Spotted Wing Drosophila --- what happened in 2012?

Stone Fruit Day
Wenatchee Convention Center, Wenatchee, WA
24 January 2013 ⊙ 9:30-10:10 am

Elizabeth H. Beers
WSU Tree Fruit Research & Extension Center
1100 N. Western Ave.
Wenatchee, Washington
SWD website

2012 trap history by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Traps deployed</th>
<th>Flies first recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oroville/Tonasket</td>
<td>Yes</td>
<td>August 29th</td>
</tr>
<tr>
<td>Okanogan/Omak</td>
<td>Yes</td>
<td>May 9</td>
</tr>
<tr>
<td>Brewster/Pateros</td>
<td>Yes</td>
<td>June 12th</td>
</tr>
<tr>
<td>Chelan/Manson</td>
<td>Yes</td>
<td>June 21st</td>
</tr>
<tr>
<td>Orondo–Beebe Bridge</td>
<td>Yes</td>
<td>May 29th</td>
</tr>
<tr>
<td>Entiat</td>
<td>Yes</td>
<td>June 19th</td>
</tr>
<tr>
<td>Wenatchee/E Wenatchee/ Wenatchee River Valley</td>
<td>Yes</td>
<td>May 18</td>
</tr>
<tr>
<td>Stemilt Hill/Wenatchee Heights</td>
<td>Yes</td>
<td>August 8th</td>
</tr>
<tr>
<td>Rock Island/Malaga</td>
<td>Yes</td>
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</tr>
<tr>
<td>Quincy/Moses Lake</td>
<td>Yes</td>
<td>July 5th</td>
</tr>
<tr>
<td>Royal City</td>
<td>Yes</td>
<td>May 24</td>
</tr>
<tr>
<td>Othello</td>
<td>Yes</td>
<td>June 20th</td>
</tr>
<tr>
<td>Mattawa/Desert Aire</td>
<td>Yes</td>
<td>May 23</td>
</tr>
<tr>
<td>Yakima/Tieton</td>
<td>Yes</td>
<td>July 20th</td>
</tr>
<tr>
<td>Union Gap/Zillah</td>
<td>Yes</td>
<td>May 7</td>
</tr>
<tr>
<td>Sunnyside/Prosser</td>
<td>Yes</td>
<td>April 30</td>
</tr>
<tr>
<td>Tri–Cities</td>
<td>Yes</td>
<td>May 15</td>
</tr>
</tbody>
</table>
SWD trap locations 2012
(Beers, Walsh Programs)

SWD trap distribution by crop
(n=334)
2012 SWD populations rebound

E. Beers, ©2013
Trap test: SCRI cup color

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[Chart showing the number of SWD/trap for different colored cups: Yellow, Red, Black, Clear, White. The chart indicates that Black and White cups have significantly fewer SWD/trap compared to the other colors.]

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E. Beers, ©2013
SWD trap test
ACV vs Monterey Ag Bait
Haviland traps

Trap Captures

Monterey Ag Bait (undiluted)
Monterey Ag Bait (diluted 1:4)
Apple Cider Vinegar (ACV)

Selectivity

SWD/trap (seasonal thru early October)

Monterey Ag Bait
ACV

25% solution

Prop. SWD
Trap Design Factors

Variables measured

• Male, female, total SWD
• Sex ratio (proportion female)
• Initial, final bait volume (prop. bait remaining)
• Selectivity: prop. of all Drosophila that were SWD
• Trap contaminants: other Diptera, Coleoptera, Lepidoptera
Trap Design Factors

Diffusion points

- 1 qt deli cups
- 150 ml ACV
- Total area of diffusion/entry: 250 mm²
  - 8 holes (6.3 mm diam) (1/4 inch)
  - 2 holes (12.7 mm diam) (1/2 inch)
  - 1 hole (17.5 mm diam) (11/16 inch)

- SWD capture increased with increasing NUMBER OF POINTS
- Prop. females lower if only 1 hole
- Prop. Drosophila, Diptera, the same
- Fewer Coleoptera in 1 hole
- Lepidoptera eliminated by 8 (smaller) holes
Trap Design Factors

Bait volume

- Plastic screw-top jars, straight sided, 16 oz
- Ten 3/16\textsuperscript{th} holes, 2 cm above bait surface
- Four levels of bait volume:
  - 50 ml
  - 100 ml
  - 200 ml
  - 300 ml

SWD capture increased with increasing VOLUME of bait
- Prop. Females not changed
- Prop SWD higher in 50 ml
- Prop. bait remaining was higher in larger bait volumes (100, 200, 300)
- Prop. Diptera the same
- More Coleoptera in 200 ml (?)
- (Lepidoptera eliminated by (smaller) holes)
Trap Design Factors

Bait Surface Area

- Plastic screw-top jars, straight sided
- 8, 16, 32 oz sizes (150 ml ACV in all)
- Three levels of bait surface area (SA):
  - Cup vol: SA (cm²) SA (in²)
  - 8 oz cup: 38 6
  - 16 oz cup: 71 11
  - 32 oz cup: 114 18

- NS trend for increased capture with increasing SURFACE AREA of bait
- Prop. Females higher in 71 cm² (?)
- Prop. bait remaining unchanged
- Diptera higher with larger SA
- [Lepidoptera eliminated by smaller holes]
GF-120 Field Trial - 2011

Sample date
- 18 Jul
- 26 Jul
- 2 Aug

Adults+Pupae Emerged/50 fruit

GF-120
Entrust
Check
### SWD Chemical Control Bait Spray Test

<table>
<thead>
<tr>
<th>Trt</th>
<th>Description</th>
<th>Rate/acre</th>
<th>Application method</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Entrust 2SC + Monterey Ag Bait</td>
<td>1 fl oz + 8 pt (=1 gal)</td>
<td>ATV 6-nozzle(^a) 4.2 gpa</td>
</tr>
<tr>
<td>2</td>
<td>Entrust 2SC</td>
<td>8 fl oz</td>
<td>Airblast 100 gpa</td>
</tr>
<tr>
<td>3</td>
<td>Check</td>
<td></td>
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</tbody>
</table>

- 3 sprays
- 1-week intervals
- 17, 10, 3 days before harvest
SWD Chemical Control
Bait spray vs Entrust

*Data from bioassay, NOT field
SWD: Residual Control

Airblast

% Mortality

Days After Treatment

- Sevin 4F 3 qt
- Sevin 4F 1 qt
- Malathion 1.75 pt
- PermaGuard 25 lb
- Check
SWD: Residual Control
(Handgun, ‘Bing’, treated 7 August 2012)
Timing of fruit susceptibility
Sweet cherry ‘Bing’, ‘Sweetheart’

**Ovipositions**

Timing in Relation to Harvest (days)

<table>
<thead>
<tr>
<th></th>
<th>H-21</th>
<th>H-14</th>
<th>H-07</th>
<th>Harv</th>
<th>H+07</th>
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<tr>
<td><strong>Sweetheart</strong></td>
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**Emergence**

Timing in Relation to Harvest (days)

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**Bing**
21 DBH

**Sweetheart**
21 DBH

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SWD in 2013….

• SWD caused significant economic damage in southern districts in 2012
• 2012 was closer to “normal” than previous 2 years
• Not enough information to predict longer-term patterns of attack and damage
• Time to start thinking about resistance management