

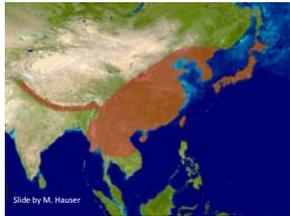


Spotted Wing Drosophila (SWD), *Drosophila suzukii*, in winegrapes

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Where is SWD from?



SWD is originally from Asia: China, Japan, Korea, and Thailand.

Most of the literature on SWD is from Japan.

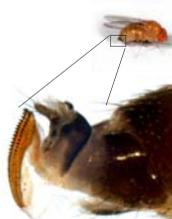
Where is SWD in the US?



SWD has also been detected in British Columbia in 2009, and in Spain and Italy.

Why is SWD a problem?

Unlike other vinegar or fruit flies that attack rotting or damaged fruit, SWD females have a serrated ovipositor (right). This enables SWD to lay eggs inside intact fruit that is ripening on the plant.



Using a 30x hand lens, eggs are visible on the fruit where the breathing tube protrudes outside.



Within a few days, the fruit begins to collapse and develop mold. If the fruit is opened, larvae can be found.



Infestation by SWD also might make the fruit more vulnerable to attack by other flies and pathogens.

- In Oregon in 2009, damage by SWD caused 20-80% crop losses in peach orchards, and 20-40% losses in late season raspberries and blueberries.
- In California in 2009, damage by SWD caused 25-50% crop losses in raspberries and blackberries.

Detecting SWD

- Adult SWD in the field can be monitored by standard yeast or vinegar traps.

- Drill ~six 3/16 – 3/8 inch holes on the side of a 16-32 oz. plastic cup with lid.
- Mix 2 tsp. bakers yeast, 4 tsp. sugar, and 2 c. water OR use apple cider vinegar with a small drop of dishsoap.
- Add ~1 inch of solution to the trap, a yellow sticky hung inside the cup can enhance captures (optional), and hang trap in shady spot near fruit.



- Males are most easily identified by the spots on their wings.



- Other traits that can be examined under the microscope include the two sex combs on the front legs of males, and the serrated ovipositor of the female.

- Larval SWD within fruit can be detected by fruit sampling methods which are easier with larger-sized larvae.

- Fruit-dunk-flotation: Crush fruit in plastic bag, add sugar water (1/4 c. sugar, 1 qt. water), fruit should sink while larvae float within a minute.
- Bag-out: Put fruit in plastic ziploc bag, keep in warm area or at room temperature, larvae should crawl out in a few hours.



Controlling SWD

- Current recommendations for managing SWD are posted at: <http://swd.hort.oregonstate.edu>
- Monitor for SWD with adult traps and fruit sampling.
- Several insecticides are registered for grapes; check with your extension office. http://swd.hort.oregonstate.edu/files/webfm/editor/Grape_SWD_Insecticides.pdf (insecticides registered for grape in Oregon)
- http://swd.hort.oregonstate.edu/files/webfm/editor/SWD_Pesticide_Update_June_2010.pdf (results from insecticide trials)
- Practice good sanitation to remove and dispose of unharvested fruit.
- Natural enemies such as parasitic wasps and Orius bugs may exert some natural control on populations.

Research on SWD in grapes

From Washington State University

- In D. Walsh's laboratory, tests have been conducted on Riesling, Merlot, early Campbell (Concord), and Flame at various ripeness stages. <http://ipm.wsu.edu>
- SWD were found to oviposit on injured grapes under no-choice conditions, and oviposit on non-injured Flame grapes with a 17.5% brix.

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Research at USDA-ARS HCRU and Oregon State University

How does exposure to SWD affect winegrapes?

Methods

- In the field, clusters of grapes are being exposed to no (control), 3 pairs of SWD (low rate), and 9 pairs of SWD (high rate) within a mesh bag for 2 days.



- Field trials are being performed on the four most common varieties in Oregon: Pinot Noir, Pinot Gris, Merlot and Chardonnay.
- Exposure treatments are replicated six times each week for 4-5 weeks.
- After grape clusters are exposed to flies, the mesh bag is removed. Clusters are then examined every week thereafter for a visual rating of damage.

Damage Rating Scale

- 0 – No Damage
- 1 – Oviposition Spotting Only
- 2 - 1-10% Damage (Fruit Splitting or Rot)
- 3 - 11-24% Damage (Fruit Splitting or Rot)
- 4 - 25-49% Damage (Fruit Splitting or Rot)
- 5 - 50-100% Damage (Fruit Splitting or Rot)

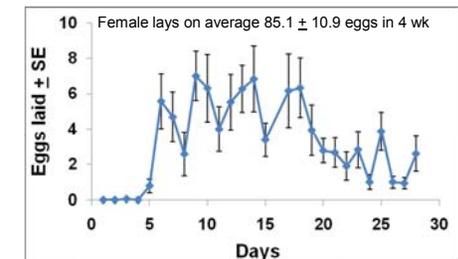


How many eggs does SWD lay on winegrapes?

Method

- Individual paired SWD were given 6 Pinot Noir grapes each day in a cage at 22°C.
- The number of eggs laid was counted each day for the first 4 weeks of life for each individual female (n = 20).

Current results



Does SWD show a preference for various varieties?

Method

- Six grapes of each variety (Pinot Noir, Pinot Gris, Merlot, Chardonnay) were simultaneously exposed to 10 pairs of SWD in a cage.
- After 24 hours, the number of eggs laid on grapes were counted.