

SPOTTED WING DROSOPHILA PREFERENCES: TRAPS AND FOOD

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Introduction

A better understanding of spotted wing Drosophila (SWD) preferences for trap designs and food baits can improve management of this new invasive pest. The goal of this research is to contribute to the development of an IPM plan for SWD, increasing attractiveness for trapping in order to reduce insecticide usage. Ultimately, this information can be used to manage SWD by mass trapping or attract and kill, to monitor SWD activity, and to evaluate the efficacy and persistence of insecticides or other treatments. Effective trap attributes include specificity for SWD, preference for females, and practicality.

Methods

Eight trap designs were tested in a wild Himalayan blackberry border adjacent to a diversified, organic farm in Corvallis, Oregon over 3 time periods (pre-harvest, harvest, and post-harvest). Trap parameters of interest incorporated headspace, color, entry type, and trap volume. Trap types included: side mesh 950 mL clear deli, 10-hole 950 mL clear deli, 20-hole modified 950 mL clear deli, 6-hole 530 mL red cup, “lucky” 13-hole 530 mL red cup, Captiva-Zorro, McPhail-type Multi-Lure, and “Squatty Botty”, a yellow, black, and red side mesh trap. Each trap contained a *Saccharomyces cerevisiae*/sugar solution bait. Traps were serviced weekly and evaluated for male and female SWD and other Drosophila spp. A killing agent was added to two high-capture traps to evaluate efficacy of attract-and-kill.



In addition, two field trials were conducted on a monoculture 6-acre no spray u-pick blueberry farm in Corvallis, Oregon to assess bait preference. Baits included: apple cider vinegar (5% acetic acid), Chinkiang vinegar (rice & wheat bran-based), *S. cerevisiae*/sugar water solution, *Hanseniaspora uvarum* with sugar, BioLure (3 sachets), Torula yeast pellets, Monterey Insect Bait®, Suzukii trap bait® (“Spain bait”), and Cha-Landolt 4-compound bait. A third trial was performed using the top five baits from the initial two trials and took place across a wild Himalayan blackberry border adjacent to a diversified, organic farm in Corvallis, Oregon. Traps contained 170 mL of selected bait and were serviced weekly. New bait or drowning solution was added weekly to the traps. All traps were evaluated for male and female SWD, and other

Drosophila spp. Researchers at USDA-ARS Horticultural Research unit performed a corresponding bait study in cherry trees at the same site as the third trial.

Results

- Squatty Botty, Lucky 13, and Clear 20-hole standard traps showed the highest average trap catches for the study period (Figure 1a) and had similar headspace.
- Introduction of a killing agent shows potential for attract & kill, but effectiveness may vary based on trap design. Squatty Botty traps with a killing agent caught 104-290% more SWD than Squatty Botty traps alone (Figure 1b). The killing agent was not as effective in the Clear 20 trap, but traps with the addition of the killing agent consistently outperformed traps without it.
- Chinkiang vinegar and *H. uvarum* yeast were consistently the top performing baits for both cherries and blueberries.
- BioLure, Torula yeast pellets, and Monterey Insect Bait® showed little/ no efficacy, with an average of less than 5 SWD/trap/week during the study period (Figure 2).

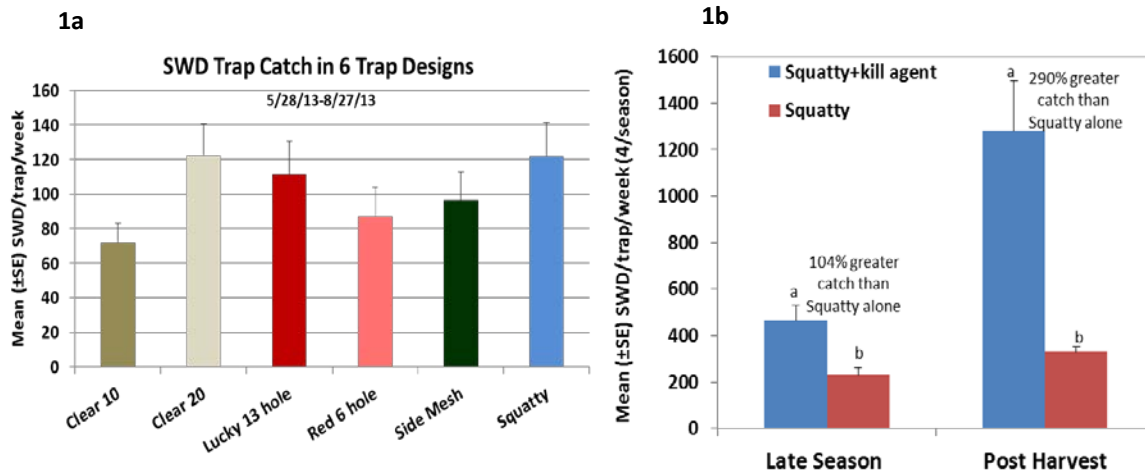


Figure 1a. Trap capture comparison of the top 5 trap designs versus the standard Clear 10-hole deli across evaluation dates.

Figure 1b. Effect of killing agent in the Squatty Botty trap during late season and post-harvest periods in Himalayan blackberry.

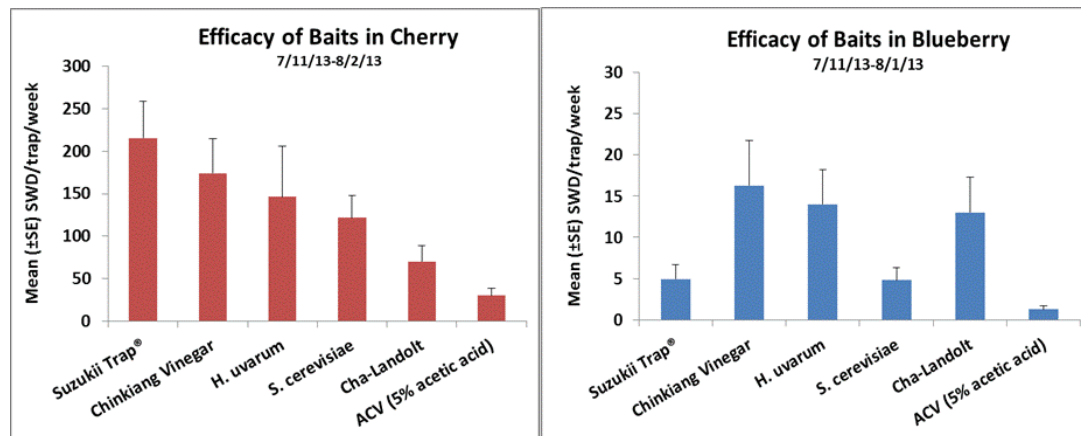


Figure 2. Bait performance based on trap captures in cherry and blueberry crops.