Use of Trapping for Management Decisions

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Collaborating Institutions

ars · NC State University · PennState · OSU Oregon State · University of Maryland · University of Georgia · Washington State University · Northeastern IPM Center · Cornell University · Utah State University · Rutgers University · The Ohio State University · University of Kentucky · UC Davis · University of Minnesota · Virginia Tech · Berkeley · Michigan State University · UC Riverside

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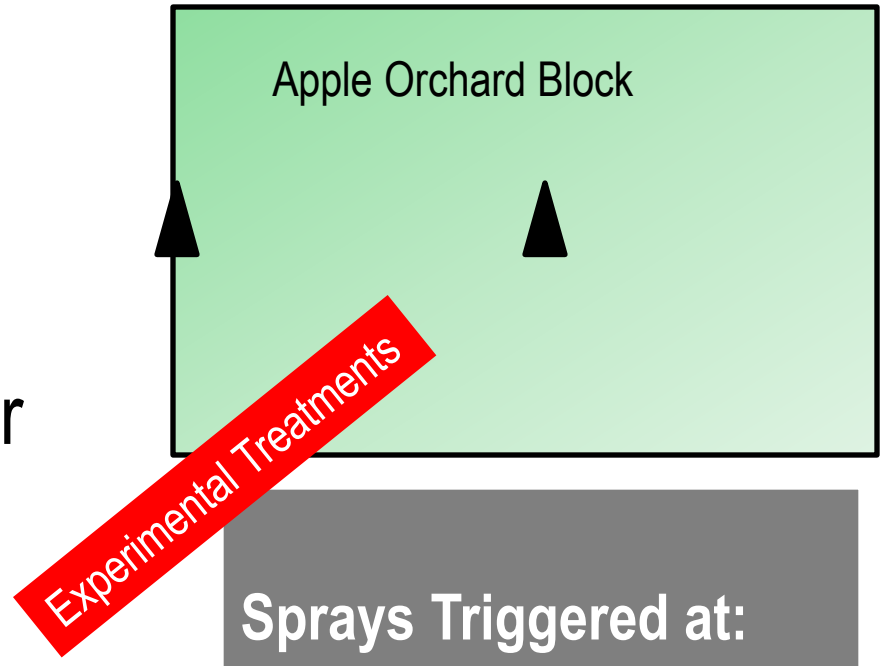
Obj 3a: Develop decision support tools to assess BMSB abundance and mitigate damage.

ii. Determine relationship between pheromone trap captures and crop damage/BMSB populations in crops.

- Leskey: Thresholds to dictate insecticide sprays in apples.
- Kuhar: Thresholds and damage relationship in peppers.
- Welty: BMSB abundance and damage in sweet corn.
- Walgenbach: Relationship between trap captures and damage in apples.
- Nielsen:

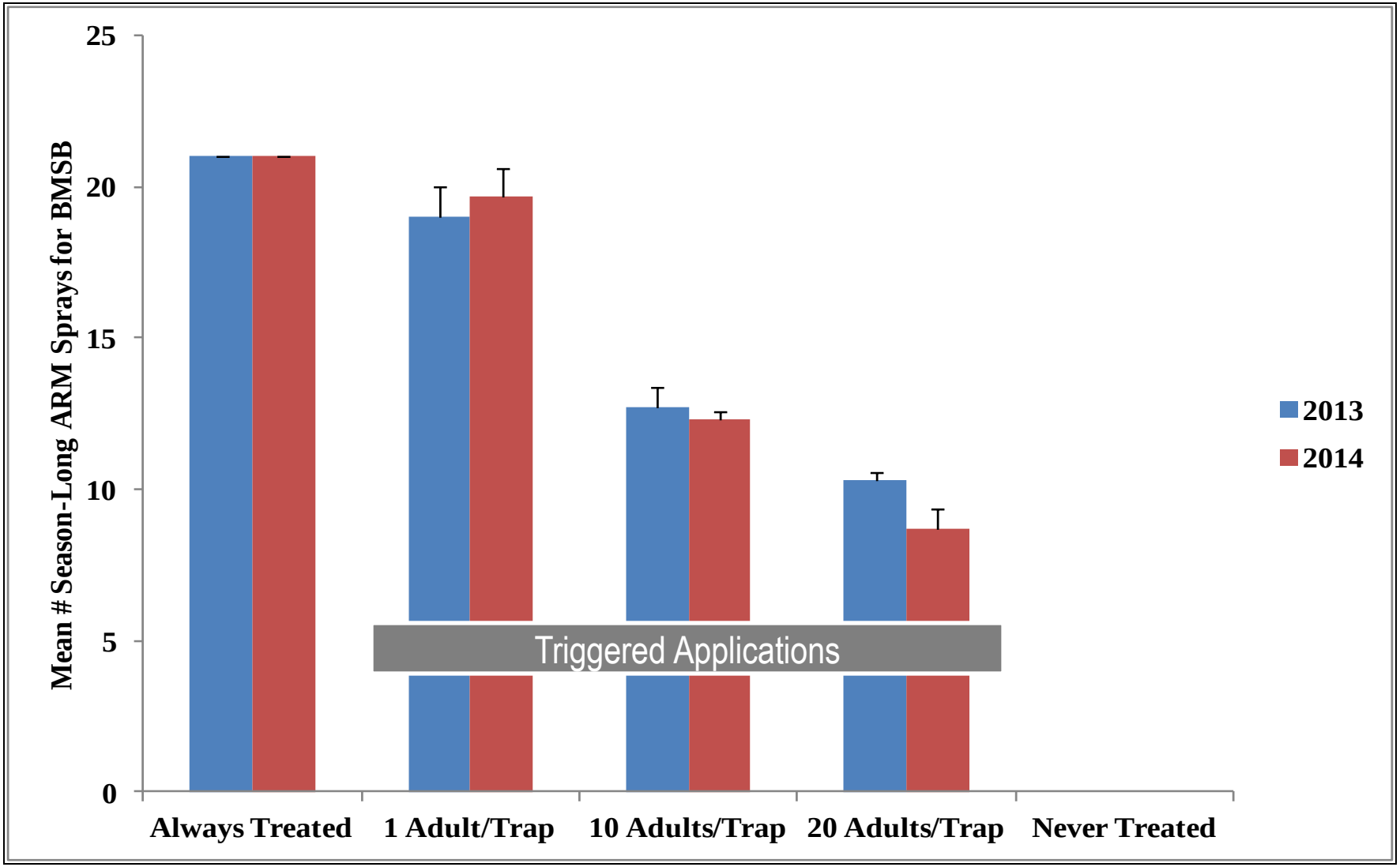
Can we use biological information provided by trap captures to guide management decisions?

