What's New in Codling Moth Management

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Codling Moth Management Issues

- Regulatory changes
- New products
- Resistance
- Pheromone trapping and degree days
- Mating disruption
How Do We Kill Codling Moths?

- Management in 2009 started in 2008 when we didn’t put the sprayers away too soon
- Foliar insecticide sprays can kill adults
- Residual insecticides kill newly hatched larvae before they become established in fruit
- Insecticides that must be eaten are not very effective because larvae don’t eat until they enter the fruit
How many insecticide applications did you make to most of the blocks in your orchard in 2008?

<table>
<thead>
<tr>
<th>0 - 4</th>
<th>5</th>
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<td>6</td>
<td>7</td>
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<td>8</td>
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<td>10</td>
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<td>12 or more</td>
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How many insecticide applications did you make to most of the blocks in your orchard in 2008?

- 0 – 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12 or more
Organophosphate Insecticides

- Guthion
- **Active ingredient** = azinphosmethyl
- **Codling moth rating** = Excellent
- **Other pests controlled** – plum curculio, apple maggot, Oriental fruit moth, leafrollers
- **Effects on predatory mites** = Slightly toxic
- **Rate range** = 2-3 lbs/acre
Guthion

- 2009 – limited to 6.0 lbs/acre
- 2010 – limited to 4.0 lbs/acre
- 2011 and 2012 – 3.0 lbs/acre
- Maximum single application rate is 3.0 lbs/acre
- No applications after September 30, 2012
Organophosphate Insecticides

- **Imidan**
- **Active ingredient = Phosmet**
- **Codling moth rating = Good**
- **Other pests controlled – plum curculio, apple maggot, Oriental fruit moth, leafrollers, Japanese beetles**
- **Effects on predatory mites = Slightly toxic**
- **Rate range = 2.1 – 5.3 lb/acre**
- **Season limits = 30 lb/acre**
How many applications of organophosphate insecticides did you make to most of your blocks in 2008?

- 0
- 1 – 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9 or more
How many applications of organophosphate insecticides did you make to most of your blocks in 2008?

- 0
- 1 – 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9 or more
Carbamate Insecticides

- Lannate SP
- Active ingredient = methomyl
- Codling moth rating = Good
- Other pests controlled – Oriental fruit moth, leaf rollers, plant bugs, periodical cicadas, green aphids, leafhoppers, leaf miners,
- Effects on predatory mites = Highly toxic
- Rate range = 0.5 – 1.0 lb/acre
- Season limits = 5 lb/acre
Pyrethroid Insecticides

- Asana
- Active ingredient = esfenvalerate
- Codling moth rating = Excellent
- Other pests controlled – plum curculio, apple maggot, Oriental fruit moth, leafrollers, plant bugs, periodical cicada, rosary apple aphid, leafhoppers, leafminer adults, Japanese beetles
- Effects on predatory mites = Highly toxic
- Rate range = 4.8 – 14.5 fl. oz/acre
- Season limits = 100.8 fl. oz./acre
Pyrethroid Insecticides

- Danitol
- Active ingredient = fenpropathrin
- Codling moth rating = Excellent
- Other pests controlled – plum curculio, apple maggot, Oriental fruit moth, leafrollers, plant bugs, periodical cicada, leafhoppers, leafminer adults, Japanese beetles
- Effects on predatory mites = Highly toxic
- Rate range = 16 – 21.3 fl. oz./acre
- Season limits = 42 2/3 fl. oz/acre
Pyrethroid Insecticides

- **Warrior**
- **Active ingredient =** lambda cyhalothrin
- **Codling moth rating =** Excellent
- **Other pests controlled –** plum curculio, Oriental fruit moth, redbanded leafrollers, plant bugs, periodical cicada, rosy apple aphid, green aphids, leafhoppers, leafminer adults, Japanese beetles
- **Effects on predatory mites =** Highly toxic
- **Rate range =** 2.5 – 5.1 fl. oz./acre
- **Season limits =** 12.8 fl. oz.
Neonicotinoid Insecticides

- Assail
- Active ingredient = acetamiprid
- Codling moth rating = Excellent
- Other pests controlled – plum curculio, apple maggot, Oriental fruit moth, plant bugs, periodical cicada, rosy apple aphid, green aphids, leafhoppers, leafminer larvae, Japanese beetles, San Jose scale
- Effects on predatory mites = Slightly toxic
- Rate range = 5 – 8 oz./acre
- Season limits = 4 applications; 32 oz./acre
Neonicotinoid Insecticides

