Spotted wing drosophila monitoring and distribution on organic strawberries in Florida

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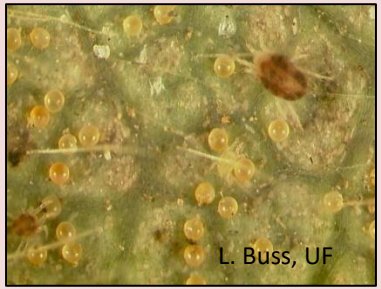
Strawberries in Florida

- Valued at ~450 million USD in 2016
- 2nd largest producer in the U.S. and primary producer of winter strawberries
- Grown as an annual crop on raised beds
- Growing market for organic strawberries

Strawberry pests



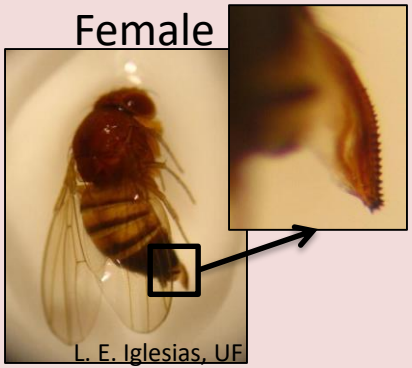
- Twospotted spider mite, *Tetranychus urticae*
- Thrips: *Frankliniella occidentalis*, *Scirtothrips dorsalis*
- Pamera seed bug, *Neopamera bilobata*
- Sap beetles (Nitidulidae)
- Aphids, armyworms, etc.

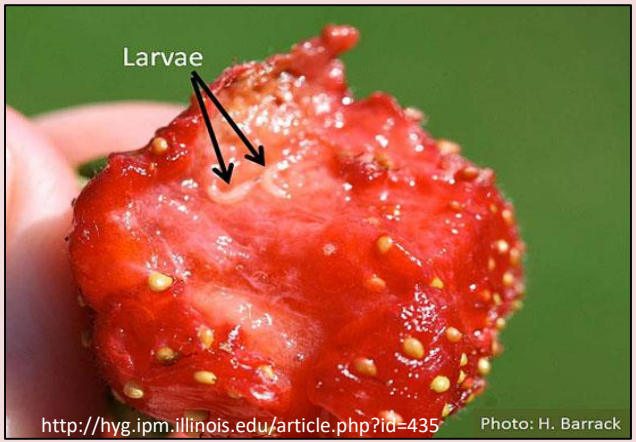
Spotted wing drosophila

- *Drosophila suzukii*
- Lay eggs in ripening and ripe fruit

Male

Female





- The presence of one larvae can cause an entire shipment of fruit to be rejected

Objectives

- Monitor the adult and larval population of SWD on strawberries under organic production

- Examine the spatial distribution and movement of SWD in an organic strawberry plot

Methods: adult monitoring

- Citra PSREU
- Four Scentry traps were placed in each of two strawberry fields
- Lures replaced every 4 weeks; water + dish soap changed weekly
- Numbers of SWD males and females were counted and recorded

- Field 1: 6 Dec 2016 – 28 Mar 2017
- Field 2: 13 Dec – 29 Mar

Methods: larval monitoring

- Field 1
  - 4 varieties: Festival, Radiance, Sensation, Winterstar
  - 48 fruit per variety
  - 30 Jan – 27 Mar
  - Freezing method
- Field 2
  - 2 Varieties: Festival, Benecia
  - 100 fruit per variety
  - 22 Feb – 29 Mar
  - Freezing method

Methods: spatial distribution

- 4 reps of 5 treatments
  - O: 5 m outside plot from N end
  - A: 5 m into plot from N end
  - B: 10 m into plot from N end
  - C: 20 m into plot from N end
  - D: 40 m into plot from N end (5 m from S end)
- Scentry traps with water + dish soap drowning solution changed weekly 4 Jan – 28 Mar

