

Assessment of Attracticidal Spheres as a Tool for Management of Spotted Wing Drosophila



Leskey Laboratory
USDA ARS
Appalachian Fruit Research Station
Kearneysville, WV 25430



Spotted Wing Drosophila in Mid-Atlantic

- Common cultivated hosts attacked: Cherry, peach, raspberry, blackberry, blueberry, strawberry
- Management challenges
 - Monitoring traps are not always reliable
 - Rapid development with numerous generations
 - Oviposition can occur at harvest
- Current management options
 - Chemical control triggered by relative maturity of crop
 - Sanitation
 - Aggressive harvesting
 - Netting

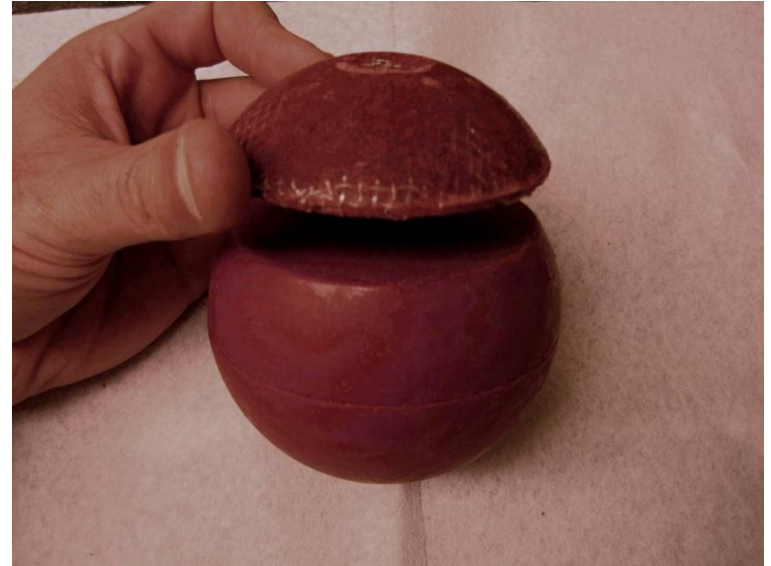
Do attracticidal spheres designed for AMF hold promise for SWD?



Visually integrated spheres maximize availability and lethality of toxicant.

Objectives

- Evaluate lethality of attracticidal spheres with known toxicants for SWD
- Determine if SWD adults will orient to and alight on attracticidal spheres deployed under semi-field conditions

