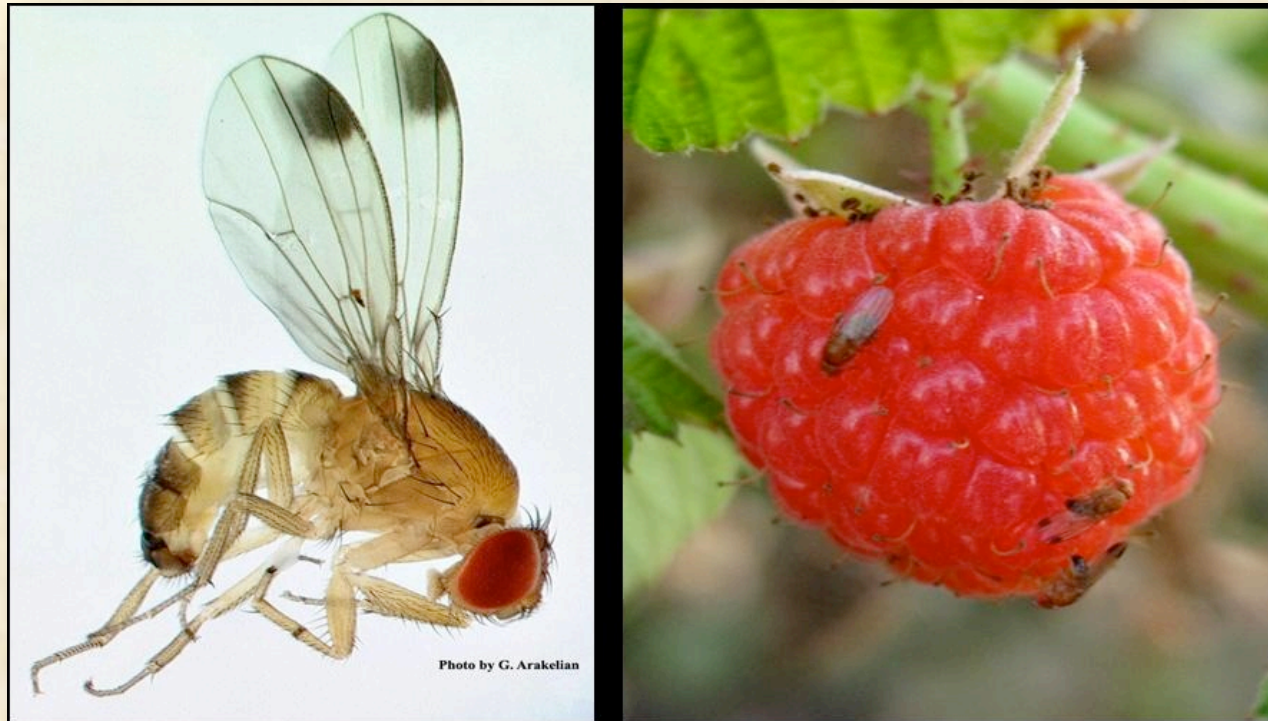


Late Season Spotted Wing Drosophila Management in NY.



Empire Producers Expo
January 23, 2014
Oncenter Convention Center
800 South State St. Syracuse, NY

Peter Jentsch
Senior Extension Associate – Entomology



THE JENTSCH LAB

INSECT BIOLOGY, ECOLOGY, AND MANAGEMENT IN HUDSON VALLEY AGRICULTURAL COMMODITIES OF NY



[HOME](#) [ENTOMOLOGY PROGRAM](#) [ORGANIC AG RESEARCH](#) [TREE FRUIT](#) [VEGETABLE](#) [SWEET CORN](#) [SMALL FRUIT](#) [GRAPE](#)

Invasive Species

Our work specifically addressing the impact of important [invasive insect pest species](#) across the major commodities grown in the Northeast, specifically those impacting the Hudson Valley, has been conducted since 2010. Monitoring invasive insects is our primary concern to determine early emergence, presence and development. Intensive scouting is then conducted to validate the presence in agricultural crops. From these data we hope to construct developmental models to initiate management and keep the agricultural community apprised of county distribution, management timing and economic injury levels throughout the region.

The insects of greatest concern include:

[Spotted Wing Drosophila, *Drosophila suzukii*](#) in small fruit, stone fruit and grape;

[2013 Hudson Valley Spotted Wing Drosophila Pest Alert](#)

[Brown Marmorated Stink Bug, *Halyomorpha halys*](#), causing economic injury to Hudson Valley tree fruit and pepper;

[Brown Marmorated Stink Bug Grower Alert](#)

[Managing BMSB Using an Integrated Approach](#): Pheromone based mass trapping, treated netting, high intensity lighting, and *Beauveria bassiana* (Mycotrol-O GHA strain)

[African Fig Fly, *Zapeionus indiana*](#), in grape; causing injury to grape in New jersey

HUDSON VALLEY LAB IMAGE



Cornell University's Hudson Valley Laboratory located in Highland, NY

THE JENTSCH LAB

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Plant Protection Presentations

Brown Marmorated Stink Bug

Empire Expo, On-Center, Syracuse, NY Jan. 21, 2014:

[Status of BMSB and SWD in NY](#)

[Studies of the Brown Marmorated Stink Bug, *Halyomorpha halys* \(Stål\), in New York State. Presented in Burlington Vt. on October 23, 2013 to 45 participants of the NY, New England, Canada Tree Fruit Pest Management Workshop.\(PDF file\)](#)

HUDSON VALLEY LAB IMAGE



Cornell University's Hudson Valley Laboratory located in Highland, NY

Spotted Wing Drosophila

Drosophila suzukii

- An invasive insect in the vinegar fly family. (Drosophilidae)
- Introduced to Western US in 2008.
- It was observed In 2011 in the Midwest, East Coast and northern Hudson Valley with **economic losses** in raspberry.
- In 2012 we **observed high levels of small fruit infestation across the Hudson Valley.**
- In 2013, **earlier emergence** and increasing range of fruit infestation.
- Raspberry & blackberry 100% loss.