- Apple blocks monitored with two baited traps. Traps checked weekly.
- When adult captures in either trap reached a set threshold, the block was treated with BMSB material (ARM).
- Block treated again 7-d later. Threshold was then reset.

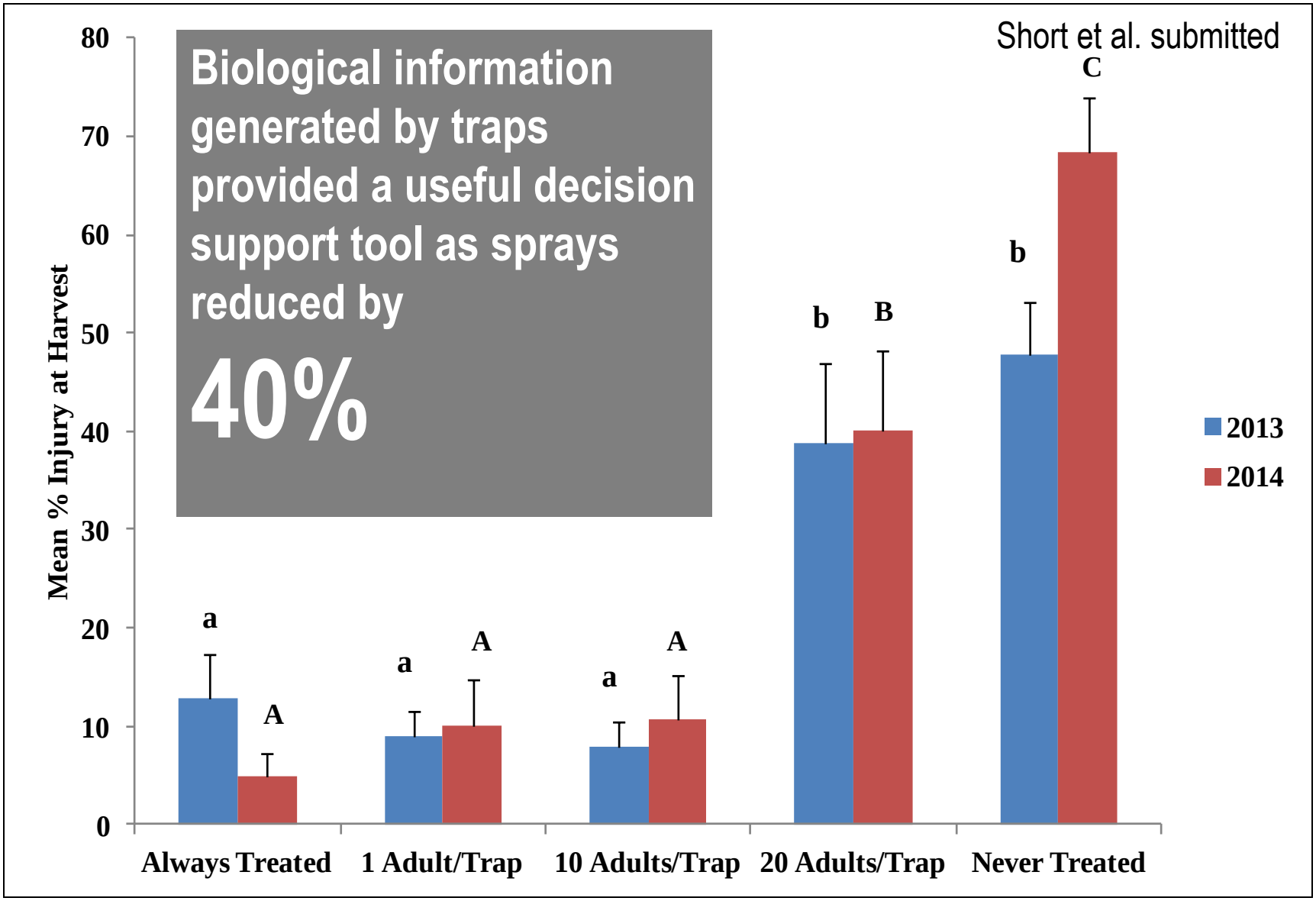


Sprays Triggered at:
1) 1 Adult / Trap
2) 10 Adults / Trap
3) 20 Adults / Trap
4) Treated Every 7 d
5) No Spray (Control)

Season-Long Insecticide Applications Made Against BMSB



