



First season experiences with Spotted Wing Drosophila

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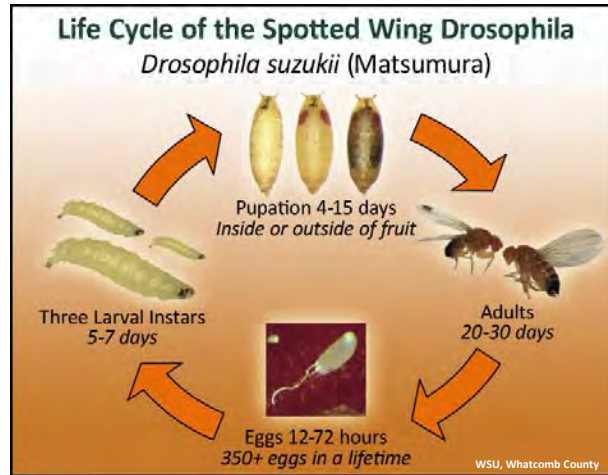


Outline

- Biology and identification
- Distribution and phenology
- Monitoring
- Chemical control
- SWD management program

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Life cycle



Optimal development at 65-70°F, ~12 day generation time.

Adult flies live for 3-6 weeks, and females can lay over 300 eggs.

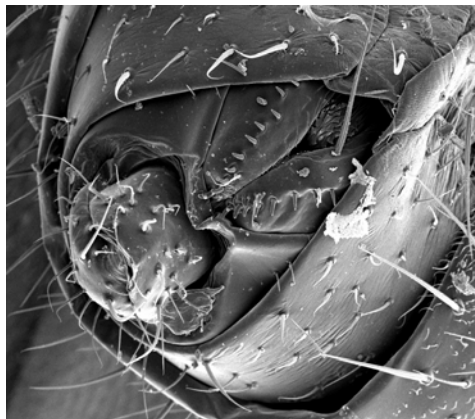
Limited by high heat in summer and by winter cold.

Female flies lay eggs into ripening fruit.

