Monitoring and Management of Spotted Wing *Drosophila*

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Spotted Wing Drosophila

Reported Distribution

China	Native
India	Native
Japan	1931
Other Asia	
Hawaii	**~1980**
Spain	2008
California	**fall 2008**
Italy	2009
Oregon	Summer 2009

Washington	Summer 2009
Florida	**Summer 2009**
B. Columbia, CN	Summer 2009
France	2010
Russia	2010
South Carolina	Spring 2010
North Carolina	Fall 2010
Kentucky	Fall 2010
Michigan	Fall 2010
Louisiana	Fall 2010
Utah	Fall 2010

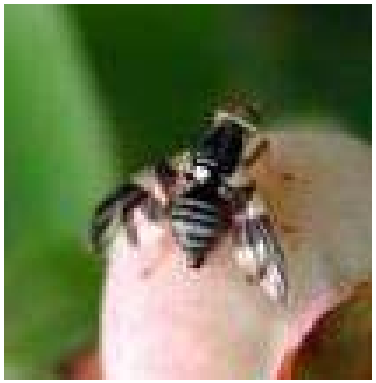
Spotted Wing Drosophila

- Diptera: Drosophilidae *Drosophila suzukii*

  "Fruit flies", "Vinegar flies", "Pomace flies"

- Our normal fruit fly *Drosophila melanogaster*

- **NOT**: Tephritidae fruit flies (bigger) Blueberry maggot



Blueberry maggot

Drosophila melanogaster

Some Vulnerable Fruits

Florida	California
Raspberries	Previous fruits plus ...
Blackberries	Cherries
Blueberries	Nectarines
Strawberries	Boysenberries
Grapes (?)	Plums
Tomatoes (?)	Asian plums
Peaches	Satsuma plums
Mulberries	Plumcots
Orange jessamine	

Identification

Monitoring
Ecology

Management

Use of Natural Enemies
Reduced-risk & Conventional
Strategies

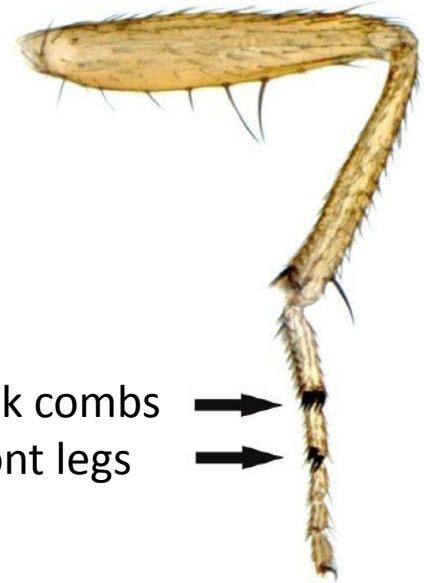
Prevention
(exclusion)

Correct Identification

Developing a Management Program for *D. suzukii*

Male

Black spot
on wings



2 black combs
on front legs

Female

Ovipositor that damage the fruit
Where eggs are laid

USDA-ARS & OSU

- *D. suzukii Management*

Monitoring in IPM programs

- Monitoring involves taking regular notes on pests, natural enemies, crop growth and environment over a specified time

- Traps should be placed in the shade

Reasons for monitoring

- ✓ To determine if the pest is present
- ✓ To determine population density and distribution
- ✓ To apply the most appropriate management programs

Monitoring (trap)

•Monitoring should begin when fruits are ‘full green’ and begin to turn blue

Yeast-Sugar Bait Solution Recipe:

2 teaspoons of bakers yeast
4 teaspoons of sugar
2 cups of water
Mix and pour ≈1 ½ inches of yeast bait into cup

USDA-ARS & OSU
D. suzukii Management

- Obtain 32 oz plastic cups
- Drill four holes (3/8 of an inch)in the lid
- Attach a wire strap for hanging the trap
- Place yellow sticky cards inside the wall of the cup

