

A new pest of fruit crops in Ohio: Spotted wing Drosophila



**Celeste Welty
Extension Entomologist
Ohio State University
March 2013**



Spotted wing Drosophila

- Looks like common vinegar flies on overripe, fallen, decaying fruit
- But the new species attacks healthy ripening fruit
- Invading mainland USA since 2008

Spotted wing Drosophila in Ohio

- **First report from Ohio:**
 - Raspberries
 - September 2011
 - VanWert County
- **2012: First catch 7/12**
- **Many reports August-Sept. 2012**
 - Blackberries
 - Raspberries
 - Grapes



Spotted wing Drosophila, Ohio, 2012: Locations positive in traps or fruit

<i>Region</i>	<i>County</i>
South	Ross, Pickaway
Central	Licking, Franklin, Greene
North	VanWert, Erie, Huron, Ashland, Lorain, Portage, Wayne, Ashtabula

In gray: not confirmed but likely positive

Hosts of Spotted wing Drosophila



Photo by Martin Hauser

- **Early:** cherries
- **Mid:** raspberries, blueberries, blackberries
- **Late:** grapes
- Also strawberries, peaches, plums, cherry tomatoes, kiwi, pears, apples

Damage by spotted wing *Drosophila*

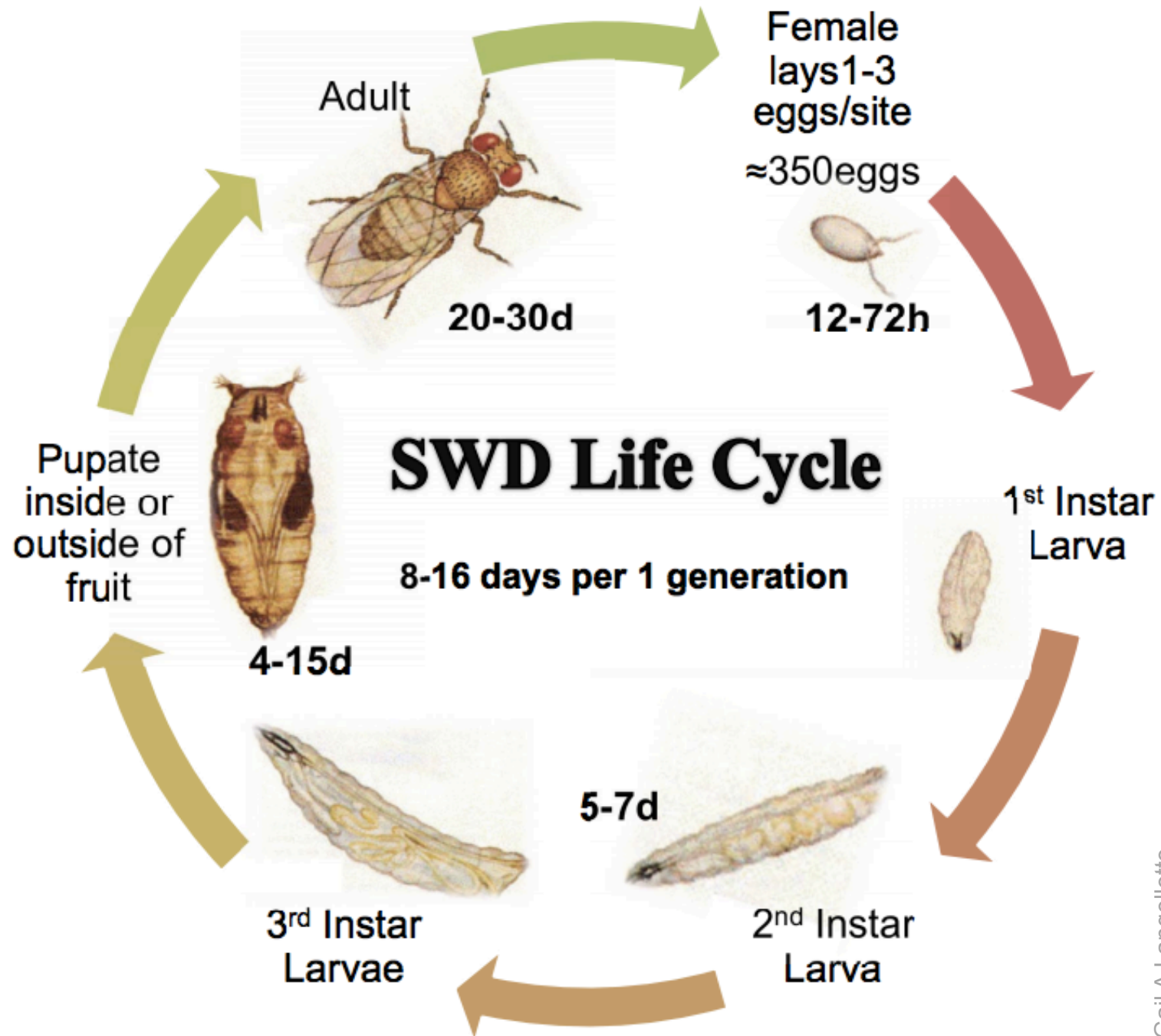


adults



larva

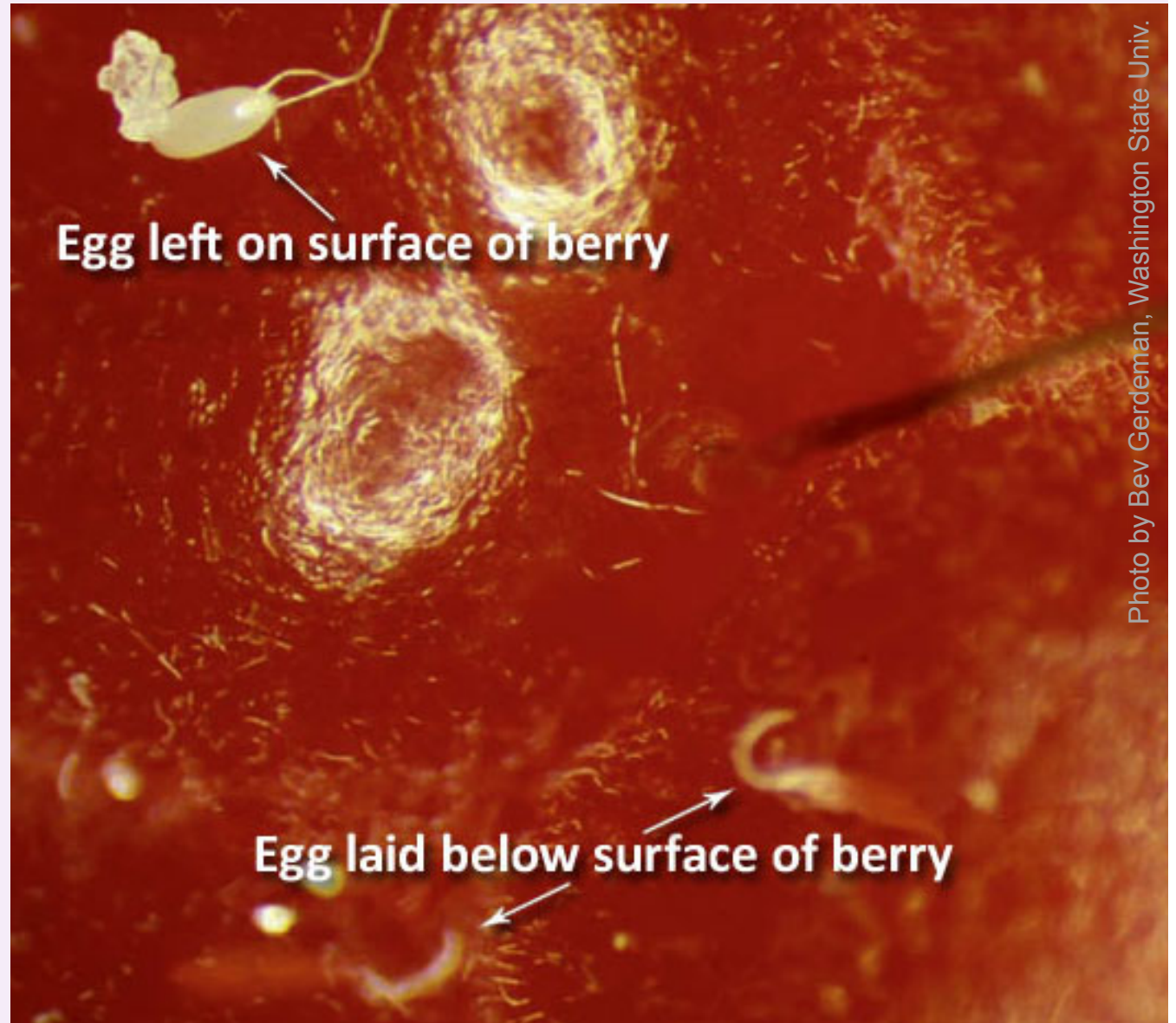
- Egg laying & larval feeding
- Starts as tiny scar on skin of fruit
- Larvae feed inside fruit
- Skin collapses in 2-3 days; molds



