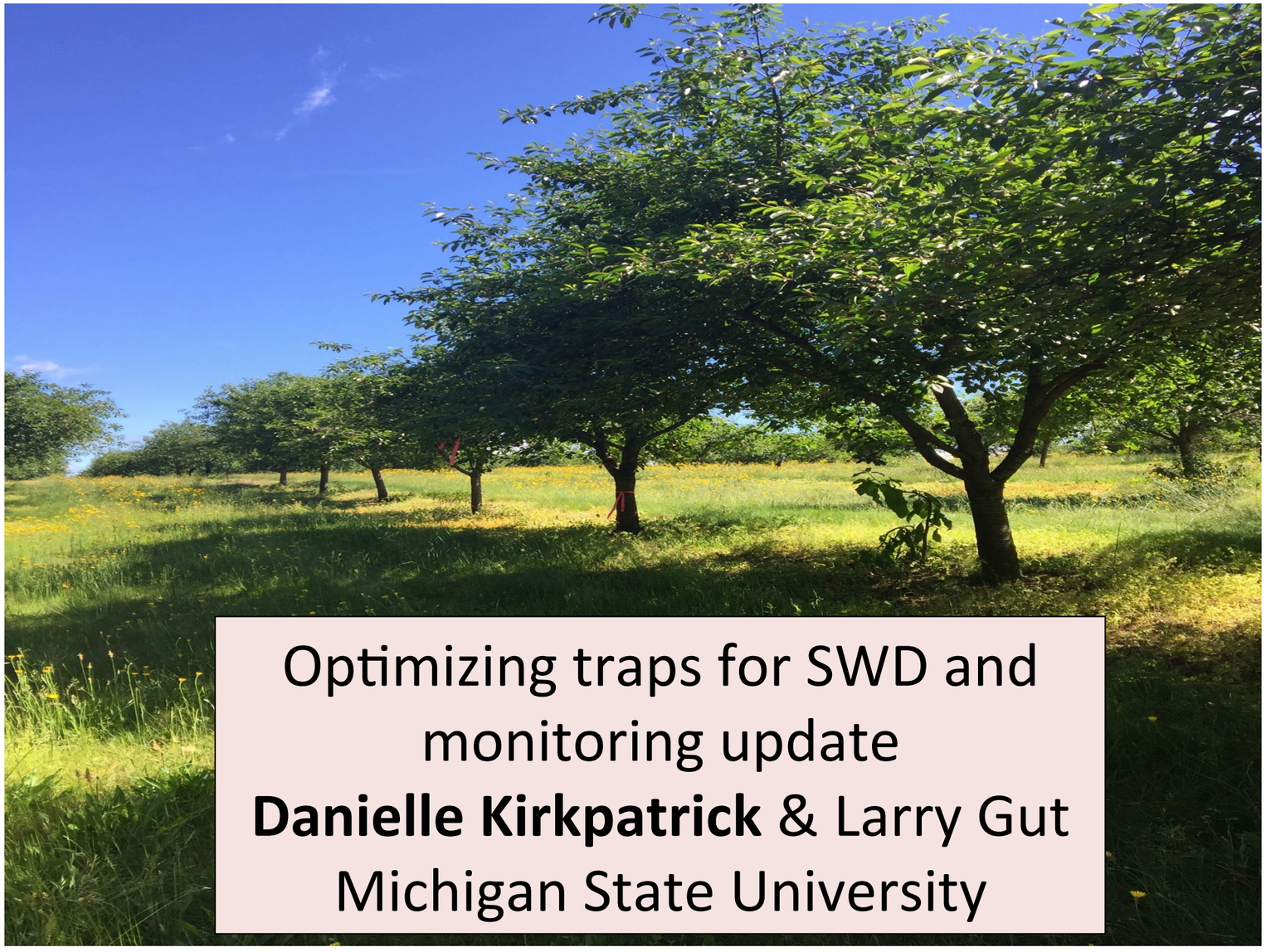

Optimizing traps for SWD and monitoring update

Danielle Kirkpatrick & Larry Gut
Michigan State University

OUTLINE

1. 2016 SWD monitoring network
2. Optimizing trap design for SWD
3. SWD winter morph studies
4. Mark-release-recapture studies



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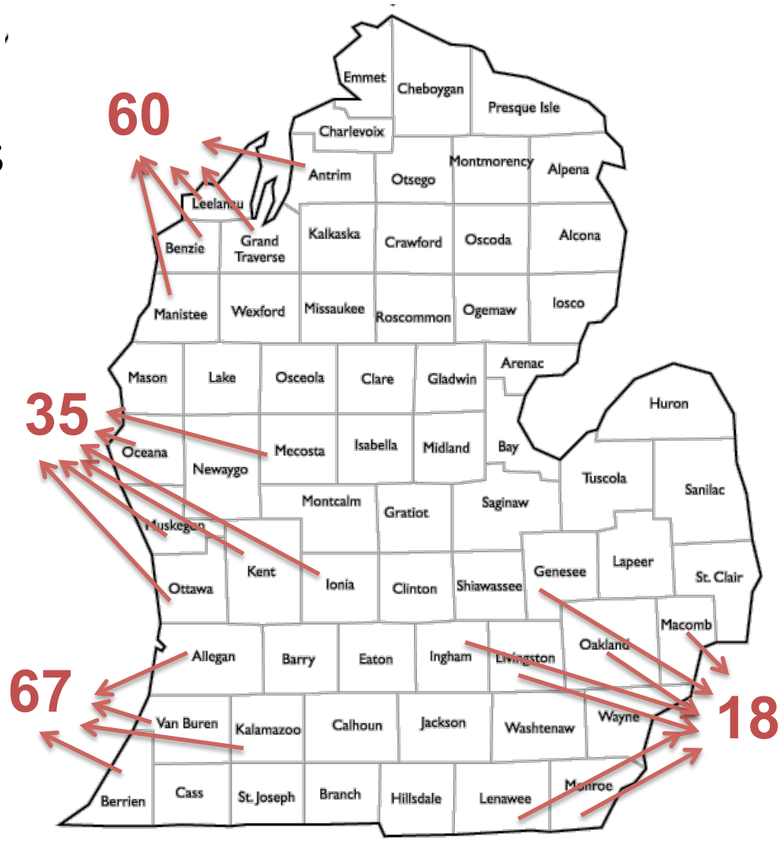
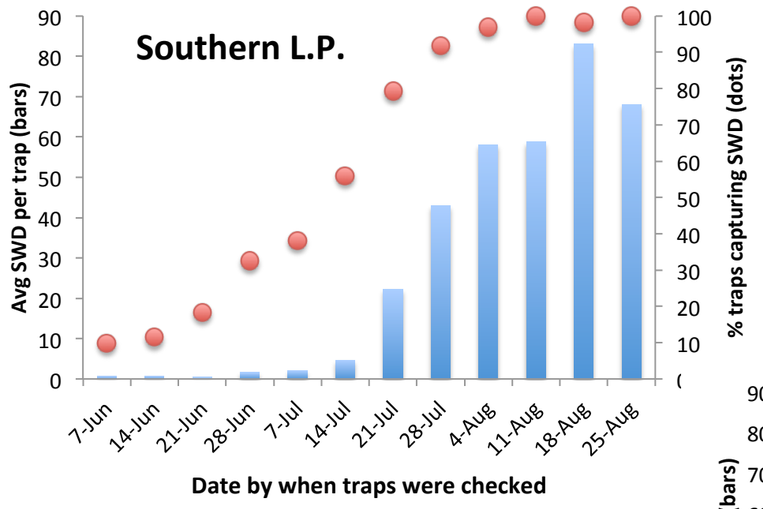
2016 SWD Monitoring Network

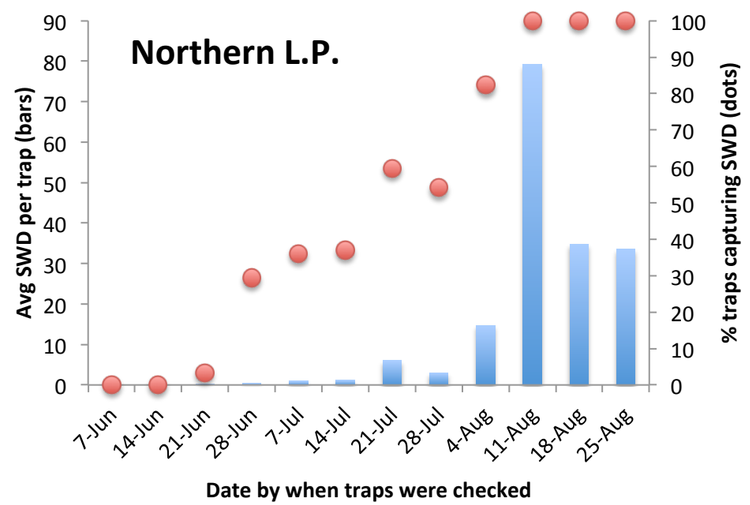
SWD: 2016 Monitoring Network

- 16 trap checkers
- 180 sites, 22 counties
- 27,439 SWD counted
- Weekly reports (11)