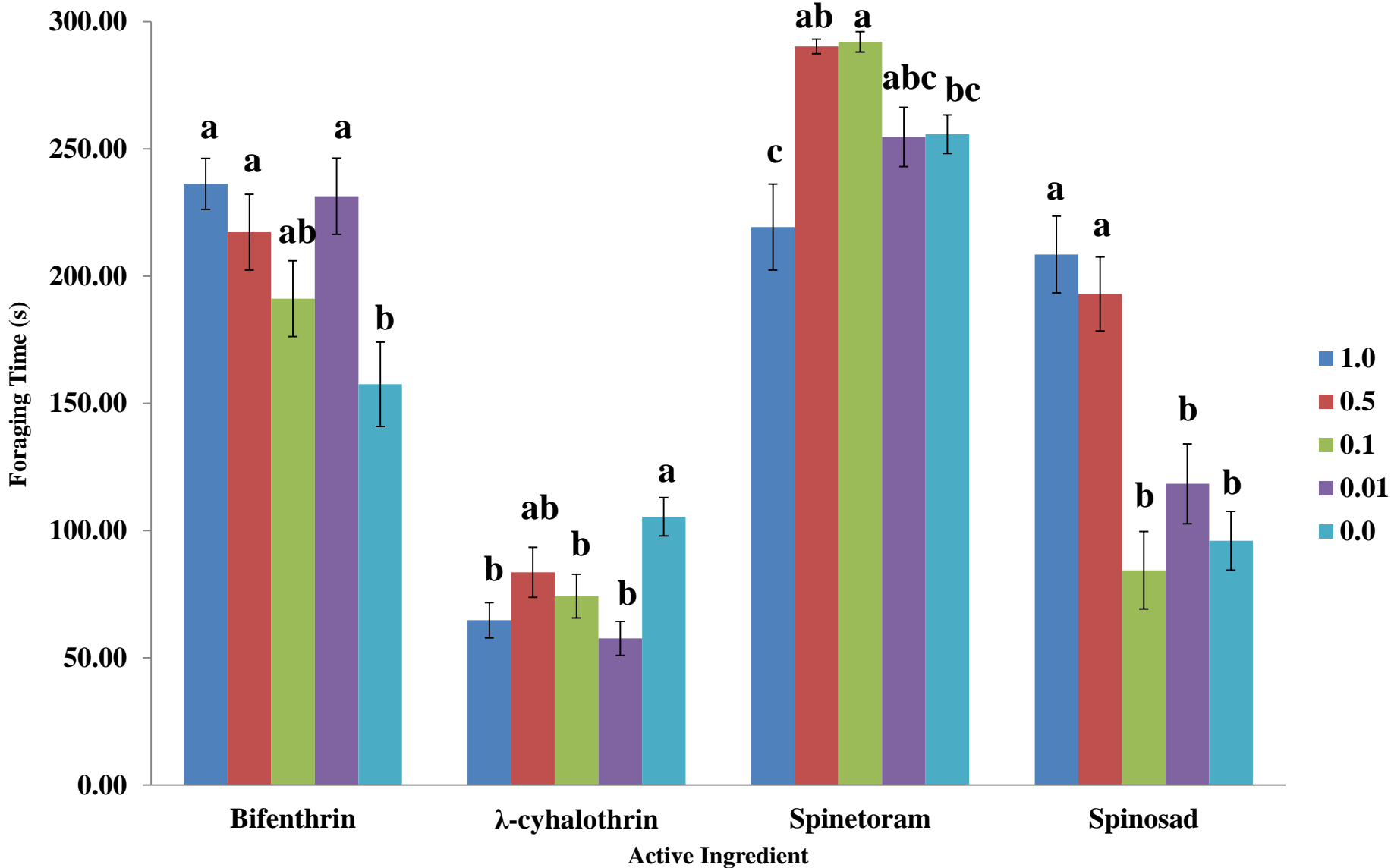


Evaluation of Lethality

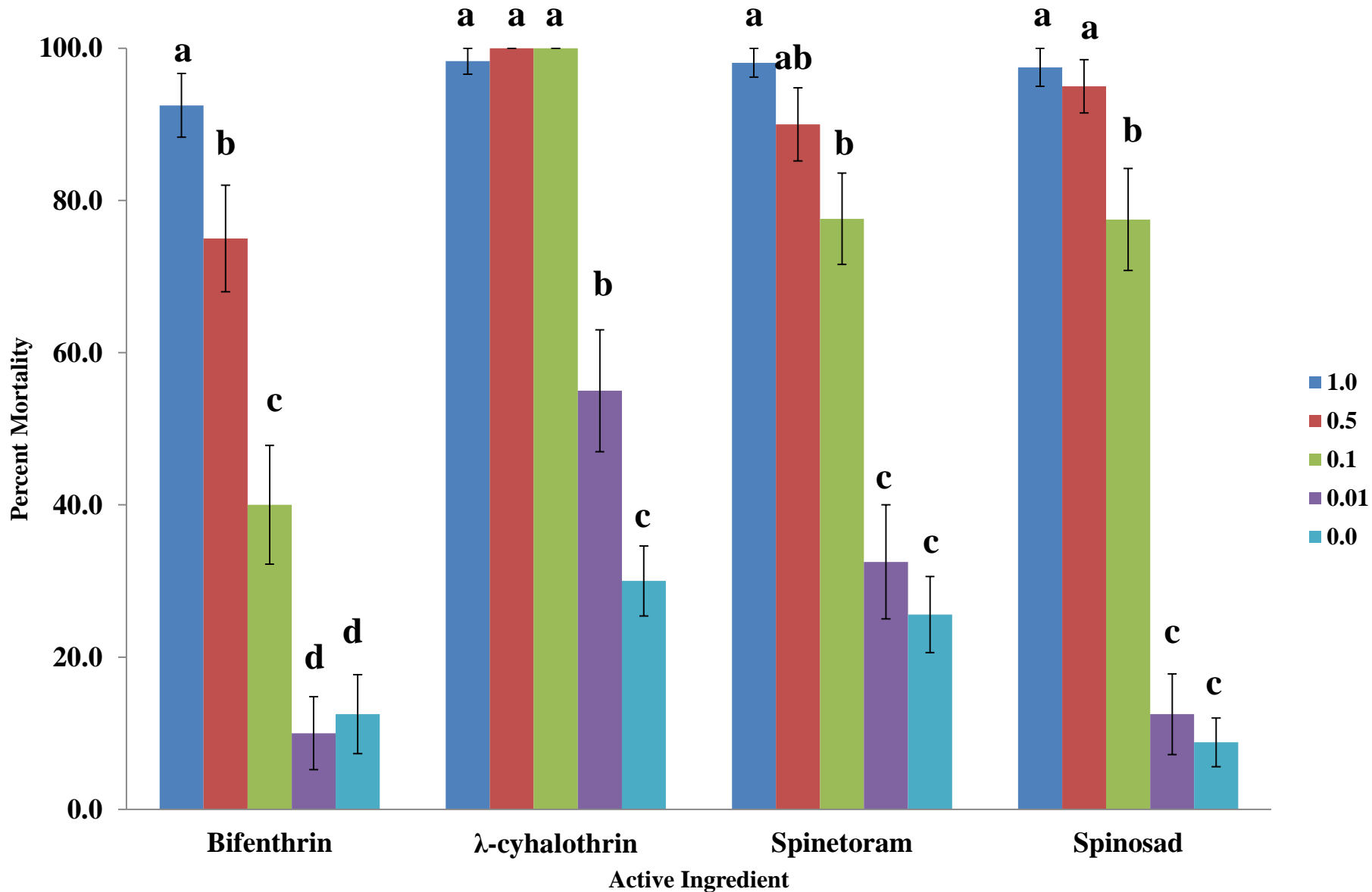
- Insecticides: Bifenthrin, Lambda-cyhalothrin, Spinetoram, and Spinosad.
- Rates: 0.0, 0.01, 0.1, 0.5 and 1.0% a.i.
- Min. 20 males and 20 females/insecticide/rate.