Eggs of spotted wing *Drosophila*



↑
**Egg being
deposited
by female
fly**



Spotted wing Drosophila: in raspberry



Fruit is susceptible to injury once it has started to turn color

Spotted wing Drosophila: in blueberry



Spotted wing Drosophila: in strawberry



Spotted wing Drosophila: in grape



- Likely $>7.5^{\circ}$ brix
- Most 17-22° brix

Spotted wing Drosophila: in cherries



Spotted wing Drosophila: in peach



Monitoring adults of spotted wing Drosophila

- **Bait traps**
 - Apple cider vinegar
 - Add a drop of dish soap
 - 1/4" holes near top
 - Change bait weekly
 - Others being tested
- **Source**
 - Make your own
 - Buy from Great Lakes IPM
- **Threshold: a single adult**



Monitoring with alternative traps

1. Same trap but with yellow sticky card inside jar →

2. Alternative bait

- Mix: Yeast (1 Tbsp active dry)
Sugar (4 Tbsp)
Water (12 oz)
- Pro: Detects earlier *
- Cons:
 - No preservative property
 - Attracts more non-targets
 - Unpleasant



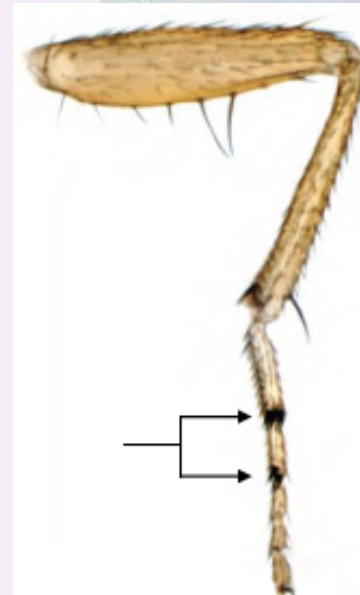
Using traps in fruit crops



- **In canopy**
- **On north side**
- **Do not dump spent vinegar in field**

i.d. of adult male

- Spots on wings
- Spots can be absent on young (newly emerged) males
- 2 dark combs on front legs





i.d. of adult female

- No spots on wings
- Saw-like ovipositor



Want to learn & practice SWD i.d.?

- **Workshop in Ohio**
- **Date to be announced:
late April or early May**
- **9-12 AM**
- **Columbus with possible
remote connection at
Wooster, Fremont**

Seasonal trends of SWD adults in traps

- **In most of Pacific NW:**
 - First catch March - May
 - Negligible catch until August
 - Peak in October
 - Higher when cool than hot
- **Michigan, 2012: 1st catch mid-June**
- **Ohio, 2012: 1st catch mid-July**



Elizabeth Beers, WSU

Test fruit for SWD larvae

- **Salt test**

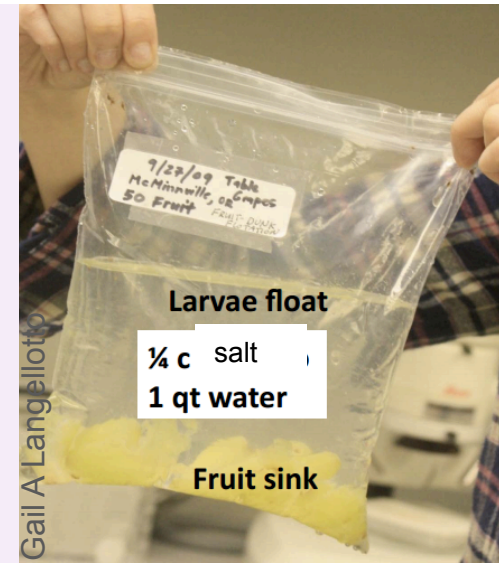
- Put fruit in zip-top bag or in pan
- 4 cups warm water + 1/4 cup salt
- Examine for floaters >15 minutes

- **Sugar test**

- Similar but 4 C water + 1/4 C sugar

- **Boil test**

- Cover berries with water
- Microwave for 1 minute
- Press with 1/4" hardware cloth





Management of spotted wing Drosophila

- **Sanitation**
 - Strongly recommended!
 - Destroy leftover fruit
 - Easier said than done
 - Do every 2 days
 - Culls in clear plastic bags in sun, 1 week
 - Or bury culls 2 ft deep

Insecticides for spotted wing Drosophila

- **Most effective:**

- **spinosyns:**

- Delegate (spinetoram)
 - Entrust, Spintor (spinosad)

- **organophosphates:**

- Malathion, Imidan, Diazinon

- **pyrethroids:**

- Mustang Max, Brigade, Pounce, Hero, Danitol, Baythroid, Asana, Warrior

- **Lannate**



Insecticides for spotted wing *Drosophila*



- **Moderately effective:**
 - Assail
 - Sevin
- **Slightly effective:**
 - Pyganic [OMRI]
- **Not effective:**
 - Actara
 - Admire Pro & Provado
 - Altacor

