Tree Fruit Insect Management

• Insecticide product news

• Recent pest issues
  – Dogwood borer
  – Woolly apple aphid

• Results of codling moth trial
New insecticide products

• New formulations
• Label expansions
  – New crops
  – New target pests
• Modifications
• Substitutions
## New or improved formulations

<table>
<thead>
<tr>
<th>a.i.</th>
<th>New product</th>
<th>Old product</th>
</tr>
</thead>
</table>
| lambda-cyhalothrin | Warrior II (2.1CS)  
Rates now **half** of old rates | Warrior (1CS)       |
| cyfluthrin    | Baythroid XL 1EC  
Rates the **same** as old rates | Baythroid 2EC        |
| beta-cyfluthrin |                                     |                     |
| buprofezin    | Centaur 70WDG                        | Centaur 70WP        |
Registration expanded to new **crops**

<table>
<thead>
<tr>
<th>Product</th>
<th>New crops</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portal, FujiMite</td>
<td>melon, tomato, pepper</td>
<td>mite, w’fly</td>
</tr>
<tr>
<td>Voliam Xpress</td>
<td>pome &amp; stone, potato</td>
<td>multi</td>
</tr>
<tr>
<td>Centaur</td>
<td>all stone fruit</td>
<td>scales</td>
</tr>
</tbody>
</table>
Registration expanded to additional pests

<table>
<thead>
<tr>
<th>Product</th>
<th>Pest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belt</td>
<td>Oriental fruit moth (apple)</td>
</tr>
</tbody>
</table>
Registration modifications

• **Lorsban 4E**
  - Apple, add post-bloom trunk drench

• **Guthion: limits per year**
  - 6 lb/A allowed in 2008 & 2009 on apple
  - 4 lb/A allowed in 2010 on apple
  - 3 lb/A allowed in 2011 & 2012 on apple
### Products discontinued but replaced by similar products

<table>
<thead>
<tr>
<th>Discontinued</th>
<th>Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>SpinTor</td>
<td>Delegate</td>
</tr>
<tr>
<td>Confirm</td>
<td>Intrepid</td>
</tr>
<tr>
<td>Endosulfan 50WP</td>
<td>Thionex 50WP</td>
</tr>
<tr>
<td>Capture</td>
<td>Brigade &amp; generic bifenthrin</td>
</tr>
<tr>
<td>Decis</td>
<td>Delta Gold</td>
</tr>
<tr>
<td>Savey</td>
<td>Onager</td>
</tr>
</tbody>
</table>
Recent pest management issues

- Dogwood borer on apple
- Woolly apple aphid
Borers in apple trees

• Problem in some orchards, 2009
• Possible species
  – Long-known species:
    • Flatheaded appletree borer (a beetle)
    • Roundheaded appletree borer (beetle)
    • Shothole borer (a beetle)
  – Relatively new species in apple:
    • Dogwood borer (a moth) **
    • Apple bark borer (a moth)
    • American plum borer (a moth)
Damage by dogwood borer in apple

- Damage usually in burr-knots
- What are burr-knots?
  - Partly-developed root initials
  - In clusters at or below the graft union
  - On exposed part of M.9, M.26 & others
  - Enhanced by low light conditions
Damage by dogwood borer

• **Larva entry into trunk:**
  – Usually in burr-knots or at graft union
  – Rarely attack smooth healthy bark

• **Feeding:**
  – Start by feeding on burr-knot tissue
  – Can move to feed on inner bark

• **Result:**
  – Slow decline after few years infested
  – Reduce tree vigor and yield
  – If girdled, tree can be killed
Symptoms of dogwood borer

• Reddish frass (excrement)
  – On surface of burr-knot
  – Pushed out of feeding tunnels
  – Held together by silk
  – Is visible sign of active infestation

• A feeding tunnel may be as much as 3/4 inch deep
Dogwood borer in apple: Control by insecticide

• How to do?
• What to use?
• When?
Dogwood borer in apple: How to control by insecticide

- Trunk drench
- High-volume handgun sprays
- Thoroughly wet trunk below graft union
- Apply to point of runoff
Dogwood borer in apple: Control by chlorpyrifos

- **Lorsban 75WG**
  - 2 pounds per 100 gal.
- **Lorsban 4E (new label)**
  - 1.5 qt per 100 gal.
- **Must be trunk drench by handgun**
- **Limited to lower 4 ft of trunk**
- **Do not allow to contact fruit or foliage**
- **Maximum of 1 application**
- **Pre-harvest interval: 28 days**
Dogwood borer in apple: Control timing