Various types of Spotted Wing *Drosophila* traps

Courtesy MSU

Monitoring Adult Emergence

- Adults can be monitored when they emerge in the spring

USDA-ARS & OSU
D. suzukii Management

Method for checking the fruit for SWD

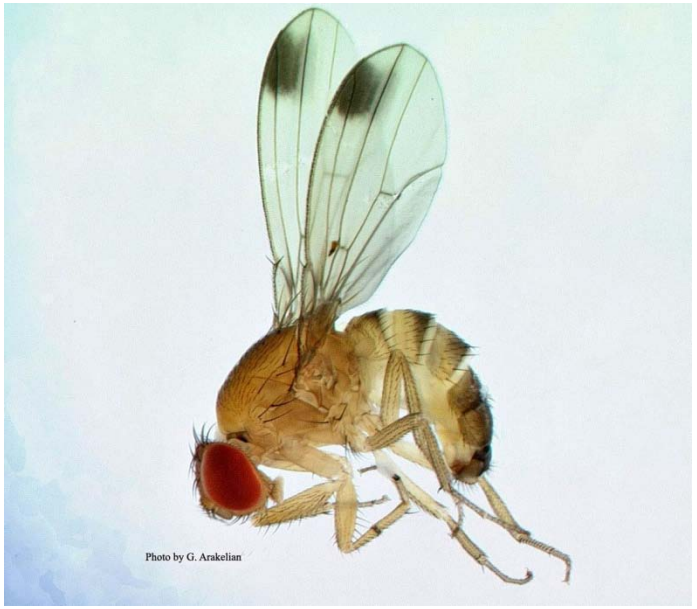
Flotation Method

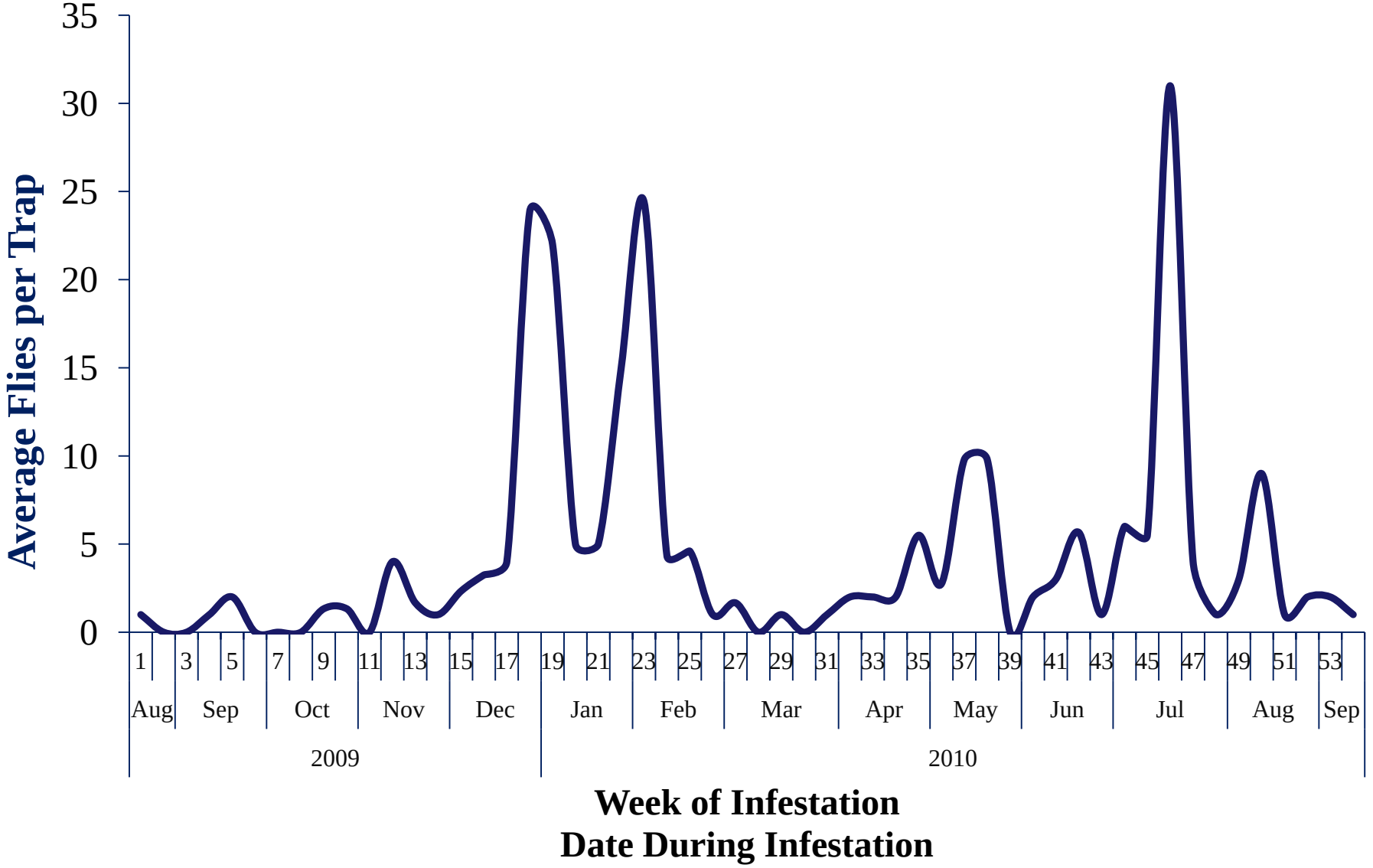
- Randomly collect 80-100 berries
- Crush the fruit in a container
- Place in a quart size zip-lock bag
- Add a cup of sugar-water solution (1/4 cup sugar and 1 quart water)
- After a few minutes SWD larvae should float to the top and crushed pulp will fall to the bottom
- A hand lens may be necessary to see the small larvae