Legend

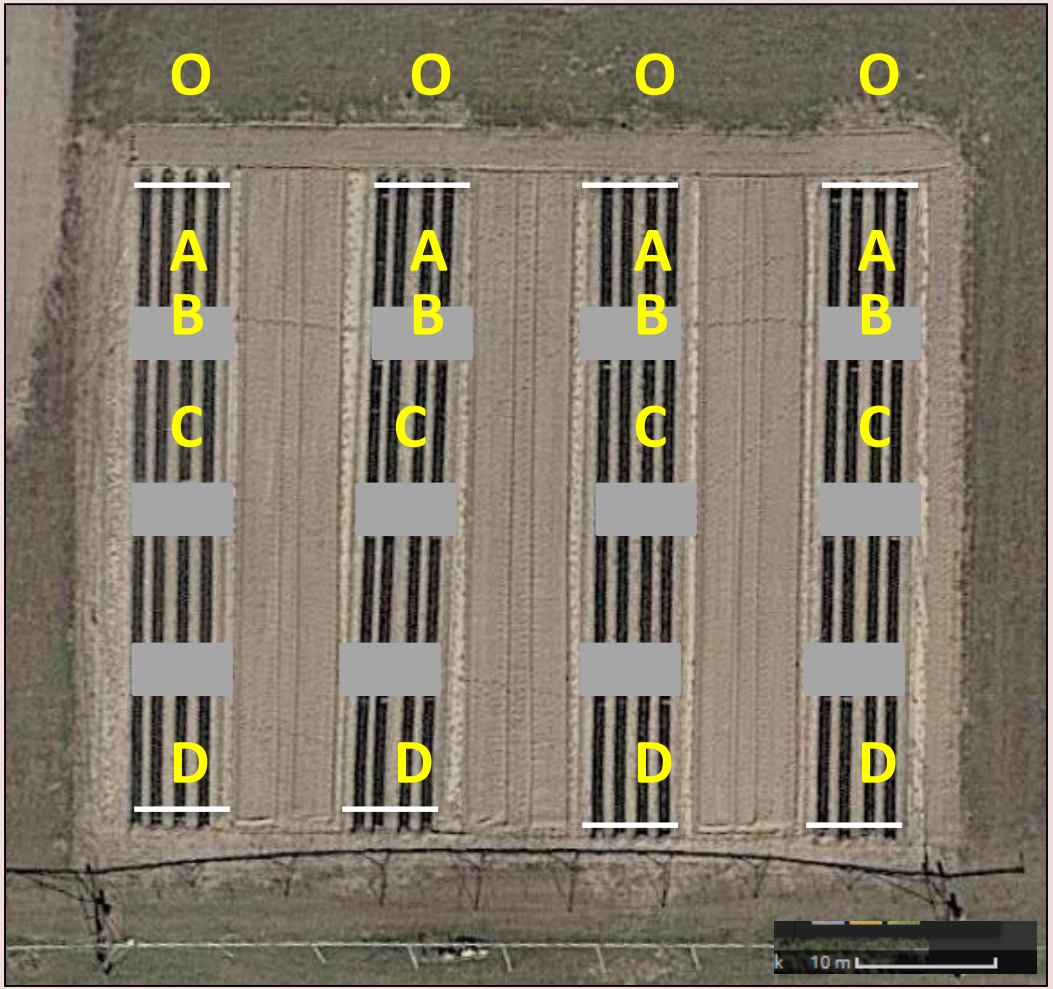
O = 5 m (outside)

