

Spotted Wing Drosophila

What Concord grape growers in Washington need to know



BACKGROUND

Concord grape growers should be concerned about a new type of vinegar fly (*Drosophila*) recently detected in Eastern Washington. This pest, known as spotted wing drosophila (SWD), is troublesome because it has the ability to lay eggs that result in maggots in **ripening** fruit rather than overripe fruit like other drosophila species. Female SWD can do this because they have a very robust ovipositor (egg injection tube) compared to other drosophila. Concord grapes can be damaged in several ways. When the SWD pierces the skin of the fruit in egg laying, she can vector yeasts and bacteria that will cause various rots in the berry. The eggs will hatch within a day and the maggots will feed inside the berry. In cherries we have observed as many as thirty maggots per fruit. We are not sure at this point how many maggots can persist in juice grapes. We will investigate this this summer.

Will SWD Invade My Juice Grapes?

Grapes including Concord and Niagras are suitable hosts for SWD. How this threat plays out in 2010 is yet to be determined. The sentinel research conducted in Imperial Japan in the 1930s documented that cherries were the preferred early summer host for SWD and that juice grapes were a preferred late summer and fall host fruit for SWD.

In early 2010, the Washington State Concord Grape Research Council funded a study to assess suitability of Concord grapes as SWD hosts and to determine at what stage of the fruit's development it is most attractive to the pest. Results of these studies will not be known until after the 2010 season. Therefore, we all need to pay attention and determine whether SWD is present in our vineyards and requires control. The three steps to responsible management of SWD are: monitor, identify, control.

Where Are These Flies Found?

SWD was found in Asia and Europe in the 1900s. It was first noted in North America in 2008, on strawberries and caneberries in California. By May 2009, the fly was causing economic-level damage to cherries in various parts of California. SWD is now established in the Pacific Northwest. As of mid-July 2010, it has been confirmed in all Western Washington counties and at least four counties in Eastern Washington.



SWD larva (maggot) inside fruit. (Courtesy of University of California IPM Program)

Japan and the Grape Connection

SWD, or *Drosophila suzukii*, was first found in Japan in the early 1900s, in soft-skinned fruits including strawberry, cherry, and grape. Studies conducted in Japan by T. Kanzawa and published in 1939 indicated SWD emergence from at least seven different grape varieties (more varieties if the skin was split or damaged) and indicated that SWD populations peaked during cherry and grape seasons, leading to the conclusion that grapes are suitable hosts for this destructive pest.

SWD Is Here, But It's Not Everywhere

SWD infestations can be somewhat isolated—the fly won't go far in search of a host if it has already found one. You'll want to be sure that SWD is present in your vineyard before employing chemical control measures. The next three pages explain how to do that.

MONITOR

IDENTIFY

CONTROL

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EXTENSION

MONITOR

IDENTIFY

CONTROL

In keeping with the principles of integrated pest management, you'll want to be sure that SWD is present in your vineyard before employing chemical control measures. The first step is monitoring for the pest.

MONITOR

1

Build your traps

Commercial fly traps, available at hardware/nursery supply stores, can be used to monitor for SWD presence, or you can make traps. The main objective is to attract SWD and trap them for identification in some sort of container that excludes most other insects. Traps can be made with the following materials:



Burning holes in a plastic cup.



Trap with optional yellow sticky card inside.

- Clear plastic beverage cups, 16-32 oz, with lids OR sturdy plastic (e.g., Nalgene) bottles with screw-on lids

- Wood-burning tool OR drill with 3/16-inch bit

- Wire, twine, or twist-ties
- "Yellow-sticky" cards (optional – available where crop control products are sold)

- Apple cider vinegar
- Dish soap (optional)

Plastic beverage cups are inexpensive and adequate for many situations. If your vineyard is subject to windy conditions, as

many are here in eastern Washington, you may wish to use a sturdier container such as the one pictured above right.

Using the wood burner (more appropriate for the thin plastic beverage cups) or drill (more appropriate for the sturdier plastic bottles), make numerous 3/16-inch holes in the upper portion of the container, leaving an unburned/undrilled section so that liquid can be poured out later without spilling from the holes. After baiting the traps, attach lids and use the wire/twine/twist-ties to hang the traps.

2

Bait your traps

Pour an inch or two of real (not flavored) apple cider vinegar in the bottom of each trap. If you are not using the yellow sticky cards, you can add a few drops of liquid dishwashing soap, which acts as a surfactant to reduce surface tension on the vinegar and help flies sink. If you use the sticky cards, hang one in each trap or arch it loosely at the top of the trap.



Nalgene bottle trap in Concord vineyard.