- Exposure period: 5 min.
- Evaluation of toxic effects at 0, 24 and 48 h after exposure



Foraging Time(s) of Adult *D. sukuzii* by Rate of Active Ingredient

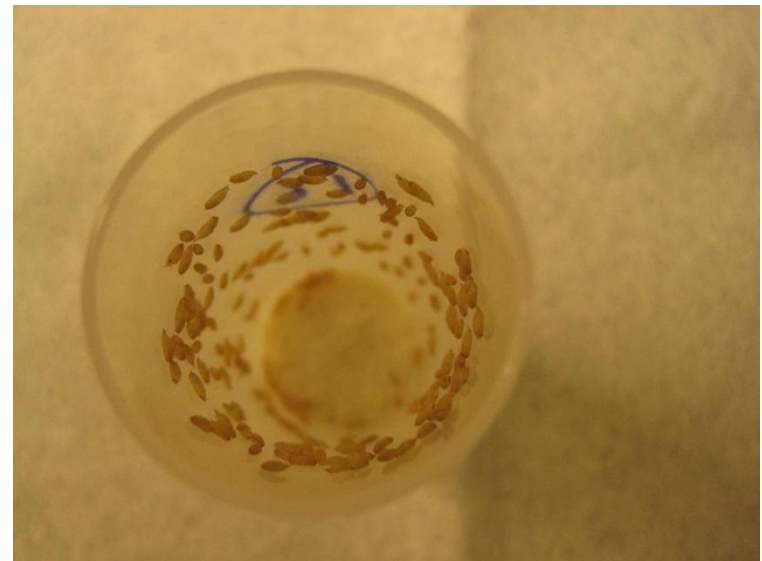


Percent Mortality of Adult *D. sukuzii* 48 h After 5-min Exposure to Insecticides



