

Title of Project:

Preliminary assessment of Spotted Wing Drosophila (SWD), *Drosophila suzukii*, infestation risk to tomatoes

Project Leader:

Marion Zuefle, NYS IPM

Abstract:

Spotted Wing Drosophila (SWD), *Drosophila suzukii*, an invasive fruit fly from Japan, appeared in NY in 2011 and has become of major concern to small fruit growers. Unlike other fruit flies, it lays eggs in intact fruit prior to harvest. Current pesticide control measures target the adult but there is great risk of developing resistance; resistance has already been reported on the West Coast. Known hosts of SWD include soft skinned fruit like raspberries and blueberries. Even though the wild host range of SWD includes nightshades (*Solanum spp.*) no research had been conducted to evaluate the threat of SWD to tomatoes, *Solanum lycopersicum*. Preliminary surveys of field-collected tomatoes showed SWD can infest cracked or damaged fruit. A no-choice test was also conducted using intact tomatoes and results showed that SWD could lay and develop in intact fruit as well. Further research will be necessary to determine the extent to which SWD can use intact tomatoes as hosts in the field.

Background and justification:

The USDA Annual Vegetable Summary of 2011 showed that over 3,000 acres of tomatoes were planted in NY in 2011. This was an increase of 11% since 2009 and was valued at nearly \$37 million. The sudden arrival of Spotted Wing Drosophila in NY in 2011 caused small fruit growers much concern and compelled us to research whether tomatoes might serve as a host as well.

With the great variation in tomato varieties it was possible that thinner-skinned tomatoes could be at initial risk. From this research we hoped to understand which varieties are at risk from SWD thereby decreasing insecticide applications to lower risk varieties. This also addressed one of the priorities listed by the SWD IPM working group: determining damage to different crops.

Objectives:

This project was a preliminary study to determine the impact SWD could have on tomatoes. By collecting several tomato varieties from the field we will determine if tomatoes are at risk and if there are risk differences among varieties. Tomatoes will also be collected from high tunnels to determine if tomatoes in high tunnels are at risk. A no-choice test will be conducted to determine if SWD can lay and develop on tomatoes.

Procedures:

To monitor for the presence of SWD, apple cider vinegar traps were placed within tomato plots at Cornell's research farm and within a high tunnel at Willson's Farm as well as along adjacent hedgerows for each site.

Eleven varieties of tomatoes were collected from Cornell's research farm and placed into individual rearing cups to monitor SWD emergence. Both intact and damaged tomatoes were collected for each variety. Tomatoes were collected over a 5-week period from 9/17/12 to 10/11/12. Two additional varieties of tomatoes (intact only) were collected from Willson's high tunnel and monitored as well.

In addition rearing cups were set-up to conduct no-choice tests. Fourteen rearing cups with damaged tomatoes and fourteen cups with intact tomatoes had adult SWD males and females placed into them. The adults were allowed to oviposit for two weeks before being removed. All emergence from the field collected tomatoes as well as the no-choice tests was recorded.

Results and discussion:

Though SWD are found in both the tomato field plots as well as the high tunnels, their numbers remain very low as compared to the hedgerow (average per trap 2.7 vs. 215.7).

Of the 11 varieties of tomatoes collected from the field, 5 had SWD emerge but all were from damaged tomatoes: no SWD emerged from intact fruit collected from the field.

Only two varieties of tomatoes were collected from the high tunnels all of which were intact. No SWD emerged from any of the tomatoes collected from the high tunnel.

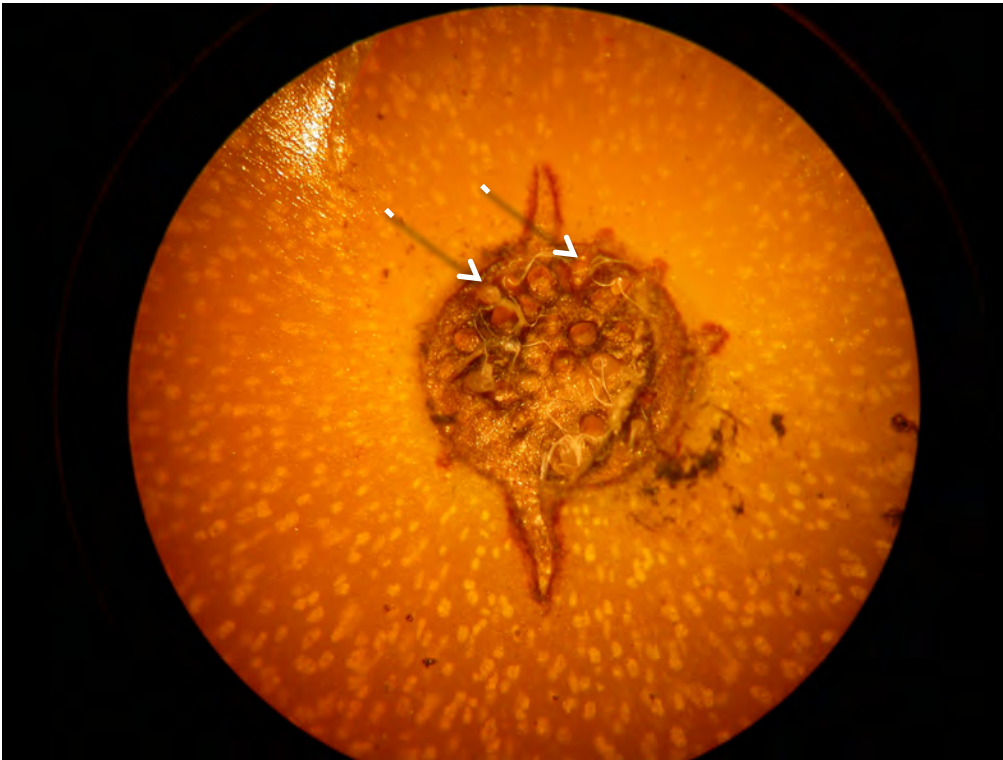
Results of the no-choice test showed that all fourteen of the rearing cups with damaged tomatoes had SWD emerge but only two of the fourteen cups with intact tomatoes had SWD emerge.

From these results we can conclude that, 1) tomatoes can be a host to SWD in a no-choice test, and 2) only damaged fruit in the field served as a host.

Further research will be necessary to determine the extent to which SWD can use intact tomatoes as hosts in the field.



Spotted Wing *Drosophila* adults that emerged from damaged cherry tomatoes in a no-choice test.



Eggs (approximately 10) with breathing tubes laid on an intact cherry tomato in a no-choice test resulting in two adult males and one adult female emerging. Eggs were laid at the point of stem attachment and were not completely underneath the tomato skin.