Effective Management Strategies for Weeds, Insects and Diseases

Kim Patten
Weevil – larvicide treatments

• **MET 52** (*M. anisopliae*)
  - 2010 trials
    • OSU found efficacy on BVW in WA, not OR
  - 2011 trials
    • WSU applied at 3 sites in Spring 2011 in Grayland, WA with known larvae populations - no treatment effect
    • WSU Applied at 2 sites in Summer 2011 in Grayland, WA with known larvae populations – no treatment effect

• **Paecilomyces fumosoroseus Apopka Strain 97**
  - WSU Applied Winter 2012
Total # alive BHFW larvae

- untreated
- Delegate
- Altacor
- H

Applied 280 gpa, washoff 730 gpa
6 reps 10' x 10'

Graph showing the total number of alive BHFW larvae over time with different treatments.
BHFW control with Chemigation - severe infestation - 2011

Chemigated 6/21/11 (Single heads 7 min on + 7 min off)
## Whole farm treatments

<table>
<thead>
<tr>
<th>Farm #</th>
<th>Treatment 1(^{st}) generation</th>
<th>#larvae/5 sweeps Pre-spray</th>
<th>#larvae/5 sweeps post 1(^{st}) spray</th>
<th>#larvae/5 sweeps post 2(^{nd}) spray</th>
<th>Peak 2(^{nd}) gen. trap counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Chem</td>
<td>Delegate 3 oz/a + Delegate 6 oz/a</td>
<td>21</td>
<td>4 DAT = 29</td>
<td>0</td>
<td>52</td>
</tr>
<tr>
<td>2 Chem</td>
<td>Delegate 6 oz/a</td>
<td>3</td>
<td>4 DAT = 1</td>
<td>No spray</td>
<td>56</td>
</tr>
<tr>
<td>3 Chem</td>
<td>Delegate 3.25 oz/a Delegate 6 oz/a</td>
<td>31</td>
<td>7 DAT = 31</td>
<td>14</td>
<td>65</td>
</tr>
<tr>
<td>4 Chem</td>
<td>Delegate 6 oz/a + Intrepid 16 oz/a</td>
<td>26</td>
<td>4 DAT = 39</td>
<td>8</td>
<td>85</td>
</tr>
<tr>
<td>5 Hand Brd. 8 gpa</td>
<td>Entrust 3 oz/a</td>
<td>18</td>
<td>6 DAT = 1</td>
<td>No spray</td>
<td>97</td>
</tr>
<tr>
<td>6 Chem</td>
<td>Acephate 1 lb/a</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>85</td>
</tr>
<tr>
<td>7 Chem</td>
<td>Diazinon</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65</td>
</tr>
<tr>
<td>8 Chem</td>
<td>Diazinon</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65</td>
</tr>
</tbody>
</table>
Whole farm treatments

Means across farms for OP and RR treated paired beds within farms
(multiple assessments during July 2011)

# alive BHFW larvae

# parastic wasps

- OPs
- Reduced Risks
Whole farm treatments

Means across farms for OP and RR treated paired beds within farms

(Assess 8/9/11)

Fireworm - infested fruit

- OPs
- RRs
- OPs + RRs

% infested fruit

Means across farms for OP and RR treated paired beds within farms

(Assess 8/9/11)
Blackheaded Fireworm: Management without OPs - Whole Farm Treatments

What happens to the fireworm population over time and what does it mean?

**Weekly trap counts**

- **BHFW**
- **PCCRF**
- **Mitch**

**Reduced Risk vs conventional**

- Reduced Risk
- Conventional

**Date**:
- 6/6/11
- 6/13/11
- 6/20/11
- 6/27/11
- 7/4/11
- 7/11/11
- 7/18/11

**Graph**
- # / trap
- 0
- 20
- 40
- 60
- 80
- 100

**Timeline**
- June
- July
- Aug
- Sept
• Recommendations – fireworm control without OPs
  – Best chemistries: Delegate and Intrepid at full label rate
  – Application timing based on sweeping / instar size
  – Repeat application may or may not be necessary
  – Adjustments are needed for chemigation system
  – Very doable and affordable
  – Not sure of implications for beneficial insects or long term BHFW populations
### Insecticide Cost $ per ac

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>~Cost $ per ac</th>
<th>Relative efficacy with chemigation For BHFW (1 to 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diazinon</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Delegate</td>
<td>35</td>
<td>8-9</td>
</tr>
<tr>
<td>Intrepid</td>
<td>20</td>
<td>8-9</td>
</tr>
<tr>
<td>Success</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>Confirm</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>Altaclor</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>Entrust</td>
<td>48</td>
<td>7</td>
</tr>
</tbody>
</table>

### Bee Toxicity LD50 (µg/ bee)

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Rate used (lbs/ac)</th>
<th>Bee Toxicity LD50 (µg/ bee)</th>
<th>Relative risk quotient to bees (use rate/ toxicity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diazinon</td>
<td>2</td>
<td>0.09</td>
<td>22</td>
</tr>
<tr>
<td>Delegate</td>
<td>0.13</td>
<td>0.02</td>
<td>6.5</td>
</tr>
<tr>
<td>Success</td>
<td>0.08</td>
<td>0.025</td>
<td>3.2</td>
</tr>
<tr>
<td>Entrust</td>
<td>0.08</td>
<td>0.025</td>
<td>3.2</td>
</tr>
<tr>
<td>Intrepid</td>
<td>0.25</td>
<td>100</td>
<td>0.0025</td>
</tr>
<tr>
<td>Confirm</td>
<td>0.25</td>
<td>100</td>
<td>0.0025</td>
</tr>
<tr>
<td>Altaclor</td>
<td>0.05</td>
<td>104</td>
<td>0.0004</td>
</tr>
</tbody>
</table>
Weed Control

New chemistries (not a lot of options for BC)
• I – has potential as pre-emergent, years off
• Q – US only
• C – US only

Old chemistries
• Stinger – mid winter/ early spring
• Callisto – Chemigation?
• Impacts of weeds on yield
Yield (bbl/ac) of Stevens Cranberries in 2011 as affected by yellow weed coverage

R² = 0.69

% of light reaching the cranberry canopy
Fungicides to increase yield?

2010 and 2011 study
Yield bbl/ac (sound berries @ harvest)

- grower trt (Bravo + Manzate @ set)
- A + I twice @ blm + grower trt

Extra $100/ac in fungicides ~ 20% increase in returns ~ $1400/ac
Variety trials – variation on size as a function of weather