

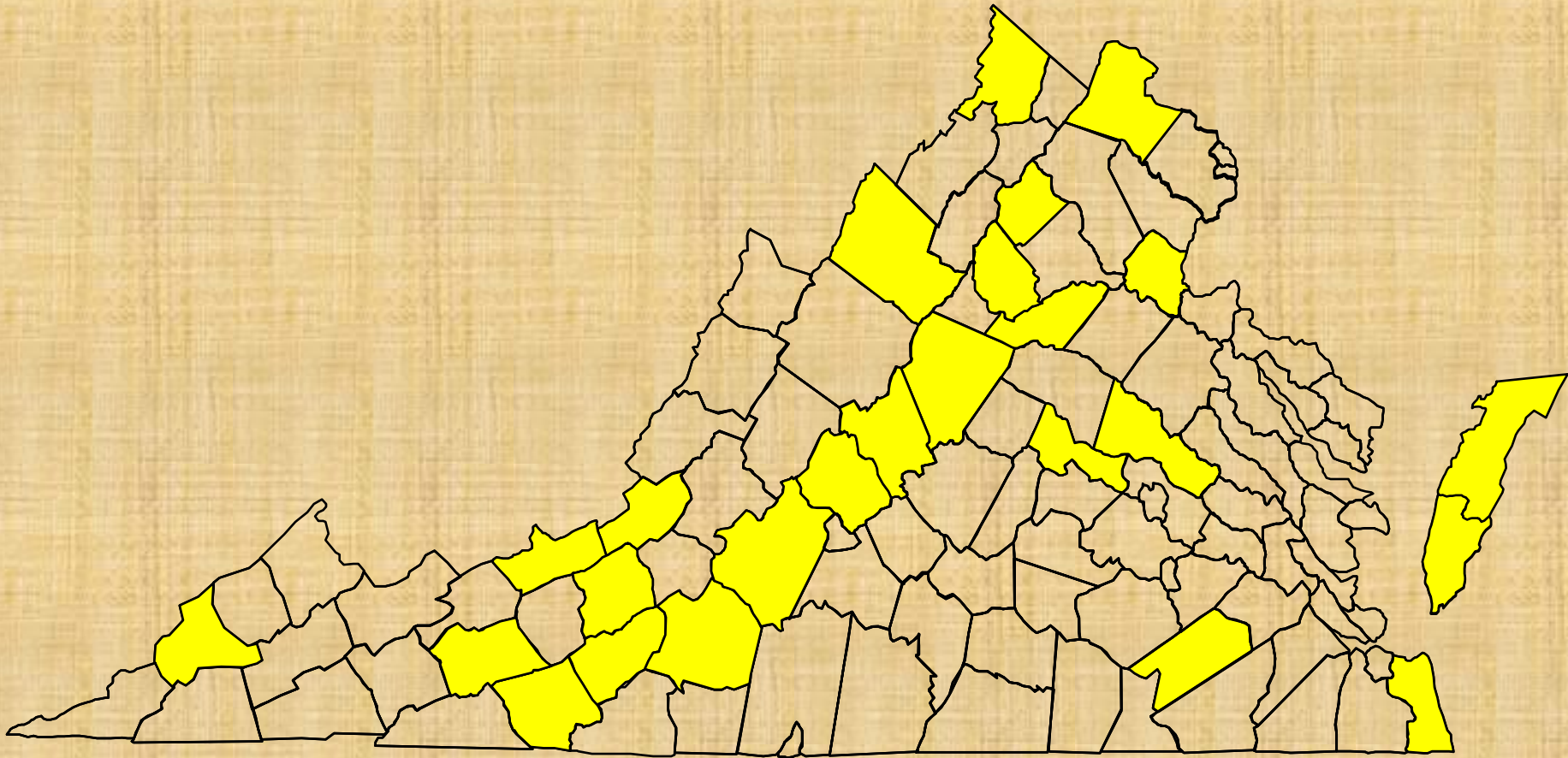
SWD Research in Virginia: Interspecific competition with African fig fly and baseline sampling for natural enemies

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NE IPM Working Group - SWD

Spotted wing drosophila, *Drosophila suzukii* (Matsumura),
in Virginia – October 2013



SWD Host List – Grape?

