



Fruit Insect Update

Fruit Pest Management In-Service Workshop
Sponsored by USU Extension Utah Pests Team
March 2, 2010
Utah State University, Logan, UT

Topics

- Spotted-wing Drosophila
 - Potential for invasion to Utah
- Raspberry Horntail
 - Research update on insect biology and management
- Greater Peachtree Borer
 - Mating disruption as a tool for even small peach orchards

Spotted-wing Drosophila

- *Drosophila suzukii* (vinegar fly)
- Exotic, first detected in CA, OR & WA in 2009 and spread rapidly (also in FL & HI)
- Native to SE Asia
- Most *Drosophila* lay eggs in decaying fruit, but *D. suzukii* attacks ripening fruit



D. suzukii larva (up to 3.5 mm;
~1/3 the size of a cherry fruit
fly larva) in blueberry fruit

D. suzukii male (2 mm)



This is not your common household- -compost pile-trash bin *Drosophila*

Female adult (3 mm) – no spot on wing



Saw-like ovipositor penetrates skin of fruit



Host range – very broad

- In CA/OR/WA
 - Cherry
 - Peach/Nectarine
 - Plum
 - Strawberry
 - Caneberries
 - Blueberry
 - Grape
 - Apple
 - Persimmon
 - Tomato

Oviposition scars in sweet cherry



Risk for introduction & establishment in Utah?

- Preferred temperature range for *D. suzukii*:
 - 68-85°F (males become sterile at higher temperatures)
 - It is not known how well this fly will overwinter in the cooler climates of the PNW (catches in Willamette Valley in Feb 2010) and Intermountain West
- Concern is based on
 - Its establishment in CA & rapid spread within CA, and to OR/WA
 - Its wide host range
 - Its rapid propagation (1-2 wk gen. time & up to 10 gen. per yr in CA)



Monitoring for *D. suzukii*



Bucket-style (McPhail) trap
with apple cider vinegar

Look for vinegar flies with
dark spot near each wing tip (males)



What to do if an infestation is suspected?

- Contact the Utah Department of Agriculture and Food and Utah Plant Pest Diagnostic Lab
- Management:
 - Insecticide sprays
 - *D. suzukii* can be controlled with standard insecticides
 - Malathion, Mustang, GF-120, Success, Entrust
 - Sanitation
 - Dispose of infested fruit



Oregon State Univ. SWD Web Site

<http://swd.hort.oregonstate.edu>

Contents

- Home
- People
- Links to Related Websites
- Links to Documents
- Distribution

English

Welcome!


Spotted Wing Drosophila *Drosophila suzukii*

Author: Vaughn Walton

The goal of this page is to disseminate knowledge on Spotted Wing Drosophila (*Drosophila suzukii*) and highlight activities and research in Oregon. The Horticulture Department is committed to serve its growers by dissemination of vital knowledge and innovative development of sustainable control practices.

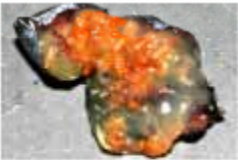
Active participants working on this pest are encouraged to look at the online independent workspace for Spotted Wing Drosophila, *Drosophila suzukii*.

Spotted Wing Drosophila Google Workspace



Insects provided by USDA, photos V. Walton

***D. suzukii* found on blueberry by Walton lab on August 18, 2009**



See additional [first photos](#)

Hot Links

- WSU Release on SWD
- Fruit Fly Dells Oregon Crops (KZZ.com)
- Drosophila suzukii* Infestation model
- Possible biocontrol agents

Upcoming Events

Spotted Wing Drosophila Training (SWD)

Beginning: Monday, March 1, 2010 9:00am

Ending: Friday, March 5, 2010 1:00pm

[more info](#)

Developing Approaches to Spotted Wing Drosophila

Beginning: Monday, April 12, 2010 9:00am

Ending: Monday, April 12, 2010 11:00am

[more info](#)