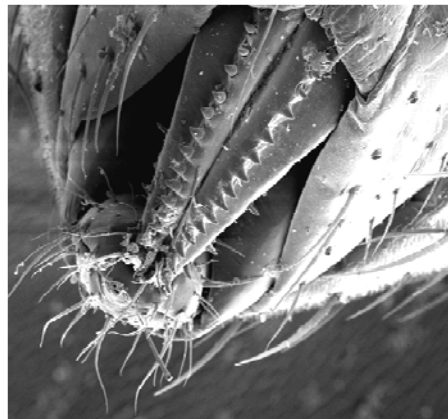


Drosophila ovipositors

Native vinegar fly



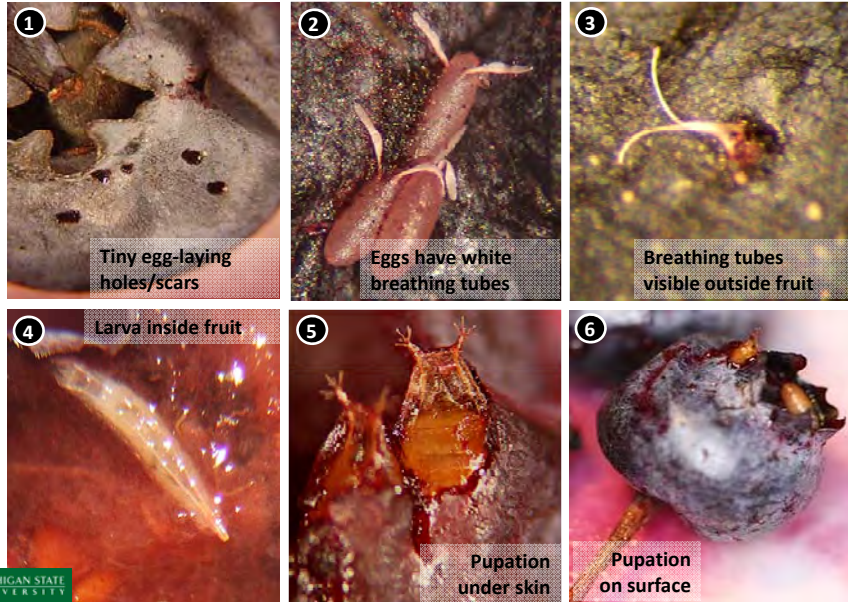
Spotted wing Drosophila



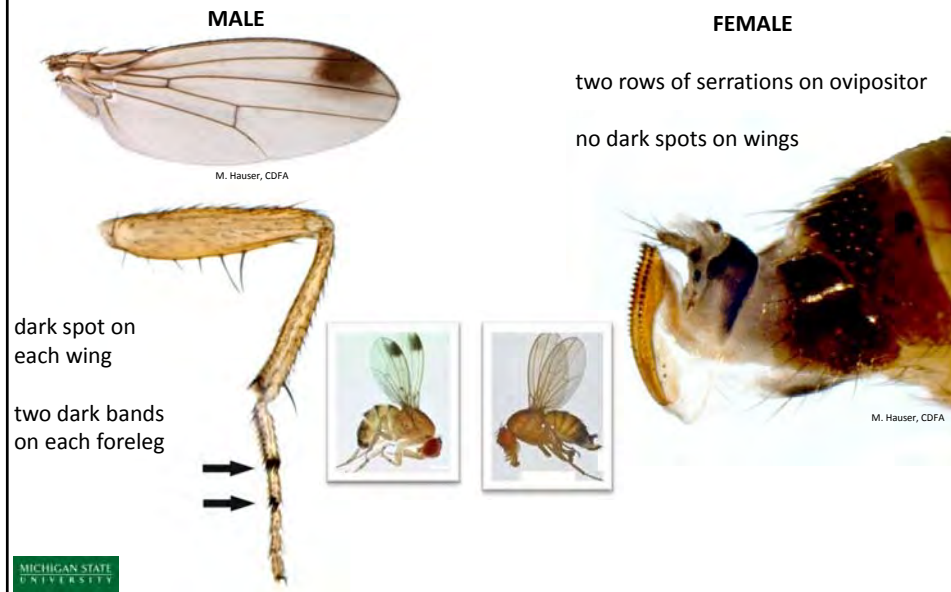
Photos by Tyler Stevens, Central Michigan University



Eggs, larvae, and pupae of SWD



Identifying male and female SWD





DISTRIBUTION & PHENOLOGY



SWD distribution

www.ipm.msu.edu/SWD.htm

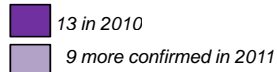
SWD has now been found in Europe, all U.S. west coast and most east coast states, and in Canadian provinces.

SWD flies detected in multiple Michigan crops and habitats:

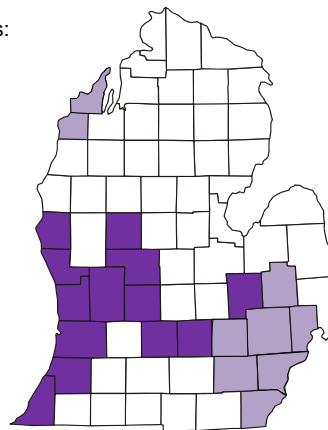
*Strawberry, raspberry, blueberry, grape, cherry,
peach, cranberry (flies only), wild areas, rest areas, backyards.*

Distributed widely in Michigan

Counties positive for SWD



Online reporting system is in place for weekly updates of fly activity in 2012.



Phenology in unmanaged fields

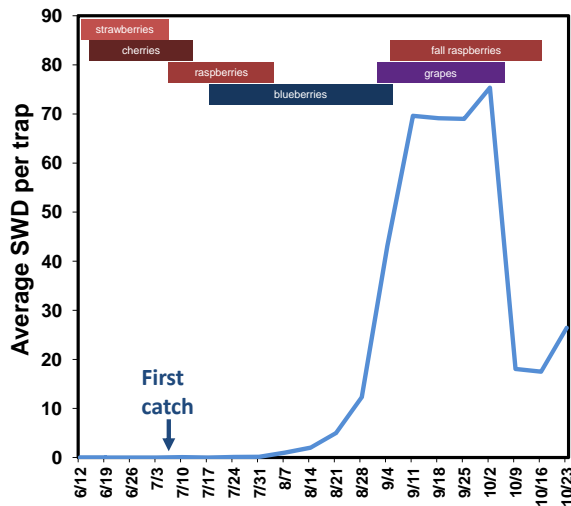
SWD was sampled all season at 3 non-sprayed fields.