- Initial impressions in western states that grape not highly vulnerable
- Mainly seen where grapes are already split
- Impact on research in the east?
- What is the situation in eastern wine grape regions?







SWD Oviposition in Grape

Petit verdot



M. Shrader





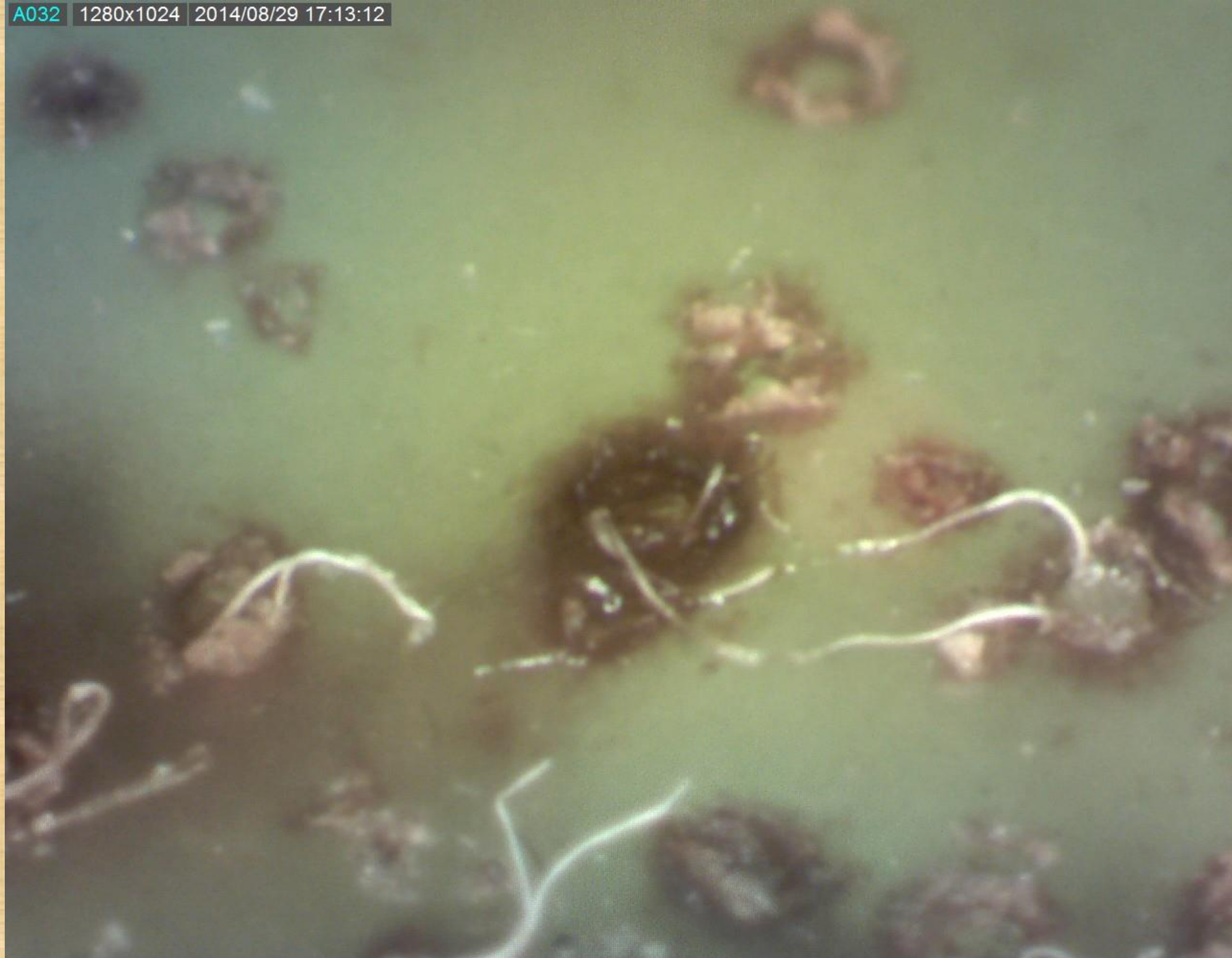
SWD Oviposition in Grape

Viognier



M. Shrader





Sample of grape grower comments...