More Events

Raspberry horntail

- Currently, most severe insect pest of raspberries (summer- and fall-bearers) in northern UT
- Caneboring wasp (*Hartigia cressonii*)
- Hosts: raspberry, other brambles, rose
- One generation per year; egg-laying extends from early spring to early summer (larval sizes overlap)



Raspberry horntail

- Attack first-year canes (primocanes)
- Apply contact insecticides in the early spring (soon after new cane growth emerges from ground) to target adults before eggs are laid
- Frequent pruning of infested cane tips during summer can lower the horntail population in a field
- Several species of parasitic wasps attack horntail larvae within canes and provide biological control (late in the season)

Wilted cane tips
with horntail



Economic losses

- University of California Pest Management Guidelines:
 - 3 actively wilting canes per 100 row ft
- In northern UT, commonly observe infestation levels:
 - 1 infested cane per 5-10 row ft
 - > 3 times higher than UC guidelines
 - Crop loss is occurring



Pruning & sanitation

- Prune & destroy infested cane tips when wilting becomes apparent (June – Aug)
- Cane tips with a larva become soft
- Cut canes ~ 6 inches below tip to ensure that larva is removed
- Can pinch cane tip & kill larva
- Prune/pinch infested canes 1-2 times / wk



Varietal susceptibility - Summer

Summer Variety	Mean no. of larvae
Cascade Dawn	1.5
Cascade Delight	1.8
Royalty	2.8
Moutere	3.0
Cowichan	4.3
Georgia	4.3
Coho	4.8
Titan	5.3
Chemainus	5.5
Tulameen	5.8
Cascade Bounty	6.0
WDNV ₂	6.3
Saanich	7.0
Canby	8.5
Reveille	10.3
Lauren	10.8
Willamette	12.0

Mean number of horntail larvae per 12 row ft from late June to mid August, 2009, Kaysville, UT

Varietal susceptibility - Fall

Fall Variety	Mean no. of larvae
Himbo Top™	3.0
Polana	3.0
Joan J	3.3
Jaclyn	4.3
Caroline	4.8
Ruby	5.3
Anne	5.5
Summit	5.5
Polka	7.5
Heritage	8.3

Mean number of horntail larvae per 12 row ft from late June to mid August, 2009, Kaysville, UT

Insecticides

- Contact insecticides
 - Adults emerge from the previous year's canes in the early spring (late March to April?)
 - Contact insecticides can kill adults & prevent egg-laying in canes
 - New primocanes should be protected as soon as they begin to grow through early summer (heavy infestations)
 - Avoid insecticides harmful to pollinators during bloom
- Systemic insecticide (imidacloprid, Admire)
 - Crown & soil drench in late spring to early summer
 - Imidacloprid is upwardly mobile in plant, so may contact & kill horntail eggs and larvae; efficacy has not been proven

Insecticide products

- Botanical (21^l)
 - rotenone + pyrethrin (Bonide, Pyrellin, Pyganic)^{OH}
- Carbamate (1A)
 - carbaryl (Sevin)^H
- Insect growth regulator (18B)
 - azadirachtin (Aza-Direct, Neemix)^{OH}
- Neonicotinoid (4A)
 - acetamiprid (Assail)
 - imidacloprid (Admire) – systemic, soil apply
 - thiamethoxam (Actara)

^lIRAC mode of action classification, ^OOMRI approved for organic production, ^Hhomeowner products available

Insecticide products (cont.)

- Organophosphate (IB)
 - diazinon (Diazinon)^R
 - malathion (Malathion)^H
- Particle barrier / repellent
 - kaolin clay (Surround)^{OH} – likely a suppressant only
- Pyrethroids (3)
 - bifenthrin (Brigade^R, Capture^R, Ortho^H)
 - esfenvalerate (Asana)^R
 - fenpropathrin (Danitol)^R
 - permethrin (Bonide, Hi-Yield)^H
 - zeta-cypermethrin (Mustang)^R

^IIRAC mode of action classification, ^OOMRI approved for organic production, ^Hhomeowner products available, ^Rrestricted use products

Natural enemies (biological control)

- At least 2 species of parasitic wasps attacked horntail larvae (June – Sep) in 2009 studies
- Parasitism occurred near cane tip (smaller diameter, softer cane tissue facilitates insertion of the parasite ovipositor)

Ectoparasite – small larvae on horntail larva



Ectoparasite – small pupae with dead horntail larva



Raspberry Horntail Fact Sheet

Raspberry Horntail (*Hartigia cressonii*)

Diane Aldous, Entomologist • Beech Black, Tree Specialist • Mason Murray, IPM Project Leader

Do You Know?