BMSB Injury at Harvest



Using sticky card trap catch to guide BMSB control decisions in peppers

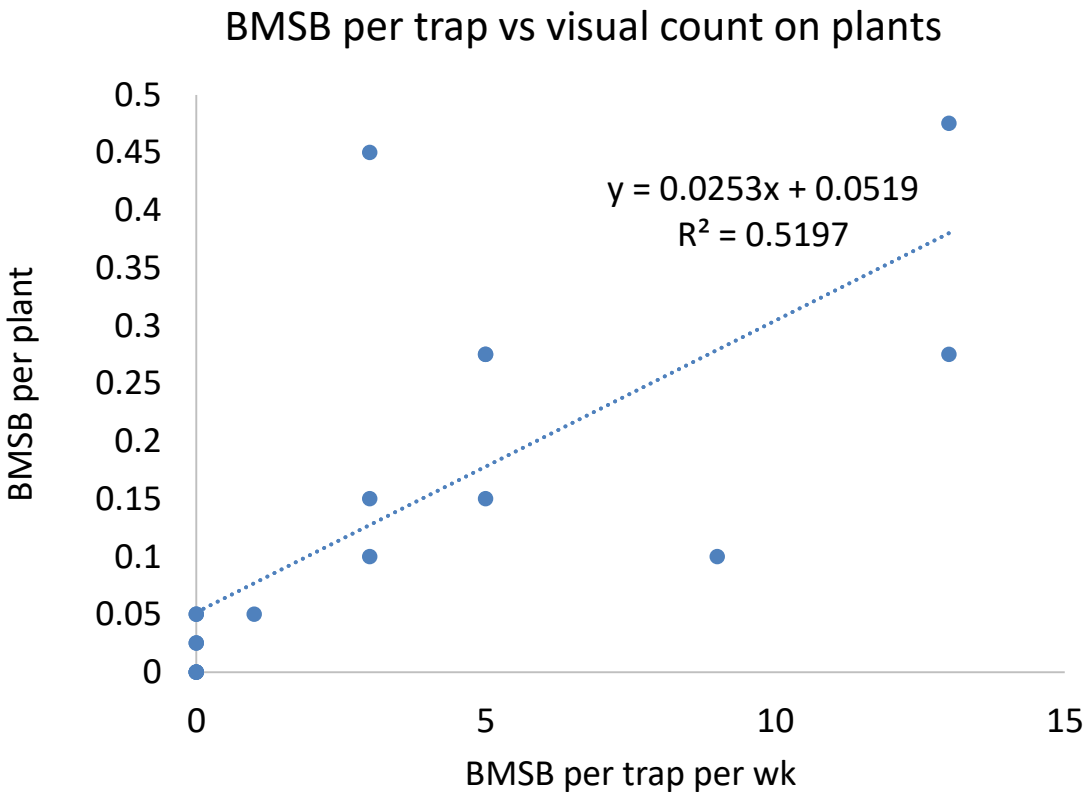
VIRGINIA TECH™

- Conducted in 3 pepper fields in VA (‘Aristotle’ bell peppers)
- Pheromone-baited sticky cards placed on stake – checked weekly
- 4 treatments (variations in bifenthrin applications):
  a) Untreated control
  b) Spray @ ≥ 10 BMSB/card/wk
  c) Spray @ ≥ 5 BMSB/card/wk
  d) Spray weekly

