Crop Perimeter Restructuring ("Border Sprays" for BMSB Management)

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Specialty Crop Research Initiative

Collaborating Institutions

dss · 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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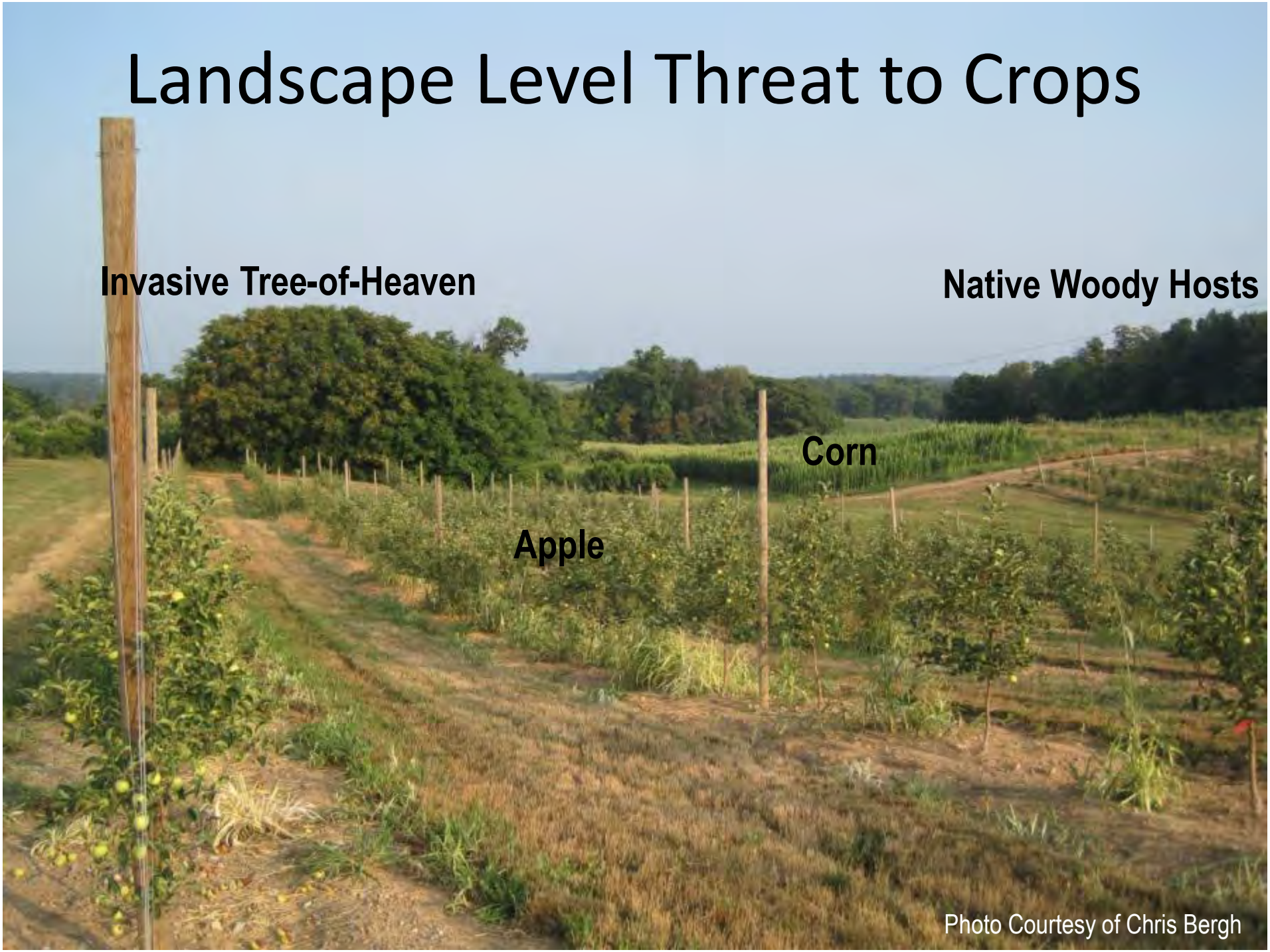
Landscape Level Threat to Crops