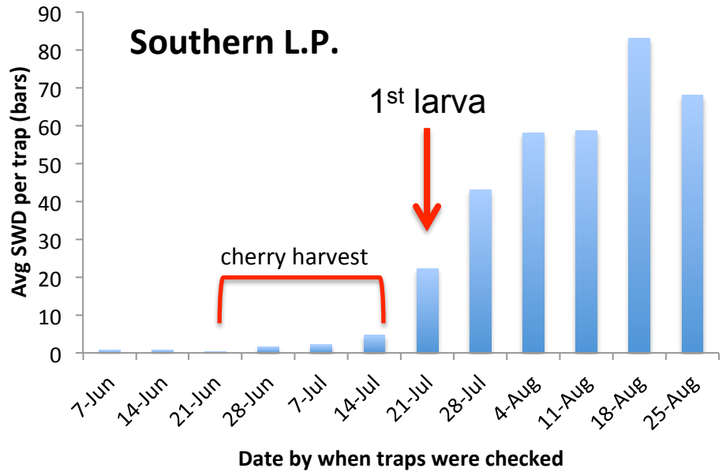


Seasonal catch in MI cherry in 2016



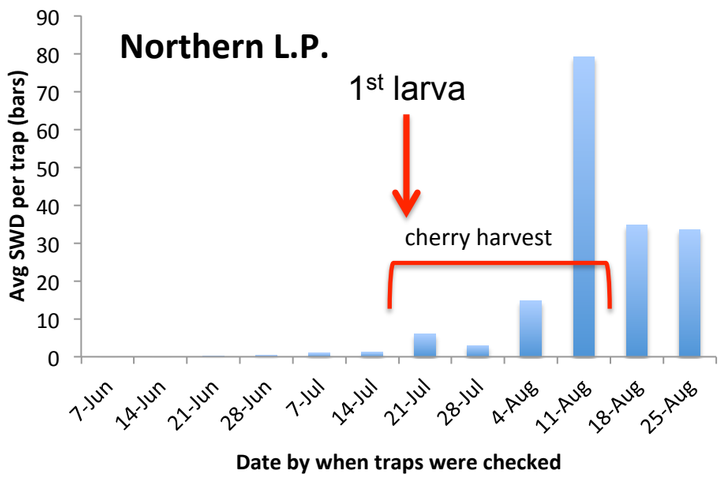


Seasonal catch in MI cherry in 2016

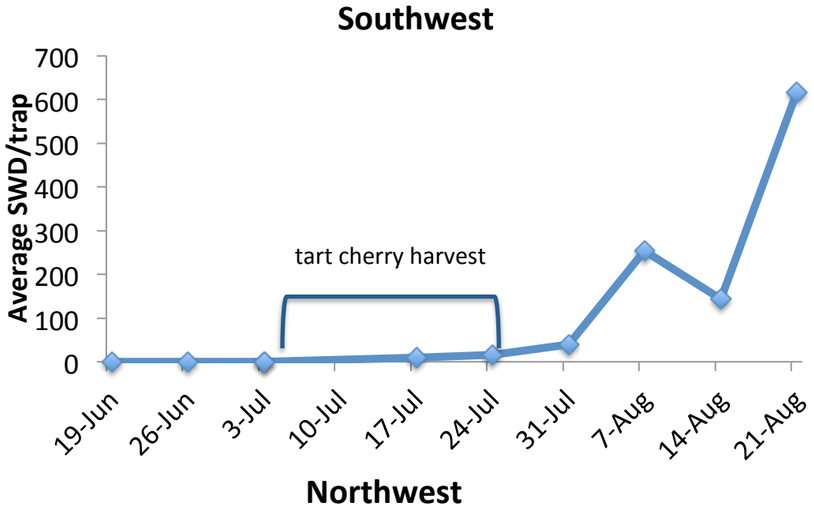


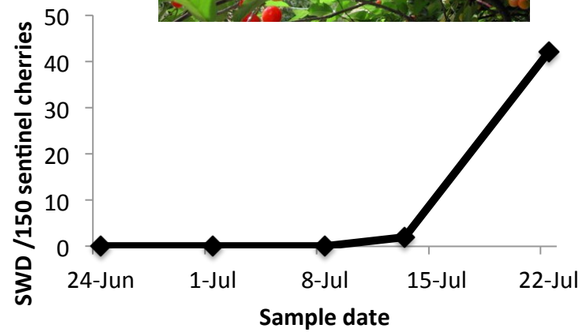
- SWD were detected in a majority of the trapping sites and populations were building during harvest
- Growers applied 4-plus insecticide sprays directly targeting SWD
- Keeping fruit SWD-free required a 7-day spray interval with effective materials and excellent coverage

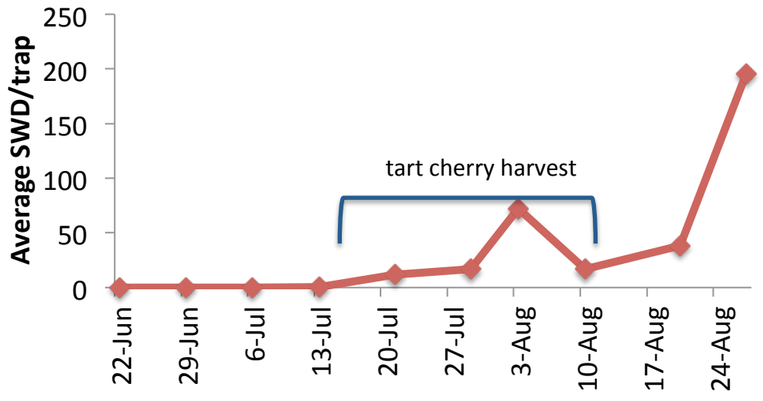
- 1-2 insecticide sprays targeting CFF sufficient to control SWD
- Timing of threshold-based program and fruit susceptibility program were similar

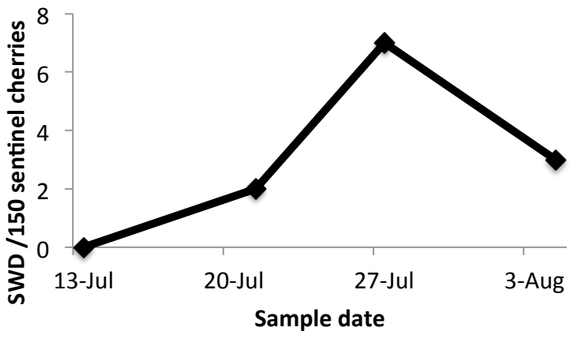


SWD captures and fruit infestation, 2015



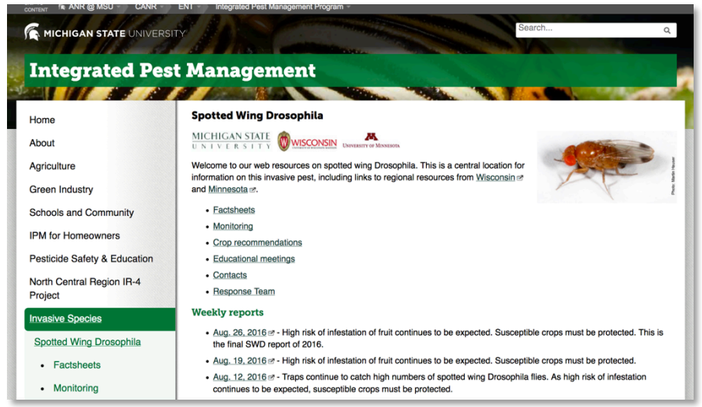


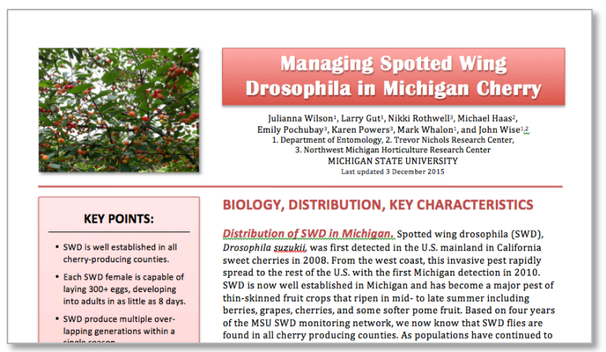




Keeping the MI cherry industry informed

- Weekly reports (e.g., AgNews - 10 articles)
- Presentations
- Management guides and Online resources