A = 5 m

B = 10 m

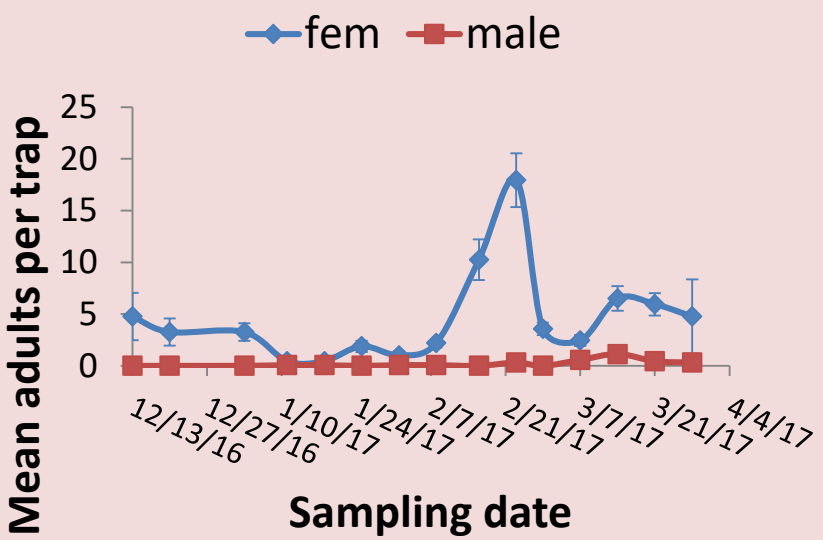
C = 20 m

D = 40 m

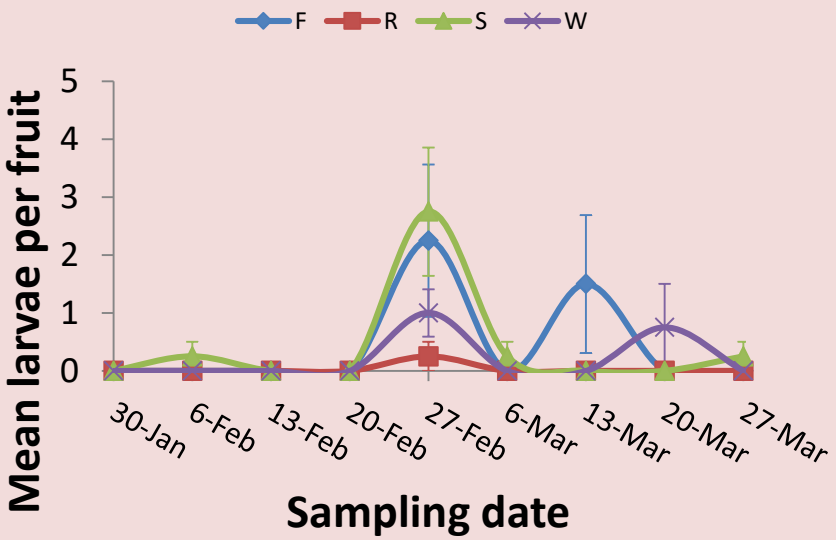


Results: monitoring field 1

SWD Adults per trap

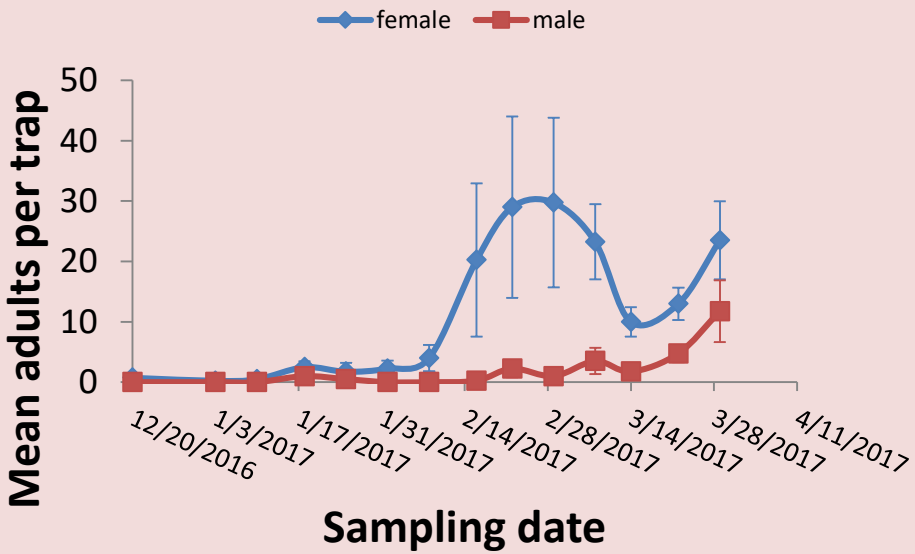


SWD larvae per fruit

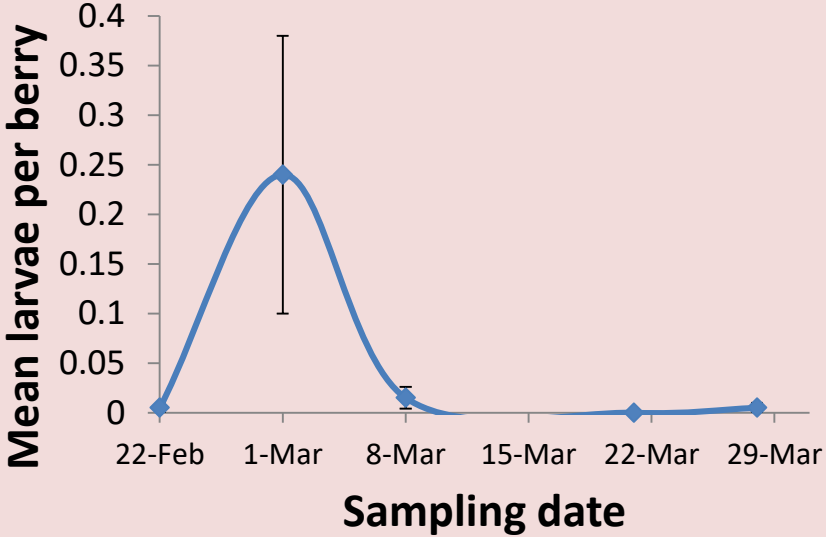


Results: monitoring field 2

Adults per trap

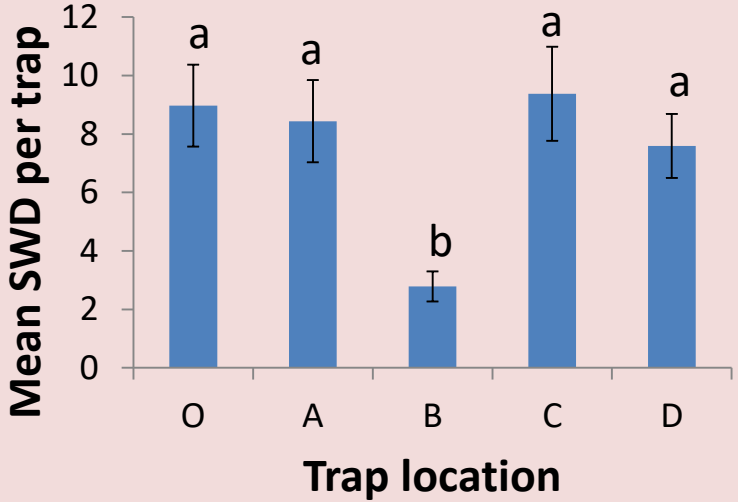


Larvae per fruit

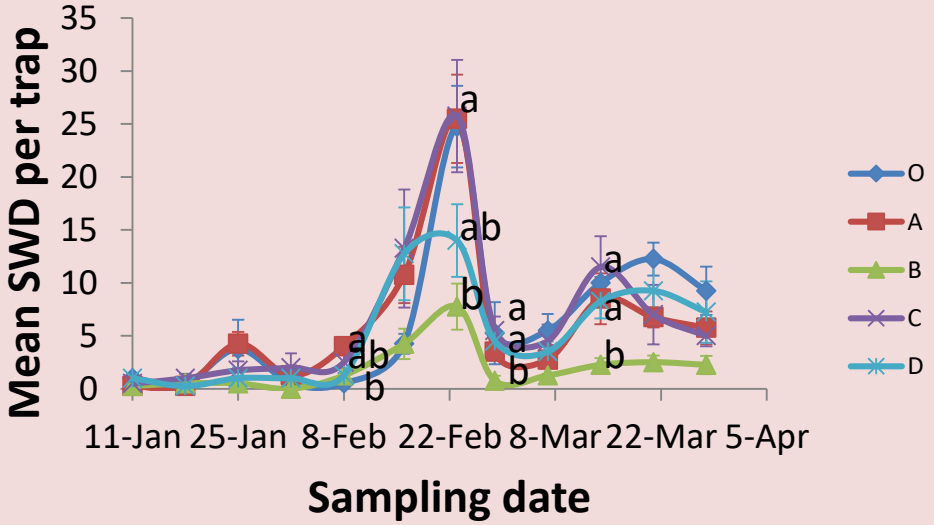


Results: spatial distribution

Overall SWD per trap



SWD per trap each sampling date



Trt $P = 0.02$

Trt*time $P = 0.05$

Results: spatial distribution

- SADIE analysis
  - $I_\alpha > 1$, $P_\alpha < 0.025$: aggregated distribution
  - $I_\alpha = 1$, $0.025 < P_\alpha < 0.975$: random distribution
  - $I_\alpha < 1$, $P_\alpha > 0.975$: uniform distribution

	I_α	P_α
11-Jan	0.97	0.51
18-Jan	0.99	0.45
25-Jan	1.02	0.39
1-Feb	0.98	0.47
8-Feb	0.72	0.96
16-Feb	1.28	0.09
23-Feb	1.01	0.42
28-Feb	1	0.44
7-Mar	0.84	0.8
14-Mar	0.9	0.66
21-Mar	1.2	0.14
28-Mar	0.89	0.68

Summary

- Much higher numbers of females
- Adult peak in late Feb / early Mar
- Larval peak end of Feb / beginning of Mar
- Adults randomly distributed throughout the plot
- Traps 5 m outside the plot caught similar numbers of flies to those inside the plot

Future research

- Continuation of monitoring work
- Conduct movement/distribution study on an organic farm that borders woods
- Efficacy trial to expand organic management options

Acknowledgements

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