Male

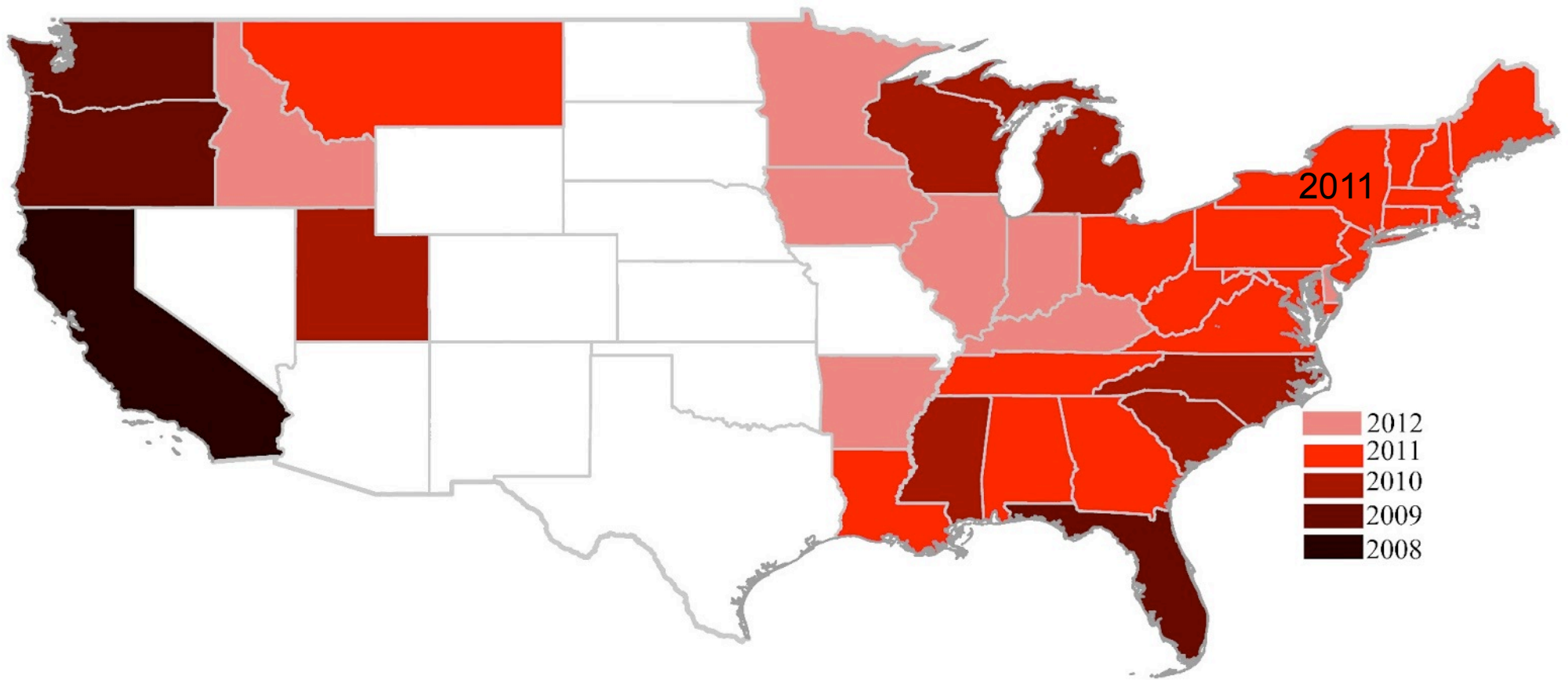


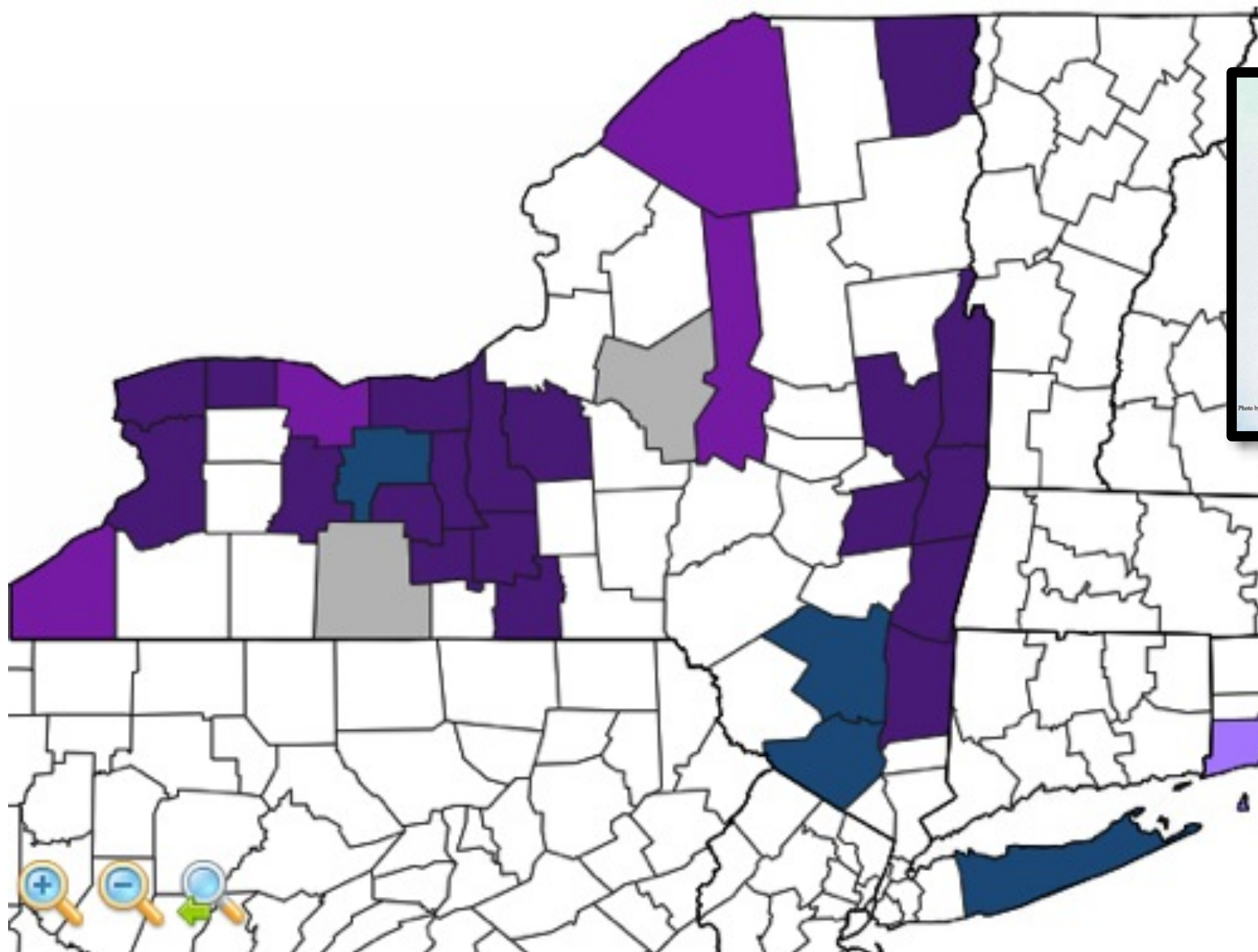
Female



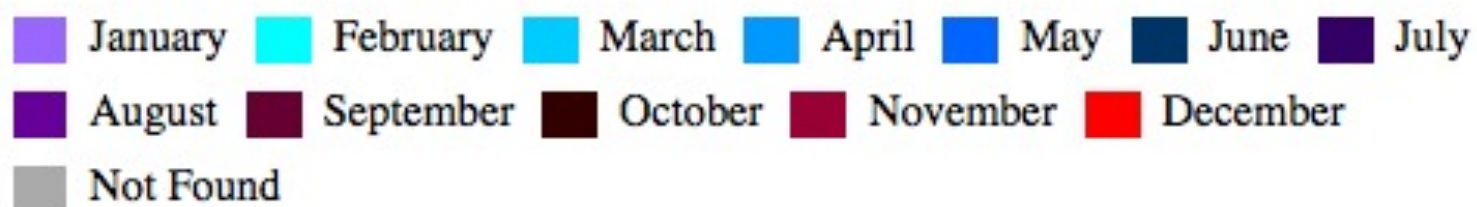
*Current state level spotted wing drosophila
in the United States.*

*Burrack, et al. 2012. Journal of Integrated Pest
Management.*





Legend



Drosophila suzukii

spotted wing

Drosophila



- Known Ag hosts include: blackberries, raspberries, blueberries, strawberries, figs, cherries, thin skin grapes, peaches, apples, pears, nectarines, plums.
- California represents the largest acreage of these fruits nationwide.
- SWD was responsible for an average of 20% crop loss in CA, although near total infestations are possible.
- Range of fruit injury from egg laying and larval infestation in the Hudson Valley of NY by mid-August: 17%-100% injury