Dreves, Lee 2010

Selected Biological Parameters: (Japanese Literature)

- Adults most active at 68 F (20 C)
- Adult activity low at 86 F (30 C)
- About 10-16 generations per year
- 300-400 eggs / female




Drosophila suzukii Flies First Year Weekly Average
Fixed Traps Hillsborough County: Dover, FL Area
Dr. David Dean FDACS
Average Flies per Trap
35
30
25
20
15
10
5
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53
Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
2009
2010
Week of Infestation
Date During Infestation

Prevention

Sanitation

- Harvest ripe berries on a regular basis
- Remove or compost ripe berries that fall unto the soil
- Area-wide cooperation

Prevention

Exclusion

Preventing adults from laying eggs on the fruit

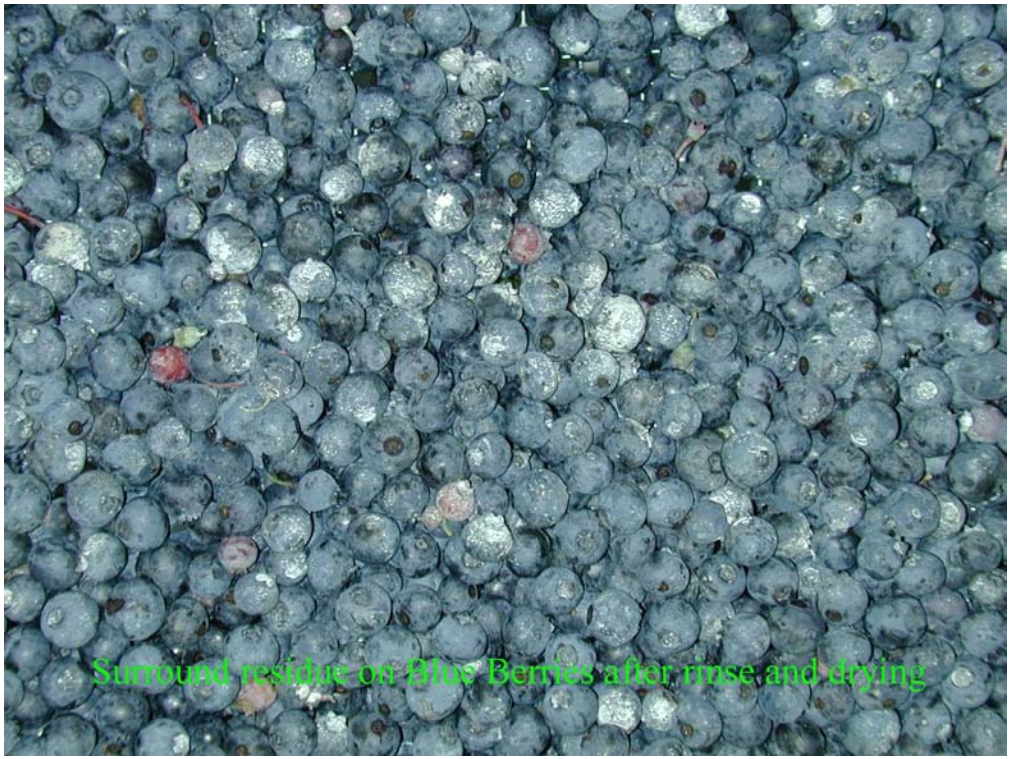
- Kaolin clay
  - coating on fruit
  - prevent adults from laying eggs on the fruit

Particle film technology
Act as a physical barrier, disrupt host finding and a repellent