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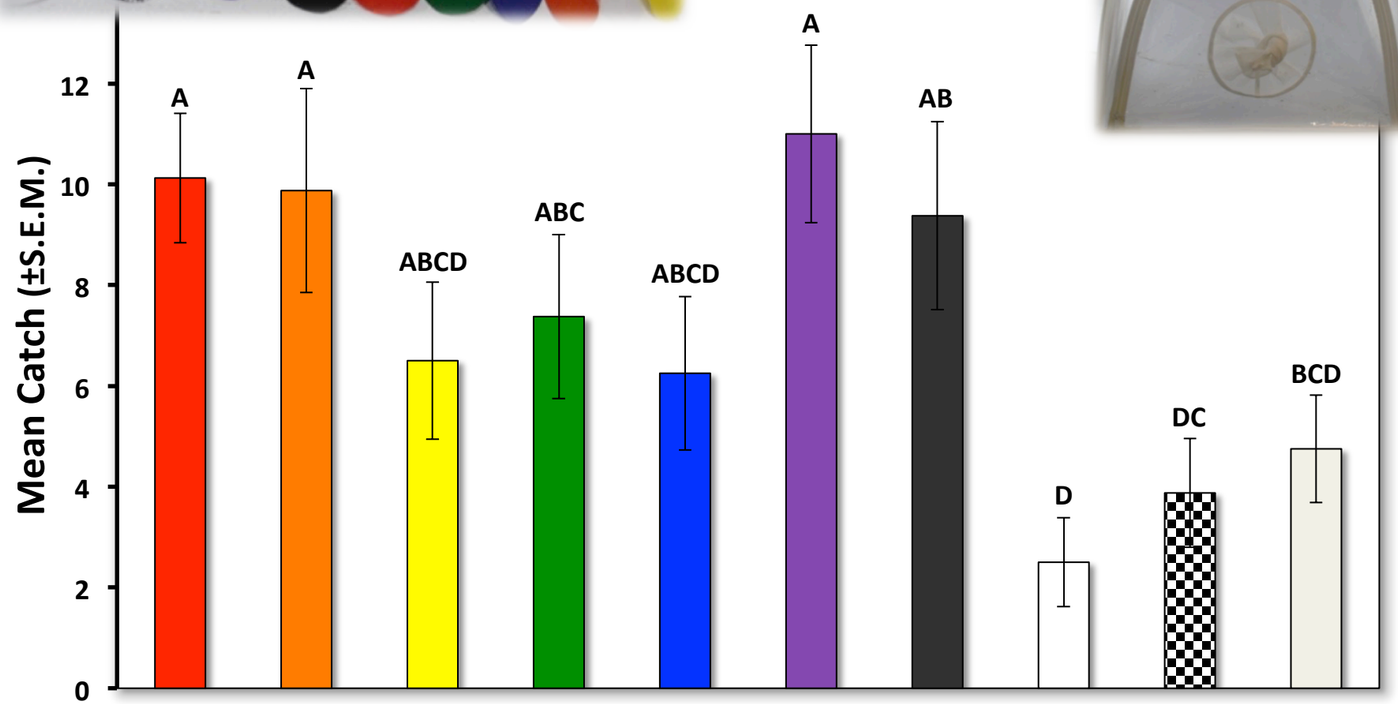
Optimizing SWD Trap Design

Certain colors strongly promote SWD alightment



Novel trap design

- Red hollow sphere
- Coated with Tangle-Trap glue
- Baited with Scentry lure

Mean SWD Catch (±S.E.M.)
120
100
80
60
40
20
0
A
A
B
Small Ball
Large Ball
Deli-cup

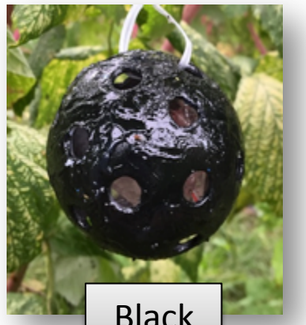
Field comparison of colored sphere traps

- Conducted in raspberry high tunnels
- 8 different colored sphere traps baited with commercial lure

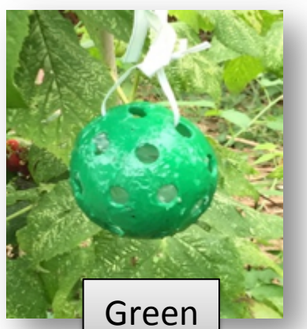

Red


Fluorescent Red


Purple


Black

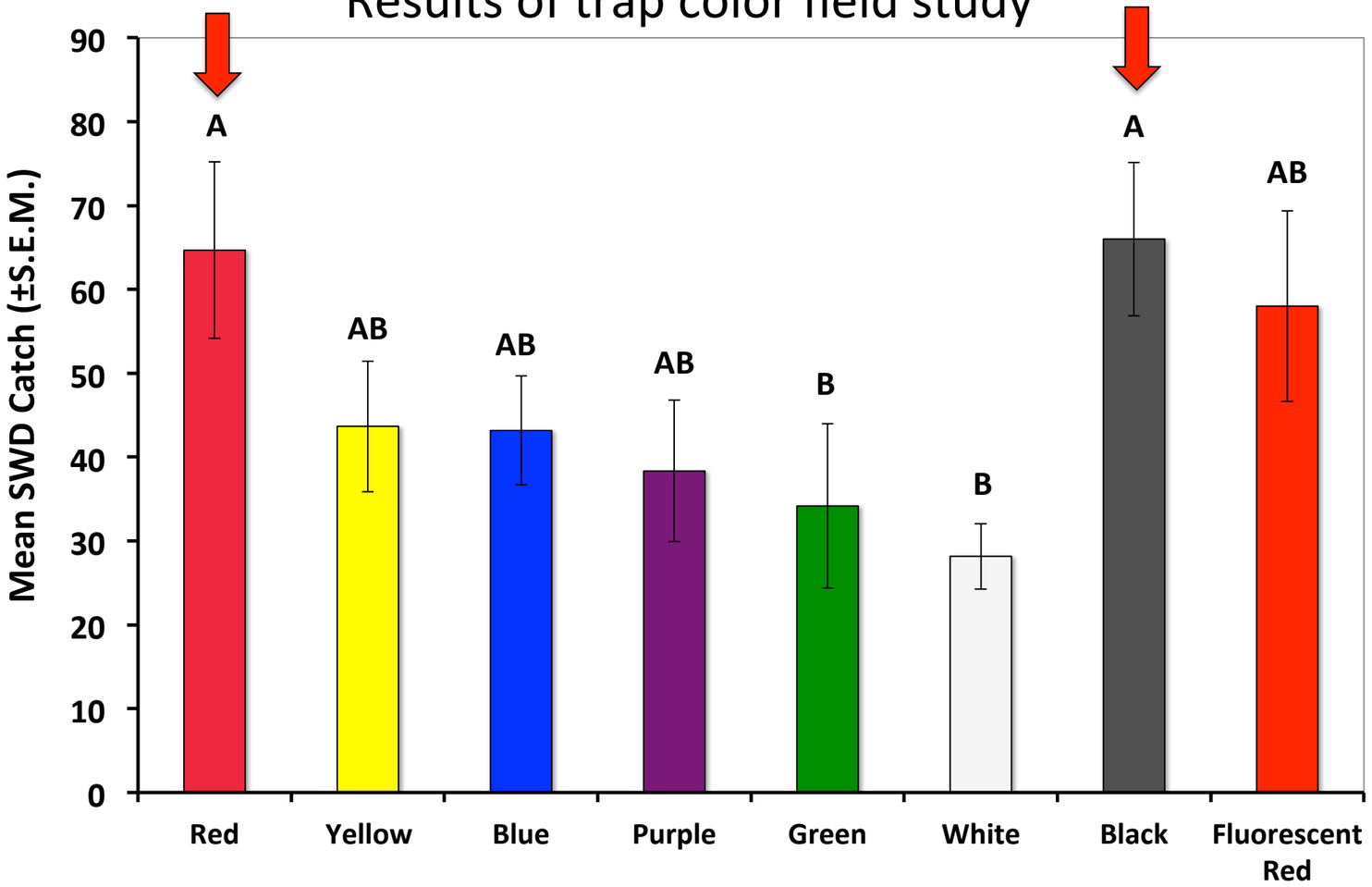

Yellow


Green


White


Blue

Results of trap color field study



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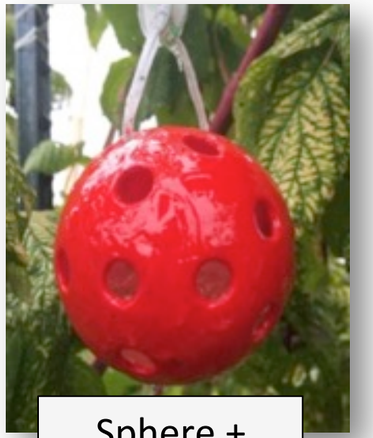
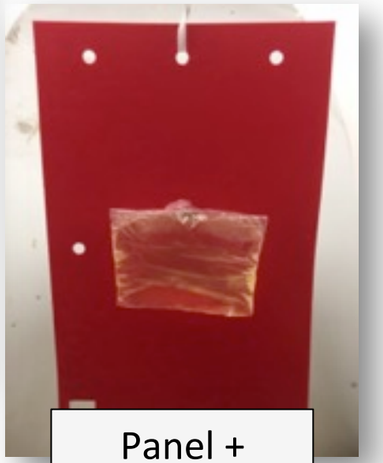
Trap type comparison study



