**Management of Spotted Wing Drosophila**
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Spotted wing drosophila (SWD) is a vinegar fly that can lay eggs in fruit as it ripens; thus larvae may be present in the fruit by harvest. Growers should monitor for this pest, correctly identify it, and take judicious steps for treatment when needed.

In the brief history of SWD in the U.S., populations have been highest in late summer and early fall. Therefore, late season fruit crops such as fall raspberries, late-season blackberries, and day-neutral strawberries have suffered the most damage. Utilizing all means of management - including cultural and chemical options - is recommended. The most suitable strategies for any farm will vary with the crop and circumstances.

**Cultural Management**

**Harvest practices.** Harvest thoroughly. All ripe and cull fruit should be removed from the planting. Paying someone to remove old fruit may be worth the cost. In pick-your-own plantings, consider rewarding customers for removing unmarketable berries as well as sound ones.

In crops that are harvested many times such as raspberries, keep harvest intervals short, and pick the fruit as soon as possible. In some raspberry plantings, this strategy alone has arrested problems with SWD - even without applying insecticides - as long as the entire planting was kept clean. On other farms, this strategy alone has been insufficient. This may be related to the presence of other host crops.

**Disposal of unwanted fruit.** Dispose of unwanted fruit in a way that will keep fruit flies from feeding on it or from hatching from it. SWD will continue multiplying in cull fruit, so remove cull fruit from the field and destroy it, or bury it a minimum of 2 feet deep. Crushing the fruit does not hamper SWD emergence from it.

SWD can easily multiply in and emerge from fruit that is below critical temperatures in compost piles. In fact, SWD development may be accelerated in warm areas of the pile. Thus, composting fruit is currently not recommended. However, research in Oregon has found that sealing fruit in plastic bags or on the ground with plastic and then exposing it to full sun for a week kills all eggs and larvae.

**Field management.** SWD will multiply on wild fruit (raspberries or blackberries in hedgerows, mulberries, wild cherries, etc.) as well as cultivated fruit, and thus wild stands of these hosts can be reservoirs of SWD. Wild plants also serve as sources of diseases, and even though they may provide refuge and food for pollinators, their removal is generally recommended.

Renovate June-bearing (short-day) strawberry fields promptly. Though SWD has not been problematic on June-bearing strawberries yet, SWD could multiply on strawberries that remain in the field after harvest. Early cultivars could be renovated sooner than late cultivars.

**Trapping.** Traps are typically used to detect SWD and determine whether control measures are needed, and not for control (see the Fact Sheet “Monitoring for Spotted Wing Drosophila”). However, research in Japan indicated that 50 to 100 vinegar traps per acre decreased SWD numbers. A commercial manufacturer of SWD traps recommends using traps at the end of the season to mop up late-season SWD that could overwinter.
Exclusion. Screening may protect individual plants or crops in protected culture such as high tunnels or greenhouses. In Japan, using extremely fine mesh with openings less than 0.98 mm \(= 0.039 \text{ inches wide (18 mesh or finer)} \) protected blueberries. If screening is used, venting can be problematic. Some means of increasing air flow such as using fan will be required, as will pollinator introduction if the crop is in bloom.

Biocontrols
Several predatory insects feed on SWD adults and pupae, but not yet in sufficient quantities to provide significant control. A tiny predatory wasp that parasitizes SWD pupae is present in the Pacific Northwest and mid-Atlantic region and thus may be found in other regions as well. Work is needed to understand whether and how this species may be utilized in long-term SWD management.

Chemical Management
Pesticides in three activity groups – pyrethroids (IRAC activity group 3), spinosyns (activity group 5), and organophosphate (activity group 1B) have shown fairly good efficacy against SWD. Watch days-to-harvest and seasonal use limitations. Pesticides in other chemical activity groups have provided moderate to little control.

Using pesticides in different chemical classes is a must; resistance development is very likely since many generations of SWD occur per year. In fact, resistance to natural pyrethrins has already been reported in West Coast SWD populations.