Using sticky card trap catch to guide BMSB control decisions in peppers

VIRGINIA TECH

- There was a significant relationship between BMSB trap catch and visual counts on pepper plants



Sticky Trap Cards to Guide Pepper Management Decisions

Brown Marmorated Stink Bug Infestation on Sweet Corn

Celeste Welty

December 2017

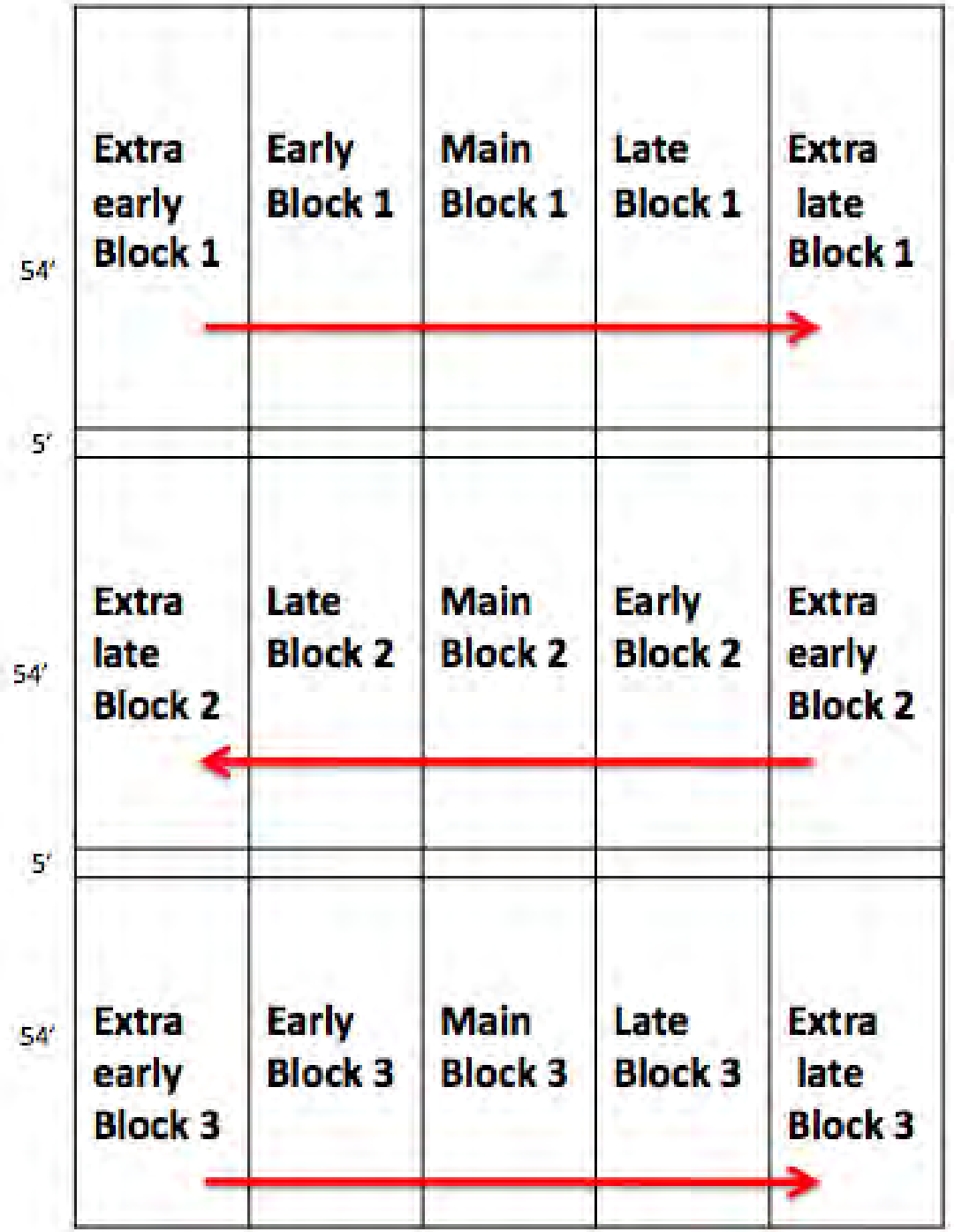
The Ohio State University

Sweet corn & BMSB infestation

- Objective to document trends:
  - Time of year
  - Corn growth stages
  - Location within plant
  - Damage to kernels
  - Relationship with trap catch