Alignment and Orientation to Spheres and Attractant

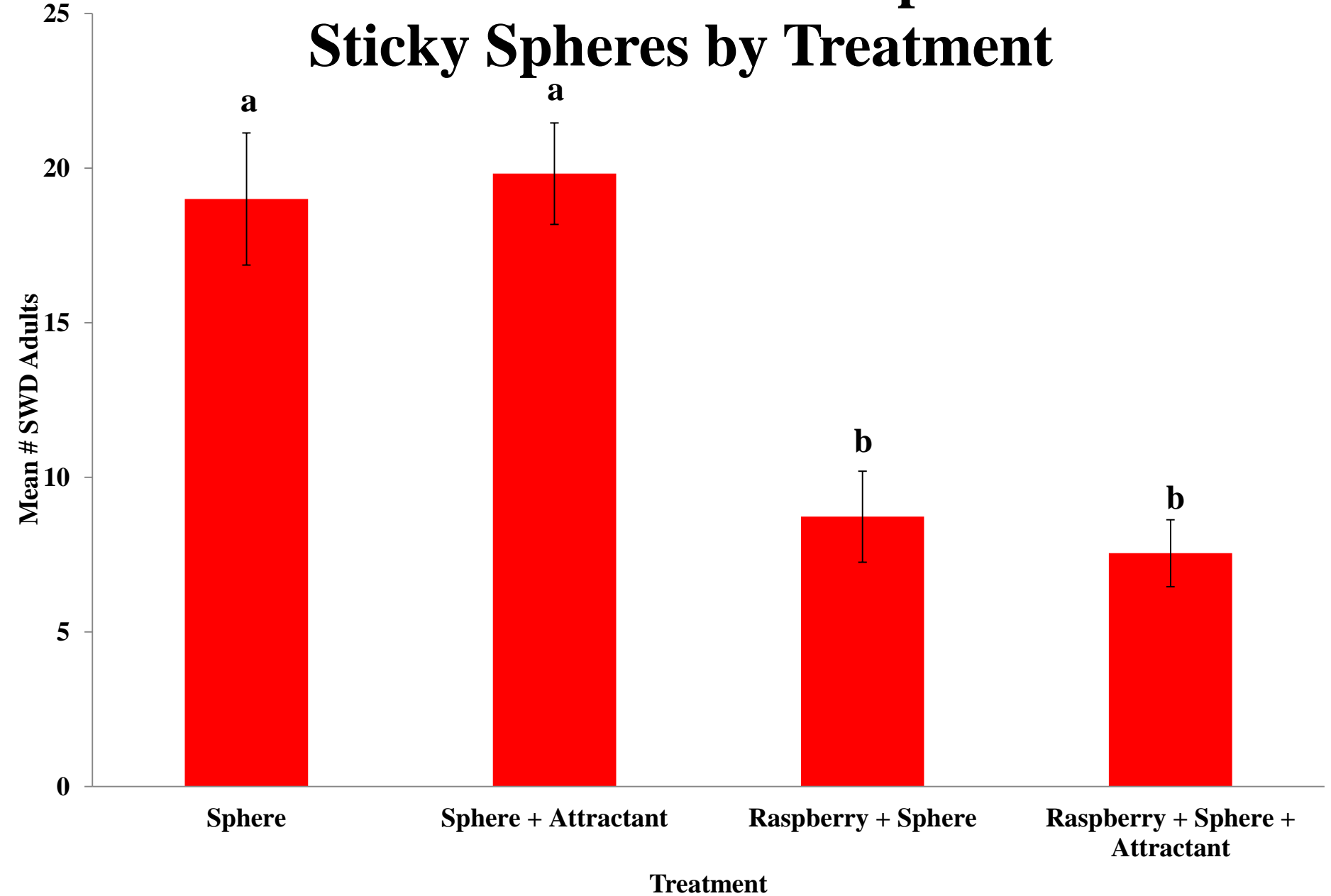
- Five Treatments
 - Sticky sphere
 - Sticky sphere + Attractant
 - Sticky sphere + Raspberry plant
 - Sticky sphere + Attractant + Raspberry plant
 - Raspberry plant
- Monterey Insect Bait, Monterey AgResources.
- 25 Males and 25 Females per treatment
 - Maintained on Formula 4-24® Instant Drosophila Medium (Carolina Biological Supply).
 - Starved 24 h with water and 7-10-d old at time of release.
- Flies allowed to forage freely for 48 h.
- Recorded number of SWD captured on spheres and number recovered from raspberry fruit



