Spotted Wing Drosophila
What the soft fruit growers of Washington State need to know

SPRING 2011 UPDATE

Fruit growers across Washington State have been hearing about the spotted wing drosophila (SWD) since it began moving into the Pacific Northwest in 2009. Drosophila flies, also known as vinegar flies, have been present in Washington for years. SWD is particularly 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. Fruit can be damaged indirectly and directly. When the fly pierces the skin during egg laying, she can vector yeasts and bacteria that can cause various rots. The eggs will hatch within a day and the maggots will feed within the fruit, contaminating the fruit and compromising quality. As many as thirty maggots have been observed in a single cherry. The chart below shows some of the crops in which SWD were detected in eastern Washington in 2010, along with trap counts and sample numbers.

2010 SWD Trap Catches by Crop/Site (EASTERN WA)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry</td>
<td>38</td>
</tr>
<tr>
<td>Raspberry/Blackberry</td>
<td>1,015</td>
</tr>
<tr>
<td>Plum/Pluot</td>
<td>46</td>
</tr>
<tr>
<td>Pear</td>
<td>15</td>
</tr>
<tr>
<td>Peach/Nectarine</td>
<td>444</td>
</tr>
<tr>
<td>Packinghouse</td>
<td>26</td>
</tr>
<tr>
<td>Grape</td>
<td>1,554</td>
</tr>
<tr>
<td>Cherry</td>
<td>3,016</td>
</tr>
<tr>
<td>Blueberry</td>
<td>513</td>
</tr>
<tr>
<td>Apricot</td>
<td>209</td>
</tr>
<tr>
<td>Apple</td>
<td>65</td>
</tr>
</tbody>
</table>

Will SWD invade my fruit crop?

While fruits as diverse as raspberries, blackberries, blueberries, cherries, strawberries, apricots, peaches, plums, pluots, nectarines, and grapes have proven to be suitable hosts for SWD under certain conditions, host preference appears to depend upon a variety of factors that may include pH and sugar content of the fruit. Studies are underway at WSU’s various Research and Extension Centers to determine suitability of various fruits as hosts to SWD. So far in Washington, most fruit (with the exception of cherries) seem to need to be ripe or overripe before attracting and hosting SWD. Field studies in 2010—an unusually cool and wet year—may not be indicative of the pest’s presence in 2011. We recommend continued vigilance on the part of growers this year. And remember: SWD is here, but it’s not everywhere. You will want to be sure it is present in your orchard, field, or vineyard before employing chemical control measures. The three steps to responsible management of SWD are: monitor, identify, and control. The next three pages explain how.

MONITOR  IDENTIFY  CONTROL

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EXTENSION
In keeping with the principles of integrated pest management, you will want to be sure that SWD is present before employing chemical control measures. The first step is monitoring for the pest, either as adults or as larvae.

To monitor for larvae (maggots) within fruit, lightly crush a sample of the subject fruit in a see-through container such as a zipper-style plastic bag. Then prepare a solution of either 1/4 c. sugar to 4 c. water OR 3 Tbsp. salt to 2 c. water. Pour this solution into the container with the fruit. Let it sit for 15 to 30 minutes. If present, larvae should float to the top of the solution.

Commercial fly traps, available at hardware/nursery supply stores, or homemade traps comprised of plastic cups or bottles can be used to monitor for adult SWD presence. If making traps, clear plastic beverage cups with lids are inexpensive and adequate for many situations, but sturdier container such as Nalgene™ bottles with screw-on lids are useful in windy conditions.

Using a wood burner (more appropriate for thin plastic cups) or drill (more appropriate for 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.

Bait the traps with an inch or two of real (not flavored) apple cider vinegar in the bottom of each trap. Studies are underway to determine the optimal bait, but apple cider vinegar is the present standard, with a drop of liquid dish detergent. The dish soap acts as a surfactant to reduce surface tension on the vinegar, which helps the flies sink.

Hang your baited traps in your vineyard, orchard, or field with wire, twine, or twist-ties as the fruit begins to ripen. Check traps frequently (at least weekly), pouring vinegar through a strainer into a white pan for easier viewing. Refresh bait as needed. Continue monitoring through harvest time.
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.

For Help Identifying Suspicious Specimens
Contact Tora Brooks or Luz Barrantes at WSU Prosser’s Environmental and Agricultural Entomology Laboratory brooks1@wsu.edu or luzdenia@gmail.com (509) 786-9244
CONTROL

If SWD is present in your field, vineyard or orchard, apply knock-down controls swiftly. No registered insecticides 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 susceptible crops in Washington appear to be effective in managing SWD. Refer to the source below that addresses your specific crop. Your approach should take into consideration pre-harvest intervals (PHI) and re-entry intervals (REI) as well as chemical controls you may already be using in your pest management program. Some 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.

Help deter the breeding and spread of this pest. If you have SWD-infested fruit, remove or destroy (e.g., bury, bag, burn, freeze) it. Whether SWD are present or not, you can eliminate breeding sites by removing or destroying any ripe, overripe, or rotten fruit on your property. Practice timely harvest; extending harvest intervals may result in larger SWD populations, more fruit damage, and a greater risk for future infestations of nearby crops.

Berries and Western WA Crops
http://mtvernon.wsu.edu/ENTOMOLOGY/pests/SWD.html

Tree Fruits
http://www.tfrec.wsu.edu

Grapes
http://cru.cahe.wsu.edu/CEPublications/eb0762/eb0762.pdf

Home Gardeners
http://pep.wsu.edu/hortsense/

For the latest updates, see also http://extension.wsu.edu/swd/

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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