

***Drosophila suzukii* in the USA; monitoring and management in berries and cherries**

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Introduction

Drosophila suzukii was first detected in the United States in California during the fall of 2008. The following year it was observed in Oregon, Washington State and Florida. It has since spread up through eastern USA states and into the country's interior. It has become a significant pest of berries and cherries causing damage and disrupting established IPM programs. The purpose of this presentation is to provide an update and overview regarding monitoring and management of *D. suzukii* in the USA.

Objectives

Several studies were conducted to determine the influence of different trap designs for monitoring *D. suzukii*. Other studies compared the attractiveness of either apple cider vinegar (ACV) or yeast plus sugar water (YSW) to *D. suzukii*. Laboratory and lab-field assays were performed to elucidate efficacy of insecticides against this pest. A search for indigenous parasitoids of *D. suzukii* was initiated.

Methods

A replicated experiment consisting of several trap designs was placed in nine crop types and 16 locations in North America affected by *D. suzukii*. Captured flies were counted weekly and trap positions rotated within replicates. In a different study, clear covered plastic food containers (950 ml) with 10 holes near the top were used to assess the attractiveness of ACV versus YSW. Adult *D. suzukii* captured in traps containing either bait were counted and traps were rotated within replicates weekly. Adult *D. suzukii* were treated either topically or residually with various insecticides in the laboratory and then assessed for mortality. Additionally, fruits and foliage treated with insecticides in the field were collected and used to assay *D. suzukii* in the laboratory. Another study was conducted in a cherry orchard to determine how many sprays were needed to control *D. suzukii* pre-harvest. Various plant fruits were collected and brought to the laboratory to rear out potential natural enemies of *D. suzukii*. Additionally, sentinel parasitoid baits containing all larval stages and known quantities of *Drosophila melanogaster* and *D. suzukii* were used to determine seasonal parasitism. Data obtained from these baits enabled the estimation of the current impact of

biological control of *D. melanogaster* and *D. suzukii* in several cropping systems as well as surrounding vegetation.

Results

Out of six trap designs, two traps with large screened entrances generally captured more adult *D. suzukii* than traps with holes on the sides. The commercially available trap with two holes on the side of the container caught the fewest flies. A red colored plastic cup trap also performed well at nine out of sixteen sites. Traps were not selective as other *Drosophila* were also caught, and the traps that caught more *D. suzukii* generally caught flies earlier. Preliminary results indicate that traps baited with yeast and sugar water outperform apple cider vinegar baited traps in some regions and cropping systems. Bioassay results from several laboratories indicated that organophosphates, pyrethroids and spinosyn insecticides are the most efficacious materials against *D. suzukii*. Field experiments revealed that the last 3 sprays applied before harvest are the most important for controlling this pest in cherry. A parasitic wasp, *Pachycrepoideus vindemmiae* and an unidentified Cynipid wasp, was reared from various fruits and the parasitoid sentinel baits. *P. vindemmiae* readily attacks *D. suzukii* in the laboratory and cherries late-season. Both wasps were reared from sentinel baits throughout the season.

Conclusions

The occurrence of *D. suzukii* in various crops in the USA has impacted IPM programs. We are working with the at-risk fruit industries to develop ecologically and economically sound management programs, but are still limited by not having a selective and effective trap for monitoring this pest. Additional studies are needed on the physical design and lures used in traps to increase attractiveness, retention, and selectivity for *D. suzukii*. We are also concerned about insecticide resistance developing in this insect because of the limited number of insecticide classes that can be used to control *D. suzukii*. The impact of biological control on reducing *D. suzukii* is still unclear.