

THINK IPM: MONITORING AND MULTIPLE TOOL APPROACHES

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Introduction

Development of a multi-tool approach for managing spotted wing *Drosophila* (SWD), *Drosophila suzukii*, requires 1) a thorough understanding of SWD's seasonal population levels, 2) when SWD female ovaries are mature with readiness to lay eggs, 3) where SWD seasonally concentrate, and 4) gaining knowledge about SWD's behavior and needs not only in a commercial crop but also in the adjacent landscape. Areas in which SWD inhabit may act as a resting place, protective refuge with favorable conditions, a food resource, or provide a host oviposition site for the fly. Trap counts and fruit damage within a crop may therefore be directly impacted by adjacent vegetation. This paper will describe new baits/lures and trap designs, mass trapping technology, attract and kill use, and a strategy for tackling SWD in 2015.

Baits/Lures

Two commercial long-lasting lures (Trécé Incorporated and Scentry Biologicals, Inc.) were tested on a wild 'Himalaya' blackberry border adjacent to a diversified, organic farm in Corvallis, Oregon over a 10-week period. A Pherocon Trécé side-mesh 950 mL clear deli trap with a water/soap drowning solution was used to compare lure efficacy. Trap contents were collected weekly and male and female SWD and other *Drosophila* were counted.

Trap Designs

In addition, several trap designs ("Pherocon Trécé side-mesh" 950 mL clear deli, 20-hole Red Stripe 950 mL clear deli, 40-hole 530 mL red cup, "Sombrero" large spice container (USDA-Knight), McPhail-type yellow dome (Trappit), and a homemade "Squatty Botty"(OSU-Dreves) 950 mL side-mesh with yellow, black, and red colors were tested with the aim to improve trap catch. Each trap contained 250 mL of 50% Chinese Vinegar. Traps were serviced weekly and evaluated for male and female SWD and other *Drosophila* spp. A commercial insecticide strip was added inside the lid of some of the traps to evaluate if a killing agent (a.i. concentrations of dichlorvos at 10%, 18.6% ai; and a 2 x 2 cm square of "No-Pest" at 18.6%ai) can increase catch by reducing escapees. In addition, a boric acid-sugar spray was tested on the outside of 40-hole red cups, in hope to kill those that land on the cup, but decide to not enter.



Pherocon side mesh | Trappit



40-hole red

Mass Trapping

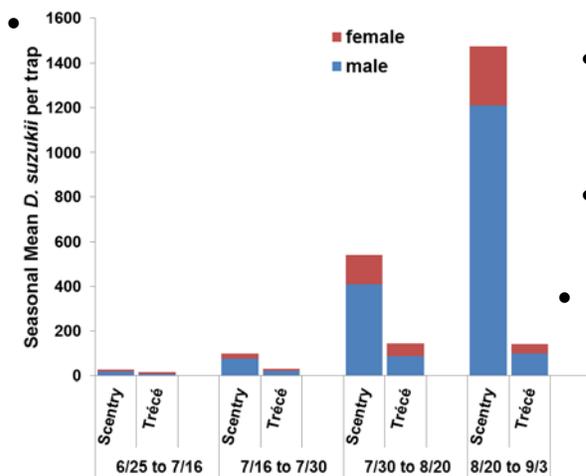
Two field trials were conducted in Corvallis, Oregon to assess the use of mass trapping (100 traps/acre) in a mid-season blueberry crop to reduce SWD levels, hence to minimize damage. Traps were constructed from 18 oz red party cups (SOLO) with forty 1/8-inch holes punched in three rows starting approximately 1 inch below the cup rim (8.5 cm width- about 40% around cup). Each trap was evenly sprayed over the entire outside surface with 2.8 mL boric acid (5%)/sucrose (10%)/carmine red dye (0.1%) solution. Baits were changed weekly to biweekly: apple cider vinegar (5% acetic acid) and 10% EtOH mix, 50% rate of Chinkiang Vinegar (rice & wheat bran-based), yeast (*S. cerevisia*)/sugar water solution, and Suzukii Trap bait® (Spain). Marketable fruits were collected from plants in trapped and untrapped areas during the harvest period; and a larval extraction was performed along with a sample set placed in individual cups in lab to confirm infestation.

Summary of results

- Significantly more SWD captures, male-dominated, and less SWD-specific *Drosophila* was recorded from traps with the Scentry pouch lure compared to traps with the Trécé lure. However, increased efficacy was observed using 50% Chinese Vinegar compared to Scentry lures for attracting SWD (see figure below).
- The addition of a toxicant (irrespective of type) increased fly capture among all trap types.----->



“Red stripe” with insecticide strip



- Fly capture was higher in traps coated with a boric-acid sugar spray compared to traps without a boric acid spray on the outside of traps.
- There was seasonal variation in fly capture between trap types, however increased catch with increased trap volume.
- No significant differences in blueberry damage were observed in trapped versus untrapped plants at a dry & open site 1. Increased damage was

recorded in the trapped plot compared to untrapped plot at site 2, most likely due to differing environmental conditions (adjacent to riparian and diversified forest, with increased shade and humidity versus the untrapped plot that was in an open, windy, no shaded area; and no close-by diversified edge). Overall, these studies give insight into, and raise questions pertaining to, the use of mass trapping, best trap designs and baits, and how to use attract-and-kill strategies as tools to minimize *D. suzukii* before infestations arise. Understanding the nature of the fly (e.g., numerous generations, high reproductive potential, multiple fruit hosts, expansive mobility) is important for an effective strategy. Once potential hotspots of SWD activity are identified, management tactics can be targeted to these areas, in hopes that immigration is minimal.



“Sombbrero”



“Squatty”