

Monitoring Techniques for Spotted-wing Drosophila

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Methods for monitoring SWD

The distribution, density and seasonal activity of spotted-wing drosophila should be monitored in commercial fruit production units to help determine crop risk. Monitoring should include both trapping and fruit inspections.

The basis of any pest-monitoring program is accurate identification of the species of interest. In the case of SWD, males have a single dark spot on the leading edge of each wing and a single comb on the first and second tarsal segments. Females have a prominent serrated ovipositor (Figure 1). Immature stages cannot be identified by gender, and they are not readily distinguishable from other closely related species of flies.

Food-baited traps are an essential tool to monitor adult activity in the field. Performance depends on trap

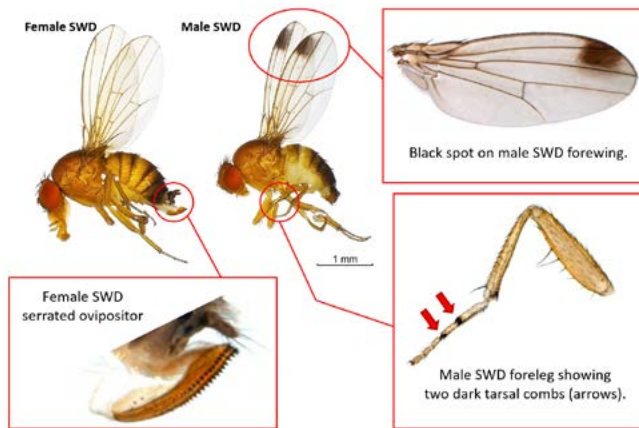


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Figure 1. The distinguishing features of the two sexes, female (left) and male (right).

Key points from this fact sheet

- *Spotted-wing drosophila (SWD) adults are monitored with food-baited traps. Larvae are monitored using the fruit dunk flotation technique. The market has zero tolerance for larvae in fruit.*
- *Adult trapping may be used as an early warning tool and year-to-year population comparison but does not give a direct measure of fruit infestation.*
- *Traps baited with a combination of red wine, apple vinegar and sugar, are effective.*
- *Place traps on the shady, cooler side of the plants at fruit level in susceptible crops, focusing on known hot spots.*

color, shape and structure, and effectiveness of the lures. Liquid yeast- or apple cider vinegar-based lures are effective. A combination of red wine (60%) and apple cider vinegar (40%) with molasses added at the rate of 0.67 ounces per quart of wine plus vinegar makes a cheap and highly attractive liquid bait for SWD. White wine can be used instead of red to aid in identification of trapped insects but may decrease overall attractiveness of the bait. A small drop of unscented detergent or soap will break the surface tension of a liquid bait and allow the flies to more easily enter the liquid and drown.

Several synthetic lures and trap containers can be purchased (Figure 2, page 2). The presence of ripe or ripening fruit in the vicinity of the trap can greatly decrease trap efficacy due to competition from the fruit and other resources near the production area. The attractiveness of traps and lures may vary depending on the time of the year and level of crop maturity.

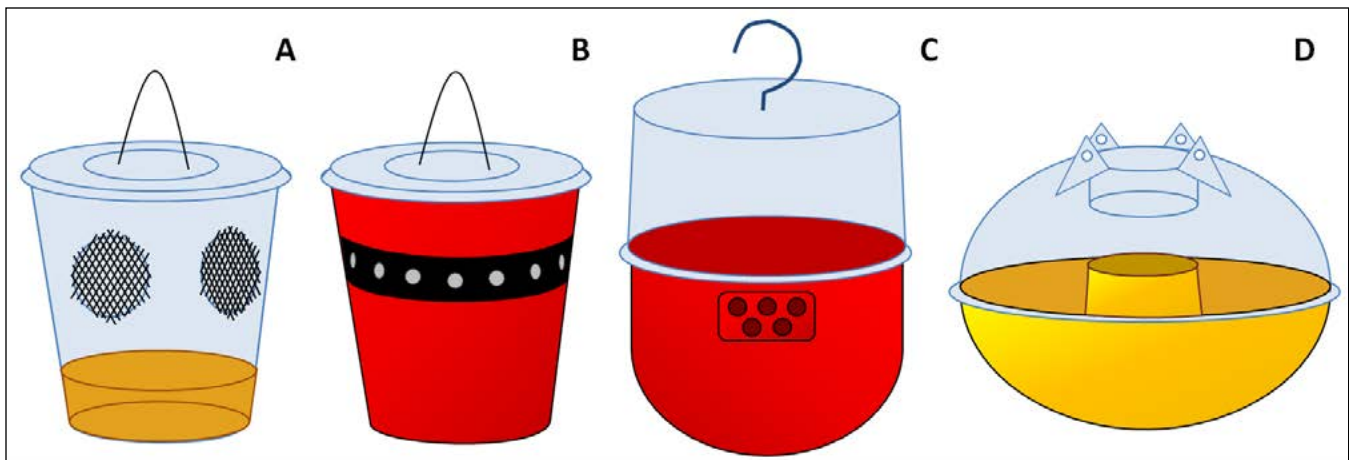


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Figure 2. Examples of homemade and commercially available traps for adult SWD monitoring. (A) Clear plastic, 20-ounce deli-cup trap baited with apple cider vinegar with mesh coverings on the two side openings; (B) red and black 12-ounce cup trap with many holes for entry points punctured around the black stripe; (C) the red Droso-Trap model (Biobest Inc., Westerlo, Belgium) with lateral holes as entry points and a clear top; and (D) the yellow ISCA trap model (ISCA Technologies, Riverside, California) with a single bottom entry point and a dome-shaped clear top.

Entrance holes with an 1/8-inch diameter (3-mm drill bit) allow entry for only small insects such as SWD while preventing larger, nontarget insects from entering.

Dry traps can be as effective as red traps baited with liquid lures. Synthetic lures such as Trécé (Adair, Oklahoma) or Scentry (Billings, Montana) brand lures are used with red or yellow plastic panels (typically 8 by 12 inches) and covered with sticky material such as Tanglefoot (The Scotts Company LLC, Tyler, Texas). Alternatively, a smaller plastic panel may be suspended above soapy water in a cup trap. Many growers prefer dry traps because SWD males can be spotted and counted in the field without transporting liquids.

Traps must be placed in the field before fruits begin to color. Follow instructions for replacement of lures. Trapping provides valuable information about the early activity of SWD adults in the field and in the surrounding environment but does not reliably predict infestation in fruit.

To assess infestation in fruits, berries must be monitored for the presence of SWD larvae. Some large, commercial berry growers use the fruit dunk flotation protocol from first fruit coloration until the end of harvest. Fruit monitoring allows for more informed decision making:

- Determine specific management actions required.
- Decide when to use management actions.
- Identify chronic SWD hotspots in fields.
- Document SWD field monitoring records for fruit handlers and certifying agencies.

Use the fruit dunk method (Van Timmeren et al. 2017) to determine the status of fruit quality.

It is important to monitor fruit suspected of being infested by SWD using a fruit dunk flotation method, because developing larvae feed on the fruit, degrading its quality and shelf life. The market has zero tolerance for larvae in fruit, as can happen when eggs develop into larvae as fruit travels to market.

Further readings

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