Applying sprays without knowing whether SWD is present is not recommended, as populations of beneficial predatory insects and pollinators may be decimated while achieving no SWD control. See the fact sheet “Monitoring for Spotted Wing Drosophila” for more information.

Using materials for which a FIFRA 2(ee) label for SWD has been issued is prudent, as rates and application methods will be listed on the label. Some states (NY for example) do not allow use of products for pests which do not appear on the product label. However, EPA currently allows use of products for pests not specified on the label as long as the use pattern (crop, rate, timing, number of applications, application methods) agrees with what is currently allowed on the label, there are no other label restrictions that preclude the product’s use for the target pest, and a recommendation has been made for that use by a company or individual. Laws and their interpretations are subject to change.

Pesticide sprays target adults to minimize the number of eggs laid and thus larvae in fruit. Materials in the spinosyn, pyrethroid and pyrethrins, and organophosphate classes have generally been effective against adults. Neonicotinoids have not been very effective against adults, although they may have some effectiveness against eggs and larvae in the fruit. More research is necessary before recommendations are made for the control of immature stages.

The following table lists insecticides that have been effective against SWD for the 4 crops at greatest risk of damage from SWD: raspberries, blackberries, strawberries (day-neutral varieties), and cherries. Materials with a long pre-harvest interval may be used immediately post-harvest to knock back populations that will feed on any remaining overripe or dropped fruit.

Residual activity has sometimes been reported to be shorter than what is listed below, so a close watch for return of adults will be needed. All materials listed work by contact, so spray coverage should be thorough. Use a higher volume of water than usual or include a spreader/sticker surfactant to increase coverage.
<table>
<thead>
<tr>
<th>Trade name</th>
<th>Active Ingredient</th>
<th>Raspberries</th>
<th>Blackberries</th>
<th>Strawberries</th>
<th>Cherries</th>
<th>Effectiveness</th>
<th>Length of Residual Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brigade</td>
<td>bifenthrin</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>X</td>
<td>Excellent</td>
<td>7 days</td>
</tr>
<tr>
<td>Danitol</td>
<td>fenpropathrin</td>
<td>3*</td>
<td>3*</td>
<td>2*</td>
<td>3*</td>
<td>Excellent</td>
<td>7 days</td>
</tr>
<tr>
<td>Baythroid</td>
<td>beta-cyfluthrin</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>7*</td>
<td>Excellent</td>
<td>7 days</td>
</tr>
<tr>
<td>Mustang Max</td>
<td>zeta-cypermethrin</td>
<td>1*</td>
<td>1*</td>
<td>X</td>
<td>14*</td>
<td>Excellent</td>
<td>7 days</td>
</tr>
<tr>
<td>PyGanic**</td>
<td>pyrethrins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Good***</td>
<td>2 days</td>
</tr>
</tbody>
</table>

**Pyrethroids and pyrethrins (IRAC activity group 3A)**

**Spinosyns (IRAC activity group 5)**

| Delegate   | spinetoram        | 1\*         | 1\*          | X            | 7\*      | Excellent     | 5-7 days                   |
| Spintor    | spinosad          | 1           | 1            | 1            | 7        | Excellent     | 5-7 days                   |
| Success    | spinosad          | 1\*         | 1\*          | 1            | 7\*      | Excellent     | 5-7 days                   |
| Entrust**  | spinosad          | 1\*         | 1\*          | 1            | 7\*      | Excellent     | 3-5 days                   |

**Organophosphates (IRAC activity group 1B)**

| Malathion  | malathion         | 1           | 1            | 3            | 3        | Excellent     | >7 days                    |
| Diazinon   | diazinon          | X           | X            | 5            | 21       | Excellent     | >7 days                    |

* 2(ee) labels have been issued for use against SWD on this crop.
** May be used in organic production. The REI is 12 hours even though the PHI is 0 days.
*** Provides knockdown of non-resistant populations, but has no residual activity.

References:


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