First catch on July 3.

Low catch through July with increasing catch in August.

Highest pressure in Sept.



MONITORING



Comparison of monitoring trap baits

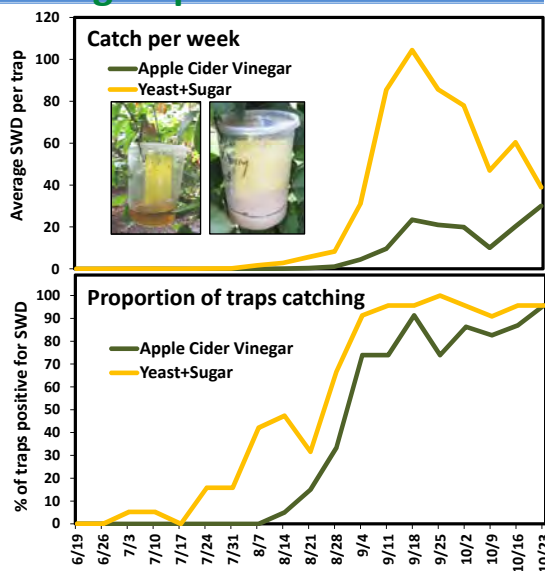
Pairs of monitoring traps deployed in June.

Baited either with apple cider vinegar or a yeast-sugar solution, checked weekly for the number of SWD.

Yeast mix: 1 Tbsp yeast, 4 Tbsp sugar, 12 oz water

Average date of first catch

	Yeast	ACV
Woods	8/7	9/4
Fields	8/14	8/28



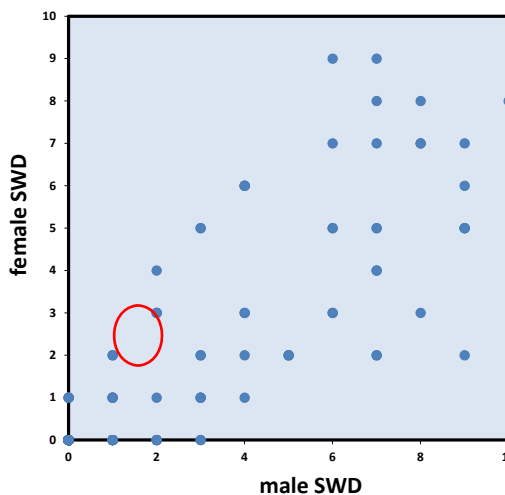
Do I need to identify female SWD?



Traps almost always catch males when they catch females.

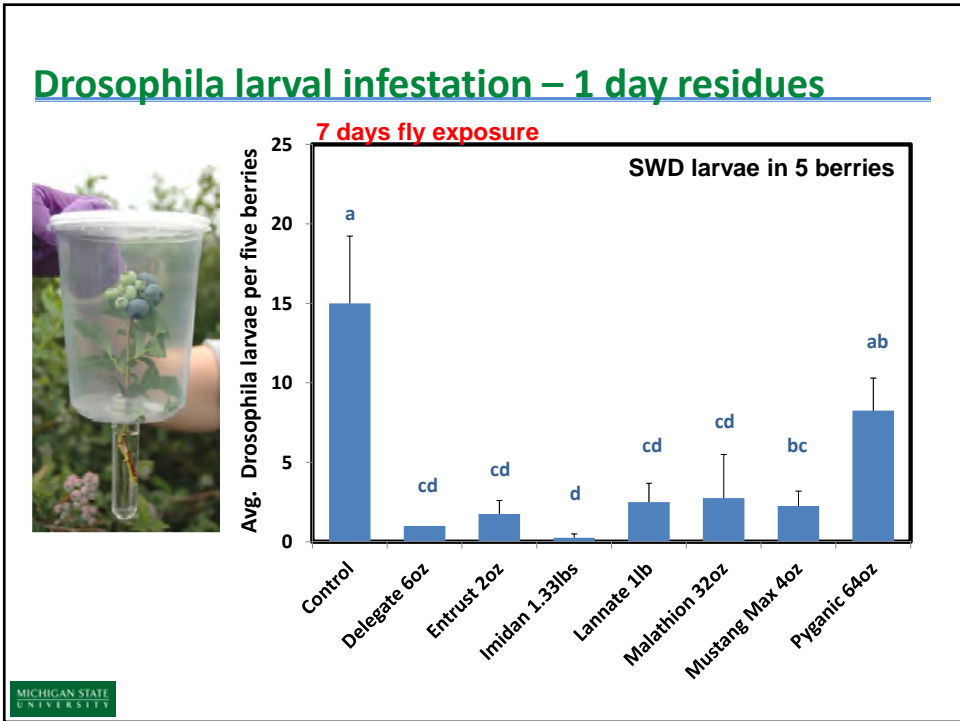
3 trap checks out of 522 had a female SWD and no male.

