Spotted Wing Drosophila: Now What?
Presentation on the Influx and Control of *Drosophila suzukii* in Eastern Washington and Chemical Control Options for 2011 Season

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Wilbur-Ellis Grower Meeting
Yakima Convention Center, Yakima, WA
18 January, 2011 11:30 am - Noon
Bioclimatic model prediction for SWD
...and then came June

28 June, fieldman brings in a sample from an apple cider vinegar trap
4 male SWD confirmed
Now distributed into Europe, the Middle East and North America
Where has SWD spread?

- Italy 2009
- Russia 2009
- Spain 2009
- France 2010
Pest/Host range observations

- Cherry (sweet, sour)
- Peach/nectarine
- Plum/pluot
- Apricot
- Berries: blackberry, raspberry, blueberry, strawberry
- Grapes (may depend on cultivar)
- Any fruit on the ground (damaged, rotting) – apples, pears, oranges, ???

Pest

Reproductive

Host
Native/Non-Crop Hosts

• Oregon grape - *Mahonia*
• Black currant - *Ribes*
• Blue Elderberry – *Sambucus*
• Cherry laurel - *Prunus laurocerasus*
• Mulberry – *Morus spp.*
• *Other suspects:*
  • Serviceberry - *Amelanchier*
  • Chokecherry - *Prunus virginiana*
**D. suzukii**, spotted wing *Drosophila*, SWD

**Identification**

Adults are 2-3 mm in size. Females and their larvae can be confused with other *Drosophila* but are larger
Primary characters: size, colour, a darkly toothed and lengthy saw-like ovipositor, unlike other *Drosophila*
Comparison of female characters

*Drosophila sp.*
Nearctic species are small size
Ovipositor soft, serrated
Otherwise similar

*D. suzukii*
Ovipositor long and heavily serrated, with many dark teeth
$D.\ suzukii$

Male identification

Primary characters: colour, eye, arista, wing spot, comb alignment and dark bands on forelegs
SWD life history

- Lifespan: adults, 21-66 days (summer generations)
- Eggs laid: 219 – 563 eggs/female
- Egg stage: 1-2.5 days
- Larvae: 3-13 days (3 instars)
- Pupa: 4-14 days
- Hatch to emergence 15 °C [59 °F]: 21-25 days
- Hatch to emergence 25 °C [77 °F]: 9-11 days
SWD 2010 Trap Catch
(Beers, Walsh traps)

% Positive Traps
Avg SWD/trap/week

100/SWD/trap/week
(n=12)

Avg. SWD/trap/week

% Positive Traps

Mar Apr May Jun Jul Aug Sep Oct Nov Dec
SWD
Seasonal Trap totals

- white – no catch
- blue – 1 to 10
- green – 11-50
- yellow – 51-200
- orange – 200-500
- red – 500+
Average SWD by Crop

- Strawberry: n=38
- Raspberry/Blackberry: n=1,015
- Plum/Pluot: n=46
- Pear: n=15
- Peach/Nectarine: n=444
- Packinghouse: n=26
- Grape: n=1,554
- Cherry: n=3,016
- Blueberry: n=513
- Apricot: n=209
- Apple: n=65

Average SWD/trap (seasonal)
Average SWD by Region

No. samples
Total

Average SWD/trap (seasonal)

- Yakima
- Wenatchee
- Walla Walla
- TriCities
- Tonasket
- Royal City
- Rattlesnake
- Quincy
- Prosser
- Othello
- Orondo
- Moses Lake
- Mattawa
- Chelan/Manson
- Brewster

Yakima: 14
Wenatchee: 254
Walla Walla: 5
TriCities: 1,160
Tonasket: 62
Royal City: 82
Rattlesnake: 57
Quincy: 483
Prosser: 2,417
Othello: 35
Orondo: 1,487
Moses Lake: 24
Mattawa: 643
Chelan/Manson: 99
Brewster: 119
SWD distribution
I-90 north, south

Avg. SWD/trap/week

14.7

I-90 North
2,274 samples

6.2

I-90 South
4,667 samples
North-South: OR, BC, WA

*Conotech traps corrected to Deli numbers
North-South: OR, BC, WA, CA

*Contech traps corrected to Deli numbers
Trap Types

White sticky card

Deli cup

Nalgene

Contech

Yogurt container

McPhail
Trap types

<table>
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<th>Males</th>
<th>Females</th>
<th>Total</th>
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<td>0</td>
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<td>4</td>
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<tr>
<td></td>
<td>6</td>
<td>10</td>
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- Deli: +41%
- Contech: +32%
- Total: +38%
Deli v Contech

1,000 ml vol.
100 ml bait

200 ml vol.
40 ml bait
First catch: Deli vs Contech

Deli earlier = 3
Contech earlier = 5
No difference = 6
Total = 14
*Avg. diff= 0 weeks
Apple Cider Vinegar vs “Super Bait”

