traps (hung high) for monitoring
- Monitor in-season damage
- Trap Catches do not relate to harvest damage but indicate CM population levels
- Watch other pests, especially Walnut Husk Fly
- “Good Neighbor Program”
Estimated Costs

- Yearly Per acre cost: $65 to $70
- Steve Wulfert, Suterra
“Medium density” dispensers under test

T. Burlando, S. Welter, 2008
Acknowledgments

Joe Grant, UCCE San Joaquin
Rick Buchner, UCCE Tehama
Carolyn Debuse, UCCE Yolo
Steve Welter, UCB
Sara Goldman Smith, UCIPM, SRA
Cindy Gilles, Tehama Field Asst.
Steve Wulfert, Suterra
Grower cooperators