2(ee) labels: add spotted wing Drosophila to list of target pests

- Baythroid XL
- Danitol 2.4EC
- Delegate WG
- Mustang Max
- Pounce 25WP



Insecticide strategy for SWD control

Depends on:

- whether crop is harvested once or many times**
- number of days between harvests**
- how long spray residue is active**

Insecticides for SWD on **brambles**

<i>Product</i>	<i>Pre-harvest interval</i>	<i>Maximum number of applications allowed</i> <i>(if used at max rate)</i>
Delegate	1 day	3
Malathion	1 day	3
Mustang Max	1 day	6
Entrust [OMRI]	1 day	4
Danitol	3 days	2
Brigade	3 days	2
Hero	3 days	2

**How often
to spray?
When
residues no
longer active**

<i>Product</i>	<i>Residual activity</i>
Delegate	5-7 days
Imidan, Diazinon	7 days
Pyrethroids: Asana Baythroid Brigade Danitol Hero Mustang Max Pounce Warrior	7-10 days
Malathion	5-7 days
Lannate	3-6 days
Entrust	3-5 days

Management of SWD on brambles



1. Use vinegar traps, check weekly
2. If any SWD in traps, start spray program when berries start to color
 - Spray every 7 days until final harvest
 - Alternate:
 - Delegate (1-day PHI)
 - Malathion (1-day PHI)
 - Mustang Max (1-day PHI)
 - Do a salt test with ripe fruit, weekly, to see if program effective

Insecticides for SWD on **blueberry**

<i>Product</i>	<i>Pre-harvest interval</i>	<i>Maximum number of applications allowed</i>
Mustang Max	1 day	6
Brigade	1 day	5
Hero	1 day	(4)
Malathion	1 day	3
Imidan	3 days	5
Lannate	3 days	4
Delegate	3 days	3
Danitol	3 days	2
Entrust [OMRI]	3 days	4
Diazinon	7 days	2

Insecticides for SWD on **strawberry**

<i>Product</i>	<i>Pre-harvest interval</i>	<i>Maximum number of applications allowed</i>
Brigade WSB	0 day	2
Entrust [OMRI]	1 day	4
Danitol	2 days	2
Malathion	3 days	4
Diazinon	5 days	1

Insecticides for SWD on **grapes**

<i>Product</i>	<i>PHI (days)</i>	<i>Maximum number of applications allowed</i>
Mustang Max	1	6
Malathion	3	2
Baythroid	3	4
Delegate	7	4
Entrust [OMRI]	7	3
Imidan	14	3
Danitol	21	2
Brigade	30	1
Hero	30	(1)

Insecticides for SWD on **cherries**

<i>Product</i>	<i>PHI (days)</i>	<i>Maximum number of applications allowed</i>
Danitol	3	2
Malathion	3	4
Pounce	3	3
Delegate	7	4
Imidan	7	3
Baythroid	7	2
Mustang Max	14	6
Asana	14	4
Warrior	14	5
Entrust [OMRI]	14	3

Insecticides for SWD on **peach**

<i>Product</i>	<i>PHI (days)</i>	<i>Maximum number of applications allowed</i>
Danitol	3	2
Lannate	4	6
Malathion	7	3
Baythroid	7	2
Mustang Max	14	6
Asana	14	4
Warrior	14	5
Delegate	14	4
Imidan	14	4
Entrust [OMRI]	14	3

Insecticide limitations

Beware:

- Imidan: subject to wash off in rain
- Pyrethroids: shorter activity in hot weather

Insecticides for high tunnels?

For products used for SWD control:

- Label allows in greenhouses:

- Malathion

- Label prohibits in greenhouses:

- Delegate

- Diazinon

- Label 'silent' on greenhouses
therefore ok to use:

- pyrethroids: Asana, Baythroid, Brigade, Danitol, Hero, Mustang, Pounce, Warrior

- Lannate

- Imidan

- Entrust

A similar new pest:
African Fig Fly
Zaprionus indianus



- **From same family as spotted wing Drosophila**
- **Detected in vinegar traps**

African Fig Fly: invasion



- **Africa to Brazil, 1999**
- **2005: FL**
- **2006: AZ, CA**
- **2007: SC, OK**
- **2009: TX**
- **2012: NC, VA, MD, PA, NY, CT, MI, WI**

African Fig Fly: damage



- Attacks injured & overripe fruit
- On figs & various tropical fruits
- Potential to harm:
 - blueberries
 - grapes
 - cherry
 - strawberries
 - brambles

the end



Info on fruit & veg. pest management
<http://bugs.osu.edu/welty/>

Questions?

e-mail: welty.1@osu.edu

office phone: 614 292 2803

cell phone: 614 746 2429