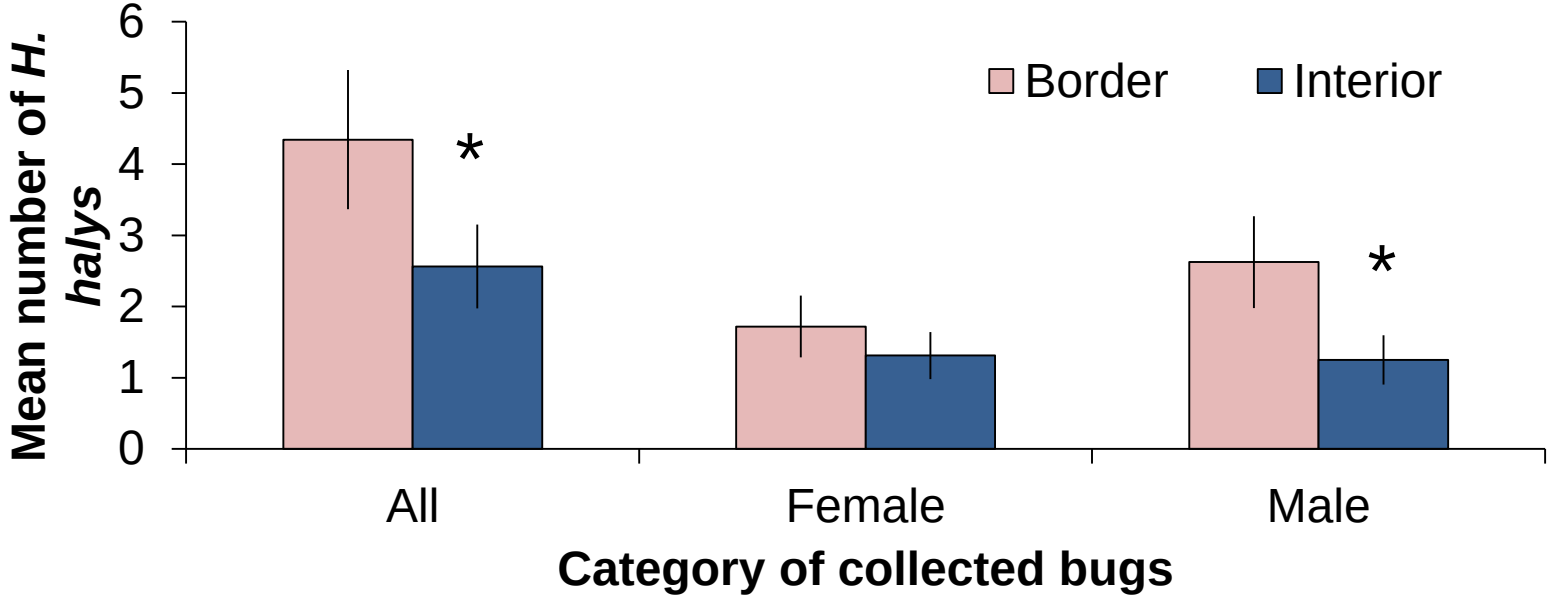
BMSB Dispersal Within Peach Orchard

- 5 acre block of peaches
- Edge sprayed with egg whites
- Interior sprayed with milk
- Marker can persist for 7 days

Blaauw et al. *PeerJ* 2016

BMSB Dispersal Within Peach Orchard

- Significantly more BMSB collected along border
  - 17% move throughout
  - Driven by female dispersal within orchard
- Continually collected more bugs along the border indicating that BMSB frequently colonizes peach

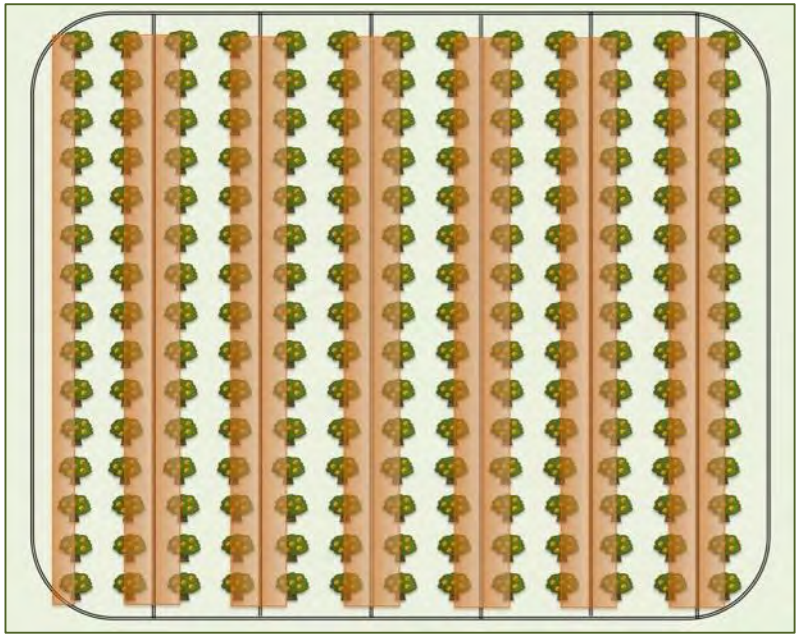


Blaauw et al. *PeerJ* 2016

IPM-Crop Perimeter Restructuring

Exploits perimeter driven behavior and maintains fresh insecticide at border while re-introducing mating disruption and groundcover management