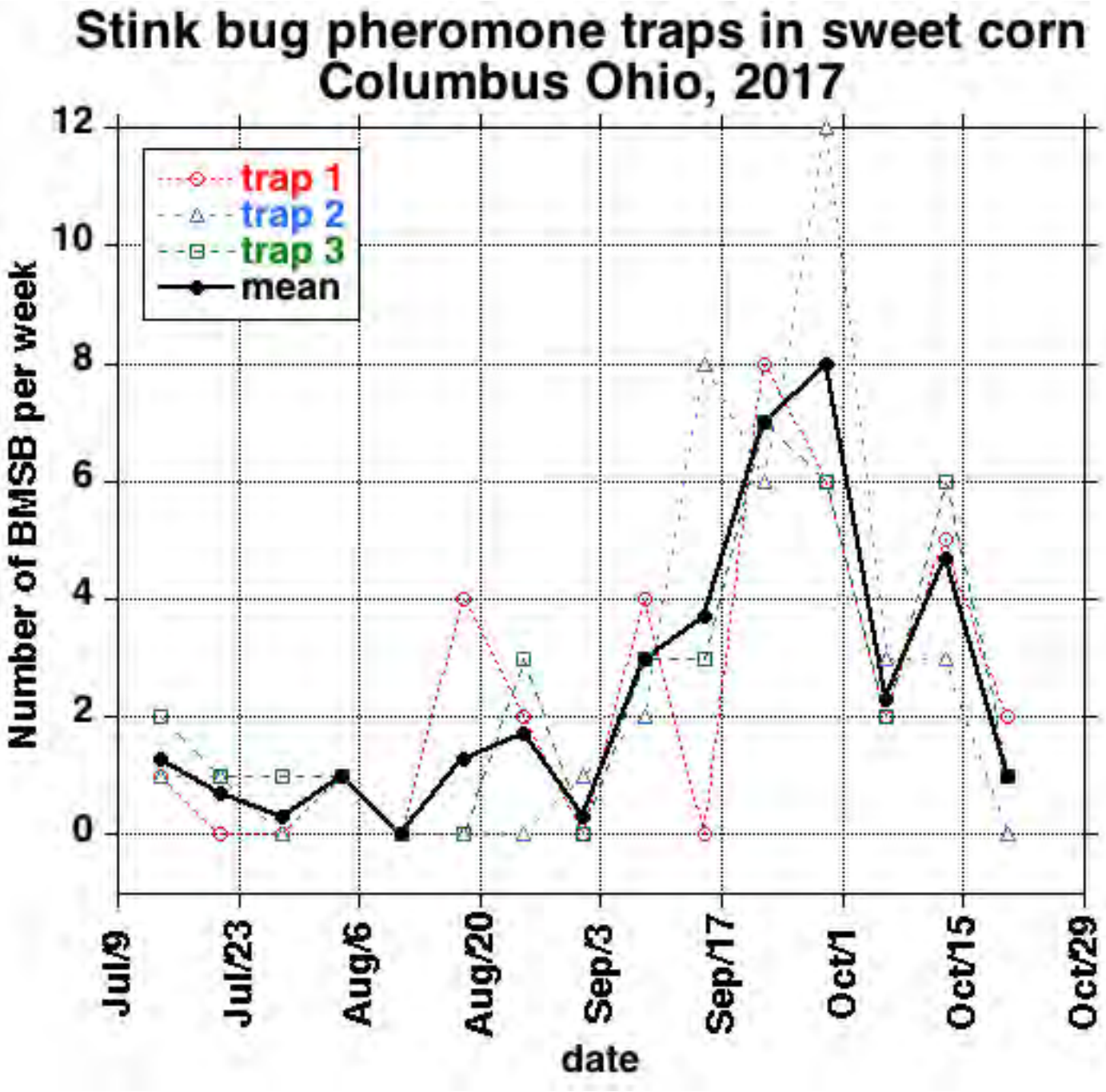
Design

- 5 planting dates
- 3 cultivars
- 3 replicates
- No insecticides
- BMSB Hotspot



Evaluation

- 3 stink bug pheromone traps, checked once per week
- Scout plants for stink bugs:
  - Whorl stage
  - Emerging tassel stage
  - Silk stage
- Injury to kernels at harvest


Stink bug pheromone traps in sweet corn
Columbus Ohio, 2017
trap 1
trap 2
trap 3
mean
Number of BMSB per week
0
2
4
6
8
10
12
Jul/9
Jul/23
Aug/6
Aug/20
Sep/3
Sep/17
Oct/1
Oct/15
Oct/29
date