- Most accurate if timed after moth flight known from trap
- Apply at peak flight (early July)
- Need to be familiar with i.d. & life cycle of this pest
I.d. of dogwood borer

• **Larva**
  - Body: white - cream - light pink
  - Head: brown
  - Length: about 1/2 inch, full-grown
  - Crochets on prolegs with 2 lines hooks

• **Adult**
  - Resemble small wasps, but are moths
  - Wings clear, with black tips & edges
  - Body 3/8 inch long, wingspan ¾ inch
  - Females larger than males
  - Abdomen black with 2 yellow bands
    • Narrow bands on males
    • Wide bands on females
  - Legs yellow
Life cycle of dogwood borer

• **Adults:**
  – Emerge over 3 months, June to August
  – Mate & lay eggs within few days of emergence

• **Eggs:**
  – Laid on surface of burr-knot or rough bark
  – Hatch in 8 to 9 days

• **Larvae:**
  – Feed on cambium
  – Overwinter under bark
  – Emerge early in spring to continue feeding
  – Spend 1-2 years feeding

• **Pupae:**
  – Pupate under bark in May/June, for 25 days
  – Pupal cases protrude from tree
Monitoring dogwood borer

• **Scouting**
  – Check under tree guards in spring
  – Look in above-ground, exposed portion of rootstock
  – Look for reddish-brown frass
  – Use knife to carefully dig away bark & frass to find borers
Monitoring dogwood borer

• **Trapping**
  – Use pheromone traps to estimate timing of peak flight
  – Place 4 feet above ground for optimal catch
  – Set up at petal-fall (early May)
  – Check weekly until late August
  – In central Ohio: 1st catch usually in mid or late May, peak in early July
Monitoring dogwood borer

- Trapping
  - Be sure to distinguish target moth from other moths like lilac borer

Dogwood borer: note the clear wings & small size (body 3/8’’)

Lilac borer: note the dark wings

Peachtree borer: larger (body 5/8’’)

Lilac borer: note the dark wings
Clearwing borers

Dogwood borer

Lesser peachtree borer

Peachtree borer
Woolly apple aphid

- Infest limbs, wounds, roots
- Less susceptible: M111 or M106
- More susceptible: B9, M9, M26 and the P series
Woolly apple aphid: management

- Preyed on by hover fly larvae
Woolly apple aphid: management

- Preyed on by hover fly larvae
- **Movento** is new option
  - Systemic
  - Active on stem & root populations
  - Best at petal-fall
- **Other options:** contact materials
  - Diazinon 50WP, Diazinon AG600 WBC
  - Thionex
- **Use high volume water**
# Codling moth on apples: field trial 2009

<table>
<thead>
<tr>
<th></th>
<th>1st generation</th>
<th>2nd generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assail</td>
<td>Altacor</td>
</tr>
<tr>
<td>2</td>
<td>Altacor</td>
<td>Assail</td>
</tr>
<tr>
<td>3</td>
<td>Calypso</td>
<td>Belt</td>
</tr>
<tr>
<td>4</td>
<td>Proclaim</td>
<td>Voliam Flexi</td>
</tr>
<tr>
<td>5</td>
<td>Imidan</td>
<td>Imidan</td>
</tr>
<tr>
<td>6</td>
<td>untreated</td>
<td>untreated</td>
</tr>
</tbody>
</table>
Apples after 1st generation codmoth, July 2009
Columbus, Ohio

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% of fruit injured by internal lepidoptera</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proclaim</td>
<td>B</td>
</tr>
<tr>
<td>Imidan</td>
<td>B</td>
</tr>
<tr>
<td>Altacor</td>
<td>B</td>
</tr>
<tr>
<td>Assail</td>
<td>B</td>
</tr>
<tr>
<td>Calypso</td>
<td>B</td>
</tr>
<tr>
<td>untreated</td>
<td>A</td>
</tr>
</tbody>
</table>

$P = 0.01$
Apples at harvest, September 2009
Columbus, Ohio

Assail/Altacor B
Altacor/Assail B
Proclaim/VoliamFlexi B
Imidan/Imidan B
Calypso/Belt B
untreated A

% of fruit injured by internal lepidoptera

P = 0.001
The end