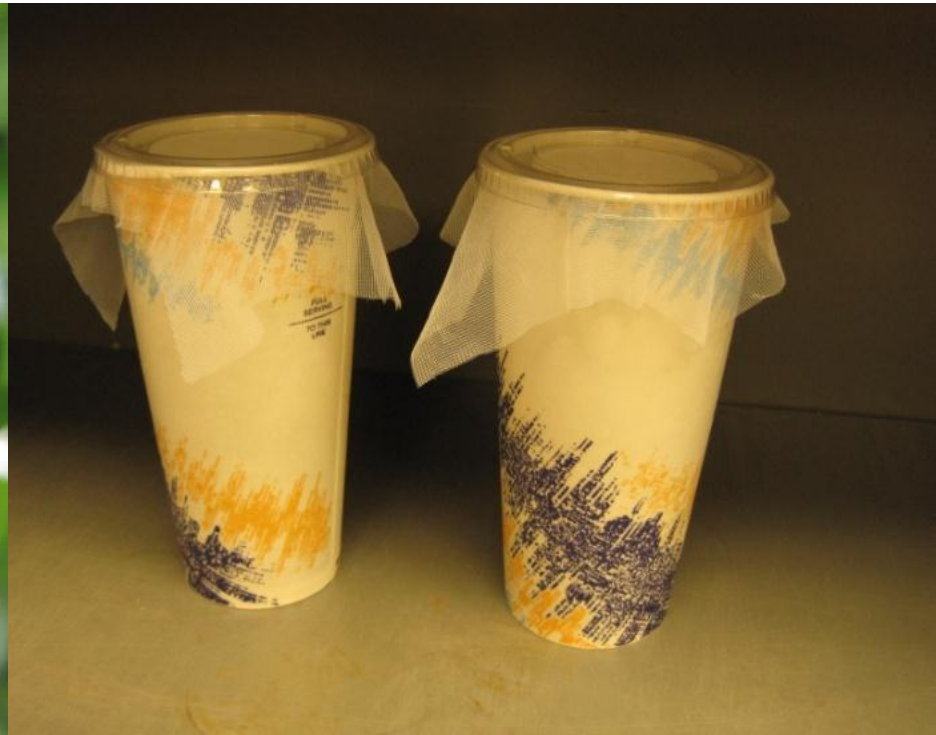
Semi-Field Deployment



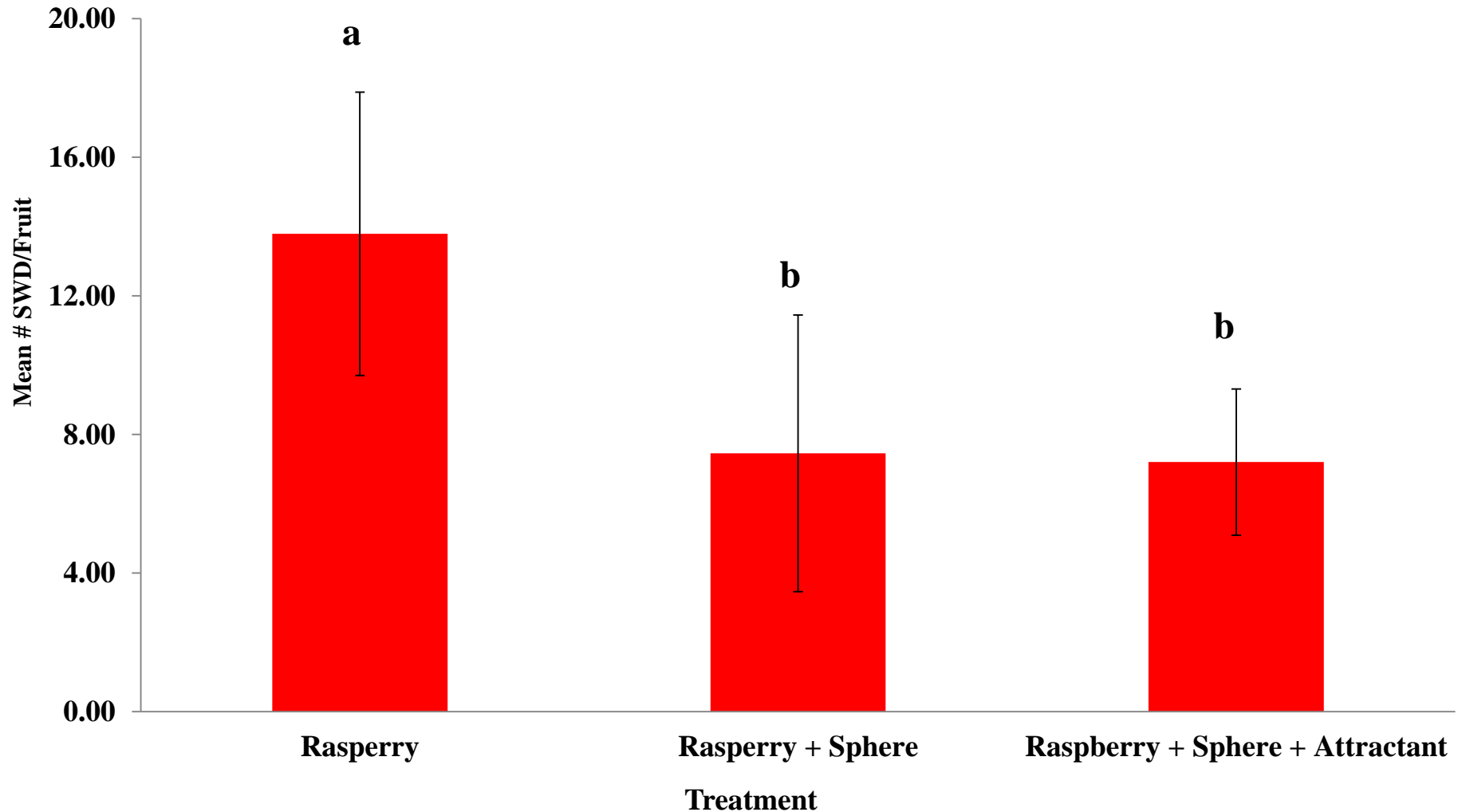
Mean Number of SWD Captured on Sticky Spheres by Treatment



Larval/Pupal Infestations



Mean Number of SWD/Raspberry in each Treatment



Preliminary Results

Lethality Trials

1. λ -cyhalothrin (Kaiso WG) very effective down to 0.1% a.i., even with reduced feeding times.
2. Other insecticides at 1.0 and 0.5% look promising.

Preliminary Results

Semi-Field Trials

1. No apparent effect of attractant in captures on spheres or SWD recovered from fruit
2. Presence of raspberry plant in cages reduced sticky sphere captures ~50%
3. Presence of sticky spheres reduced SWD infestation in fruit by ~50%

Future Research

- Identify attractive, optimal visual stimuli and incorporate into trap design.
 - Size, shape, and color
 - Orientation and alignment within a susceptible crop
- Physiological state of responders and non-responders.
- Incorporate novel attractants and evaluate under semi-field and field conditions

Acknowledgments

- North American Raspberry and Blackberry Association
 - Driscoll Strawberry Associates, Inc.
 - Monterey AgResources
 - Dow AgroSciences, LLC
 - Nufarm Americas
-
- Brittany Rankin
 - Sean Wiles
 - Preston Brown, OSU