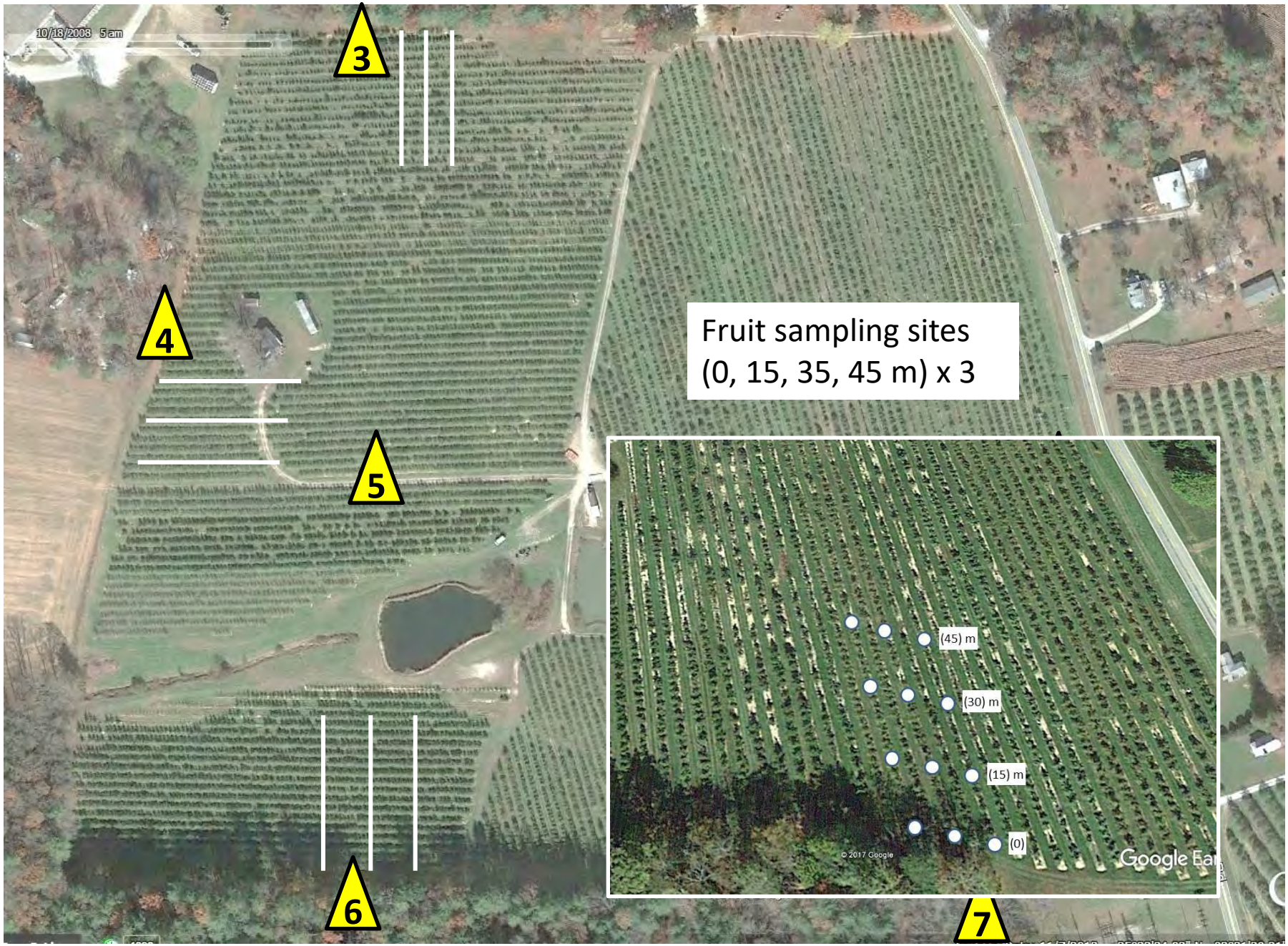
Results (preliminary)

- Data not yet summarized
- Stink bugs later than expected: few found in first 3 plantings
- Most bugs on ears, not tassels
- Kernel injury not apparent until late & extra-late plantings
- Heavy damage localized on plants near traps