We have a small vineyard in VA of Pinot Noir and Chardonnay. As you are probably aware, Virginia vineyards are facing a new enemy in the SWD. We are following spray recommendations and protocols but still finding it hard to control growing infestations of SWD

Sample of grape grower comments...

I went down to the upper rows at 6:30 and they were filled with SWD. The main portion of vineyard is not too bad.. some rows have none, others a few and others have a high concentration in a few areas. ...

Top rows are worst.. prob a combination of hatching and from surroundings. ...

I am spending day in vineyard culling out bad fruit.

Sample of grape grower comments...

I have a block of petit verdot, malbec & merlot on the family farm 2011 was a disaster for many reasons (wet & cool September) and the SWD did a number in my PV & malbec. Last year [2012] it was only the malbec.

Sample of grape grower comments...

We first discovered we had SWD in 2011. The outside perimeter of a 2 acre block of Cab. Franc was basically destroyed. The fruit was mushy and we found larvae in the fruit (juice). This block was next to a block of Traminette. We had bad rot in about 4 rows and had not picked the fruit. In hindsight, leaving the fruit on the vine was a perfect breeding ground for the SWD. When the Franc began to ripen they went to town on it.

Sample of grape grower comments...

I looked at the chancellor today and noticed emerging larvae and damaged berries

Sample of grape grower comments...

This year I noticed at least two vineyards that experienced fruit degradation due to the spotted wing fruit fly. You could see a pin hole in the infected berries which oozed and the area seemed to spread in the cluster. It seemed to affect the red varieties more than the whites. This problem caused a substantial decrease in fruit quality. I see where this could be a big problem for the wine industry if it is not solved.

Sample of grape grower comments...

I had SWD last year in chancellor, and wanted to know when I should start to spray for them this year and with what, since last year I tried malathion and Py-ganic and did not have much luck reducing their numbers.

Sample of grape grower comments...

We have identified the larvae in the Pinotage as African Fig Fly instead of spotted wing Drosophila.

Grower Comments

■ Just left you a phone message. Looks like I have SWD in SB and probably reds. Which of the treatments do you recommend and does it kill those inside a grape or just the ones outside.

Grower Comments

■ In 2011 SWD was much more present as it was just beginning to be discussed much more within the State. SWD was most present in our late harvested CF as we had not developed a comprehensive spray program for the fruit fly at that time. We also attributed some of the CF infestation to a fair amt. of nearby Traminette fruit not harvested and allowed to hang on vine until the end of harvest, and may have been an unintentional breeding ground.

Grower Comments

■ Hi Doug,

I think we also need to focus on primary SWD damage and secondary infections in already compromised fruit. There does seem to be both going on.

Problem is that all these insecticides are bringing on mealy bugs and lots of spider mites (of course the SWD applications follow intensive insecticide use from Jap beetles).

I think the warning label on Surround is a bit generic and the SWD damage is worse for quality, esp. if it causes rotten berries and early picking.

Potential Reasons for Regional Differences in Use of Grape?

- Higher rainfall/humidity in east affecting SWD
- Higher rainfall/humidity in east affecting insecticide residues
- Differences in fruit skin/firmness
- Abundance of wild hosts
- Different understanding of symptoms



