

Empire State Fruit and Vegetable Expo - 2015
Syracuse, NY

Title of session: Berry Crops

Speakers: Dr. Greg Loeb, Department of Entomology, Cornell University and Ms. Dale Ila Riggs, President, NYSBGA and Owner, The Berry Patch, Stephentown, NY

Title of talk: Spotted wing drosophila research update

Summary: The invasive species Spotted Wing Drosophila (SWD) *Drosophila suzukii* is causing significant economic damage to soft-skinned fruit crops in NYS and much of the USA. Unlike other fruit flies, SWD lays eggs into intact and marketable fruit. Berry crops such as raspberries and blueberries are especially vulnerable, although SWD attacks many other fruit crops and wild plants. Since its arrival in NY in 2011, SWD has caused millions of dollars in economic damage to the berry industry in NY through lost yield and increased production costs. A team of Cornell researchers and extension educators, in collaboration with NYSBGA, has been fully engaged in gaining a better understanding of the biology of spotted wing drosophila, developing management tactics and communicating with stakeholders. The partnership between Cornell and NYSBGA has been particularly important in identifying critical research and extension objectives to address this serious threat to the berry industry and obtaining the financial support necessary to carry out the work. In this presentation, we will provide an update on the progress we have made to date and outline future goals.

SWD caused havoc to the NY berry industry in 2012, the year after it was first reported in our state. This was because of its great abundance, the limited information on its biology and methods for control, and a lack of familiarity with it by berry growers. As an example, The Berry Patch in Stephentown, NY owned and operated by Dale Ila Riggs, lost 40% of its revenue from blueberries and part of its fall raspberry harvest due to SWD damage. The only way a raspberry crop could be harvested was by applying organically approved crop protection materials every three days. Prior to SWD, The Berry Patch had never sprayed their raspberries or their blueberries. SWD literally threatened the viability of The Berry Patch and many other berry farms in NY. Berry farmers started removing fall raspberry and late blueberry plantings. Other berry farmers stopped growing fall strawberries. At The Berry Patch, we thought long and hard about tearing out our fall raspberries and using the tunnel space to plant more winter greens and tomatoes in the summer.

In response to this emerging SWD crisis, the NYS Berry Growers Association asked researchers and extension educators from Cornell University what they needed for funding to initiate an aggressive research and education agenda. Working hand in hand, the industry and researchers at Cornell developed a research and education plan to address short term needs, medium term needs, and long term needs for managing this pest. In the intervening two years we have made significant progress, at least to the point where some tools have been developed to manage the crisis, although SWD remains a significant threat. To date we have accomplished the following objectives:

1. Increased industry awareness of the problem with SWD through education at the state and county level (fact sheets, newsletter articles, webinars, web blogs, pest management guidelines, presentations, workshops).
2. Identified what crops are at most risk and when during the season.
3. Made progress in developing protocols for monitoring adult SWD as a tool for decision-making. We have established a statewide monitoring network.
4. Identified which wild plant species are important sources for SWD to increase their population that then infest berry crops.
5. Developed a better understanding of the overwintering biology of SWD (e.g. role of day-length and cold tolerance) and its implication for management.
6. Identified which insecticides, both for organic production and non-organic production, are effective in [managing SWD](#) and reducing fruit damage. We have made progress in how to optimize their use, such as the addition of feeding stimulants, and the use of fixed sprayer systems in high tunnels.
7. Identified cultural practices to help minimize damage, such as frequent harvests.
8. Demonstrated the use of netting to exclude SWD from some berry crops.
9. We conducted both laboratory and field trials examining the deterrent properties of two volatile compounds, geosmin and 1-Octen-3-ol, with the goal of using deterrents to discourage colonization of berry crop in combination with an attractant placed on the periphery that includes a toxicant, to kill adult SWD.
10. We held an in depth workshop on monitoring and identification of SWD and other *Drosophila* as part of a training program for regional monitors in preparation for monitoring SWD for the 2014 field season.
11. We have developed and held day-long workshops providing up to date information on SWD research and management options.

We still have numerous challenges to overcome to achieve a sustainable management plan for SWD in NY. Although the current use of insecticides has helped reduce the impact of SWD on berry crops, they can be costly both in dollar terms and in environmental impacts, and organic options are very limited. Past experience tells us that sole reliance on insecticides is not sustainable. Moreover, a significant number of berry growers do not want to use insecticides (organically approved or conventional) on their farm. We hope to address at least the research objectives listed below toward improving management of SWD.

1. Develop approaches to managing SWD adults that manipulate their behavior including identification of repellents to spray on or near the crop to push SWD out of crops and attractants that can be combined with toxicants to attract adults outside of the crop and kill them.
2. Increase the impact of natural enemies as a control method for SWD. For example, work has begun in NY on the use of insect diseases, but the research is only in the beginning stages. We need funding over multiple years to identify successful pathogens, optimize their effectiveness, and develop delivery systems.
3. Improve lures and traps for adult SWD to make it more practical as a decision tool for growers. We have made progress to date, but improvements are necessary before being useful to growers.

4. Optimize exclusion netting techniques, assess impact on crop function, and examine economics.
5. Identify other horticultural practices, such as pruning and raspberry cane positioning, to enhance control of SWD.
6. Measure movement of SWD from wild hosts to berry crops and quantify the impact of removing wild hosts from periphery.
7. Optimize the effectiveness of insecticides, including testing of season long control programs, that are cost effective and reduce impact on non-target organisms such as pollinators and natural enemies.
8. Release biological control organisms (parasitoids) and assess their impact on SWD in crops and in wild habitats.