Codling Moth Control with Selective Insecticides + Sugar and Yeast

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Experimental Design – Calif. Field Exp.

• Commercial Bartlett pear orchard in Fairfield, CA
  • 25’ x 25’ spacing

• Six treatments with and without sugar/yeast
  • Replicated four times in a RCB

• Materials applied at 75% max label

• Cane sugar at 1 lb and Red Star bread yeast at 3 lb/100 gal (SY)

• Treatments: Entrust, Assail, Altacor, Delegate, Intrepid and check
Degree Days and CM captured per trap/day

- 4 April 1st Biofix
- 16 April 126 DD Spray
- 24 April 243 DD Spray
- 22 May 663 DD Spray
- 17 May 590 DD Spray
- 11 June 136 DD Spray
- 5 June 2nd Biofix
- 18 June 250 DD Spray
- 1 July 520 DD Spray
- 8 July 685 DD Spray

CM/trap/day
Evaluation

- 20 leaves sampled weekly from interior and exterior of foliage of each replicate
- 250 fruit per replicate were inspected at harvest for damage
Web Spinning Mites

Season total WSM per 20 leaves

Without SY
With SY

Entrust 2SC
Assail 30SG
Intrepid 2F
Altacor 35WDG
Delegate 25WG
Untreated check

0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
**Rust Mites**

<table>
<thead>
<tr>
<th>Product</th>
<th>Without SY</th>
<th>With SY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrust 2SC</td>
<td>bc</td>
<td>a</td>
</tr>
<tr>
<td>Assail 30SG</td>
<td>bc</td>
<td>ab</td>
</tr>
<tr>
<td>Intrepid 2F</td>
<td>ab</td>
<td>ab</td>
</tr>
<tr>
<td>Altacor 35WDG</td>
<td>ab</td>
<td>ab</td>
</tr>
<tr>
<td>Delegate 25WG</td>
<td>c</td>
<td>bc</td>
</tr>
<tr>
<td>Untreated check</td>
<td>a</td>
<td>ab</td>
</tr>
</tbody>
</table>

Season total RM per 20 leaves
Rust Mites
Harvest Evaluation

Percent rust mite damaged fruit

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<tbody>
<tr>
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<td>ab</td>
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<td>Assail 30SG</td>
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<td>Altacor 35WDG</td>
<td>b</td>
<td>b</td>
</tr>
<tr>
<td>Delegate 25WG</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Untreated check</td>
<td>b</td>
<td>b</td>
</tr>
</tbody>
</table>
% Codling Moth Damage
Harvest Evaluation

Entrust 2SC  Assail 30SG  Intrepid 2F  Altacor 35WDG  Delegate 25WG  Cumulative

Without SY
With SY
Secondary Pests:

- Assail 30SG caused outbreak of TSSM
- Delegate 25WG caused outbreak of PRM in leaf and harvest samples

Harvest Evaluation:

- The SY did not significantly improve CM control
- Lower CM infestation in SY with Entrust 2SC and check but not significantly different
- All treatments had significantly less CM damage than the checks
Laboratory bioassays

- Fruit treated with water, Intrepid, Delegate, Entrust and Altacor at 1% and 5% of field rates, with and without the SY using a fruit dip method.
- 5 neonate CM larvae placed on each fruit
- Fruit was stored for 14 days at 25°C
- Fruit was then examined under a microscope to determine number of larvae alive and number of stings
*Only Altacor at 5% showed significantly lower damage when combined with sugar and yeast
Seven treatments replicated 10 times

Treatments were: untreated check, a water control, CpGV\textsuperscript{a}, CpGV\textsuperscript{b}+BY\textsuperscript{c}, CpGV + Ct\textsuperscript{d}+S, CpGV + Lasp\textsuperscript{e}+S, CpGV + MIB\textsuperscript{f}

Treatments applied at 100 gpa on 28 May, 6, 13, and 21 June and 2, 12, 17, and 26 July and 5 Aug

Data was recorded for pear slug, CM, Pandemis leafroller and San Jose Scale

\textsuperscript{a} 0.5 oz per 100 gal
\textsuperscript{b} 3 lbs of Red Star bread yeast per 100 gal
\textsuperscript{c} 1 lb of cane sugar per 100 gal
\textsuperscript{d} 3 lbs of the wild yeast \textit{Cryptococcus tephrensis} isolated from codling moth larvae in 2011 per 100 gal
\textsuperscript{e} 3 lbs of L-Aspartate per 100 gal
\textsuperscript{f} 2 quarts of Monterey Insect Bait per 100 gal
Pear Slug Damage

Mean Proportion injury from Pear Slug


Heavy is >10 marks, low is <10 marks from pear slug
CM Damage

<table>
<thead>
<tr>
<th></th>
<th>Proportion CM damaged fruit</th>
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</thead>
<tbody>
<tr>
<td>Unsprayed</td>
<td>a</td>
</tr>
<tr>
<td>Water control</td>
<td>a</td>
</tr>
<tr>
<td>CpGV</td>
<td>b</td>
</tr>
<tr>
<td>CpGV + BY/S</td>
<td>b</td>
</tr>
<tr>
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<td>b</td>
</tr>
<tr>
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Conclusions - WA

• The addition of yeast and sugar significantly increased the efficacy of Altacor in lab trial.

• The addition of adjuvants did not improve efficacy of a codling moth CpGv program.

• Pear slug outbreak, injury pattern indicates that the sugary baits attracted and/or stimulated pear slug feeding, likely confounding the results of the field study.
QUESTIONS ANYONE?