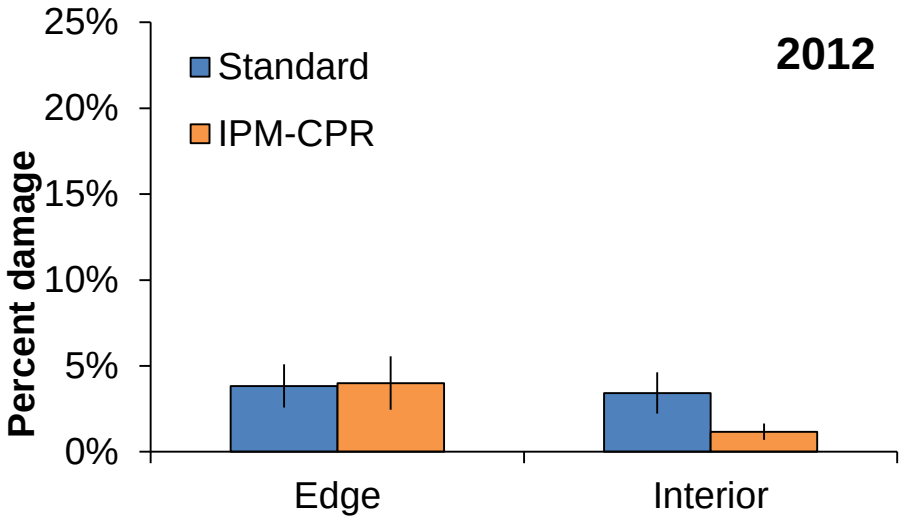
- Weekly border + first full row insecticide sprays for BMSB starting at 170 DD_{57} in peach or threshold in apple
- Mating disruption for internal worms