3

Deploy your traps

Traps should be hung in the vineyard as the grapes begin to ripen. Guidelines for number and placement of traps per acre are yet to be determined.

4

Monitor your traps

Check traps frequently (at least weekly), observing yellow sticky cards or pouring vinegar through a strainer into a white pan for easier viewing. Refer to SWD identification information on Page 3. Refresh vinegar and cards as needed. Continue monitoring through harvest time.



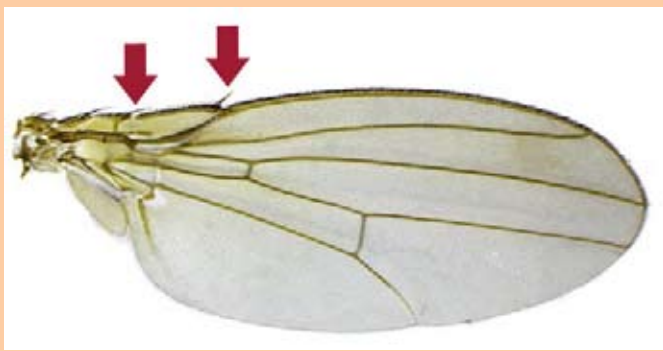
IDENTIFY

Since many *Drosophila* species are present in Washington, and most cause no harm to marketable fruit, it is important to identify the pests you find before assuming they are spotted wing drosophila and applying control measures. Adult SWD are small—just 2 to 3 mm long. They have red eyes and a pale brown or yellowish-brown body. If you find a fly that looks like this, use the following 3 steps to determine whether a specimen is SWD.

1

Is it a *Drosophila*?

Many insects (e.g., flies, wasps) have spotted wings. Species within the *Drosophila* genus have two “breaks” along the top (costal) vein of their wings.



2

Is it a male SWD?

Male spotted wing drosophila are relatively easy to identify. The males have the characteristic dark spot on the tips of their wings. They also have red eyes and two dark bands on their front legs.



3

Is it a female SWD?

The female spotted wing drosophila are more difficult to identify than the males, not having dark spots on their wings. Their most distinguishing characteristic is their ovipositor—it is longer than those of other *Drosophila* and is deeply serrated. The ovipositor can be more easily viewed by pressing gently on the abdomen of the specimen.



Ovipositors of SWD (above) are serrated and larger than those of other *Drosophila* (at right).



For Help Identifying Suspicious Specimens

Contact Tora Brooks at WSU Prosser's Environmental and Agricultural Entomology Laboratory:
brooks1@wsu.edu or (509) 786-9244

CONTROL

If SWD is present in your Concord grape vineyard, knock-down controls should be applied swiftly. There are no registered insecticides that will control maggots within fruit, so chemicals must target adult control with an intent to eliminate adult flies before they mate and lay eggs.

A number of insecticides registered for use on grape in Washington appear to be effective in managing SWD, including those listed below. Efficacy tests have been conducted in laboratories in Oregon and Washington and field efficacy has been studied in California, but conditions vary and so will results. Your approach should be based upon your vineyard and the unique factors of your situation, taking into consideration all label cautions, pre-harvest and re-entry intervals (PHIs/REIs), and any chemical controls you may already be using in your pest management program. Some of these insecticides have potential negative impacts on IPM programs, beneficial arthropods, and/or the environment. **Always read and follow label directions; apply only registered pesticides. Rotate among chemical classes to slow the development of resistance.**

Class	Active Ingredient	Trade Name*
pyrethroids**	beta-cyfluthrin bifenthrin fenpropathrin	Baythroid® Brigade® Danitol®
organophosphates	malathion	
spinosyns	spinetoram spinosad	Delegate® Entrust®, Success®
neonicotinyls	acetamiprid imidacloprid thiamethoxam	Assail® Provado® Actara®

* Trade names are examples, provided for illustrative purposes only. Other products may be registered with this active ingredient. No recommendation or endorsement of a particular trade name is implied.

** Pyrethroids should be used under extreme circumstances only. Not suitable for use in wine grapes.

Whether you have SWD or not, you can help deter the breeding and spread of this pest.

- Eliminate breeding sites in overripe grapes (and other fruit, if applicable) where SWD can complete their life cycles.
- If you have SWD-infested fruit, remove or destroy (e.g., bury, bag, burn, freeze) it.
- If you have any ripe, overripe, or rotten fruit on your property that can serve as a host, remove or destroy it.
- Practice timely harvest; extending harvest intervals may result in larger SWD populations, more fruit damage, and a greater risk for future infestations of nearby vines yet to be harvested.

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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