Prevention

Exclusion

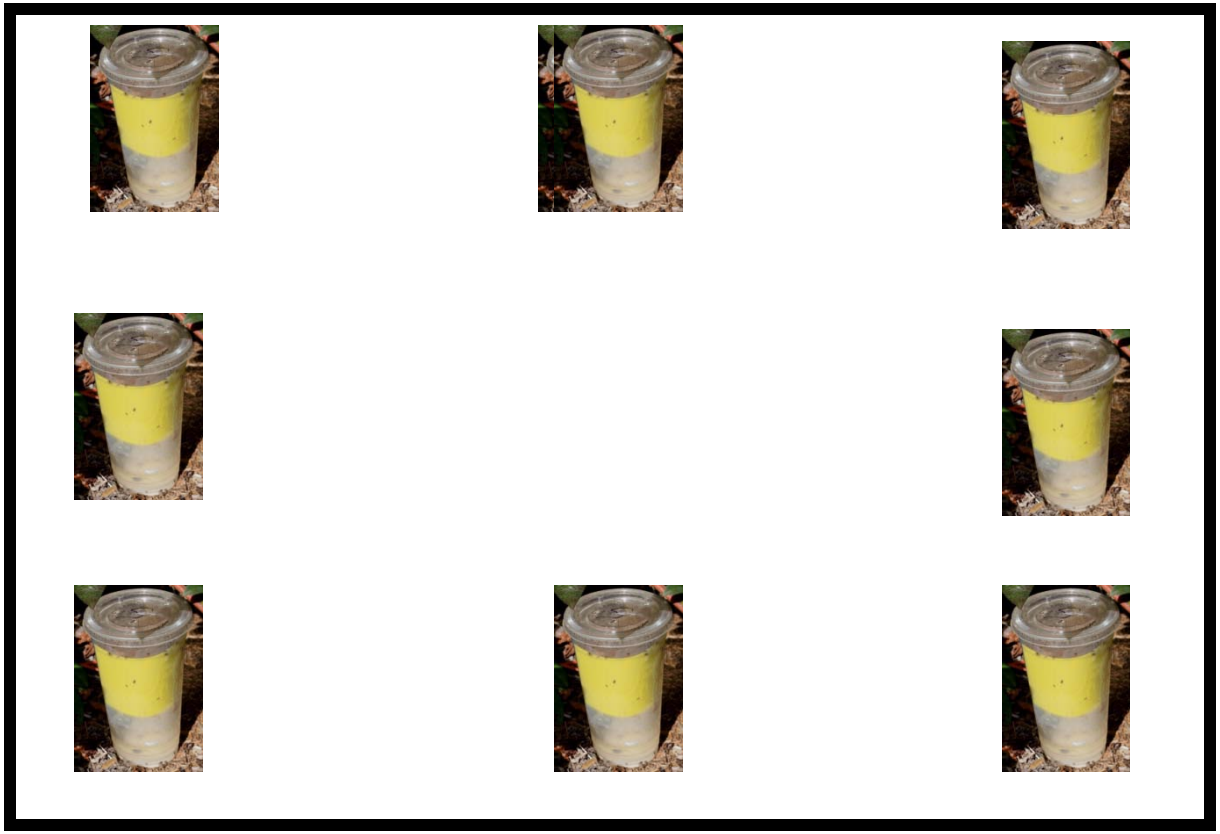
- Berries sprayed with Kaolin needs to be washed, which can create marketing problems



Exclusion

Perimeter Mass Trapping

Preventing adults from entering the planting



Reduced-risk strategies

- GF120 (protein-based attractant with killing agent spinosad)
- NuLure (a protein hydrolysate fruit fly lure) comprised of corn gluten meal mixed with a chemical

Biologicals

- Delegate (2nd generation spinosyn)
- Entrust (spinosyn, labeled for organic use)

Some Possibilities for Organic Blueberries

- Pyganic
- Aza-Direct
- Entrust
- GF-120

Conventional Chemical Sprays

- Depending on the state of fruit development it is important to note the PHI on the pesticide label

OP's -

Malathion bait sprays (1 day PHI)

Imidan (Phosmet) (3 day PHI)

Diazinon (7 day PHI)

Conventional Chemical Sprays

- Depending on the state of fruit development it is important pesticides are safe and have short PHI

Pyrethroids

- Danitol® (Fenpropathrin) [3 day PHI]
- Mustang Max™ (1 day PHI)
- Asana (14 d PHI)

Beneficial insects regulating *D. suzukii*

Bigeyed bug (*Geocoris* spp.)

Amblyseius swirskii

Minute pirate bug (*Orius* spp.)

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Acknowledgements

Dr. James Price (Univ. of Florida)

Dr. Hannah Burrack (NC State Univ)