SWD – Key Characteristics

Male



Black spot
on wings



2 black combs
on front legs



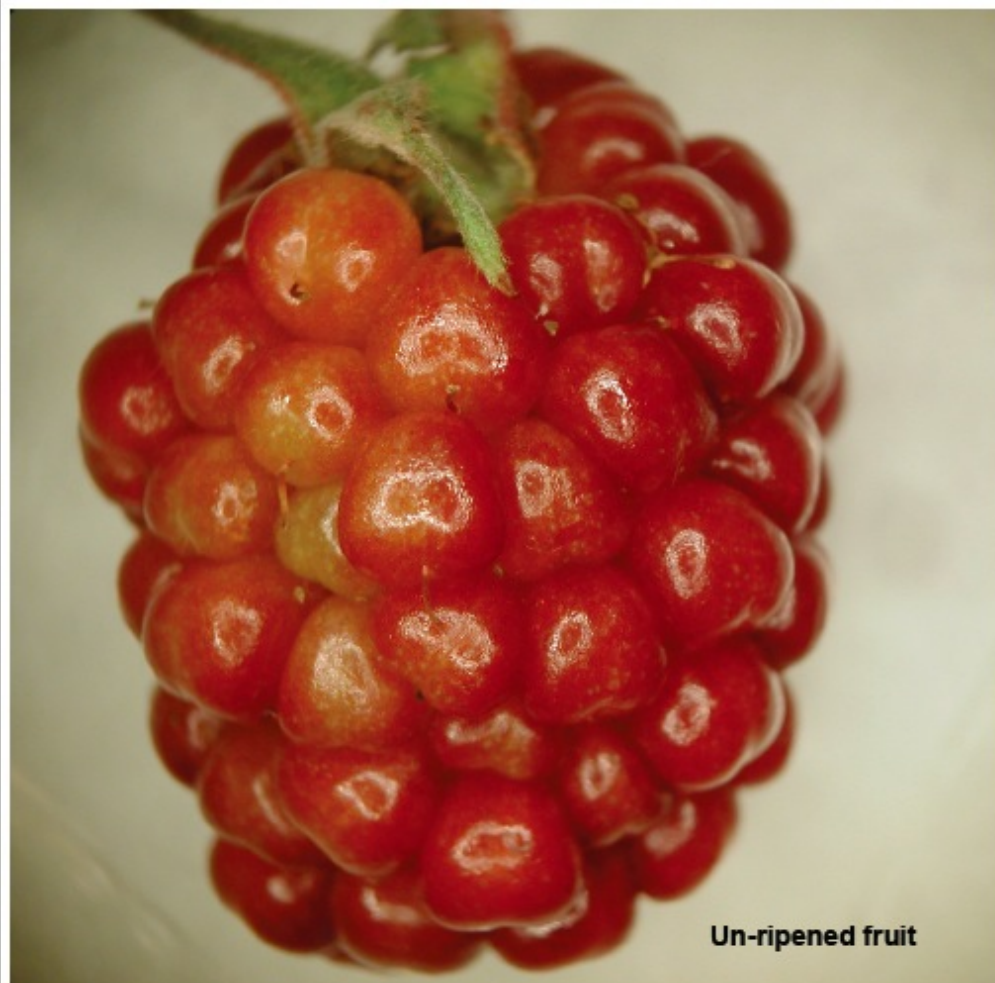
Female



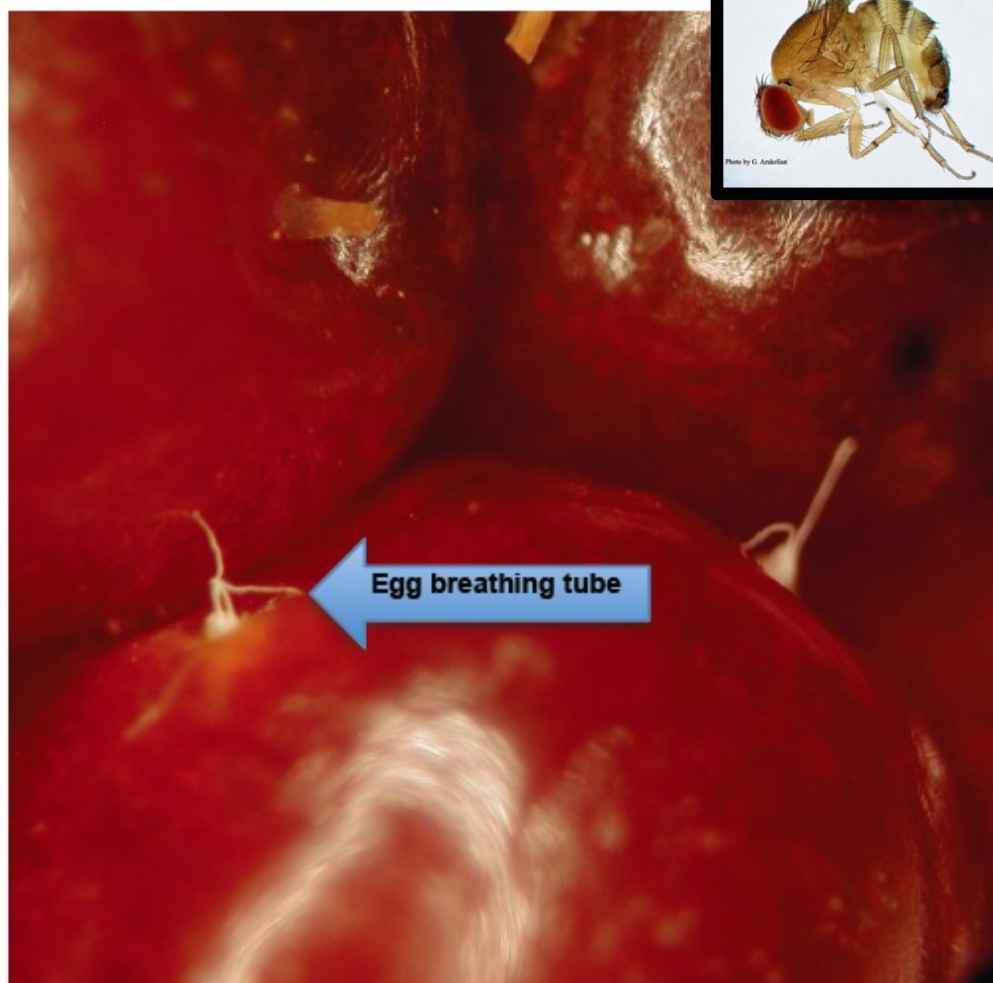
She inserts saw-like device
(ovipositor) into fruits and
lays eggs