Only a 0.57% chance of making a wrong decision if only looking for males.

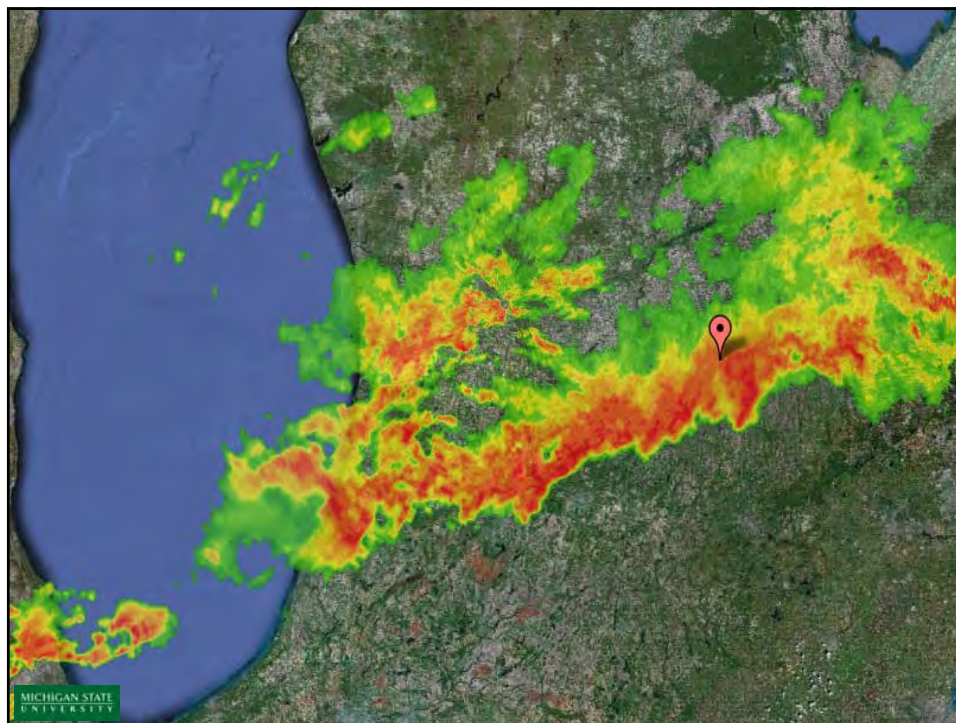
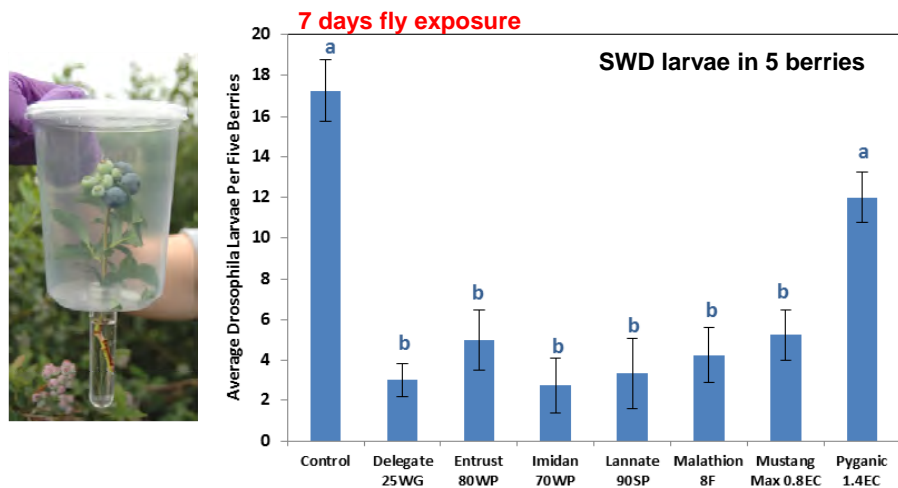