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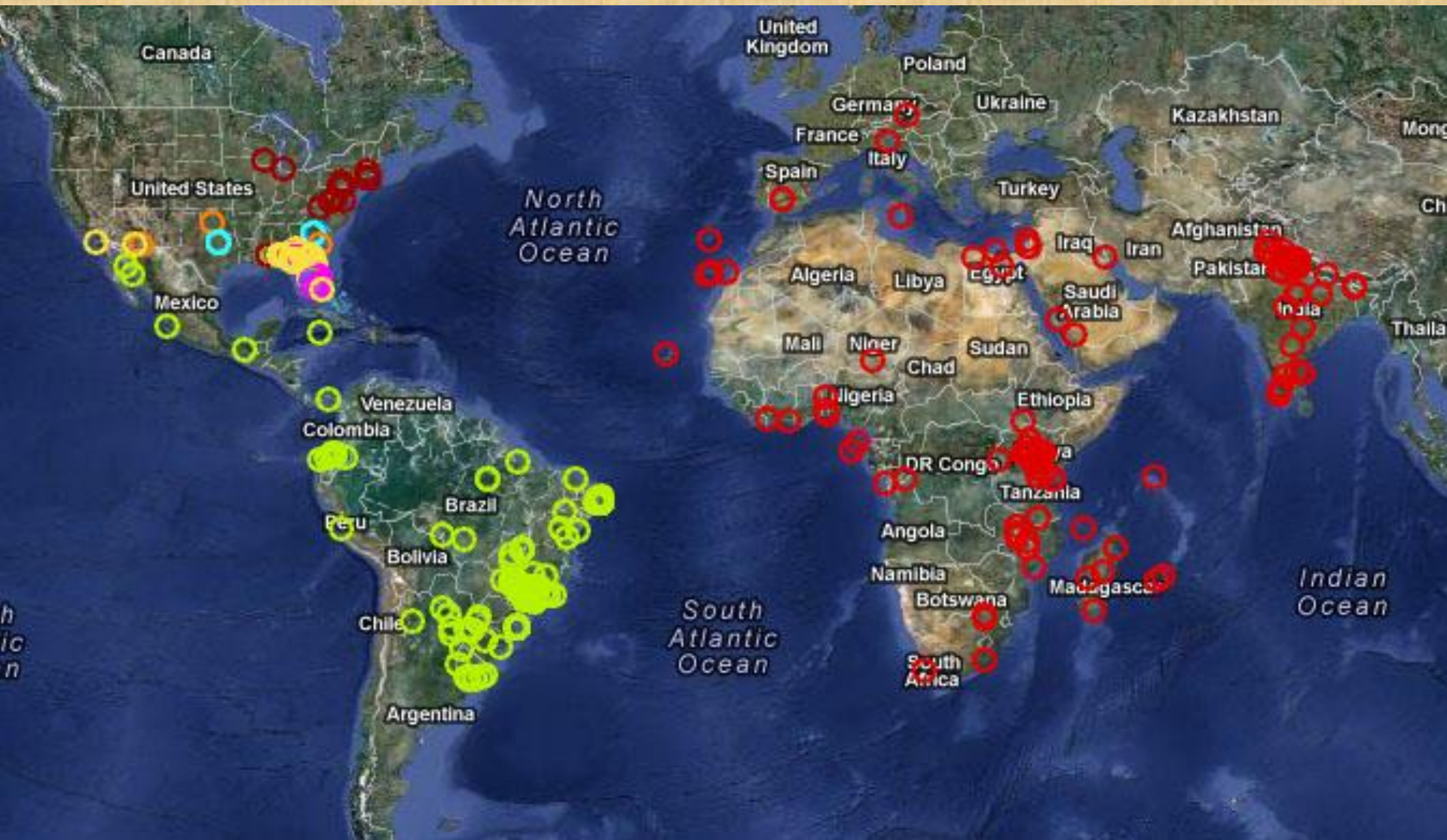