Un-ripened blackberry infested with SWD eggs 2012

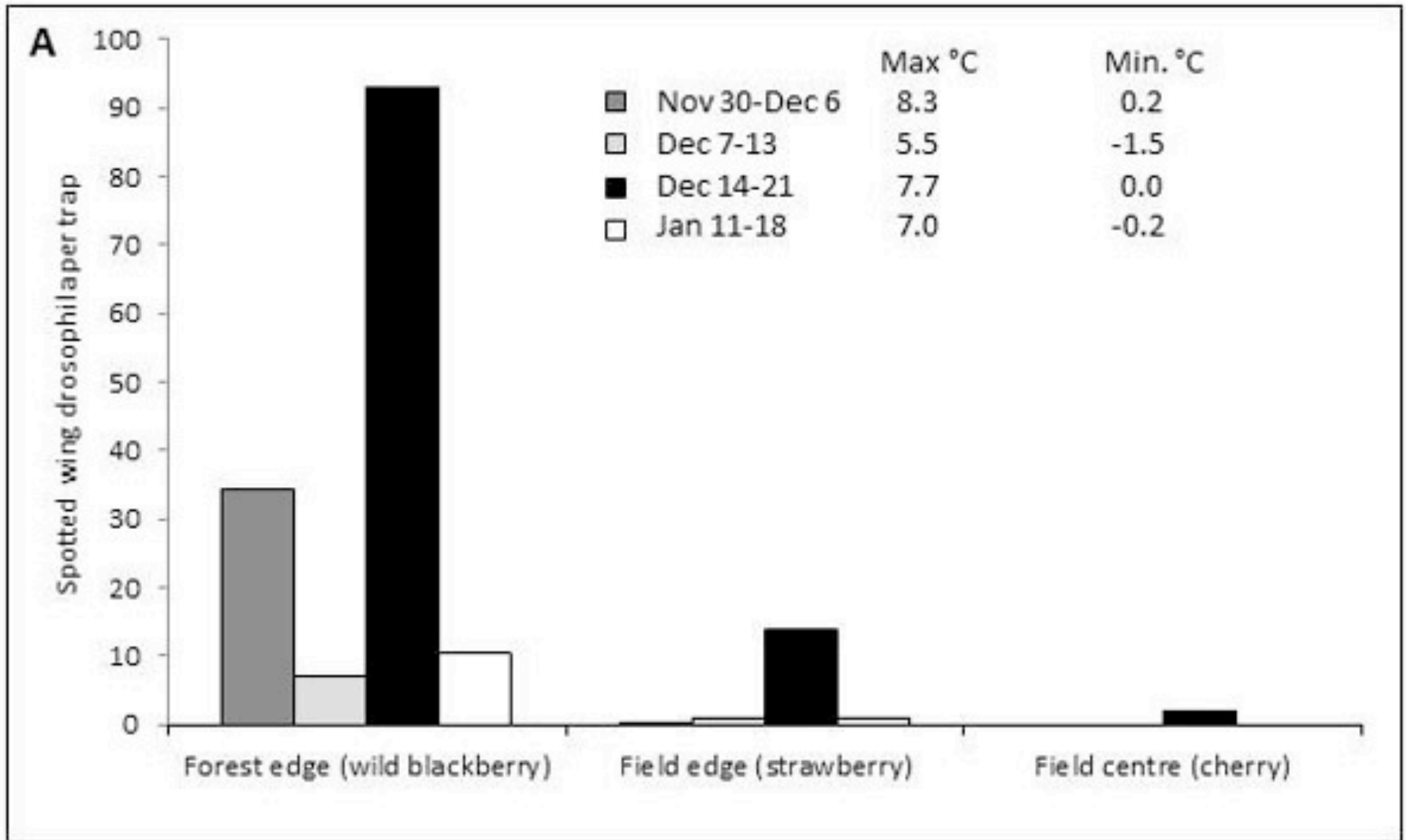


Un-ripened fruit



Key problem: SWD oviposits into pre-ripened fruit

Spotted Wing Drosophila – Overwintering



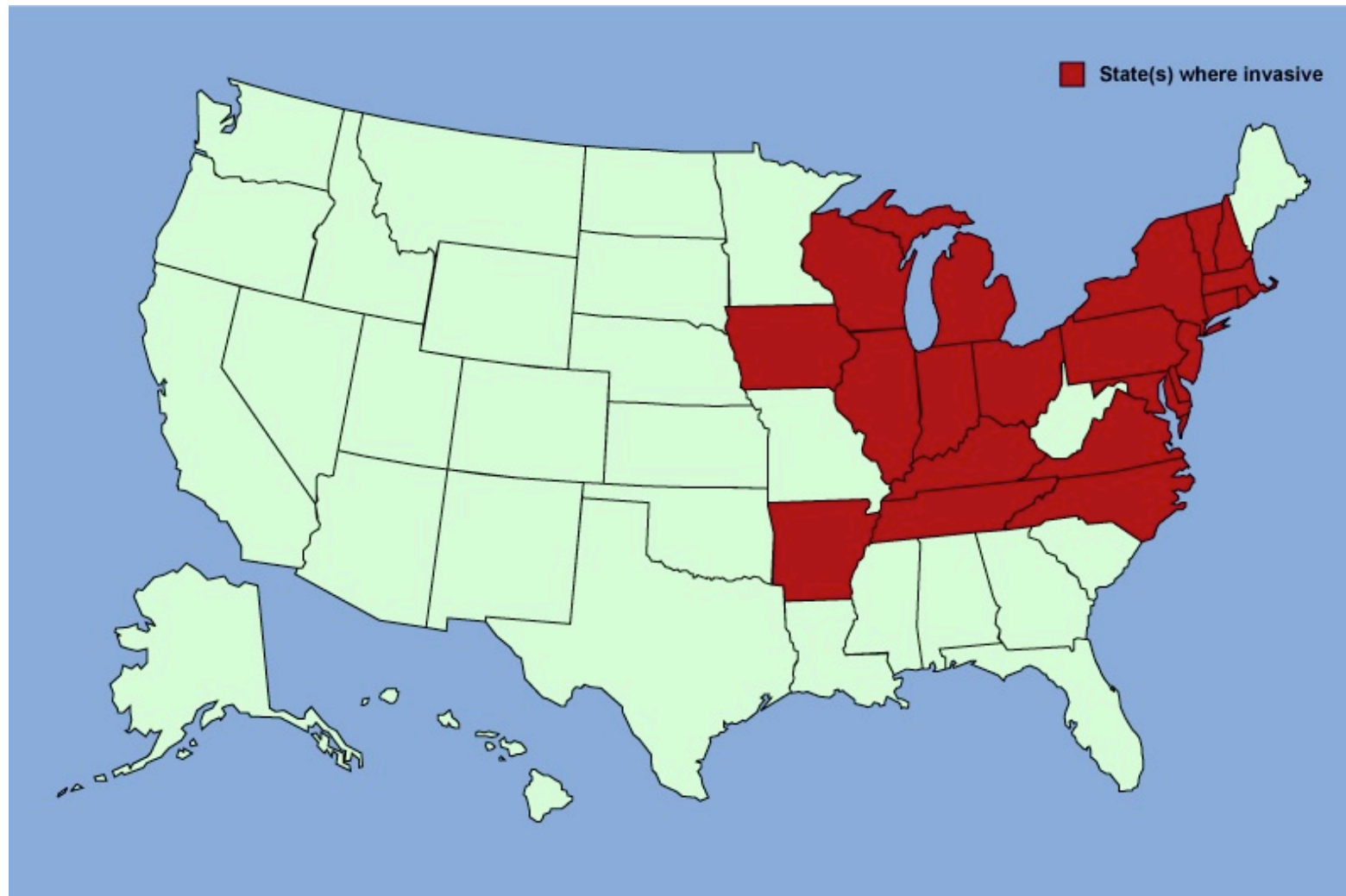
SWD trap captures in Vineland, Ontario

- Highest numbers move toward the forest in the winter

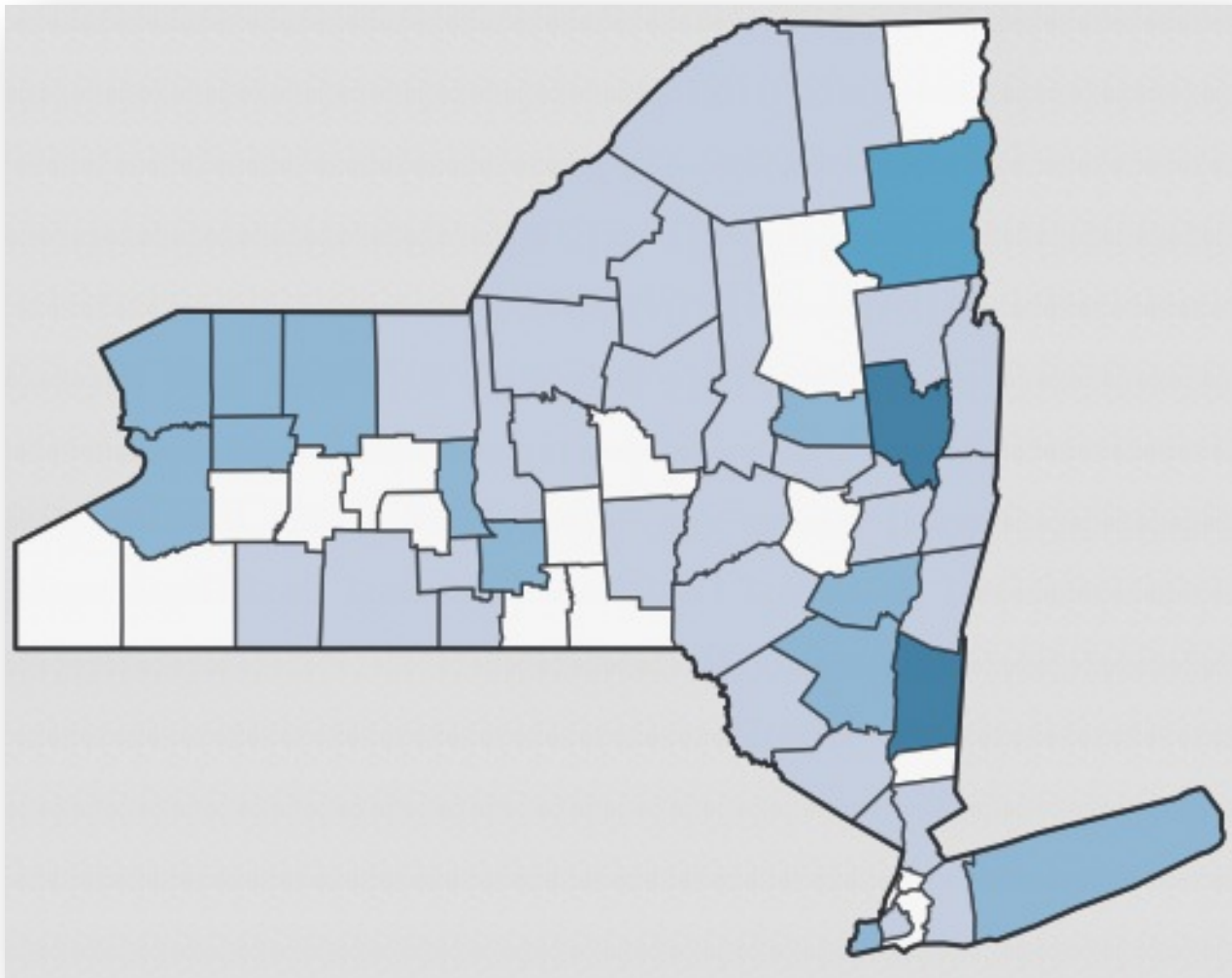


Tartarian Honeysuckle (*Lonicera tatarica*)

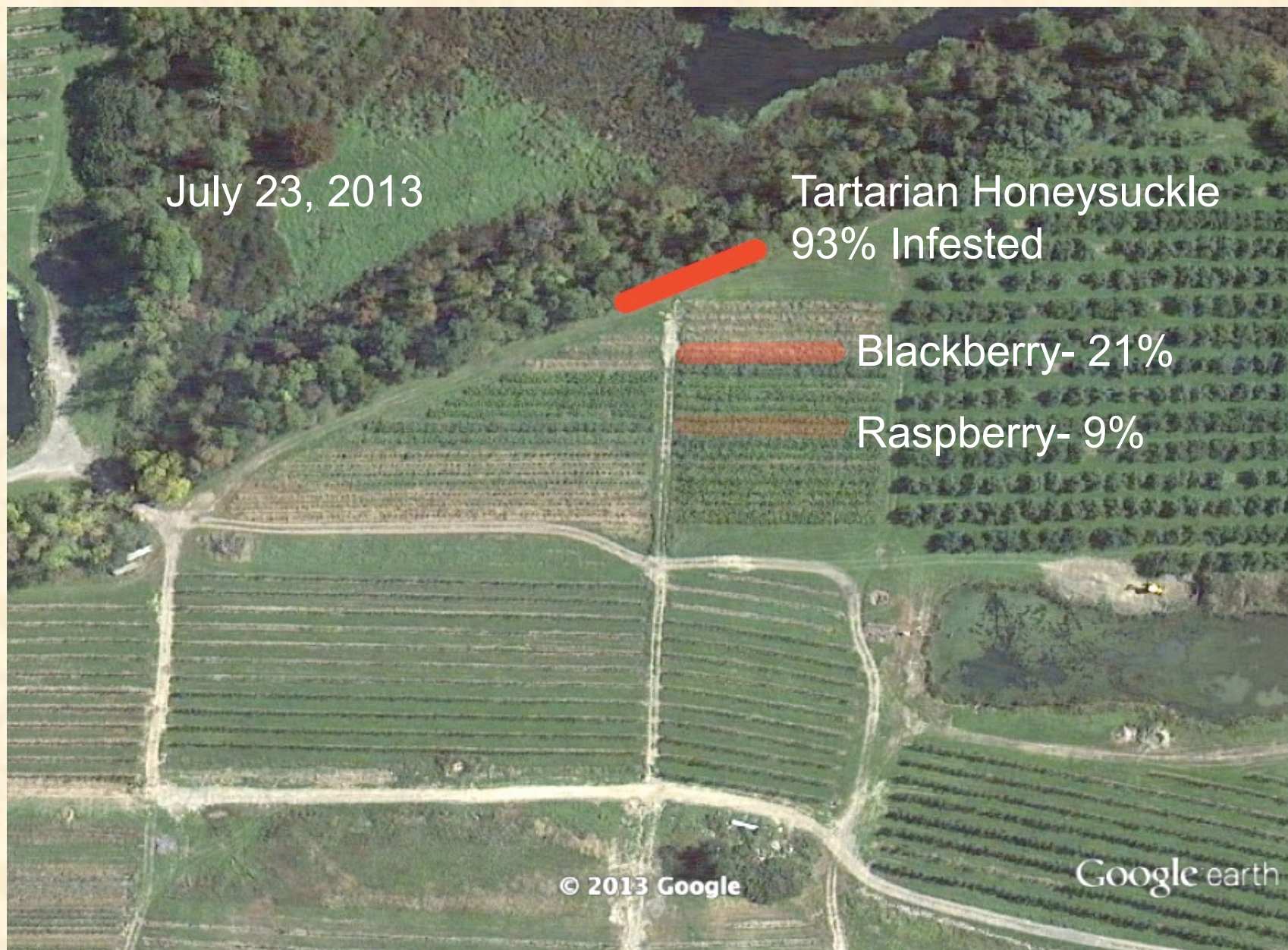
An invasive shrub, Tartarian honeysuckle is a native of eastern Asia and was first introduced into North America as an ornamental in 1752. SWD was found to be highly attracted to the fruit, and infestations in *L. tatarica* were noticed before infestation in cultivars.