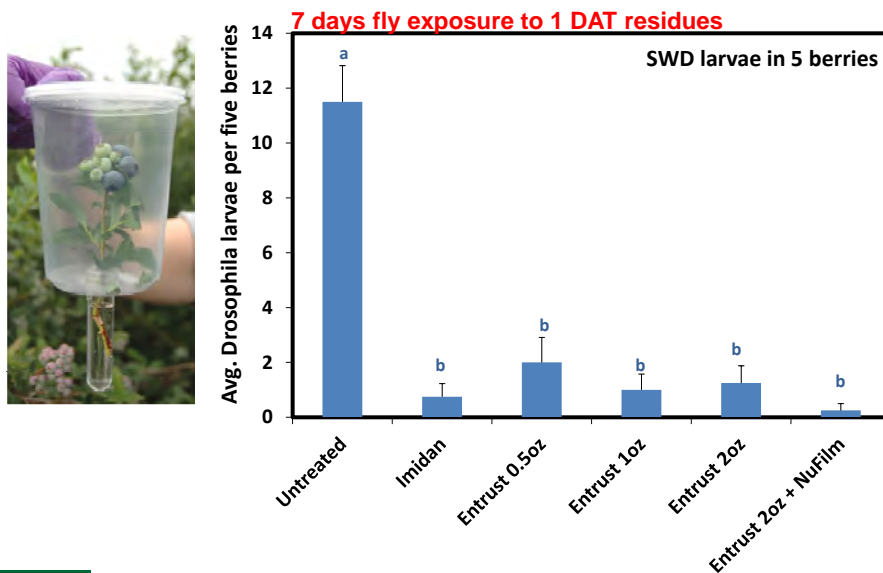
CHEMICAL CONTROL

Drosophila larval infestation – 4 day residues



Drosophila larval infestation – Entrust rates

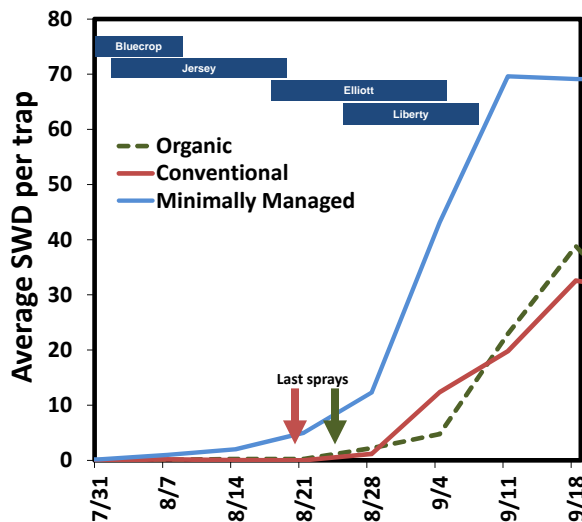


SWD activity in managed fields

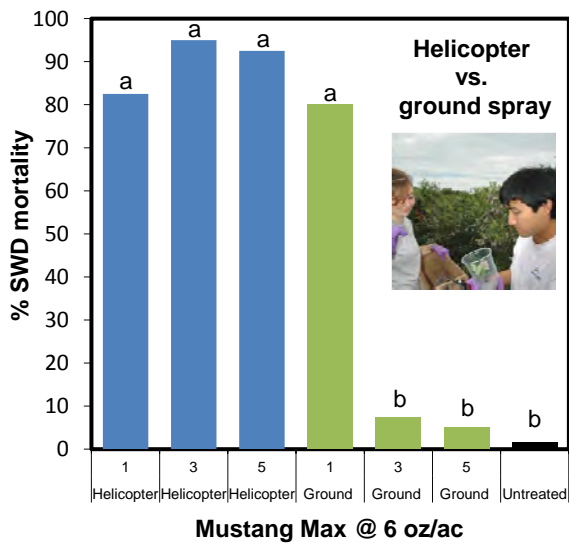
SWD sampled all season at 3 organic, conventional, and non-sprayed fields.

Managed fields had lower fly catches during harvest.

Later-harvested varieties are at greatest risk.



Comparison of application methods in blueberry



SWD MANAGEMENT

Don't throw out the IPM baby with the SWD bathwater!



Cultural control options



- Remove host hot-spots outside fields
- Remove soft/infested fruit in small plantings
- Solarization to kill larvae
- Cold temperature treatments?
- Freezing

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Biological control

In our 2011 collections, no natural enemies were reared from SWD.

Two species of parasitic wasp discovered recently in Oregon.

Wasp population growth is delayed with respect to SWD populations.

Movement from native *Drosophila* is expected.



Peter Shearer & Preston Brown, OSU



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Insecticide ratings for pre-harvest insect control

Insecticide	Class	REI (h)	PHI (d)	BBM	JB	SWD	Nat. En.
Imidan	Organophos.	24	3	****	****	****	Moderate
Malathion	Organophos.	12	1	***	**	***	M
Sevin	Carbamate	12	7	***	****	*	Toxic
Lannate	Carbamate	48	3	**	**	***	T
Asana	Pyrethroid	12	14	***	***	****	T
Brigade	Pyrethroid	12	1	***	***	****	T
Mustang Max	Pyrethroid	12	1	***	***	****	T
