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Spotted Wing Drosophila (Drosophila suzukii)

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Background

Spotted Wing Drosophila (*Drosophila suzukii*), SWD, is a recently introduced new species of fruit fly in the United States. It was first found on the west coast in 2008, but has rapidly colonized many fruit producing regions of the country. It was found in New England in late summer 2011 shortly after Hurricane Irene and caused significant crop damage in fall raspberries among other crops. While fruit flies (or vinegar flies) are nothing new in the US, this species is different in it's ability to infest healthy fruit. Other species typically infest over-ripe or damaged fruit. Females of this species have serrated ovipositors that can cut into healthy fruit to insert eggs. This can lead to problems with deteriorating fruit in the field or with customers who find multitudes of larvae in fruit after harvest.

Crops at Risk

This insect has a wide host range but is primarily a pest of berry crops and some stone fruits (cherry, nectarine, peaches), but may also be found in high tunnel tomatoes.

Crop Host	Crop Host	Wild Host
Apple	Grapes	American Pokeweed
Asian Pear	Italian Plums	Autumn Olive
Asian Plum	Mulberries	Beach Plum
Blackberries	Nectarines	Climbing Nightshade
Blueberries	Peaches	Crabapple
Boysenberries	Persimmons	Fox Grape
Cherries	Plumcots	Japanese Yew
Cold Hardy Kiwis	Raspberries	Kousa Dogwood

Elderberries	Strawberries	Porcilainberry
	Tomatoes	Wild Rose

Identification/Lifecycle

The first step in dealing with this new pest is identification. Spotted Wing Drosophila is a small vinegar fly. Both males and females have red eyes. Males have two spots on their wings, which is a key identifying feature. Females lack the wing spots but have a robust and serrated ovipositor that distinguishes them from other species of fruit fly. Seeing the ovipositor requires some magnification; a hand lense will do.

- Overwinter as adults and maybe pupae in leaf litter, duff, and rotting fruit
- Adult flies live for up to 2 weeks
- Females can lay 300 eggs
- Can develop from egg to adult in as little as 8 days

- Likely to have over 10 generations per growing season

Damage:

- Females lay eggs in fruit
- Larvae eat flesh, which renders it unmarketable or causes customer discontent (infested fruit ‘melts down’ in 2 days)
- Egg laying introduces fungal pathogens, which rot fruit

Significance:

- Unlike other fruit flies, SWD attacks sound ripening fruit
- Once eggs laid in fruit, no longer able to control with pesticides
- Short lifecycle and overlapping generations make spray timing difficult
- Requires sprays near harvest time
- Requires multiple sprays which can lead to pesticide resistance

Management:

Monitoring

- Use traps to establish presence and abundance of SWD
- Set traps out prior to fruit ripening to establish onset of infestation
- Check traps frequently (at least once per week)
- Replaice bait weekly to maintain effectiveness (don't dump old bait on ground; remove from field)

Identification

- Use sticky cards inside traps or sieve contents to and check to confirm presence of SWD (males are easiest to see)
- Use hand lense and ID key to help with ID
- Record date and number of SWD caught to determine trend

Control

Sanitation - keep area free of overripe fruit to reduce habitat for build up; eliminate wild hosts as much as possible

Exclusion - small areas can be covered with fine netting or row covers prior to fruit ripening to keep SWD out

Biological Control - researchers are looking for suitable predators, parasitoids, pathogens and other beneficial organisms that might help suppress SWD populations.

Chemical Control - use of short residual pesticides (organic and conventional) are likely the most effective short term solution for this pest.

Table 1. Insecticides for Blueberries, Strawberries, Caneberries, Grapes and Stone Fruit for Spotted Wing Drosophila

Active Ingredient	Trade name1	IRAC code	Blueberry PHI (days)	REI	Caneberry PHI (days)	REI	Strawberry PHI (days)	REI	Grapes PHI (days)	REI	Stone Fruit PHI (days)	REI	Probable Efficacy
Carbaryl	Sevin	1A	7	12 hrs	7	12 hrs	7	12 hrs	7	12 hrs	3	12 hrs	Good
Diazinon	Diazinon	1B	7	5 days	7	5 days	5	3 days	Not labeled	Not labeled	21	4 days	Excellent
Malathion	Malathion	1B	1	12 hrs	1	12 hrs	3	12 hrs	3	24-72 hrs	1 or 3	12 hrs	Excellent
Methomyl	Lannate	1A	3	48 hrs	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	Excellent
Phosmet	Imidan	1B	3	24 hrs	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	7	3 day	Good
Bifenthrin	Brigade	3	1	12 hrs	3	12 hrs	0	12 hrs	Not labeled	Not labeled	Not labeled	Not labeled	Excellent
Esfenvalerate	Asana	3A	14	12 hrs	7	12 hrs	Not labeled	Not labeled	Not labeled	Not labeled	14	12 hrs	Excellent
Fenpropathrin	Danitol	3	3	24 hrs	3	24 hrs	2	24 hrs	21	24 hrs	3	24 hrs	Excellent
Pyrethrin	Pyganic*	3A	0	12 hrs	0	12 hrs	0	12 hrs	0	12 hrs	0	12 hrs	Good
Zeta-cypermethrin	Mustang Max	3	1	12 hrs	1	12 hrs	Not labeled	Not labeled	1	12 hrs	14	12 hrs	Excellent
Imidacloprid & cyfluthrin	Leverage 360 & 2.7	4A, 3	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	Not labeled	3	12 hrs	7	12 hrs	Excellent
Actamiprid	Assail	4A	1	12 hrs	1	12 hrs	1	12 hrs	7	12 hrs	7	12 hrs	Fair
Imidacloprid	Provado††	4A	3	12 hrs	3	12 hrs	7	12 hrs	0	12 hrs	0-7	12 hrs	Fair
Thiamethoxam	Actara	4A					3	12					
Spinetoram	Delegate	5	3	4 hrs	1	4 hrs	Not labeled	Not labeled	7	4 hrs	7	4 hrs	Excellent
Spinetoram	Radiant	5	Not labeled	Not labeled	Not labeled	Not labeled	1	4 hrs	Not labeled	Not labeled	Not labeled	Not labeled	Excellent
Spinosad	Entrust*,††	5	3	4 hrs	1	4 hrs	1	4 hrs	7	4 hrs	1 - 14	4 hrs	Good/Exc
Pyriproxyfen	Esteem	7	7	12 hrs	Not	Not	2	12 hrs	21	12 hrs	14	12 hrs	Fair/Good

labeled labeled

*OMRI listed

†† Stone Fruit: there are different PHI depending on specific stone fruit crop, check label before using

PHI= pre-harvest interval; time between last application and harvest

REI= re-entry interval; time between application and when workers may re-enter the field

Probable ratings based on lab and field assays in western USA and Michigan

Chart courtesy of Mary Conklin, UConn Extension

However:

- Requires a short pre-harvest interval (PHI)
- Requires > 5 day residual activity
- Requires rotation among mode of action (MoA) to avoid developing resistance

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