Tartarian Honeysuckle (*Lonicera tatarica*)



Tartarian Honeysuckle (*Lonicera tatarica*)



Fruit Infestation levels by location. Opacity of line indicates level of infestation.

August 3rd, 2013

Tartarian Honeysuckle
60% Infested

Blackberry Outer Row- 90% Infested

Blackberry Inner Row- 50% Infested

Raspberry- 25% Infested

As Tartarian Honeysuckle loses fruit, infestation increases in cultivars closest to forest edge.

August 12th, 2013

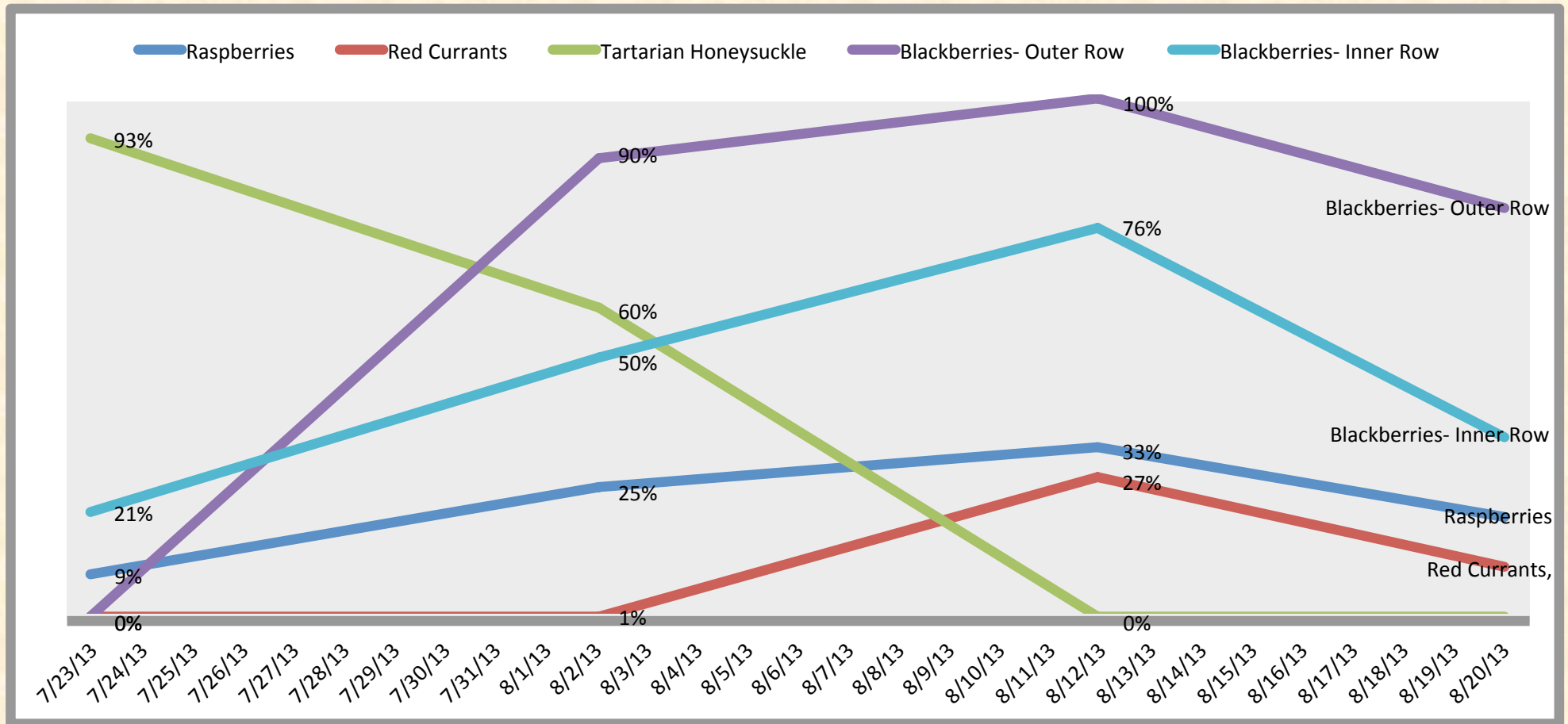
Tartarian Honeysuckle: No Fruit

Red Currant-
25% Infested

Blackberry Outer Row- 100% Infested
Blackberry Inner Row- 76% Infested
Raspberry- 33% Infested

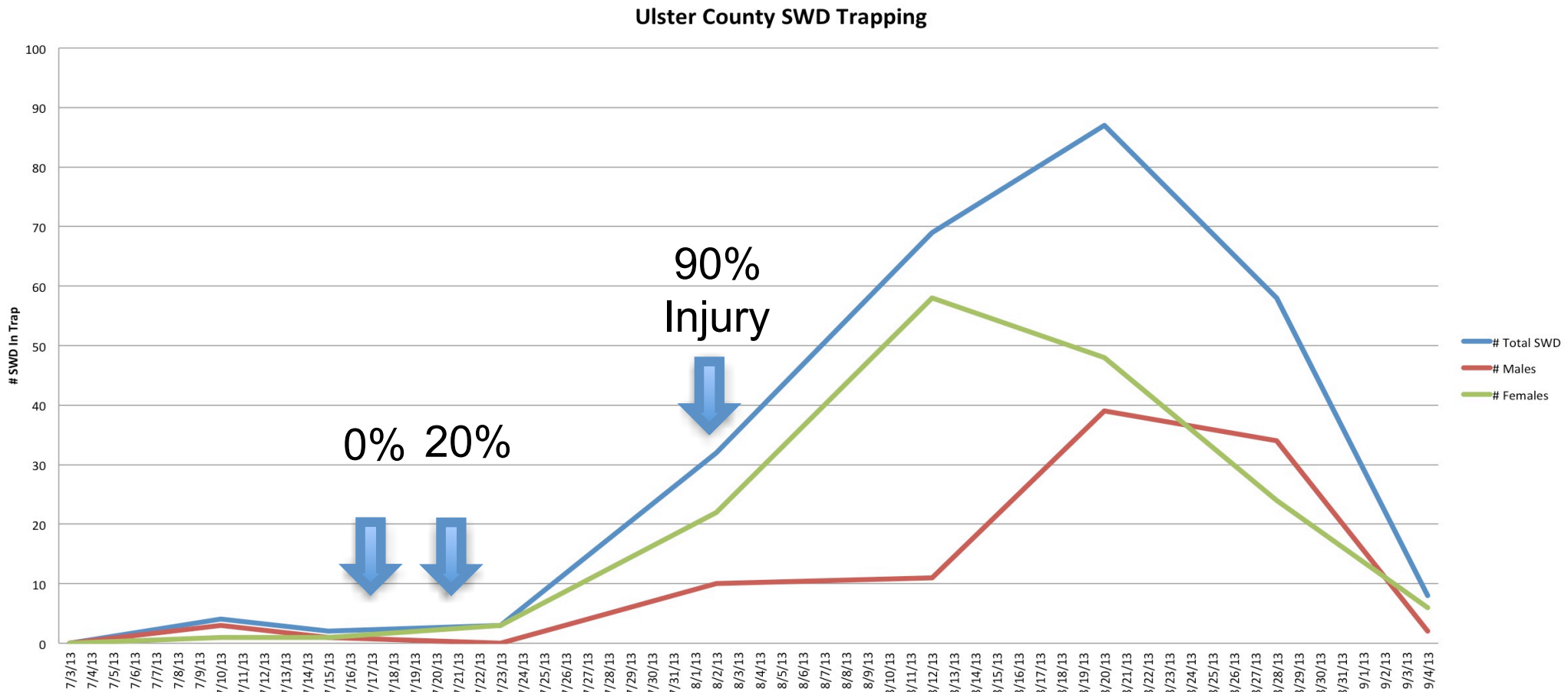
As Tartarian Honeysuckle loses all fruit, Infestation in cultivars reaches higher levels.

