Spotted-Wing Drosophila: A new pest in Ohio's fruit crops

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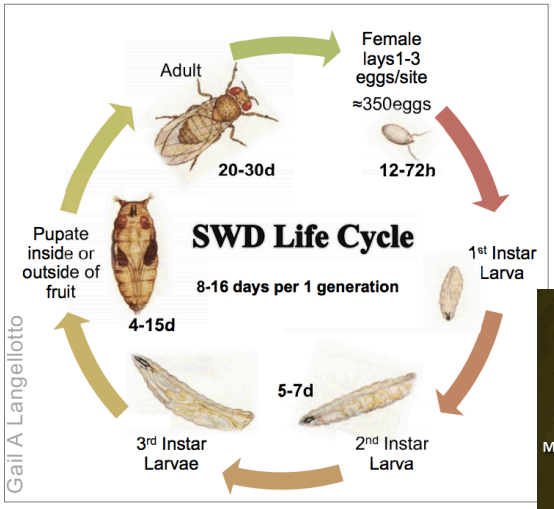
Introduction
- Looks like common vinegar flies on overripe, fallen, decaying fruit
- But the new species attacks <u>healthy</u> ripening fruit

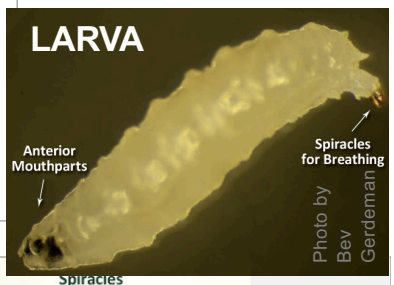
Detected locations
- In Hawaii since 1980
- California in 2008
- Florida, Washington, Oregon in 2009
- Michigan, Carolinas, Utah in 2010
- Ohio & many States since 2011
- Ohio:
  - – First detection in raspberries, September 2011, VanWert County in Northwest Ohio
  - – As of December 2019: confirmed in 57 of Ohio's 88 counties

Hosts
- Early: cherries
- Mid: raspberries, blackberries, blueberries
- Late: grapes
- also: peach, plum, day-neutral strawberries

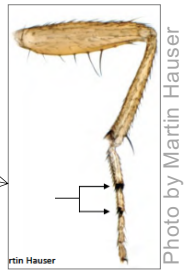


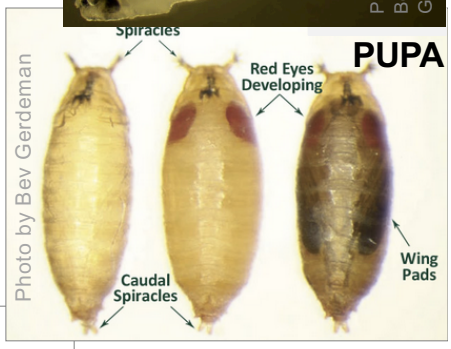
Damage
- Egg laying & larval feeding
- Starts as tiny scar on skin of fruit
- Skin collapses in 2-3 days; molds

Life cycle
- Larvae feed inside fruit for 5-7 days
- Pupa inside or outside fruit
- 350 eggs per female fly
- One generation in 8-16 days
- Many generations per year
- Overwinters as adult in protected places



Identification
- Adult male:
  - – Spots on wings (visible with naked eye)
  - – Two dark bands on front leg (need magnifier)
- Adult female:
  - – Saw-like, hard ovipositor (need magnifier)





Current Status
- Please alert us if this pest is found or suspected
  - – Celeste Welty, at OSU, Columbus
  - – Your local county extension educator

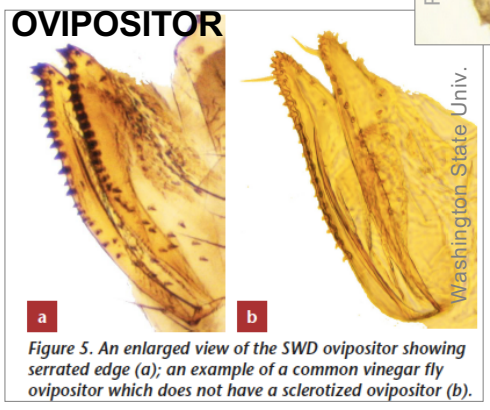
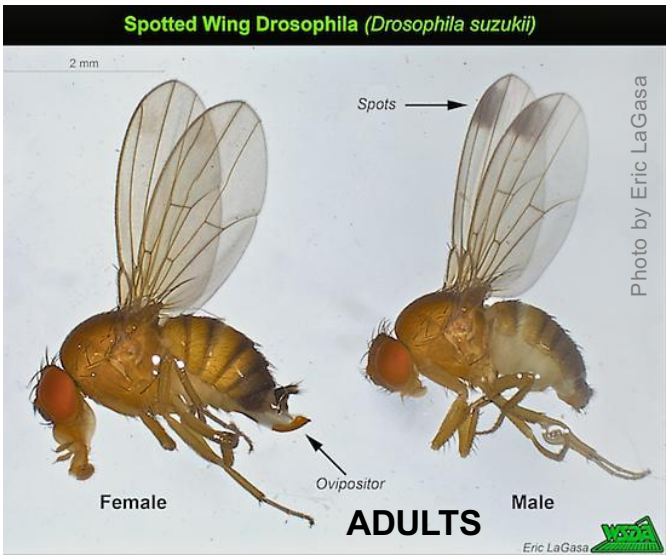
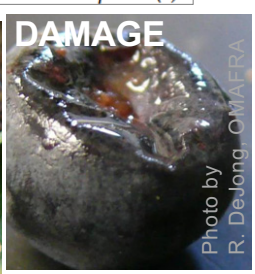


Figure 5. An enlarged view of the SWD ovipositor showing serrated edge (a); an example of a common vinegar fly ovipositor which does not have a sclerotized ovipositor (b).