Danitol	Pyrethroid	24	3	***	***	****	T
Intrepid ^{RR}	IGR	4	7	-	-	-	Safe
Confirm ^{RR}	IGR	4	14	-	-	-	S
Esteem ^{RR}	IGR	12	7	-	-	-	S
Rimon ^{RR}	IGR	12	1	-	-	-	S
Actara ^{RR}	Neonic.	12	3	**	**	*	M
Assail ^{RR}	Neonic.	12	1	****	**	*	M
Provado ^{RR}	Neonic.	12	3	***	**	*	M
Delegate ^{RR}	Spinosyn	4	3	**	-	****	M
SpinTor ^{RR}	Spinosyn	4	3	**	-	**	M
Entrust [▲]	Spinosyn	4	3	**	-	***	M
Ecozin [▲]	Neem	12	0	**	*	*	M
Azadiract [▲]	Neem	4	0	**	*	*	M
Neemix [▲]	Neem	12	0	**	*	*	M
Pyganic [▲]	Pyrethrum	12	0	*	*	**	M
Evergreen	Pyrethrum	12	0	**	**	**	M

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IPM for SWD in blueberries

1. Monitor for SWD using yeast-baited traps.

Check traps weekly.
Yellow sticky insert or drop of unscented soap.
Count male SWD.

2. At first SWD capture, protect any ripening or ripe berries from infestation using effective insecticides.

Coverage
Resistance management
PHIs and REIs
MRLs for export markets

3. Maintain monitoring and fruit protection as needed.

4. Once harvest is complete, focus controls on ripening fields.

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SWD Resources from MSU

www.ipm.msu.edu/SWD.htm

Local extension educators

**Michigan SWD
Detection Survey**

We couldn't have done this without...

Technical Assistance

Katie O'Donnell
Jon Wyma
Adam Young
Kalli Shades
Nick Davros



Michigan SWD Response Team

Berry and tree fruit growers

Carini Farms, Hamilton Helicopters

Funding

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MBG Marketing
 Project GREEN