- The raspberry horntail is a parasitizing wasp that can cause crop loss to raspberries in northern Utah.
- Apply insecticides in the spring targeting adults, to prevent egg-laying in the new cones.
- Infested cones often become evident during summer when tips wilt and die back.
- Frequent pruning of infested cone tips during summer can lower horntail populations in a field.
- Several species of parasitic wasps attack horntail larvae within cones and can provide biological control.



Fig. 1. The raspberry horntail larva bites a spine on the tail end!



Fig. 2. Raspberry horntail adult!

The most injurious insects to raspberries are those that bore within the cones resulting in cone dieback, reduced fruit yields, and even cone death. The most common of the borers attacking raspberries in northern Utah is the raspberry horntail (*Hartigia cressonii* (Kromb)), a type of wasp (Hymenoptera: Cteniscidae). It was first documented in Utah in the 1980s, and is known to occur in other western states. Horntails spend the winter as mature larvae in the previous year's cones, pupate in the early spring, and emerge as adults to mate and lay eggs in primocanes (first year canes) just after cone growth begins. Early-season egg-laying and protection of the eggs and larvae within cones create challenges for horntail management and potential for high infestation levels in raspberry fields. Recent research to evaluate the susceptibility of raspberry varieties and observations of high population levels of horntail larvae in some fields, provide new insights into raspberry horntail management.

HOST PLANTS

raspberry, other brambles, rose

LIFE HISTORY

There appears to be only one generation per year in northern Utah. Egg-laying extends from early spring to early summer, so larvae of all sizes can be found in cones during the summer.

Mature Larva – Overwintering Stage

- **Size, shape, and color:** cylindrical, white body about 1 inch (25 mm) long; hardened, brown head; short spine on the tail end (Fig. 1).
- **When and where:** spends the winter in a skinned cavity in the lower cane.

Pupa

- **Size and color:** tan and about 1/2 inch (12 mm) long.
- **When and where:** pupation occurs within the cane in the early spring.

Home Site Map Site History Search Extension Sites A-Z

Utah State University COOPERATIVE EXTENSION

UTAH PESTS

Utah's diverse landscape supports thousands of insects and plant pathogens. UTAH PESTS is your portal for learning more about pests and their beneficial counterparts around the state, and how Utah Extension personnel are working to provide a greater understanding of these organisms in our world.

fact sheets (circled in red)

Recently asked questions

Image galleries

Slide shows

Utah pests news quarterly newsletter

Contact us

Utah Plant Pest Diagnostic Lab

Choose this site for the [plant pest advisories](#), the [IPM/MSU-Grant program](#), [weather data](#), and much more.

Choose this site for a multitude of fact sheets on diseases and disorders of [fruit trees](#), [fruits](#), [ornamentals](#), [nut](#), and [vegetables](#).

[Insects and their relatives](#)

This site will help to shed some light on the insect world, with [fact sheets](#), [images](#), [slide shows](#), and more.

[Utah plant pest diagnostic lab](#)

The UPPDL, the only lab of its kind in Utah, is here to identify and provide management recommendations for your pest problems.

webmaster UTAH CEE text only go.usafaf

Greater Peachtree Borer

Crown Borer

- Primary hosts in UT
 - Peach, nectarine (plum?)
- Mating Disruption
 - ▶ Excellent performance in UT
 - ▶ Single application
 - ▶ Isomate-P (Pacific Biocontrol Inc.)
 - ▶ Hang dispensers in lower half of canopy
 - ▶ Effective in small orchards (≤ 1 acre)
 - ▶ Complete trap shut down