Sphere + Scentry

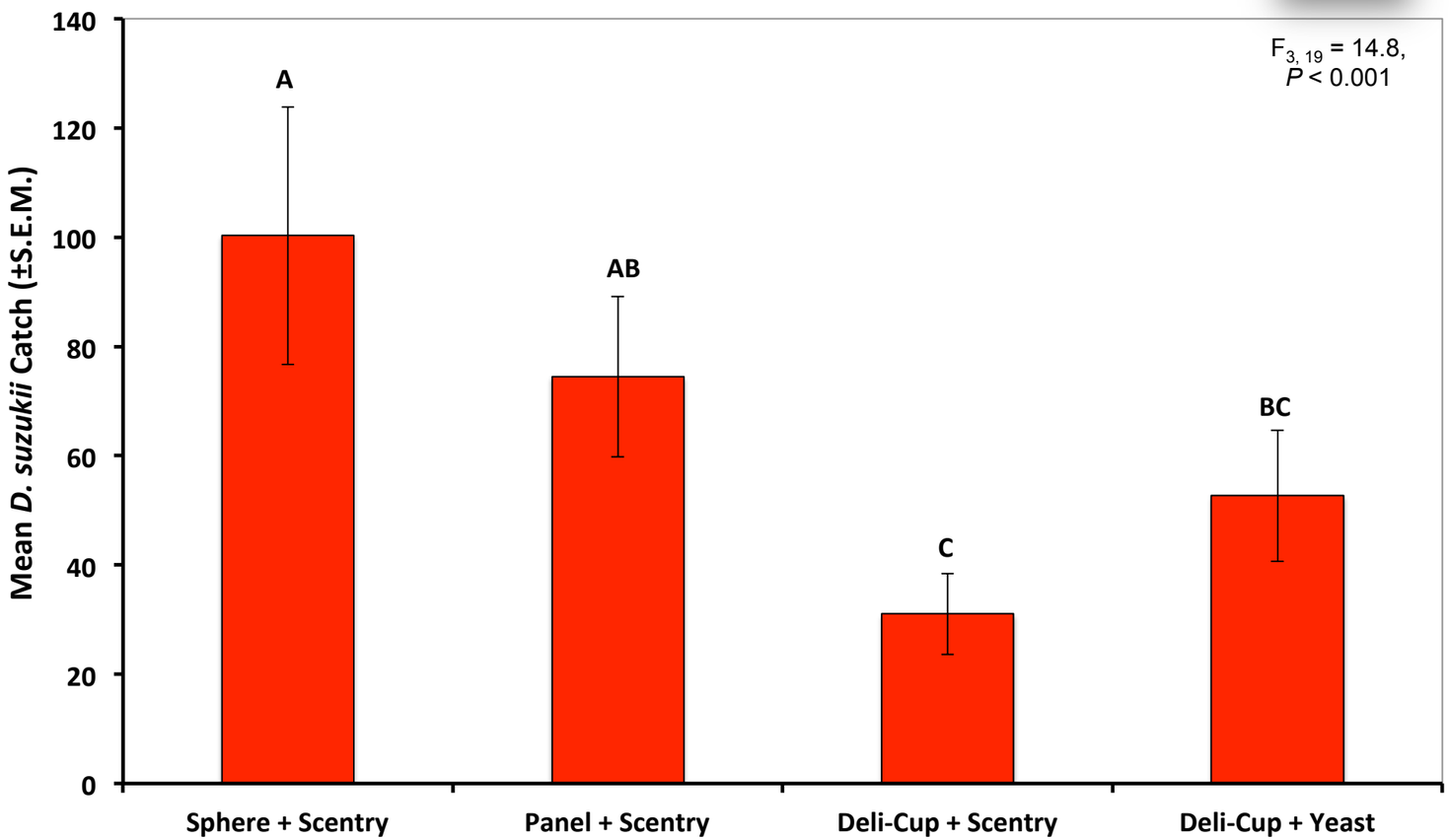


Panel + Scentry

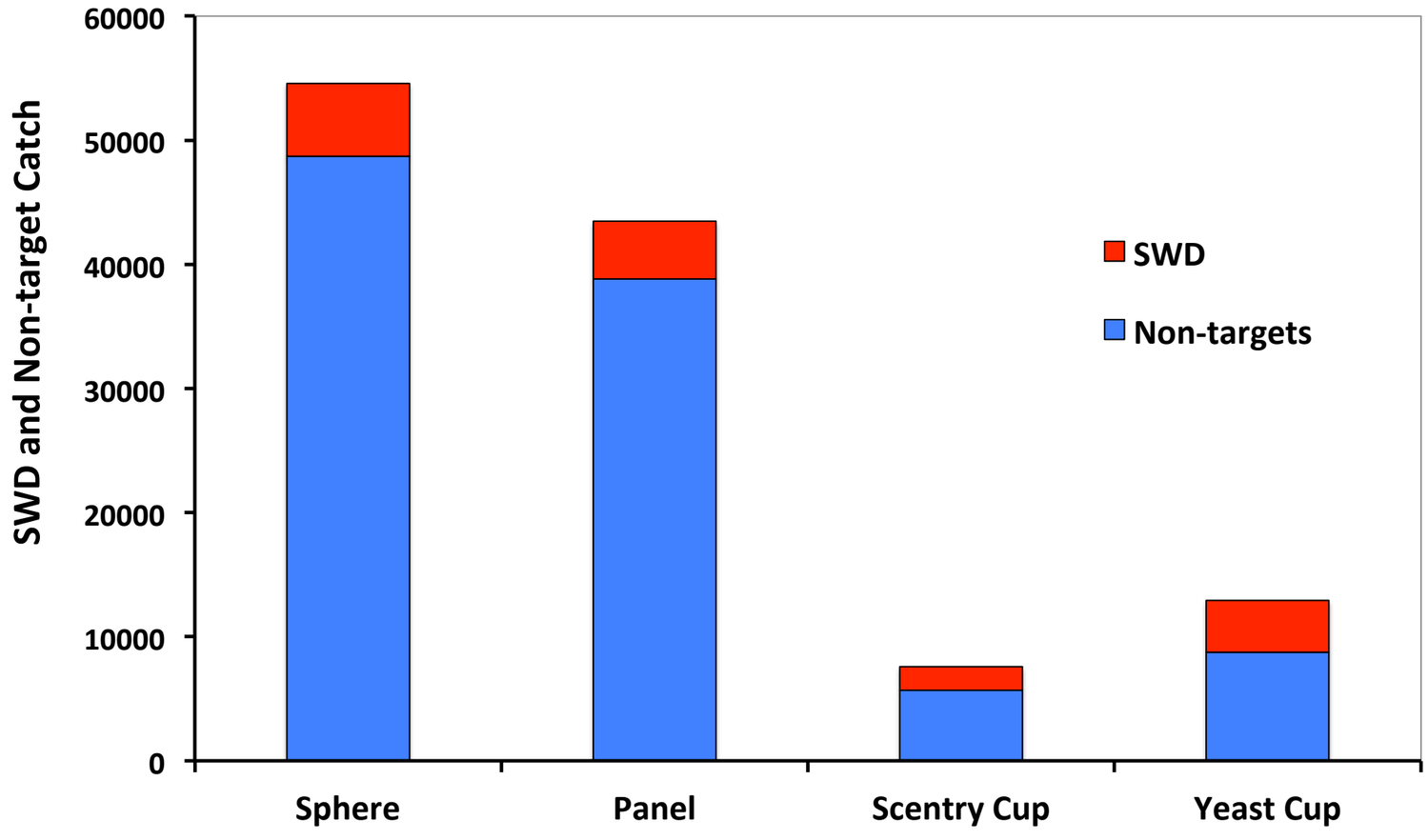
Deli-Cup + Scentry

Deli-Cup + Yeast

Trap type comparison study



Proportion of SWD catch to non-target catch



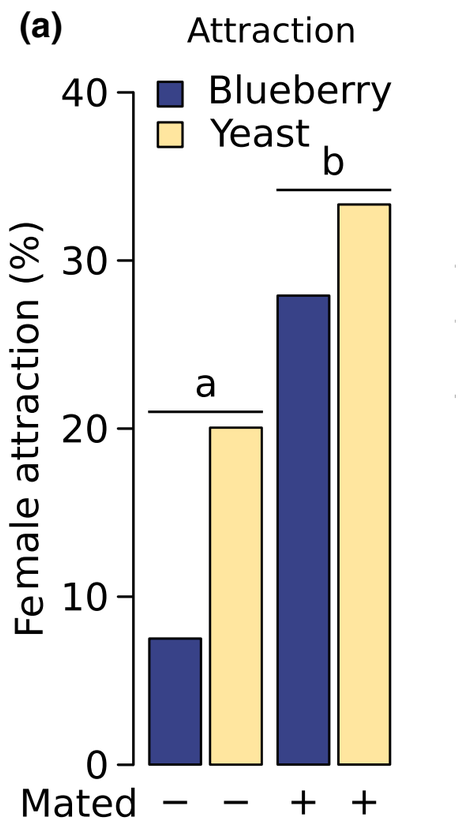
Novel Attractants

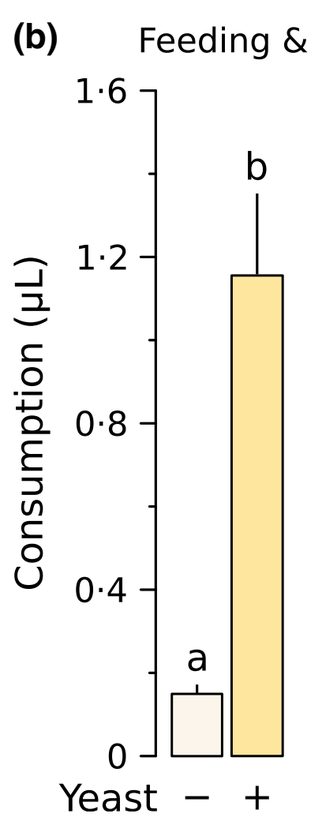
- Compared four volatiles and the yeast sugar solution
- 5 Michigan cherry orchards in SW MI

Aijun Zhang – USDA-ARS

Cesar Rodriguez-Saona, Rutgers