Super Bait:
- Water (5.5 pt)
- Red wine (cheap) - 32 fl oz
- Apple cider vinegar -3 fl oz
- Molasses – 6 fl oz
- Dishwashing liquid – 1 tsp

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<th>Males</th>
<th>Females</th>
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<tr>
<td>ACV</td>
<td>a</td>
<td>b</td>
<td>ns</td>
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<tr>
<td>SuperBait</td>
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ACV vs SuperBait
(max catch=444)
SCRI - SWD

SCRI grant funded summer of 2010
OSU (lead); USDA (Corvallis); Univ. Calif
(Davis, Berkeley, Farm Advisors); WSU
(berries, tree fruits)
Objectives: Genomic studies, ecology,
phenology, host preferences, monitoring,
degree-day model, chemical control,
resistance, biological control, sanitation,
economics, impact/evaluation, outreach

Walton et al.: $5,758,980 (4.5 years)
Malathion ULV (Ultra-low volume) Test
P. Shearer, OSU, Hood River

- Residue on leaves:
  - 12% corrected mortality after 16 hours of exposure
  - **81%** corrected mortality after about 2 days of exposure
  - (12% mortality in the untreated controls at 43 h)
SWD Field-Lab Bioassay (cherry leaves)
P. Shearer, MCAREC, Hood River, OR

% Mortality (41 h)

- Entrust 80WP
- Malathion 5EC
- Delegate 25WG
- Warrior II
- Sevin XLR
- Malathion 8F
- Assail 70WP
- Provado 1.6F
- Check

- Organophosphate
- Pyrethroid
- Spinosyn
- Neonicotinoid
- Other
SWD Field-Lab Bioassay (cherry fruit)
P. Shearer, MCARED, Hood River, OR

% Mortality

Organophosphate
Pyrethroid
Spinosyn
Neonicotinoid
Other
SWD Field-lab bioassay (fruit, larval mortality)

P. Shearer, MCAREC

Stages/replicate

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<td>Assail 70WP</td>
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<tr>
<td>Provado 1.6F</td>
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<tr>
<td>Malathion 5EC</td>
<td>6</td>
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<tr>
<td>Malathion 8F</td>
<td>7</td>
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<tr>
<td>Check</td>
<td>8</td>
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SWD Field-Lab Bioassay (cherry leaves)
R. van Steenwyk, UC Berkeley, Tracy, CA

% of Best Treatment

- Organophosphate
- Pyrethroid
- Spinosyn
- Neonicotinoid
- Other

Malathion 5EC 3.75 pt
Diazinon 50W 4 lb
Danitol 2.4EC 21.33 oz
Delegate 25WG 3 oz
Entrust 80WP 2.5 oz
Provado 1.6F 8 oz
Pounce 25WP 12.8 oz
Baythroid XL 2.8 oz
Mustang 1.5 EW 4.3 oz
Warrior II 2.56 oz
Assail 30SG 8 oz
Sevin XLR 2 qt
Actara 25WDG 5.5 oz
SWD Field Trial (cherry)
R. van Steenwyk, UC Berkeley, Hollister, CA

4-spray:
- Diazinon
- Mustang
- Danitol
- Malathion

3-spray:
- Mustang
- Danitol
- Malathion

2-spray:
- Danitol
- Malathion

1-spray:
- Malathion

SWD/trap or SWD/100 fruit

Harvest 7 June

Graph showing SWD/trap or SWD/100 fruit from May to July, with different spray treatments indicated by different colors and symbols.
Fruit Susceptibility – ‘Bing’
Jana Lee, USDA Corvallis
Postharvest test on cherries
Postharvest test on cherries

- D. suzukii
- Drosophila spp.

Bar chart showing the number of adult Drosophilas per fruit for different treatments:
- Dimethoate 4 pt
- Provado 8 fl oz
- Check

Legend:
- Black bars represent D. suzukii
- Grey bars represent Drosophila spp.

Notations:
- a
- b
- ab
WSU resources for SWD

• Elizabeth Beers, WSU-TFREC, Wenatchee
• Doug Walsh, WSU-IAREC, Prosser
• Tim Smith, Chelan-Douglas-Okanogan Area Educator
• Gwen Hoheisel, Benton-Franklin Area Educator
• Mike Bush, Yakima County
What to do:

• Check WSU website for first trap catch in your region (or -- put traps out in in stone fruit orchards)

• If crop is susceptible (pink stage on cherry) and pest is present, begin fruit protection sprays (7-10 day intervals)

• Sprays may work better when applied on a regional (area-wide) scale – communicate with your neighbors

• 2011 recommendations will be posted at:
  • http://extension.wsu.edu/SWD
A huge

“Thank You!!”

to the Fieldmen of Eastern Washington

including, but not limited to:

Wilbur-Ellis
Northwest Wholesale
Quincy Farm Chemicals
Cascade Ag Distributing
Northwest IPM
Cascade IPM

http://jenny.tfrec.wsu.edu/opm
http://extension.wsu.edu/SWD