Monitoring adult SWD adults with bait traps

- Option #1: commercial trap & lure made by Scentry Biologicals Inc.
  - hang lure from hook in lid of trap
  - make drowning solution: 25% apple cider vinegar, 75% water
  - put solution in trap, 1 inch depth, add drop of detergent (to prevent floating)
  - change lure every 4 weeks
- Option #2: make-your-own traps
  - clear plastic container (1 quart) with lid
  - drill 1/8" holes across top, along one side
  - bait option #1: commercial lure (see above)
  - bait option #2: apple cider vinegar, full strength, 1 inch deep + drop soap
  - bait option #3: yeast + sugar + flour + water in small cup with net lid, float on vinegar
- Use strainer and fine brush to remove trapped insects once per week
- Threshold: capture of a single confirmed SWD adult
- Beware, many non-target insects likely to be caught





Monitoring fruit for SWD larvae using salt tests

- In cup or bag: 2 tablespoons salt + 2 cups warm water + fruit
- After 20 minutes, look for larvae floating to top

Management

- Do not delay harvesting; pick as soon as fruit first ripen.
- Keep harvested fruit cooled as soon as picked.
- Sanitation is critical: collect & destroy damaged fruit every 2 days; put culls in clear plastic bag in sun for 1 week.
- Fine netting is a mechanical control option, especially for organic growers.
- If any SWD found in trap, then fruit need protection by insecticide sprays, starting when fruit begin to ripen (berries start to turn color), until final harvest.
- Spray every 3 - 7 days with insecticides, frequency based on residual activity shown in table below.
- Do a salt test weekly to see if control program working well; if control not good, shorten the spray interval.
- Insecticides for home gardens: see separate document; spinosad is one good choice for most crops.
- For resistance management, rotate among different mode-of-action groups: spinosyns (yellow in chart), diamides (light gray), pyrethroids (pink), organophosphates (blue), carbamates (green), and neonicotinoids (dark gray).
- Adjuvants that can increase efficacy slightly are NuFilm-P, or sugar, or sugar plus yeast, but beware of possible negative effects on pollinators and natural enemies when sugar or yeast attractants are used.

INSECTICIDE OPTIONS (based primarily on trials in OR, WA, CA, MI, NJ, NC, FL):

Efficacy on SWD	Mode of action group	Product	Residual activity (days)	Pre-harvest interval (PHI)						
				raspberry, blackberry	blue-berry	straw-berry	grape	cherry	peach	plum
Very effective	5	§ Delegate	5-7	1 day	1 or 3 days	X	7 days	7 days	1 day	1 day
	5	§ Radiant	5-7	X	X	1 day	X	X	X	X
	28	§ Exirel	5	1 day	3 days	1 day	X	3 days	3 days	3 days
	28	§ Verdepryn	5-7	1 day	1 day	1 day	7 days	7 days	7 days	7 days
	3A	! Mustang Maxx	7-10	1 day	1 day	X	1 day	14 days	14 days	14 days
	3A	! Hero [2(ee)]	7-10	3 days	1 day	X	30 days	X	X	X
	3A	! Danitol	7-10	3 days	3 days	3 days	21 days	3 days	3 days	3 days
	3A	! Baythroid [2(ee)]	7-10	X	X	X	3 days	7 days	7 days	7 days
	3A	! Pounce 25WP [2(ee)]	7-10	X	X	X	X	3 days	X	X
	3A	! Asana [2(ee)]	7-10	X	X	X	X	14 days	14 days	14 days
	1B	Imidan	7	X	3 days	X	7/14 days	7 days	14 days	7 days
	1A	! Lannate	3-6	X	3 days	X	X	X	X	X
Effective	1B	Malathion [2(ee)]	5-7	X	X	X	X	3 days	X	X
	5	Entrust [OMRI] [2(ee)]	3-5	1 day	1 day	1 day	7 days	7 days	1 day	1 day
Moderately effective	-	Grandevo [OMRI]	1-3?	0 days	0 days	0 days	0 days	0 days	0 days	0 days
	-	Venerate [OMRI]	1-3?	0 days	0 days	0 days	X	0 days	0 days	0 days
Slightly effective	3A	Pyganic [OMRI]	1-3	0 days	0 days	0 days	0 days	0 days	0 days	0 days

X means that the product is NOT ALLOWED for use on that crop.
! Restricted-Use Pesticide.
§ Not allowed in greenhouses or high tunnels.
OMRI *means allowed for use in organic production.*
2(ee) *means SWD not listed as target pest on the federal label but is listed on a 2(ee) recommendation label.*

Compiled 26 March 2012, revised 4/2013, 11/2013, 2/2015, 6/2015, 3/2017, 7/2017, 2/2018, 2/2019, 3/2019, 11/15/2020.