Fruit Infestation levels in wild hosts and small fruit: Ulster Co.



- Tartarian Honeysuckle berries maintained high levels of infestation until August 12, when the plants bordering the orchard no longer had fruit.
- Infestation in the domestic cultivars increased as wild hosts disappeared.

SWD Population over Time: Blackberry, Ulster Co. 2013



Injury in blackberry crop:

- Clean crop up to mid-July
- 20% injury on 21 July
- 90% injury on 1 August

SWD Management

Adult Trapping: Yeast mixture, sugar, apple cider vinegar
Adult captures provide early warning
Begin management at 1st adult SWD ?

Crop Monitoring: Assessment of fruit for eggs & larva

Cultural management of crop: Clean pick & removal of injured fruit

Maintain harvested fruit at 33F: ASAP

Insecticide frequency: 3-4 day program using best materials
Alternate row middle vs full row

Insecticide class rotation: Resistance management 10d to 2 wks

SWD Management after 0.8" of Rainfall (R. Issacs, Univ. Mich)

Material	Rate	% Control	% Control 0.8" rainfall
Mustang Max	4.0 oz./A	100	70-100
Assail 30SG	5.3 oz./A	60-100	20-45
Delegate 25WDG	4.5 oz./A	88-100	20-60
Malathion 8F	2.0 pts./A	70-100	8-45

Loss of SWD efficacy 1-3 days after rain

24 hrs post application rain event.

Stresses the need for retreatment of most insecticides.

SWD Control in Mixed Small Fruit; Orange Co.

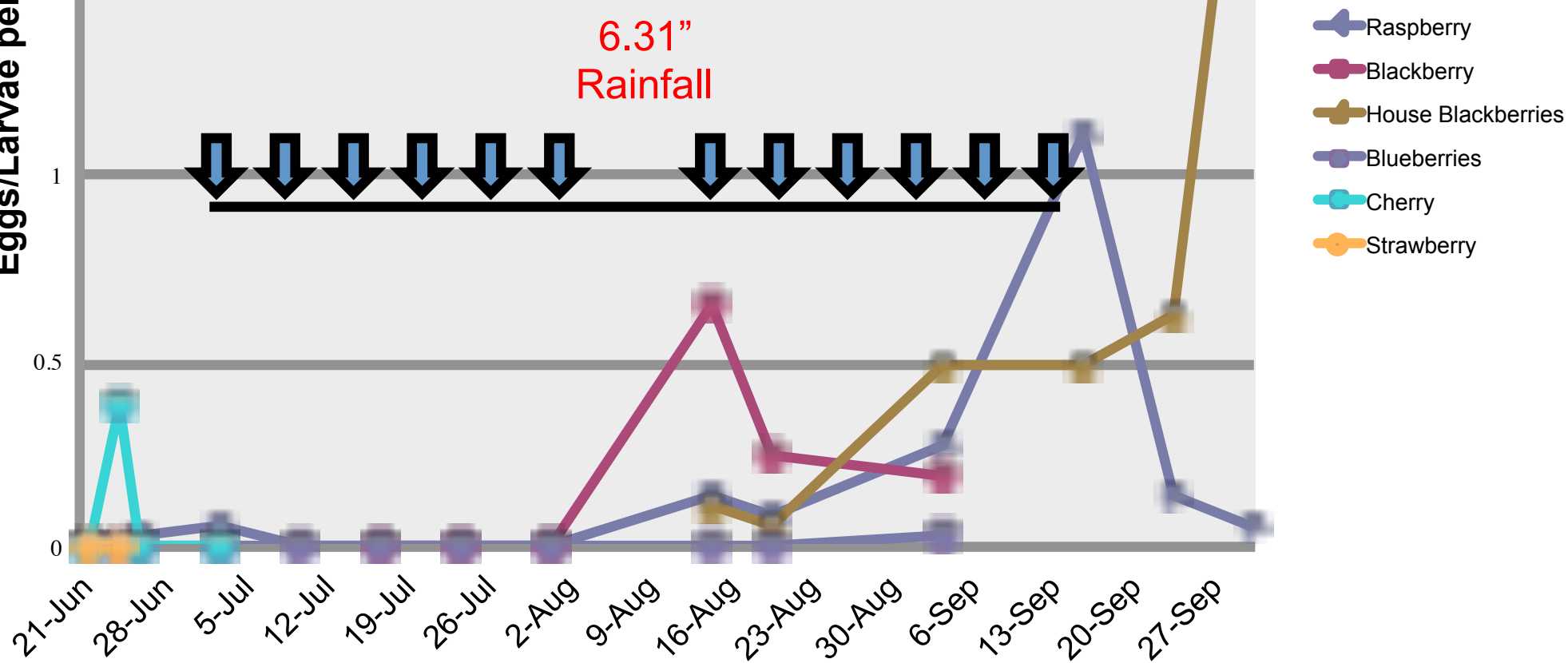
<u>Date</u>	<u>Material</u>	<u>Rate</u>	<u>Commodity</u>
27 June	Malathion 57	2 pts./A	Raspberry
1 July	Assail 30SG	5 oz./A	Raspberry
5 July	Malathion 57	2 pts./A	Raspberry
12 July	Delegate 25WDG	3 oz./A	Raspberry
14 July	Brigade	8 oz./A	Raspberry
19 July	Assail 30SG	5 oz./A	Raspberry
22 July	Danitol	16 oz./A	Raspberry
27 July	Mustang Max	4 oz./A	Raspberry
30 July	Assail 30SG	5 oz./A	Raspberry
6.31" Rainfall; 6 day application interval			
5 August	Delegate 25WDG	3 oz./A	Raspberry
<u>19 August</u>	<u>Brigade</u>	<u>8 oz./A</u>	<u>Raspberry</u>