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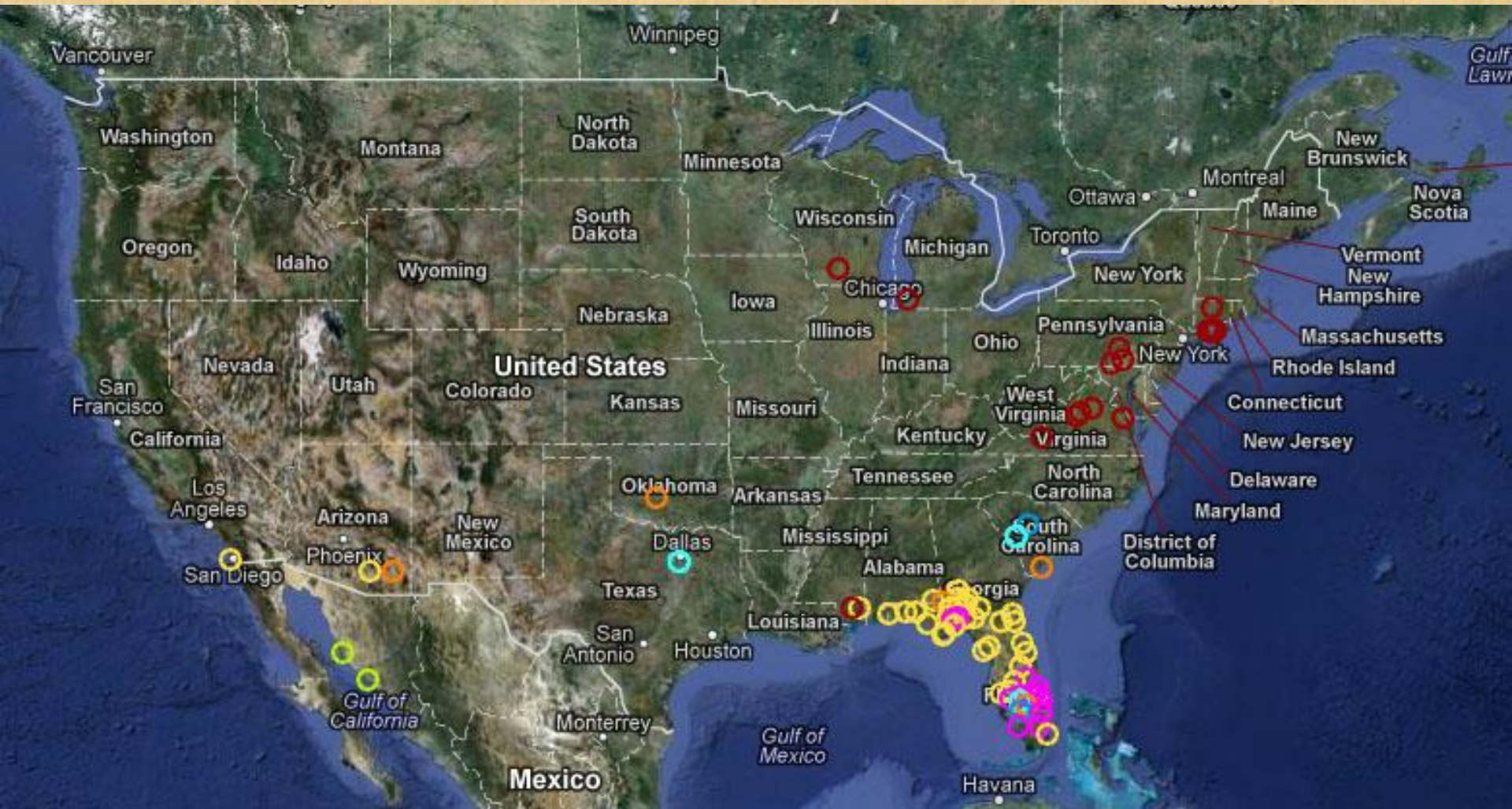
Zaprionus indianus Gupta, African fig fly