Effect of yeast, H. uvarum, on SWD oviposition and feeding
B. Mori et al. J. Appl. Ecol. 2015



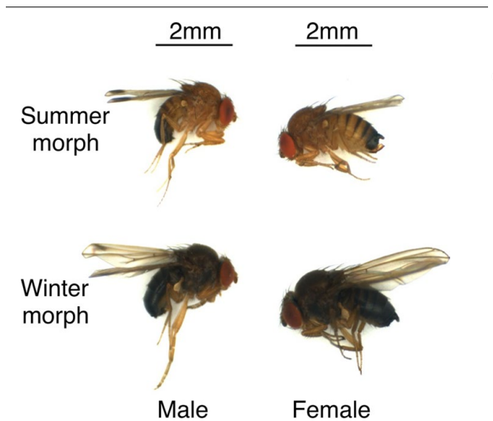


SLU

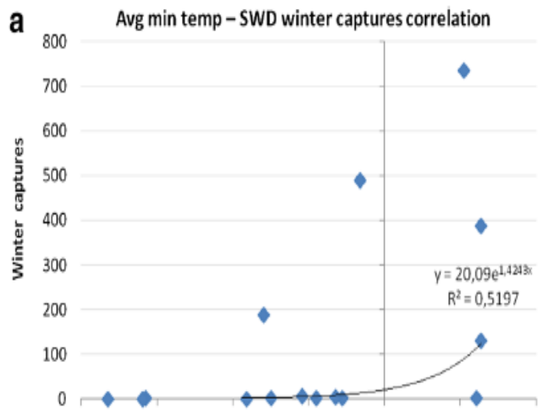
Swedish University of Agricultural Sciences

SWD Winter Morph Studies

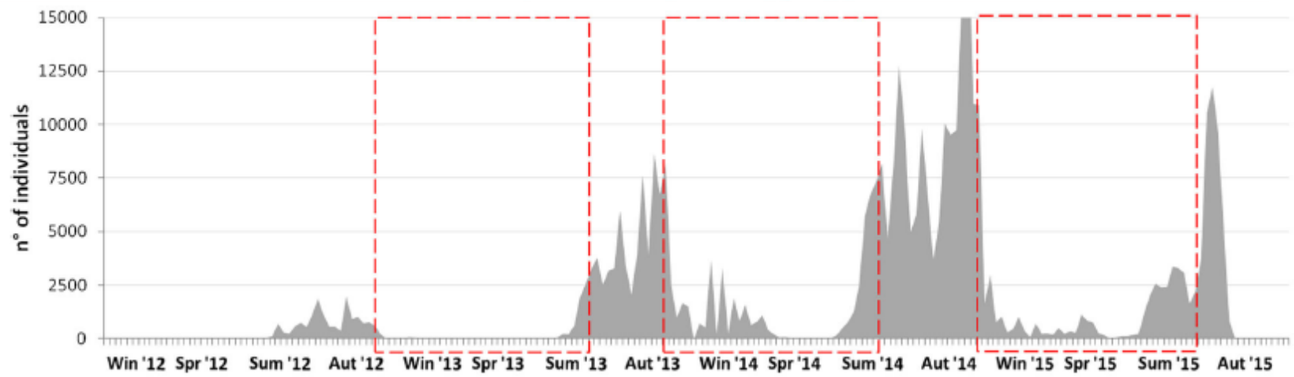
Winter diapause: Key bottleneck period



- Harsh winters can efficiently reduce the number of overwintering individuals



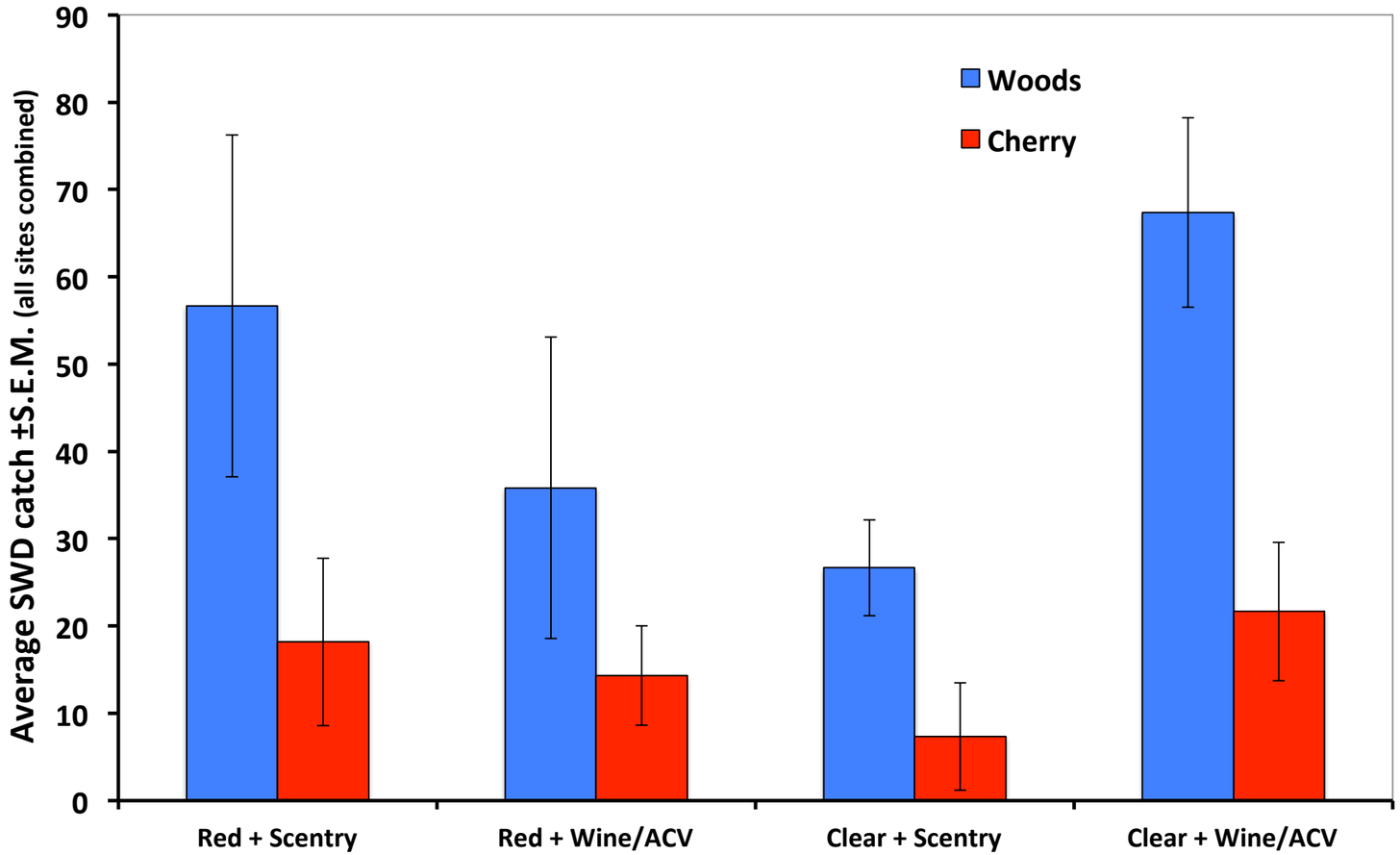
And consequently effect the population in the spring and summer