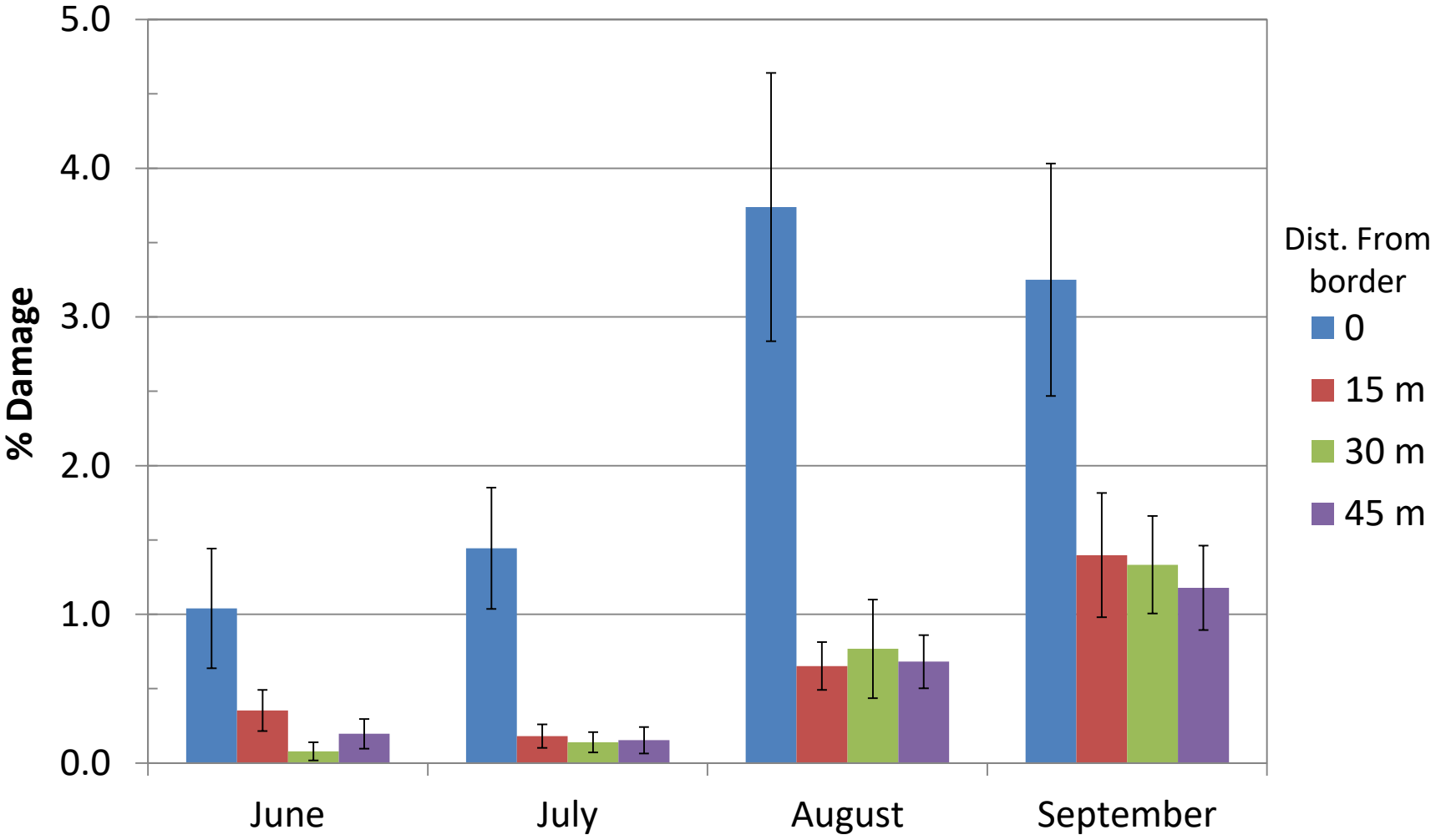
Relationship Between Pheromone Trap Captures and Apple Damage

- Correlate trap captures with damage.
- How well do trap captures predict damage on an orchard-wide level

