

**SPOTTED WING DROSOPHILA,  
A NEW INVASIVE PEST IN FRUITS ON THE WEST COAST**

Amy J. Dreves  
Oregon State University, Crop and Soil Science Department  
3017 ALS Bldg., Corvallis, OR 97331  
[Amy.Dreves@oregonstate.edu](mailto:Amy.Dreves@oregonstate.edu)

Infestations of the Spotted Wing Drosophila fly, *Drosophila suzukii* (Diptera: Drosophilidae; SWD), an exotic pest, were found in Oregon fruits in 2009. These flies are native to SE Asia -- China, Japan, Thailand, and Korea. They were first discovered in N. America in California in 2008 and now Oregon, Washington, Canada, Florida, and have been established in Hawaii since 1986. The SWD can infest and cause a great deal of damage to ripening to ripe fruit, as opposed to overripe and fallen fruit that are infested by most of the other *Drosophila* species. We have confirmed findings of SWD in 15 Oregon counties and over 15 fruits including, but limited to, blueberries, raspberries, blackberries, strawberries, Asian pears, cherries, peaches, plum, persimmons, fig, and grape.

**Description of Pest**

Adult *Drosophila* flies resemble small fruit or vinegar flies that you may notice buzzing around your kitchen fruit. They have a body length of 2-3 mm, with red eyes and a yellowish-brown colored body. The male flies have a small dark spot on the front edge near the tip of each forewing. Females do not have this wing spot. Females have a large saw-like ovipositor on their tail end for inserting < 1 mm eggs with 2 filaments in fruit (Fig. 1). The maggots are small (~3 mm) and white-to-cream colored. After maggots mature they may pupate. The pupae are cylinder-shaped, reddish-tan, 2 to 3 mm in length with 2 small projections (respiratory horns) on the end (See Fig. 2).

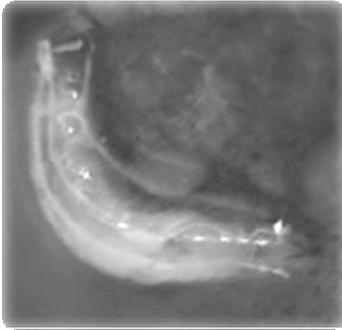


SWD eggs

**Life History**

At this point not much is known about the life cycle in Oregon. In Japan, 13 generations have been observed per year. Three to ten generations are predicted for most Californian production climates. It is believed that this fly can have several generations per season in Oregon. Flies are most active at temperatures of 68° F. Activity, longevity, and egg laying decrease at higher temperatures (above 86° F). They thrive at cool temperatures typically experienced during the most of early summer and fall, but do poorly at temperatures above 86° F. This means that most of Oregon's small and stone fruit crops are at risk during the growing season. This is especially concerning due to the fact that Oregon has a variety of crops that ripen at different times during the season. SWD may move from one crop to another as the season progresses, and populations may build up to high number in many crops. Berry growers who utilize closed canopies and tunnels and well as shady areas in crop fields are hit the hardest by the fly. However, this fly is found in California and Florida's summer seasons in hot locations, which mean that they should be able to survive in temperatures found during the height of Oregon's summer period.

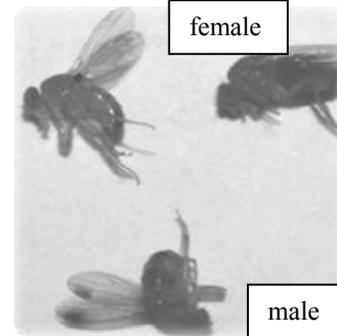
A single life cycle can be as short as 8-14 days, depending on the weather. Flies can be active from April to November. In mid-season, adult life span is 3-9 weeks. Late summer or fall emerging flies can overwinter. They will lay eggs during the following summer on early ripening fruit. Females typically will insert their ovipositor into the fruit, lay 1-3 eggs per fruit, 7-16 eggs per day, and greater than 300 eggs in their lifetime. Pupation can take place both inside and outside of fruit in about 3 to 15 days. It is unknown as to how well this pest will overwinter in Oregon. However, because it occurs to the south, there is great potential for continual re-introductions.



**SWD Larva**



**Pupae**



**Adults**

### **Fruit Damage**

Infestation of fruit reveals small scars and indented soft spots on the fruit surface left by the females ovipositor. The egg(s) hatch in a short time, about 1-3 days, maggots soon begin feeding inside the fruit. Fruit damage is caused by the feeding from maggot development. Within as little as 2 days, the fruit begins to collapse around the feeding site. Thereafter, fungal and bacterial infections and secondary pests may contribute to further damage. These damage symptoms may result in severe crop losses. The implications for exporting producers may also be severe, depending on quarantine regulations.

### **Management**

Unfortunately there are no established management plans for this new pest in Oregon. There are a team of Oregon, California, Washington, and Canadian researchers addressing questions of overwintering capability, spring emergence, timing of oviposition, fruit preference and susceptibility to better understand the life cycle and phenology of SWD in Oregon. With this new knowledge, a management strategy and control recommendations will be developed. However, two principles will be at the heart of controlling this pest regardless of crop. Control the flies before they lay eggs; and reduce the fly's breeding sites by immediately removing and disposing of infested fruit. Monitoring traps for detection and as a means of controlling the pest are being investigated. Cultural and preventative practices such as sanitation techniques, netting, and harvesting methods will be studied in 2010. Insecticide products labeled for use on specific fruits list fruit flies as pests are targeted for laboratory and field testing in conventional, IPM, and organic fruit systems.

### **Monitoring**

Monitor for presence of *D. suzukii* when fruit begins to ripen by using baits and traps. Effective monitoring traps and baits will be explored in 2010 by USDA-ARS and OSU researchers.

*Bait attractants:* ripe bananas, strawberry puree, apple cider or a yeast mixture (1 package of Brewers yeast, 4 teaspoons of sugar and 12 oz of water) have been used in traps to lure and catch

adult flies. The yeast mixture appears to be the most successful. GF120 is a commercially-available Spinosad-based material which will both attract and kill fruit flies.

*Traps:* These flies can be particular about entering traps. A small plastic pop or water bottle, wide-mouth jar with holes in the lid, or a plastic Nalgene bottle with a perforated lid for fly entry, and a hanging wire are cheap but working methods for trapping flies. About 2-inches of liquid bait are added to traps. A small funnel can be placed within container to reduce numbers of flies escaping once they enter a funnel's hole or the addition of a yellow sticky card placed inside the trap can catch increased numbers of SWD. Three commercial traps used are glass McPhail trap, Omni trap (or slight variations) and the liquid Rescue FlyTrap. Traps need to be serviced/cleaned at least once per week in order to determine population dynamics and optimize trap efficiency.

In order to evaluate efficacy trials and alternative treatment effects applied to fruit crops, sweep netting, fruit damage assessments, and netted sleeves placed over fruit throughout the ripening period will be tested to detect fly activity or oviposition in fruit.

- Dreves, Walton, and Fisher. Oct 2009. A New Pest Attacking Healthy Ripening Fruit in Oregon---*Drosophila suzukii* (Matsumura). Extension Bulletin, EM 8991.