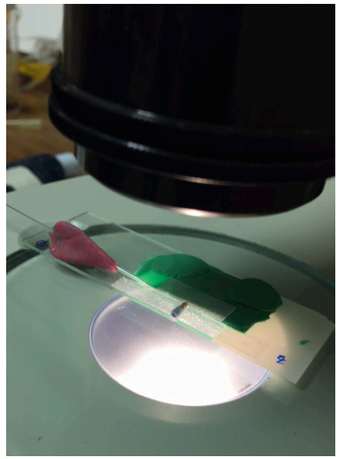
Where are SWD overwintering?

- Traps in cherry orchards and in adjacent woodlots
- Red traps and clear cup traps
  - Liquid baits and lures

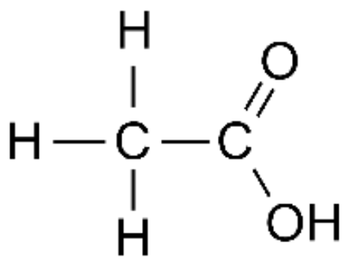
Overwintering trap study



Winter morph and summer morph attractants



- Do summer and winter morphs respond to same attractants?



- Electroantennogram studies with known attractants or repellents

- Optimize early season trap for monitoring winter morph SWD

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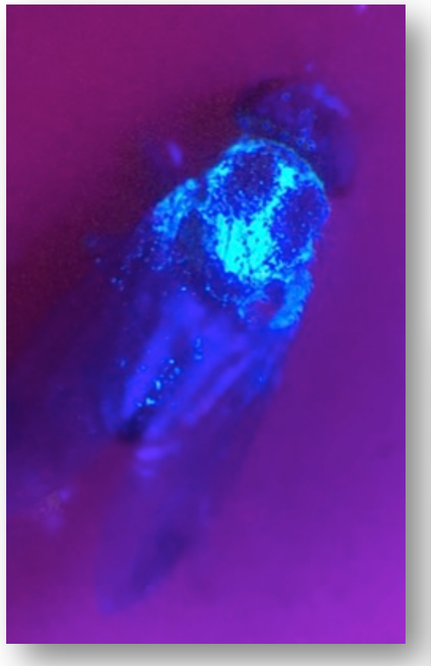
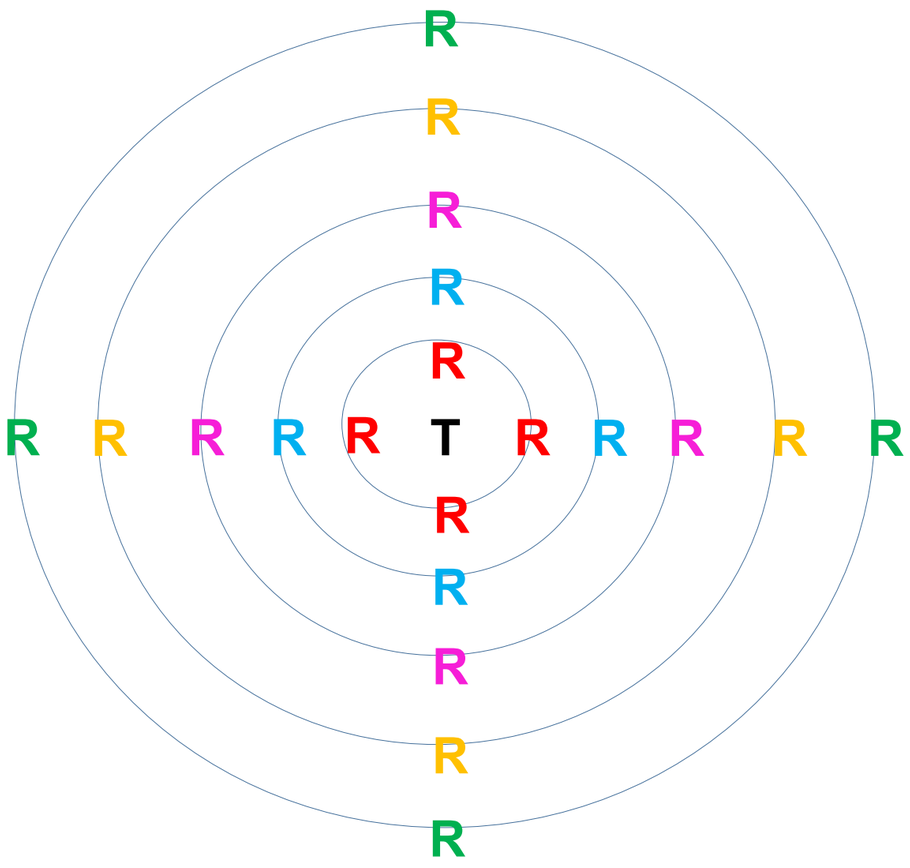
Mark-Release-Recapture of *D. suzukii*

