IPM considerations for organic fruit production: managing insect pests

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Pest Alert:

Spotted Wing Drosophila in Arkansas

Stink Bugs and Pecan Weevils Damaging Nuts

Arkansas Pest Management News- click here

New Fact sheets:
- Brown Marmorated Stink Bug
- Spotted Wing Drosophila
- Raspberry Crown Borer

Link: http://comp.uark.edu/~dtjohnso/
Outline

• Organic tactics against:
  – Codling moth or Oriental fruit moth
  – San Jose scale
  – Plum curculio
  – Japanese beetle
  – Grape root borer

• Screen exclusion

• Summary
Integrated Pest Management (IPM)

• USDA IPM Roadmap (2003) definition of IPM:
  ❖ Science-based, decision-making process that identifies and reduces risks from pests and pest management related strategies.
  ❖ It coordinates pest biology, environmental information and available technology to prevent unacceptable levels of pest damage by the most economical means, while posing the least possible risk to people, property, resources, and the environment.
Organic Apple Project


Objectives:
Evaluate effects of ground cover and nutrient management practices on soil chemical, physical and biological characteristics, plant health

- Evaluate organic pest management practices
- Apprenticeship program mentored by a local grower
- Develop economic production and marketing budgets
- Develop organic apple teaching module
Organic Orchard Management

Developing Best Practices for Ground Cover, Nutrition and Pest Management in the South

‘Enterprise’
Pest Management

- Surround white wash
- CM or OFM trapping
- Isomate CM/OFM TT dispensers used between early and late season sprays of Entrust, Cyd-X, Bt
- Benzaldehyde + plum essence baited PC pyramid traps set around perimeter
Organic Apple PM Program

Fayetteville 2012

PC per trap (abandoned)
PC per trap (conv.)
PC per trap (Org. N)

Abandoned: Sevin Imidan for PC
Conventional: Sevin Actara Imidan for PC Imidan Clutch
Organic: JMS Oil for rosy apple aphid Surround for PC Surround (decrease PC & heat stress)

No. PC adults / trap

ET = 1

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20


% damage or eggs or tunnels / larvae
Organic Apple PM Program
(overwintered density was low due to similar program in previous years)
Apple Pest/Disease Damage in Organic ‘Enterprise’ Apples

<table>
<thead>
<tr>
<th>Year</th>
<th>% PC</th>
<th>% CM/OFM</th>
<th>% SJS</th>
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<tbody>
<tr>
<td>2008</td>
<td>3.7</td>
<td>1.1</td>
<td>1.5</td>
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<tr>
<td>2009</td>
<td>23.3</td>
<td>7.1</td>
<td>25</td>
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<tr>
<td>2010</td>
<td>25.8</td>
<td>0.2</td>
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<td>2011</td>
<td>41.0</td>
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<td>2012</td>
<td>38.7</td>
<td>0</td>
<td>9.5</td>
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- Damage by CM and OFM prevented by Entrust, Cyd-X, Bt and Isomate CM/OFM ties
- Damage by SJS prevented by 4 JMS Stylet Oil sprays in 2011
- Damage by plum curculio reduced by Surround whitewash compared to 100% damage in untreated orchards
Can Japanese Fruit Bag Prevent Damage?

Undergraduate, Spencer Fiser, determined effect of date of fruit bag placement on percent fruit damage

- 25 fruit bag wrapped over fruit on several dates
- Aug. 28, assessed fruit damage at harvest
Placement of Fruit Bag

Source of Japanese Fruit Bags: Wilson Irrigation & Orchard Supplies, 1902 S. 11th St., Union Gap, WA 98903; (800) 232-1174 ($0.14 ea. Or $140/1000 bags)

1. First, expand the sack. Next, the young fruit is positioned by slipping the stem into the center slot of the open sack.

2. Gather the left side of the open bag top and lay it over the embedded wire on the right side as you prepare to wrap and twist as shown in step 3.

3. Use the wire embedded in the right side like a twist tie to wrap up and over the bunched left top until clasped securely. Try to keep the sack "inflated".

4. Gently tap the bottom of the expanded sack to appear dented or concave, this preserves the ballooned shape.
Results: < 2% damage

8 bag placement dates

No bag

No bag
Surround Prevents Japanese Beetle Damage
### Grape Root Borer

- Larva tunnels in grape & muscadine roots = slowly causes vine decline and death
- Apply soil application of Lorsban in mid-June to prevent larval entry to roots (35 day PHI)
- Mating disruption using Isonet-Z pheromone ties
- Mass trap GRB males in sex pheromone baited green bucket traps at density of 1 trap per acre
Mating Disruption

Plot A

Plot B

Plot C

Muscadine vine *without* a twist-tie (○)

Muscadine vine *with* a twist-tie (●)

Baited monitoring wing trap = ▲
Results: Isonet-Z ties reduced trap catch to zero which implies no mating.

Roubos, Nyoike, Stelinski, and Liburd (2011)

Mass trapped GRB male moths in sex pheromone baited green bucket traps at density of 1 trap per acre.
Result: mass trapping reduced larvae in roots (2009)
Future: exclude insects in high tunnel evaluating ProtekNet screen
Placement of ProtekNet screening

Very little difference in temperature in high tunnel with screen vs. no screen (Fayetteville, AR 2012)
Summary

• Japanese fruit bags prevented disease and insect damage
• 4 weekly sprays of JMS Stylet oil prevented SJS spots
• Mating disruption in combination with Entrust, Bt and/or codling moth virus (Cyd-X) prevented wormy fruit
• Japanese fruit bags produce 98% clean fruit
• Surround whitewash did not reduce damage by plum curculio but prevented Japanese beetle damage
• Mass trapping (1 trap/acre) and mating disruption both reduced grape root borer larval counts and mating
• ProtekNet screen on high tunnel may exclude many pests
Acknowledgements

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• Materials / Sources:
  ➢ Certis USA / Cyd-X (virus), Deliver (Bt)
  ➢ Dow / Entrust (spinosad)
  ➢ Engelhard Corporation / Surround

• Assistants:
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Questions?