Orange County Fruit Infestation- 2013

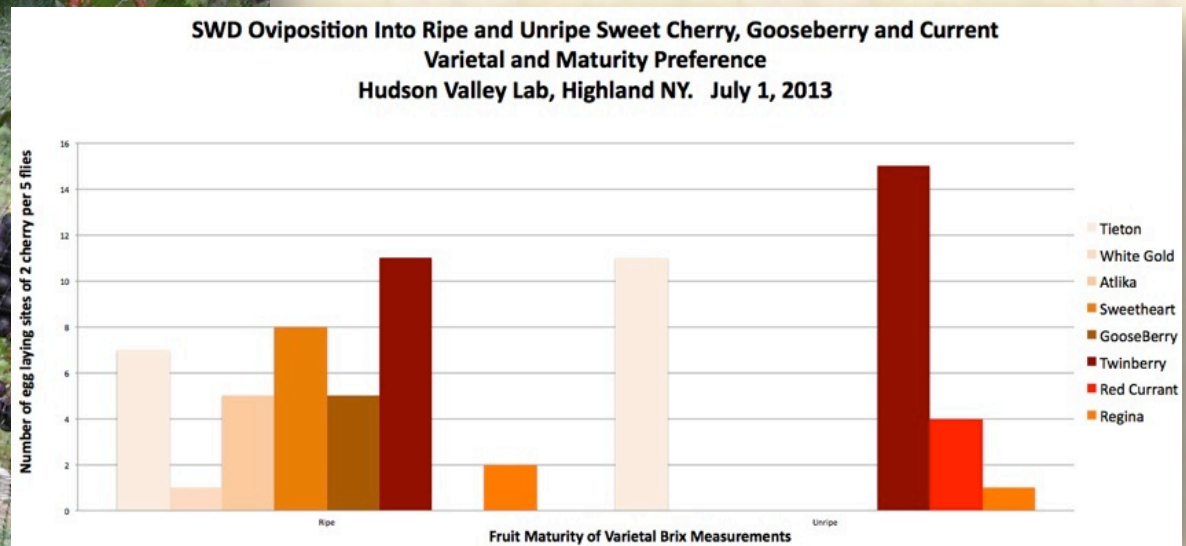
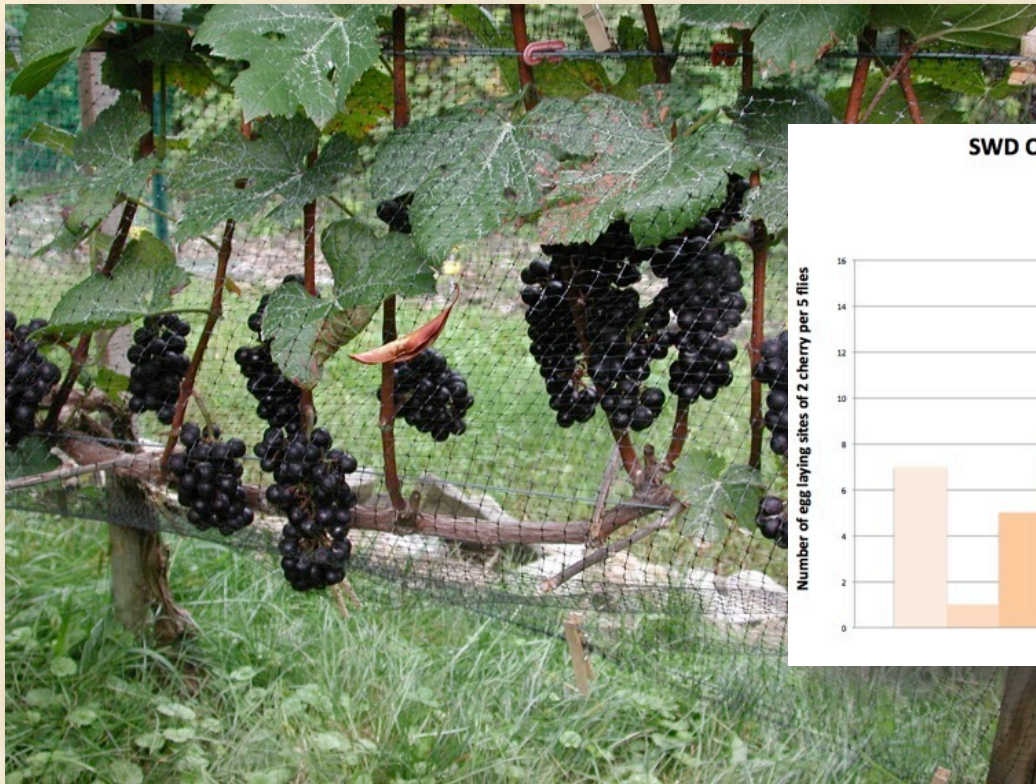
Raspberry Management

6.31"
Rainfall

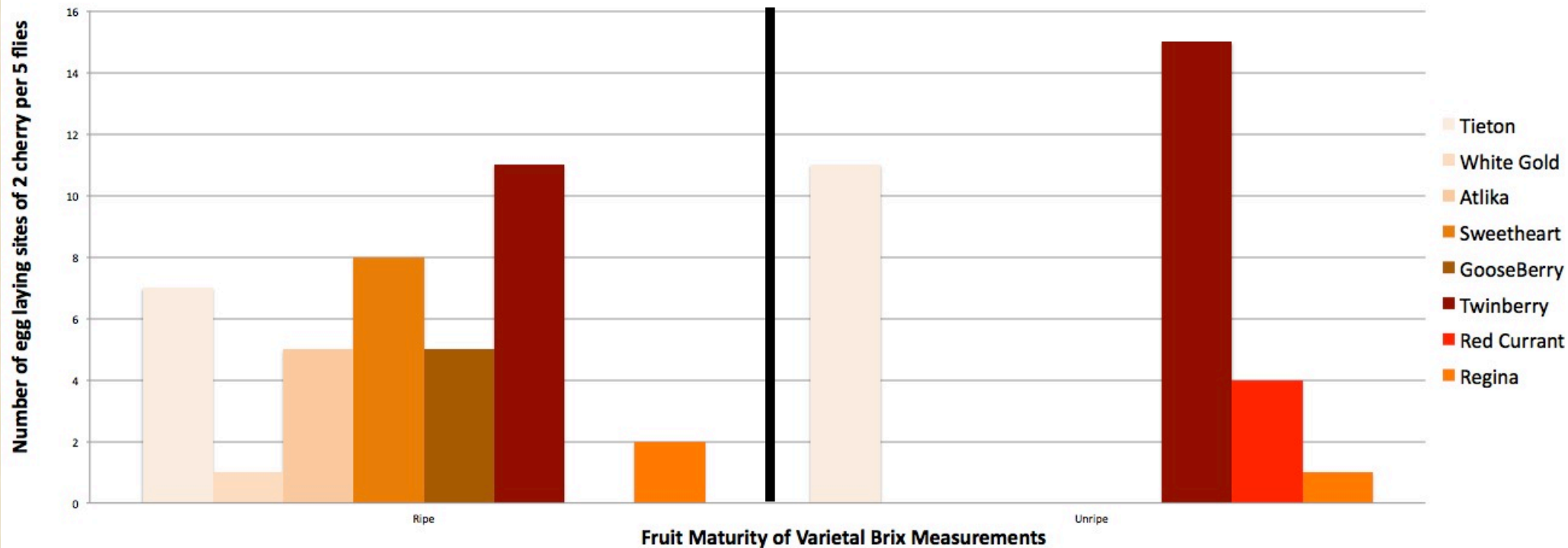
Eggs/Larvae per Gram



Varietal Preference of SWD to Sweet Cherry & Wine Grape in the Hudson Valley of NY



SWD Oviposition Into Ripe and Unripe Sweet Cherry, Gooseberry and Current Varietal and Maturity Preference Hudson Valley Lab, Highland NY. July 1, 2013

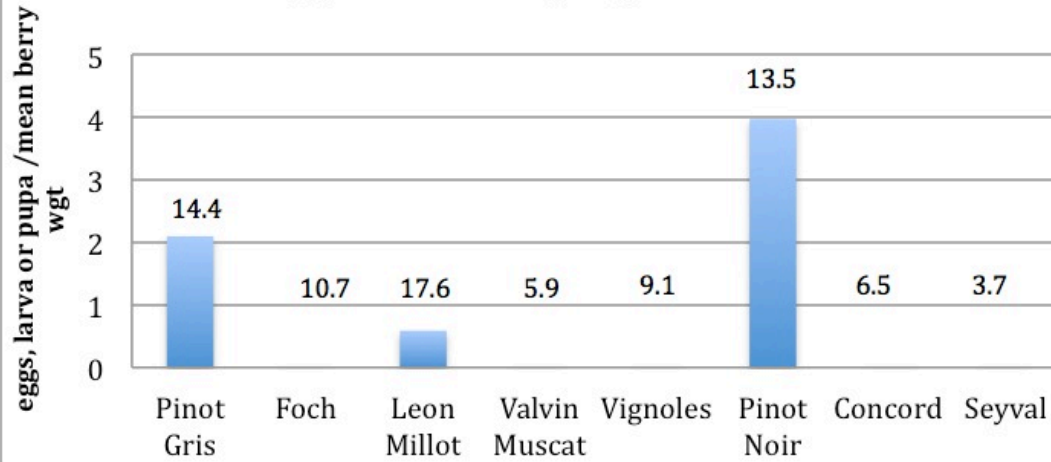


SWD oviposition during pre-harvest and ripened development.

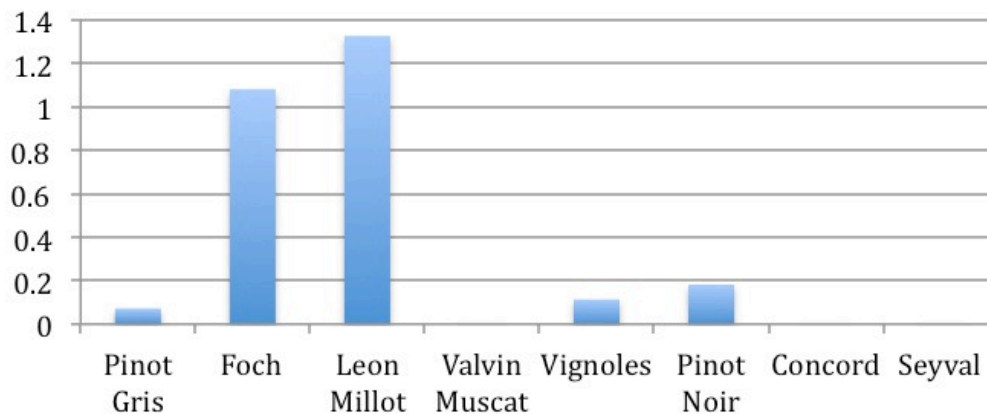
Male and Female flies were introduced to fruit, and allowed 48 hours to oviposit before they were removed and eggs were counted.

Each fruit was isolated with 2 cherry of each V. and 5 female SWD adults.