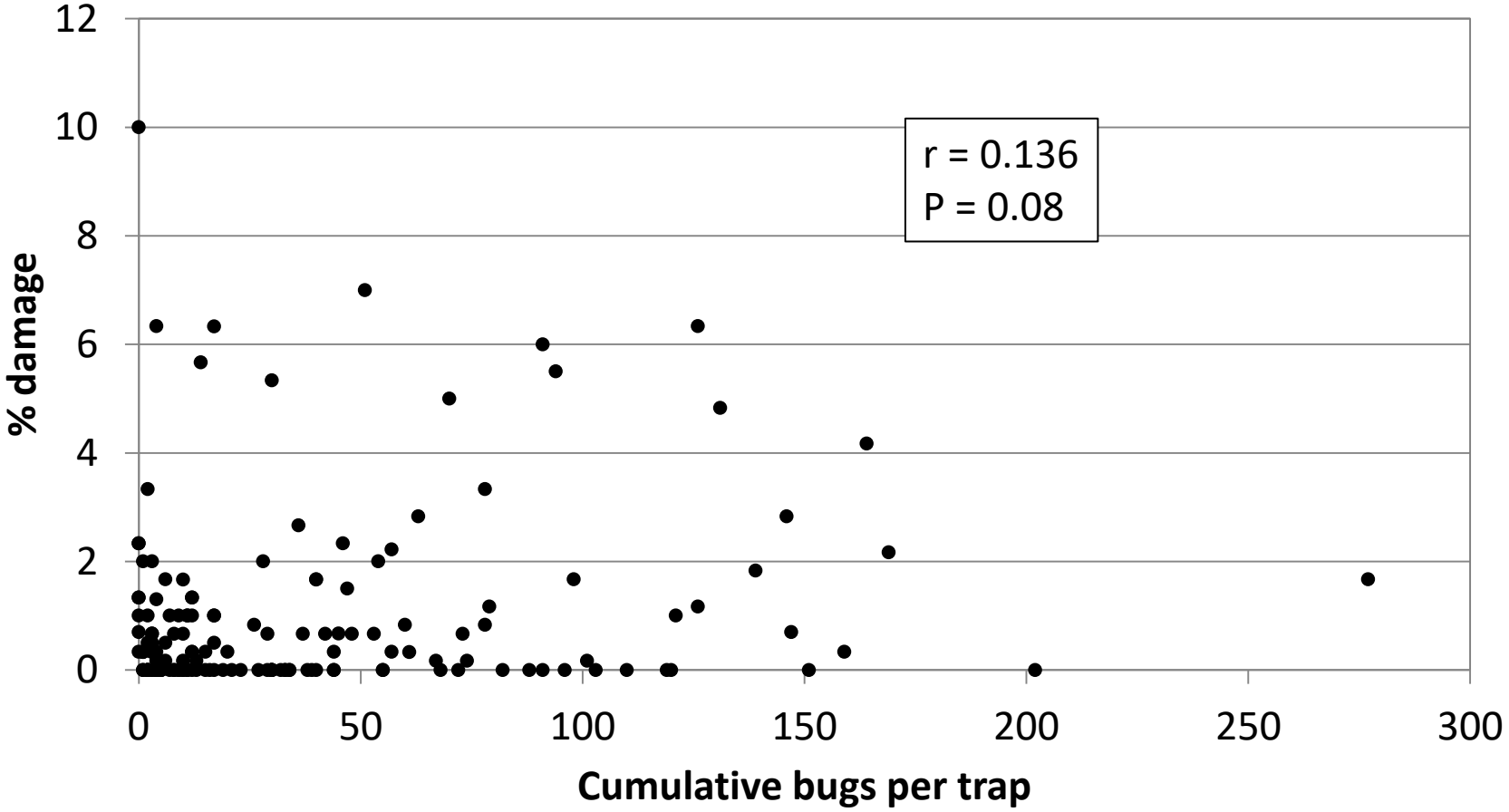
2016 Nix – North State BMSB



BMSB Damage – Temporal and Spatial Impacts



Damage on all Dates vs. Previous 4-wk Cumulative Trap Capture



Correlation of Trap Captures with Damage to Apples

		<3 m		15 m		30 m		45 m	
	n	R	P	R	P	R	P	R	P
Jun	34	0.63	<0.01*	0.27	0.11	0.53	0.01*	0.39	0.02*
July	48	0.46	<0.01*	0.01	0.99	0.02	0.89	0.03	0.84
Aug	58	0.05	0.68	0.06	0.68	0.12	0.361	0.09	0.52
Sept	19	0.04	0.97	0.01	0.96	0.32	0.223	0.14	0.58

Pheromone Traps vs. Apple Damage

- Diversity of orchard agroecosystems can lead to highly variable BMSB pheromone trap captures.
- To more effectively deploy pheromone traps for whole orchard management decisions, need to identify factors affecting trap capture
  - Adjacent host plants
  - Active space of trap
  - BMSB Dispersal distance
- To what extent do traps “cause” damage by attracting bugs to trees near traps.

Methods for aggregation pheromone experiment

Designed to compare efficacy of pheromone baited traps in 2015 and 2016

Treatments used:

- Treatment 1: Trece Lure
- Treatment 2: AgBio
- Treatment 3: UTC

Blocks Used: Peach and apple orchards

- 3 replicates in 2015 and 4 replicates for each treatment per orchard in 2016

Sampling:

- On multiple sampling dates, BMSB densities were recorded in
    - Traps: Nymphs and Adults
    - Trap tree: Egg masses, nymphs, and adults (3 minute count)
    - Adjacent tree: Nymphs and adults (1.5 minute count)
    - Injury level was measured by picking 25 fruit per tree (trap tree and adjacent tree) and damage assessed by peeling off the skin and inspecting feeding punctures

Field outlay

V1

Trece lure (T1)

V2

Xtra combo lure (T2)

V3

Unbaited control (T3)

Results

- In both crops and years, more *H. halys* responded to the Trécé lure, and fruit from trees located near baited traps had correspondingly higher injury

- In both years peach fruit near Trécé baited traps had significantly higher feeding injury (52.2 ± 5.0%) than fruit near Xtra Combo-baited and unbaited traps (35.2 ± 4.5% and 22.2 ± 3.4%, respectively)

- Injury to apple fruit near baited traps in 2016 was significantly different from fruit near unbaited traps (Trécé: 93.0 ± 3.8%, Xtra Combo: 74.1 ± 5.1%, unbaited: 19.0% ± 2.7%)

- Field response index to measure the relative attraction of *H. halys* to each lure showed equal response to both lures in 2015 peach and a higher response to Trécé in 2016 in both crops.