- **Calypso**
- **Active ingredient =** thiocloprid
- **Codling moth rating =** Excellent
- **Other pests controlled** – plum curculio, apple maggot, Oriental fruit moth, plant bugs, rosy apple aphid, green aphids, leafhoppers, leafminer larvae
- **Effects on predatory mites =** Slightly toxic
- **Rate range =** 4 – 8 fl. oz./acre
- **Season limits =** 16 fl. oz./acre
Neonicotinoid Insecticides

- Clutch
- Active ingredient = clothianidin
- Codling moth rating = Good
- Other pests controlled – plum curculio, rosy apple aphid, green aphids, leafhoppers, leafminer larvae
- Effects on predatory mites = Moderately toxic
- Rate range = 3 – 6 fl. oz/acre
- Season limits = 6.4 fl. oz./acre
If you have used one of the neonicotinoid insecticides for codling moth control, what was your impression of the level of control you received?

- 🎮 Haven’t tried them
- 🎵 Excellent
- 🎵 Good
- 🎵 Fair
- 🎮 Poor
If you have used one of the neonicotinoid insecticides for codling moth control, what was your impression of the level of control you received?

💡 Haven’t tried them
🎁 Excellent
👍 Good
🙁 Fair
😞 Poor
Rimon

Active ingredient = novaluron

Codling moth rating = Excellent

Other pests controlled – Oriental fruit moth

Effects on predatory mites = Slightly toxic

Rate range = 20 – 40 fl. oz./acre

Season limits = 4 applications; 150 fl. oz./acre
Naturalyte Insecticides

- SpinTor/Entrust
- Active ingredient = spinosad
- Codling moth rating = Good
- Other pests controlled – leafrollers, leafminer larvae
- Effects on predatory mites = Slightly toxic
- Rate range = 5 – 10 fl. oz./acre
- Season limits = 29 fl. oz./acre
Delegate

Active ingredient = spinetoram

Codling moth rating = ?

Other pests controlled – Oriental fruit moth?

Effects on predatory mites = ?

Rate range = 4.5 – 7.0 oz./acre

Season limits = 4 applications; 28 oz./acre
Ryanidine Insecticides

- Altacor
- Active ingredient = rynaxypyr
- Codling moth rating = Excellent
- Other pests controlled – Oriental fruit moth, leafrollers
- Effects on predatory mites = ?
- Rate range = 2.5 – 4.5 oz./acre
- Season limits = 4 applications; 9 oz./acre
Ryanidine Insecticides

- Belt
- Active ingredient = flubendiamide
- Codling moth rating = Excellent
- Other pests controlled – Oriental fruit moth, leafrollers
- Effects on predatory mites = ?
- Rate range = 3 – 5 oz./acre
- Season limits = 3 applications; 15 oz./acre
Resistance

- Present in many surrounding states
- Not known to exist in Indiana
Spray Timing

- Biofix = 3-5 moths caught in pheromone trap
- Timing to first spray based on how pesticide functions
- Calculate degree days, base 50 F
Recommended Timing
Degree Days after Biofix

- 50 – 75: Rimon
- 100 – 200: Intrepid, Confirm
- 150 – 250: Assail, Calypso, Clutch
- Altacor – prior to egg hatch
- Belt – “early threshold in a developing larval population”
- Delegate – prior to egg hatch, which is 220-250 DD
Did you use pheromone traps to monitor codling moth populations in 2008?

- Yes
- No
Did you use pheromone traps to monitor codling moth populations in 2008?

- Yes: 52%
- No: 48%
New Research on Biofix

- Study done in Washington looked at whether establishing a biofix was necessary
- Found that biofix occurred consistently at about 97 DD since January 1
- Just using DD without biofix was just as accurate as using biofix and then DD
- Need to look at this in the Midwest
When Is 97 DD at Lafayette, IN?

- 2008 - April 21
- 2007 - March 27
- 2005 - April 11
- 2004 - April 17

- Biofix - May 27
- Biofix = May 3
- Biofix = May 16
- Biofix - May 11
<table>
<thead>
<tr>
<th>Year</th>
<th>Biofix</th>
<th>DD</th>
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<tbody>
<tr>
<td>2008</td>
<td>May 27</td>
<td>376</td>
</tr>
<tr>
<td>2007</td>
<td>May 3</td>
<td>350</td>
</tr>
<tr>
<td>2005</td>
<td>May 16</td>
<td>358</td>
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<tr>
<td>2004</td>
<td>May 11</td>
<td>382</td>
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Mean = 366.5
Range = 350-382
Mating Disruption

- Best option if you have both codling moth and Oriental fruit moth is the Isomate CM/OFM polyethylene tube dispenser
- 300-400 dispensers per acre is recommended; no magic number but the more the better
- Can be used on small blocks
- Should not be used on problem blocks; get population to reasonable level first
Questions?