AFF World Distribution



AFF US Distribution





SWD Identification: Female

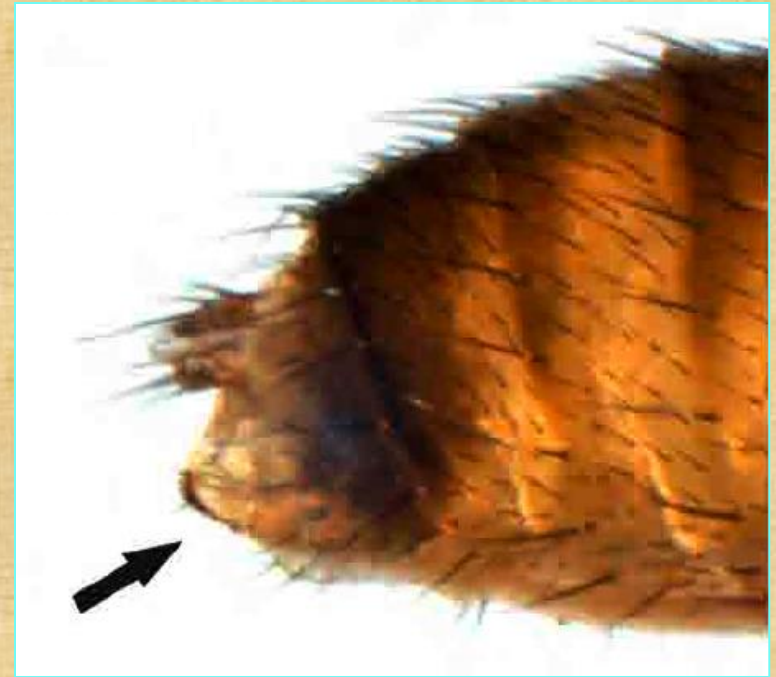
Female:
No spot
on wing

SWD
D. suzukii

Other *Drosophila*

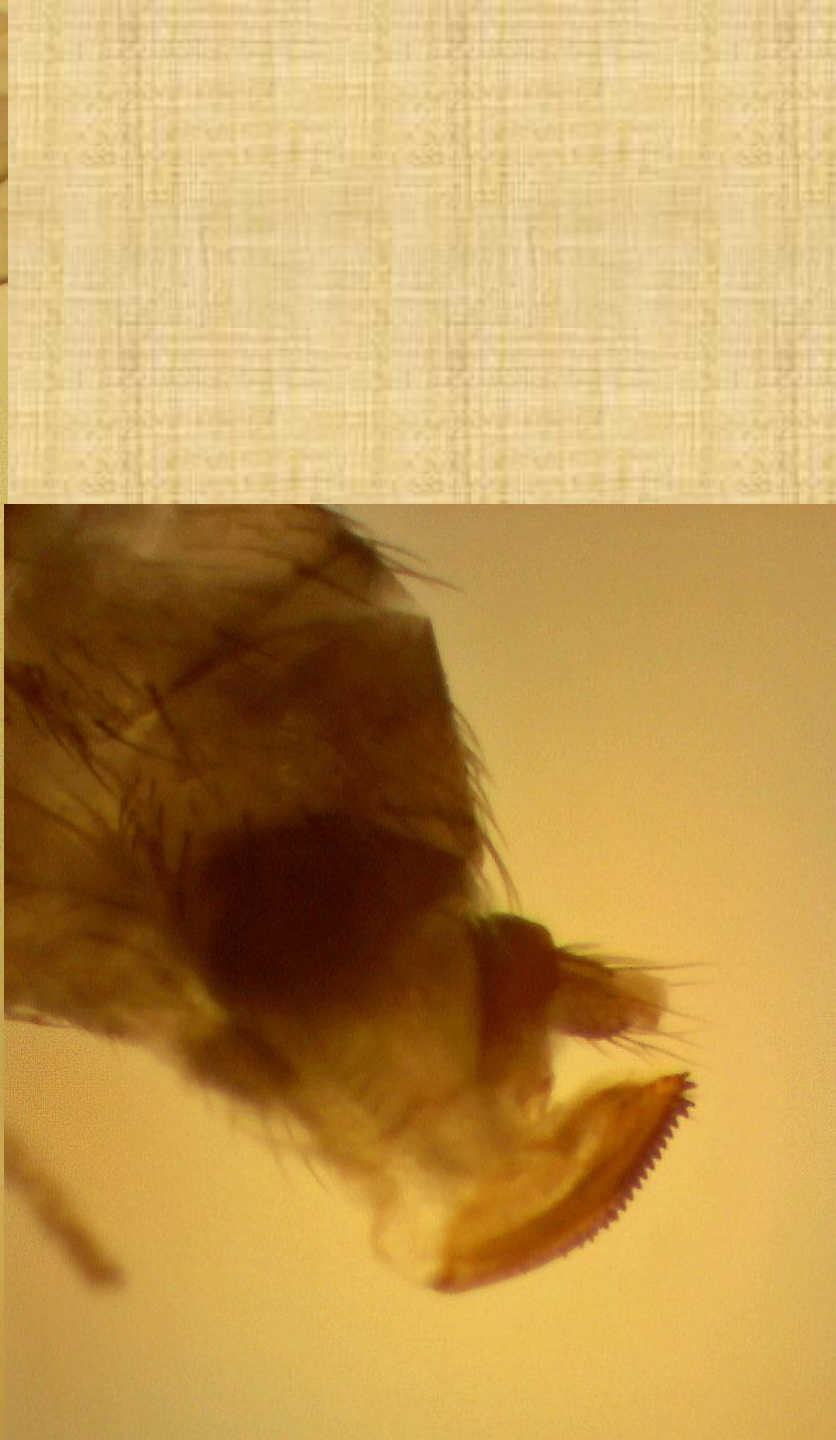


**Saw-like, serrated
ovipositor with two
even rows of teeth**



**Blunt ovipositor cannot
pierce skin of healthy
fruit**







Incidence in wine grapes

- Weak ovipositor
- Sometimes high incidence in grape berries
 - In some Virginia clusters, 90% of emerging drosophilids were AFF
 - Sweep net samples in Pennsylvania vineyards
- How do they get into grapes?



Incidence in wine grapes

- Perhaps follow SWD injury?
- Biological control example in giant reed
 - *Arundo donax* takes over wetlands
 - *Lasioptera donacis* can kill reeds by mining in stalk
 - Oviposits in hole made by another insect



Competition stuey of Gilpin et al. (1986)

- Paired rearing comparisons of 28 drosophilid species, at two temps, two media
- 1 *Zaprionus*, 27 *Drosophila* spp.



Gilpin et al. (1986)

- In thick food, carried out at 19° C, it was ranked 12 out of 28 in competitiveness
- In thick medium at 25° C, it was ranked 8
- But in thin food, it was ranked 5 at 25° C, and ranked 3 at 19° C.



Gilpin et al. (1986)

- Crowd out other larvae
- Liquify substrate, drowning other larvae



Current approaches

