

Evaluation of plant-based materials for attractiveness to the invasive spotted wing *Drosophila*, *Drosophila suzukii*



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Background

Drosophila suzukii (commonly Spotted Wing *Drosophila*, or SWD) is a fruit fly native to southeast Asia and invasive to the United States and Europe. Female SWD, identifiable by their distinct serrated ovipositor, lay eggs in ripe and otherwise undamaged fruit. As such, SWD are responsible for severe economic loss among soft fruit growers. Current pest management practices for SWD require frequent pesticide applications, which come at a high environmental and economic cost. In order to time effectively time these sprays to mitigate damage, growers rely on costly SWD monitoring lures.



Figure 1: Male and female *Drosophila suzukii*, identifiable by their spotted wings and serrated ovipositor, respectively. (Photo courtesy of Oregon State University.)



Figure 2: SWD damage in a cherry cluster. (Photo courtesy of the Ontario Ministry of Agriculture, Food and Rural Affairs.)

Objective

This study aimed at identifying inexpensive, more species-specific and readily available materials that could be used to attract and trap male and female SWD, primarily for monitoring purposes.



Figure 3 (left) Example of laboratory trial set up, **(right):** Example of field trial set up.

Methods

1. Laboratory Experiments:

- Store-bought tart cherry, red tart cherry, grape, pomegranate and blueberry juices were tested inside 60 cm³ cages against each other and against a control of water. 200 microliters of each material were exposed to the flies over a 4-hour period. Each test was replicated 10 times.
- The most attractive juices, tart cherry and grape, were subsequently evaluated at 0%, 25% (= 3 parts of juice and one part of water) and 50% dilutions against a control of water. While pomegranate performed well in experiment (a), it was excluded from additional testing due to its higher price and less availability. Tests were replicated 10 times.

1. Field Experiments:

- The attractiveness of grape juice (200 ml) diluted at 0%, 25% (3 parts of juice and 1 part of water) and 50% was evaluated against water control in cherry trees using clear plastic containers (Fig. 3). A second experiment compared 50% and 75% (1 part of juice in 3 parts of water) dilutions against water control.
- In a second field study, grape juice diluted at 50% and 75% (= 1 part of juice and 3 parts of water) was tested against the commercial Scentry lure in two separate experiments.

For both field experiments, traps (n= 4 per treatment) were serviced twice a week for 3 weeks.

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Results

1. Laboratory Experiments: The most attractive juices to male and female SWD were grape, tart cherry, and pomegranate. Red tart cherry and blueberry were the least attractive juices (Fig. 4A-C).

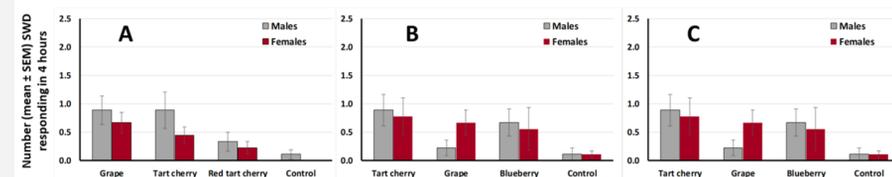


Figure 4: Response of male and female SWD to grape juices in cages. Three sub-experiments (denoted by letters A-C) were conducted separately.

The attractiveness of grape and tart cherry juice were not influenced by dilution. Juices diluted by 50% remained as attractive as the undiluted material (Fig. 5A,B).

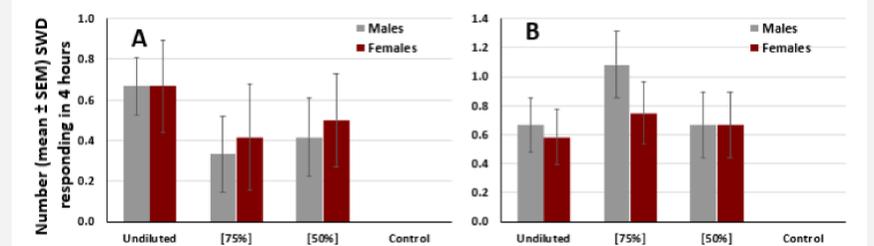


Figure 5: Comparison of juice dilutions (A) grape (B) cherry in cages

2. Field Experiments: Grape juice at 50% dilution was more attractive to SWD than the commercial Scentry lure (Fig. 6A). When further diluted to 75%, grape juice captured nearly 4 times as many SWD as the Scentry lure (Fig. 6B), indicating excellent performance.

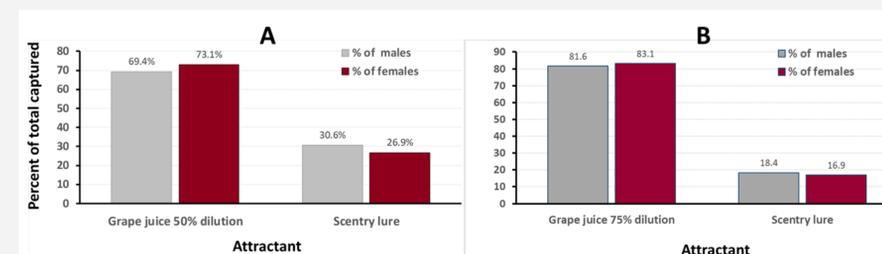


Figure 6: Comparison of grape juice at either 50% dilution (A) or at 75% dilution (= 1 part of juice in 3 parts of water) (B) versus the Scentry commercial SWD lure.

Discussion

The results of these experiments indicate that water-diluted (75%) grape juice is an effective and economically viable attractant (cost per trap is ~\$0.08), compared to the commercially available Scentry lure (~\$7/ea).