SWD Oviposition in Wine Grape
Eggs and Larvae per gram- Choice

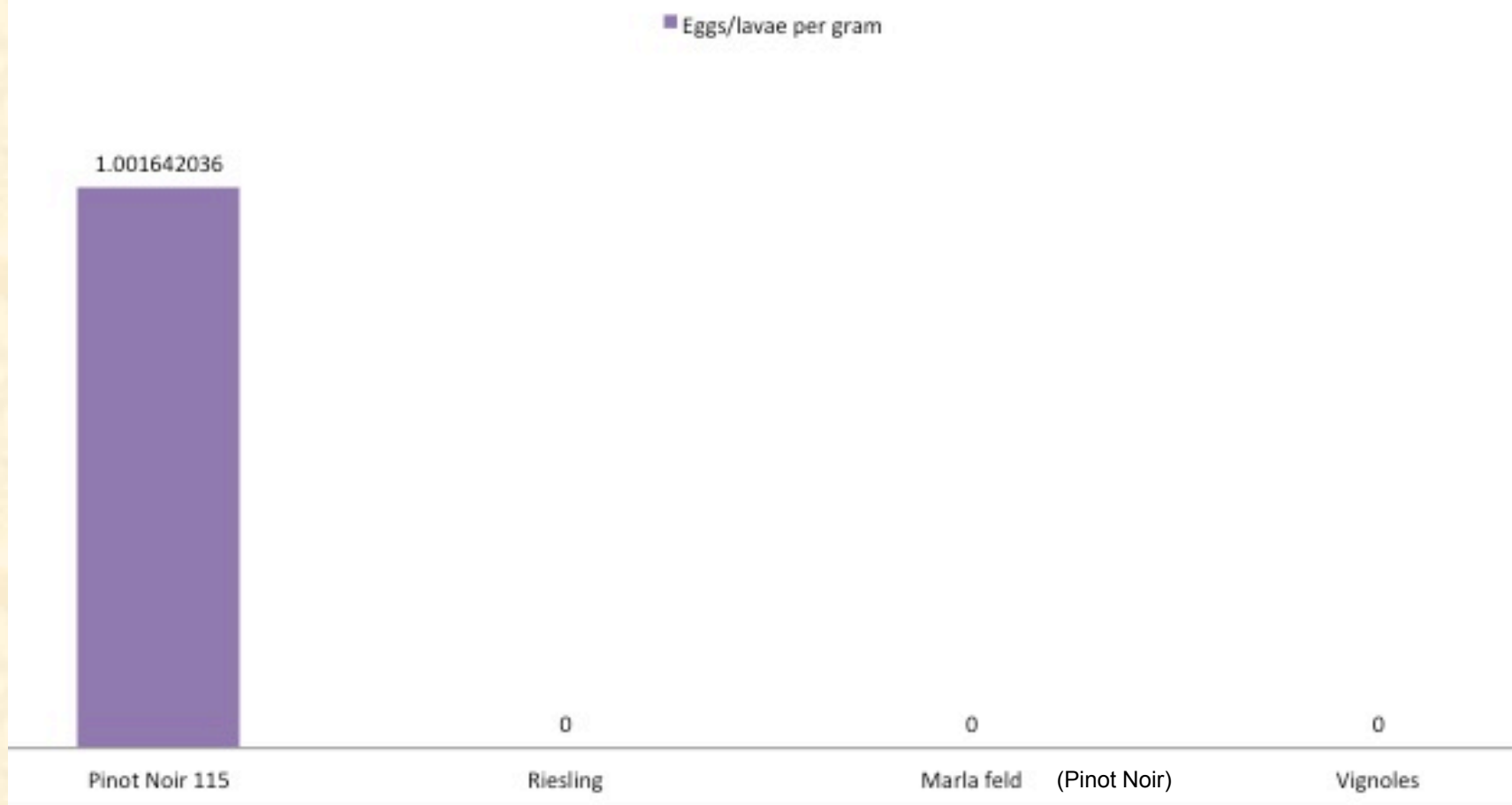


SWD Oviposition in Wine Grape
Eggs and Larvae per gram- No Choice



- Grape varieties placed in same container.
- 40 female SWD
- Grapes varieties placed in individual containers.
- 5 female SWD
- SWD ovipositional preference in pre-ripened grape varieties.
- Allowed 48 hours to oviposit.

SWD Infestation in Grape- Ulster County- September 16th



- Grapes collected and analyzed from an Ulster County vineyard indicated that Pinot Noir 115 is at high risk of SWD infestation.



Pinot Noir 115 var.

- One UC vineyard with P115 with 100% injury levels.

Alternative Approaches to Conventional IPM

Mycotrol-O is a mycopesticide, employing a fungal pathogen (*Beauveria bassiana*) as a method of controlling *D. suzukii*.



- **OMRI approved**
- Strain GHA at a concentration of 10.9% or 2×10^{10} viable spores per gram of active ingredient.



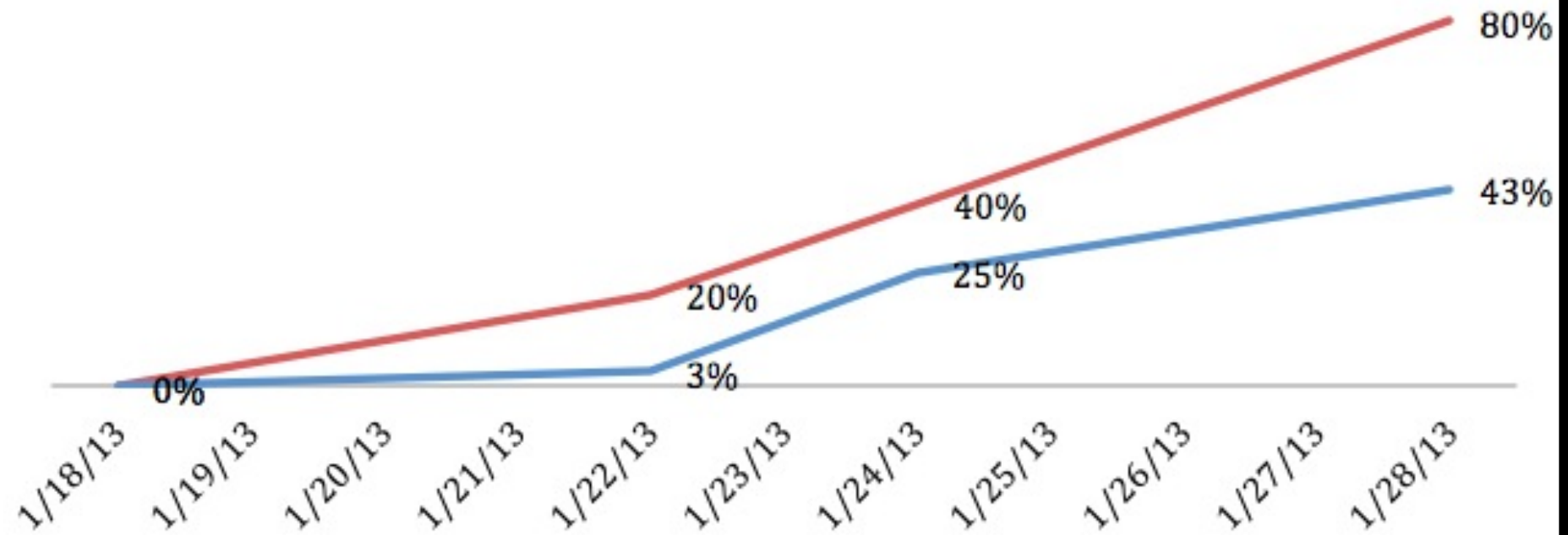
In laboratory studies, BotaniGard was applied to surface of blueberries in closed bioassay (one adult fly per berry, 10 replicates), adult fatality measured daily.

Mycotrol-O mycopesticide. (*Beauveria bassiana*) to control *D. suzukii*.



Adult fatality

— BotaniGard — Untreated



BotaniGard applied to surface of blueberries in closed bioassay (one adult fly per berry, 10 replicates). Adult mortality measured daily.

**Mycotrol-O mycopesticide. (*Beauveria bassiana*)
to control *D. suzukii*.**



SWD adult (~5 days of exposure). Signs of fungal growth present on head and abdomen.

**Mycotrol-O mycopesticide. (*Beauveria bassiana*)
to control *D. suzukii*.**



Advanced stage of fungal growth (~10 days of exposure).



Thanks to the staff at the HVL for all their support:

<i>Technical Assistant.....</i>	Tim Lamposona
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<i>PT Summer Research Assistant</i>	Henry Grimsland
<i>Summer Research Intern (CCE BMSB).....</i>	Susan Weibman
<i>PT Summer Intern</i>	Brianna Flonc
<i>Farm Manager</i>	Albert Woelfersheim
<i>Administrative Assistant</i>	Donna Clark
<i>HVL & NEWA Weather Data.....</i>	Anne Rugh, Joe Whalon

Support from Dow AgroSciences, Bayer, NY Farm Viability Institute

Thank You...Questions??