■ SWD and AFF eggs were placed onto a 0.38 g block of molasses media at different densities. The densities that have been tested were 1:1, 2:2, and 4:4. Controls for each species were also tested with 2, 4 and 8 fly eggs, so any interspecific competition can be detected. Fly competition or interactions were evaluated based on developmental time, pupal volume and lifetime egg production for female flies.

Current approaches

■ A further study of SWD and AFF interactions will be tested within wine grapes. Grapes are ripening and this test should be started in 1-2 weeks. Egg densities will be the same as conducted with the molasses media.

SWD Management Chemical Control

- Sustainability?
- Broaden the list of available tactics

SWD Management Cultural Control

- Harvest fruit promptly to eliminate breeding sites
- Destroy nearby overripe or rotten fruit
- Proper management of pomace



SWD Management

Biological Control

- Starting a new project on biological control
- Will compare crop environments
 - Grape
 - Caneberry
 - Cherry
- Sentinal specimens of SWD and AFF
- Collected parasitoids tentatively identified as:
 - Figitidae
 - Asobara* sp. (Braconidae)



Drosophilid Parasitoid Trapping



Drosophilid Parasitoid Trapping









Figitidae

SWD Spray Trial, Ankida Ridge, Amherst VA

Sample Date	8/19	8/27	9/2	9/9	9/12
DAT	6	8	6	7	3
Brix	16.9	18.4	20.3	21.2	21.9
DPX 8 oz Induce	0	0	1.1	3.8	6.7
DPX 4 oz Induce Monterey	0	0	2.9	7.9	8.8
DPX 8 oz Induce Monterey	0	0	0	7.9	7.4
Control	0	0	1.9	18.0	17.2

DPX-HGW-86 (Exirel), Monterey Bait

Questions?



<http://www.virginiafruit.ento.vt.edu/SWD.html>