



# Spotted Wing Drosophila (SWD) Monitoring, Identifying, and Fruit Sampling

WASHINGTON STATE UNIVERSITY EXTENSION FACT SHEET • FS049E

## Introduction

Spotted wing drosophila (SWD, *Drosophila suzukii*) is a soft fruit pest, originates in Asia, and is in the same genus as other species commonly known as vinegar flies. SWD were discovered in California in 2008 and in Washington and Oregon in 2009. SWD are distinguished from other vinegar flies in that they lay their eggs in undamaged fruit still attached to plants. SWD can quickly destroy soft fruit such as blueberry, raspberry, strawberry, plum, peach, and cherry due to larvae feeding inside the fruit. SWD have a rapid reproductive cycle, and depending on environmental conditions, 4–10 generations can hatch each year in the Northwest.

Commercial and home fruit growers are encouraged to monitor SWD starting just before fruit begins to ripen and to apply control sprays when the first SWD are found in the monitoring traps or when there are local reports of SWD found in the area. For updates on local SWD findings, refer to the distribution maps at <http://extension.wsu.edu/swd/Pages/treeFruitLinks.aspx>.

This fact sheet describes how to make a monitoring trap, how to sample fruit, and how to identify SWD. For more information on SWD, including its biology, life cycle, and control, refer to websites in Washington (<http://mtvernon.wsu.edu/ENTOMOLOGY/pests/SWD.html>) and <http://extension.wsu.edu/swd/Pages/treeFruitLinks.aspx>) and Oregon (<http://swd.hort.oregonstate.edu/>).

## Monitoring Traps

Traps for monitoring SWD can easily be made at home:

- Use a clear plastic cup or deli container. A 16 oz plastic cup is ideal.
- Drill or punch 7–10 holes measuring 1/8 to 3/16-inch around the top edge of the cup (Figure 1a); flies will enter the trap through these holes. Leave a 3-inch section on one side of the container to pour out used vinegar.
- Add 1 inch of pure apple cider vinegar (not artificially flavored).
- Add 1–2 drops of unscented dish soap.
- Snap the lid in place and fasten tape over any openings in the lid to keep rainwater out.



**Figure 1.** A clear plastic drinking cup with holes punched in the top (a) and placed in raspberry (b), strawberry (c), and cherry (d) plantings as a SWD trap.

Set the traps in place to monitor SWD before fruit begins to ripen.

**Caneberries and Blueberries:** Hang the trap on a plant, stake, or trellis 3–5 ft above the ground within the shady, cooler side of the plant canopy (Figure 1b).

**Strawberries:** Place the trap on the ground or elevated slightly above the canopy on a stake within the strawberry row (Figure 1c).

**Tree Fruit:** Hang the trap within easy reach or at eye level on the shady side of a tree (Figure 1d).

Place 1 trap in each crop or 1 trap per acre for large plantings. Entrance holes should be clear of leaves and fruit to allow easy entry by flies. Check traps for flies and replace vinegar weekly. Do not pour the vinegar from the trap on the ground, as it can attract SWD and affect trap results; remove the vinegar from the field and dispose elsewhere. Filter the trap contents over a fine screen or coffee drip filter placed in a hand-held colander (Figure 2) and examine with the naked eye or with a 10X–14X hand lens. Use the information below to identify male and female SWD. Track SWD numbers in your area by following the statewide monitoring and mapping program on the WSU Whatcom County website at <http://whatcom.wsu.edu/ipm/swd/scouting.html>.



*Figure 2. Coffee filter placed in a hand-held colander; pour trap contents through the filter and examine the insects.*

## Identifying SWD

Male SWD (Figure 3) are identified by:

- Red eyes
- A single spot located on the outside edge of each wing
- Two dark patches (sex combs) on each foreleg (requires at least 30X magnification)

Female SWD (Figure 4) are more difficult to identify. Key characteristics to look for are:

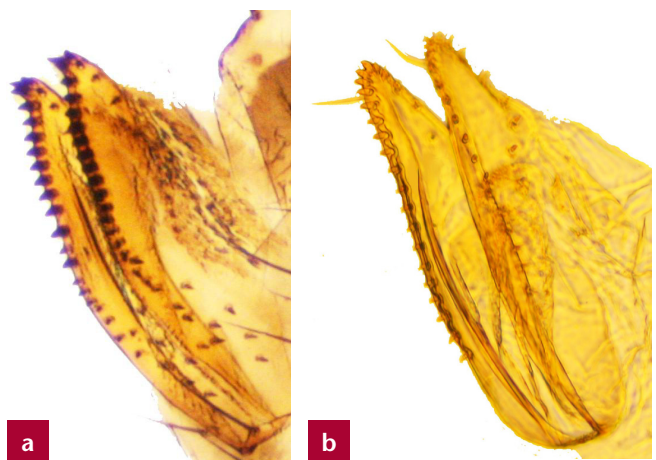
- Red eyes
- A serrated (saw-like) ovipositor (egg-laying structure) which often extends when the fly is floating in liquid (Figure 5a). Several common species of vinegar flies possess similar but more rounded ovipositors and may be easily mistaken for SWD (Figure 5b).
- No spots on their wings



*Figure 3. Male SWD, with red eyes and a single spot on the outside edge of each wing.*



*Figure 4. Female SWD also have red eyes but lack spots on their wings.*



*Figure 5. An enlarged view of the SWD ovipositor showing serrated edge (a); an example of a common vinegar fly ovipositor which does not have a sclerotized ovipositor (b).*

### SWD ovipositor

- Spines are dark due to increased sclerotization or hardness.
- The largest spine is located at the tip of the ovipositor; it punctures the skin of the fruit, allowing insertion of the ovipositor.

### Non-SWD ovipositor

- Blunt tip of ovipositor
- Spines are not blackened, indicating less hardening or sclerotization
- Cannot pierce skin of healthy fruit

### Salt Solution for Rapid Fruit Sampling

Once SWD have reached the egg-laying stage in your area, it may be necessary to test fruit for infestation to determine if your management program is effective. Collect potentially infested fruit (e.g., oviposition scars, soft and bruised areas) and test for live SWD larvae by placing fruit in a salt solution (Figure 6); larvae will wiggle out of the holes in the fruit.

- Dissolve 1 tablespoon salt per 1 cup warm water.
- Place fruit in a shallow pan, cover with a screen to keep fruit from floating, and cover with salt solution.
- Watch the fruit closely for at least 10–15 minutes to observe larvae exiting the fruit.
- You may need a hand lens and good lighting to see small larvae. If a quantitative sample is necessary, count quickly while the larvae are still alive and moving.



*Figure 6. Supplies needed for salt solution to extract live SWD larvae from fruit.*

The larval stage of SWD is especially difficult to identify. If you find larvae in the salt solution test, collect a second sample of potentially infested fruit, and place in a small clear plastic container with a lid at room temperature. Adult flies will emerge within 7 to 10 days. Refer to the information above to identify adult SWD. If you find SWD using this method, then your management program was not effective. Refer to the WSU Mount Vernon NWREC Entomology website at <http://mtvernon.wsu.edu/ENTOMOLOGY/pests/SWD.html> for more information to control SWD.



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