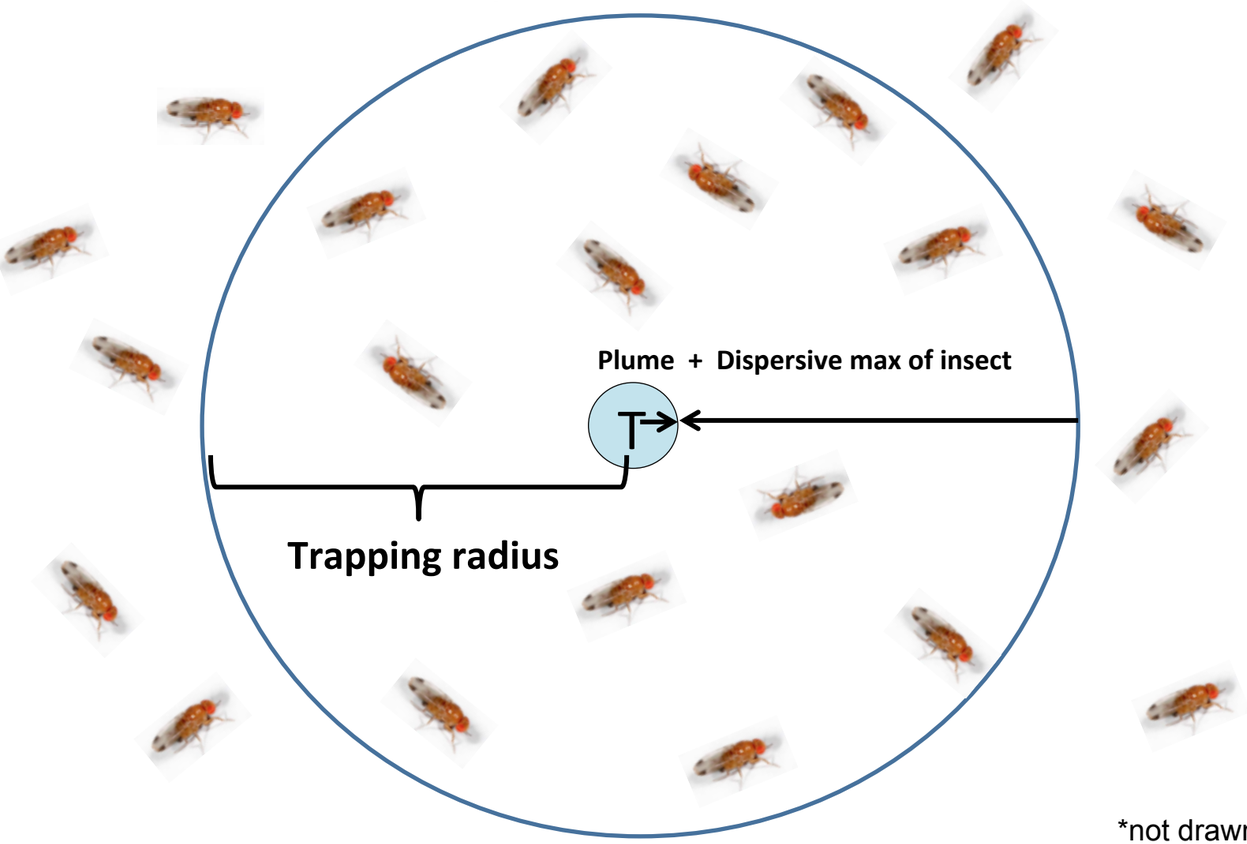


Mark-Release-Recapture of SWD

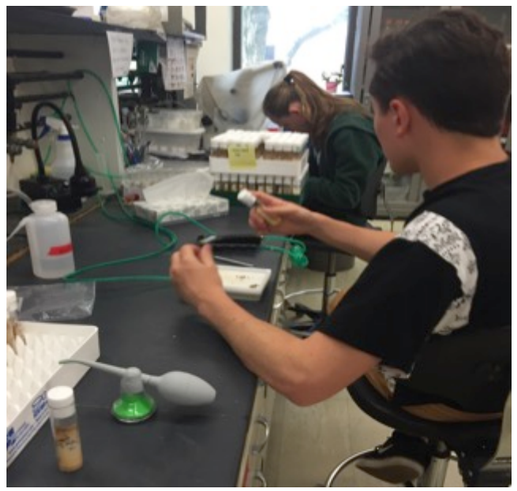
Single trap,
multiple release

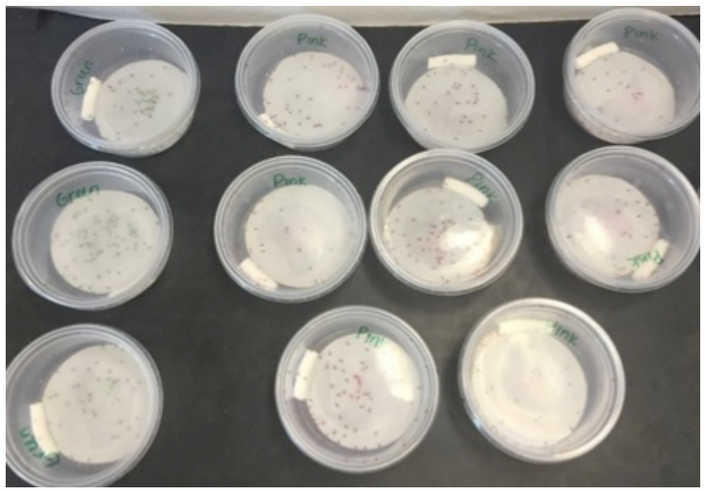


Trapping area, maximum dispersal distance, and plume reach

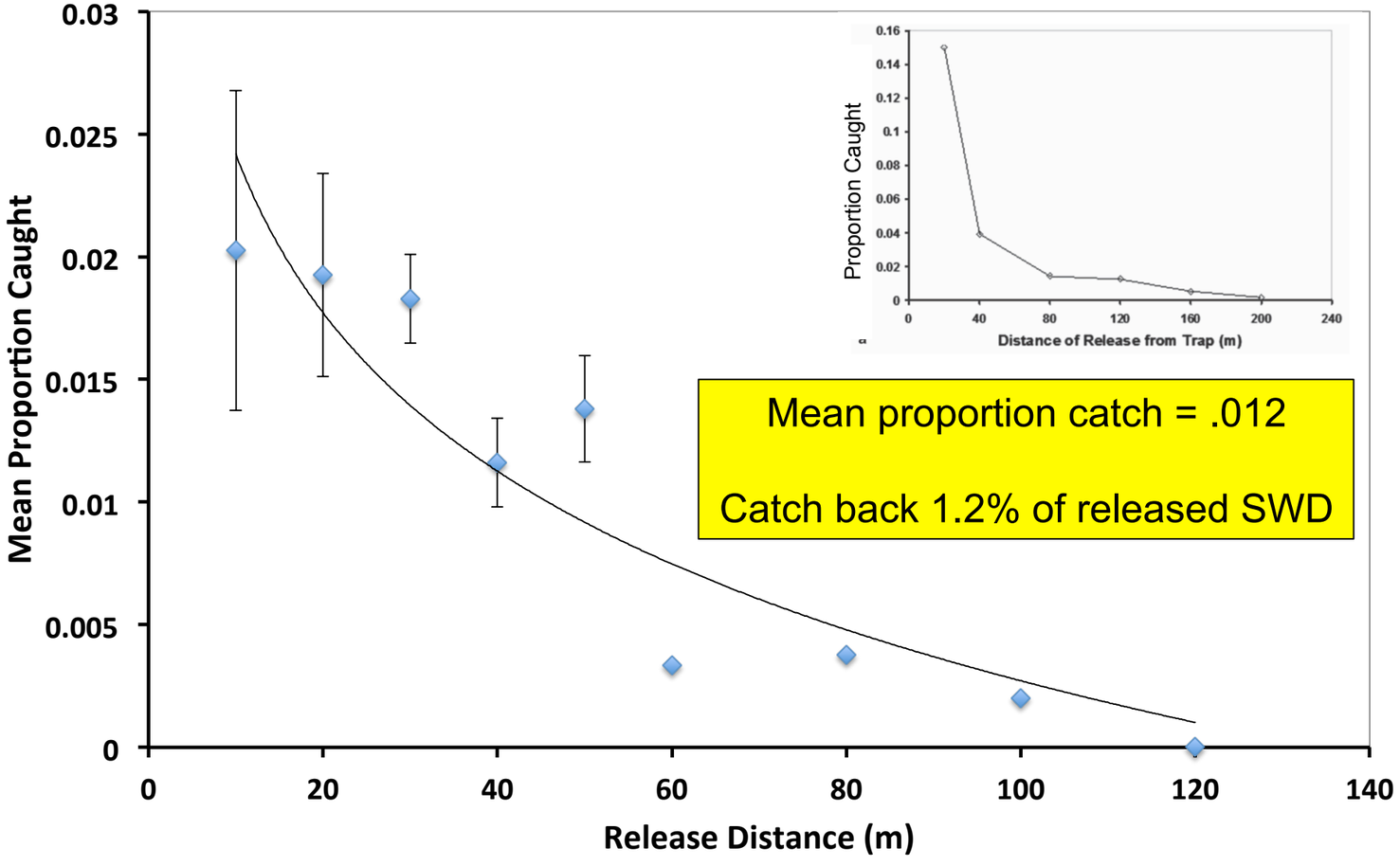


*not drawn to scale

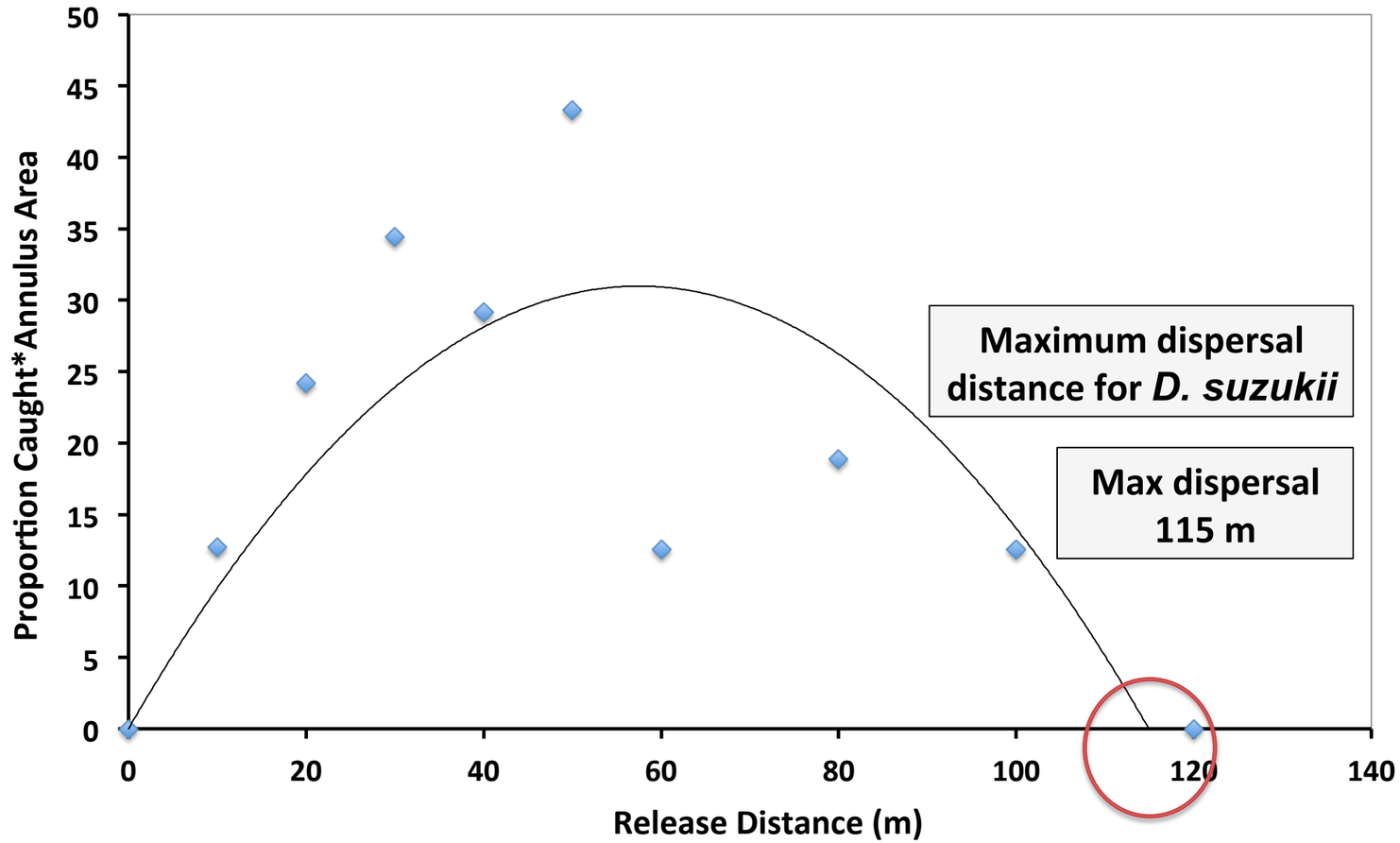


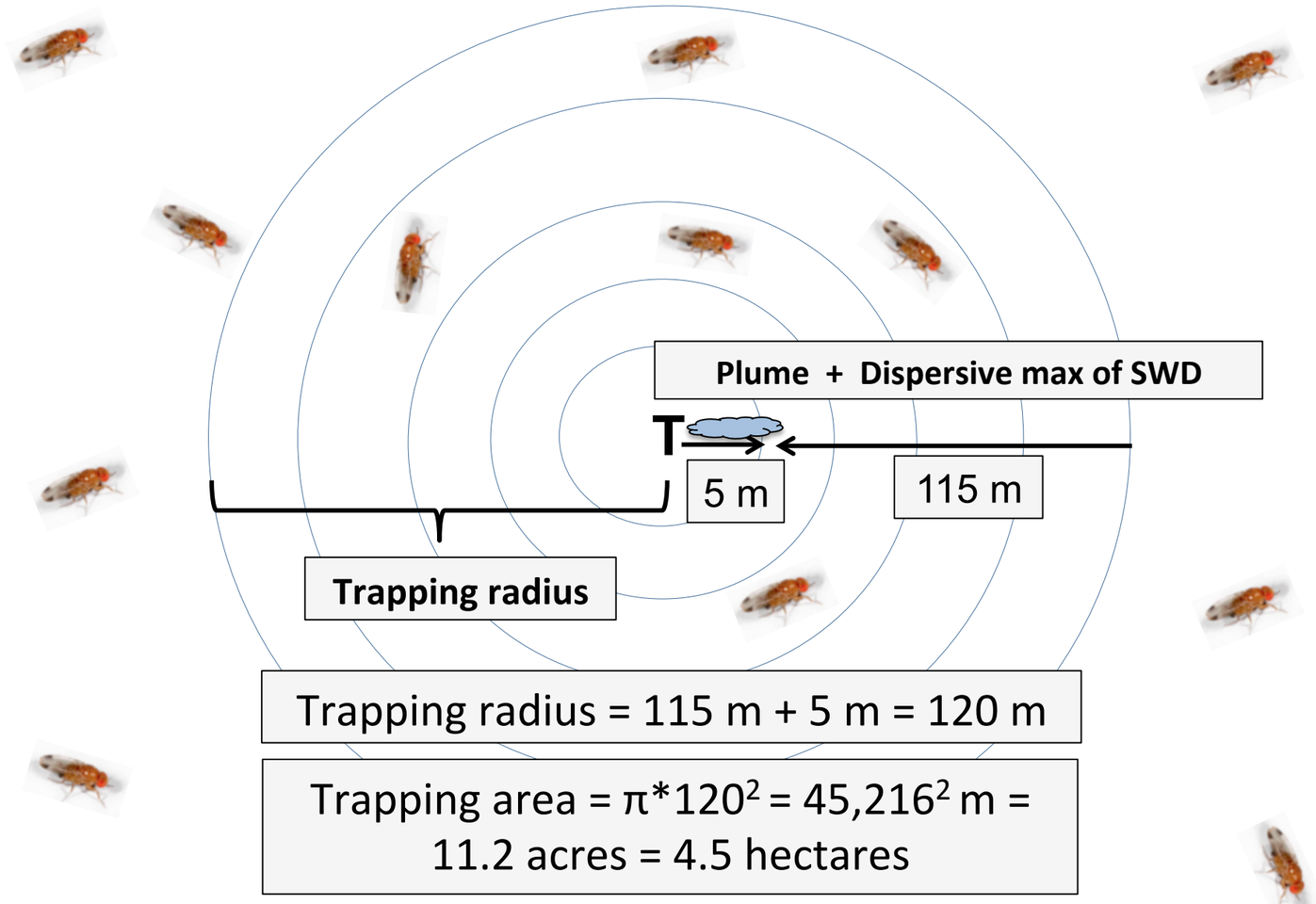

Green
Pink
Pink
Pink
Green
Pink
Pink
Pink
Green

Untransformed plot of trapping data



Transformed data: Miller Plot





Trapping radius = 115 m + 5 m = 120 m

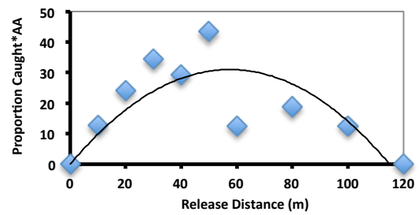
Trapping area = $\pi * 120^2 = 45{,}216^2$ m = 11.2 acres = 4.5 hectares

SWD population estimation

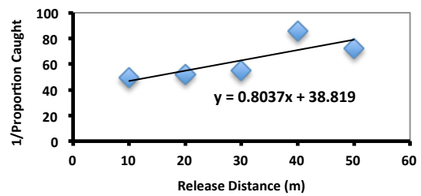
***D. suzukii* per Trapping Area = Catch in Trap / Proportion Caught**

Catch per single monitoring trap	*D. suzukii* per trapping area (4.5 hectares)	*D. suzukii* per hectare	*D. suzukii* per acre
1	171	38	15
10	1,706	379	153
50	8,528	1,895	767
100	17,055	3,790	1,534
500	85,277	18,950	7,672
1000	170,554	37,901	15,345

Maximum dispersive distance for *D. suzukii*: 115 m

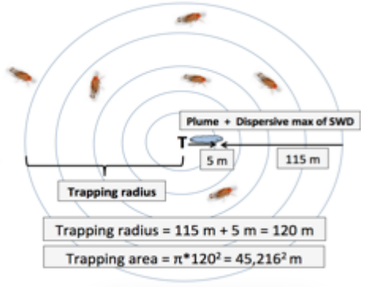


Plume reach for red baited panel trap: < 5 m



One panel trap samples:

$45{,}216^2$ m = **11.2 acres (ac) = 4.5 hectares (ha)**



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Acknowledgements

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- Isaacs Lab
- MSU Field Team

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  - MI Horticultural Society
  - MI Project GREEEN
  - MI Project GREEEN AABI

Thank you!

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