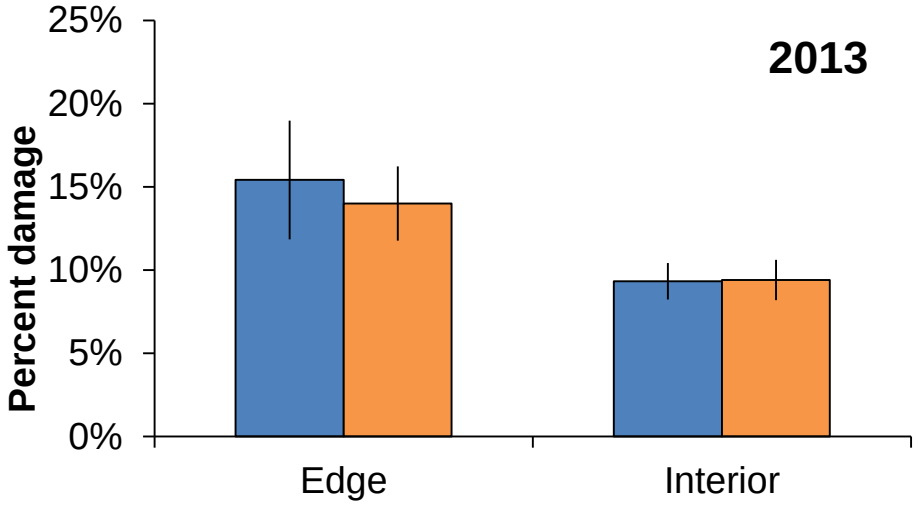


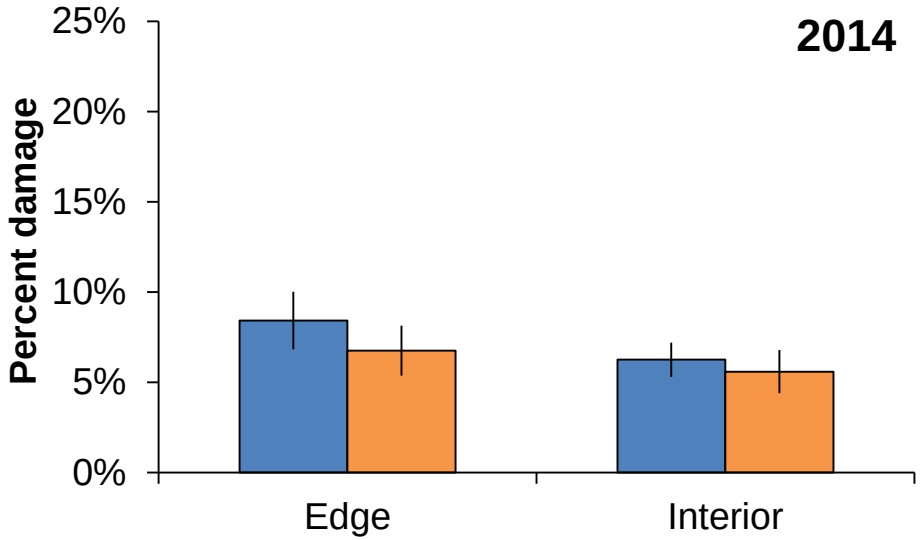
Peach Damage at Harvest

Blaauw, Polk, and Nielsen. 2014 *Pest Management Science*

Catfacing Injury at Harvest in Peach

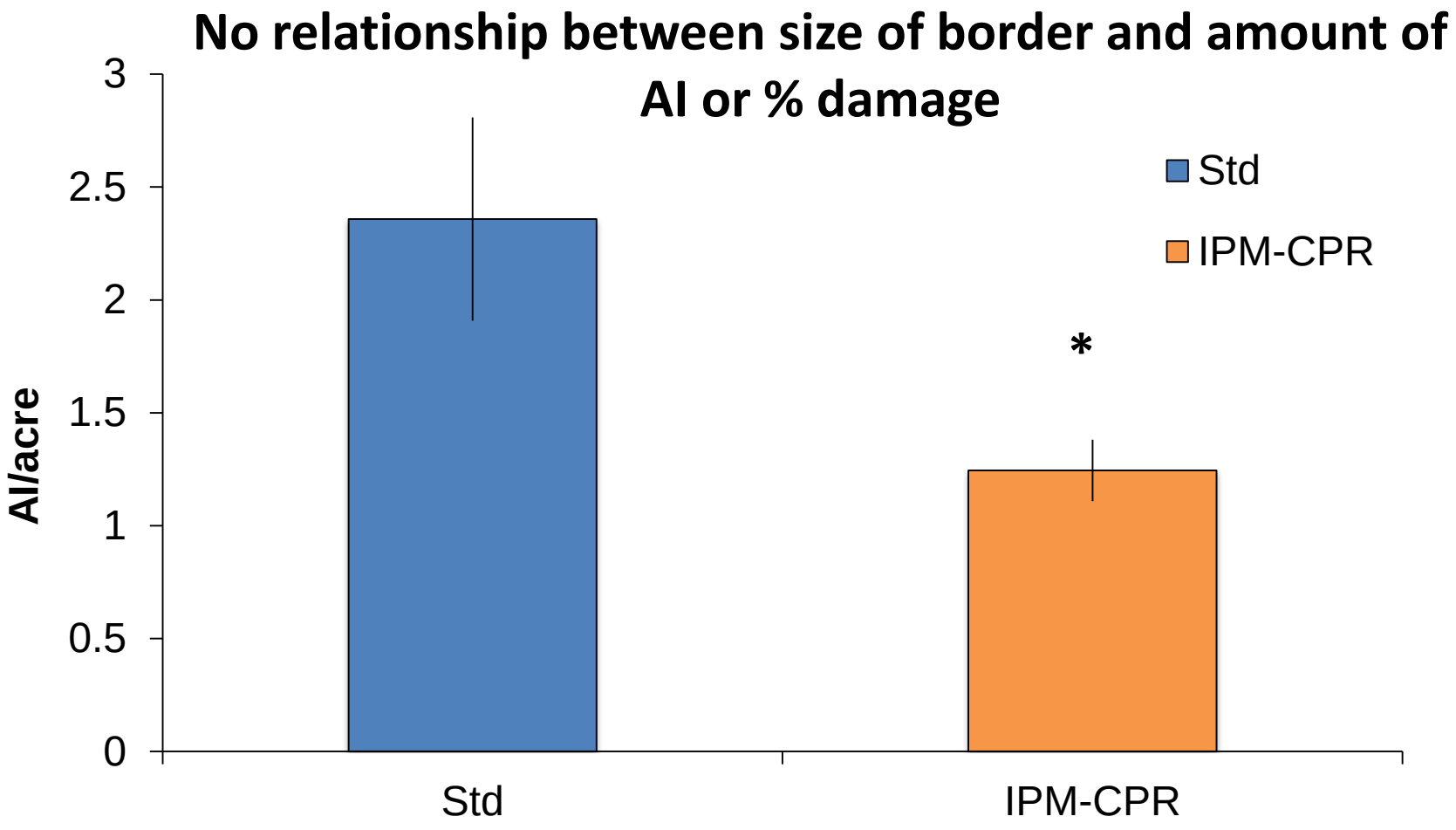




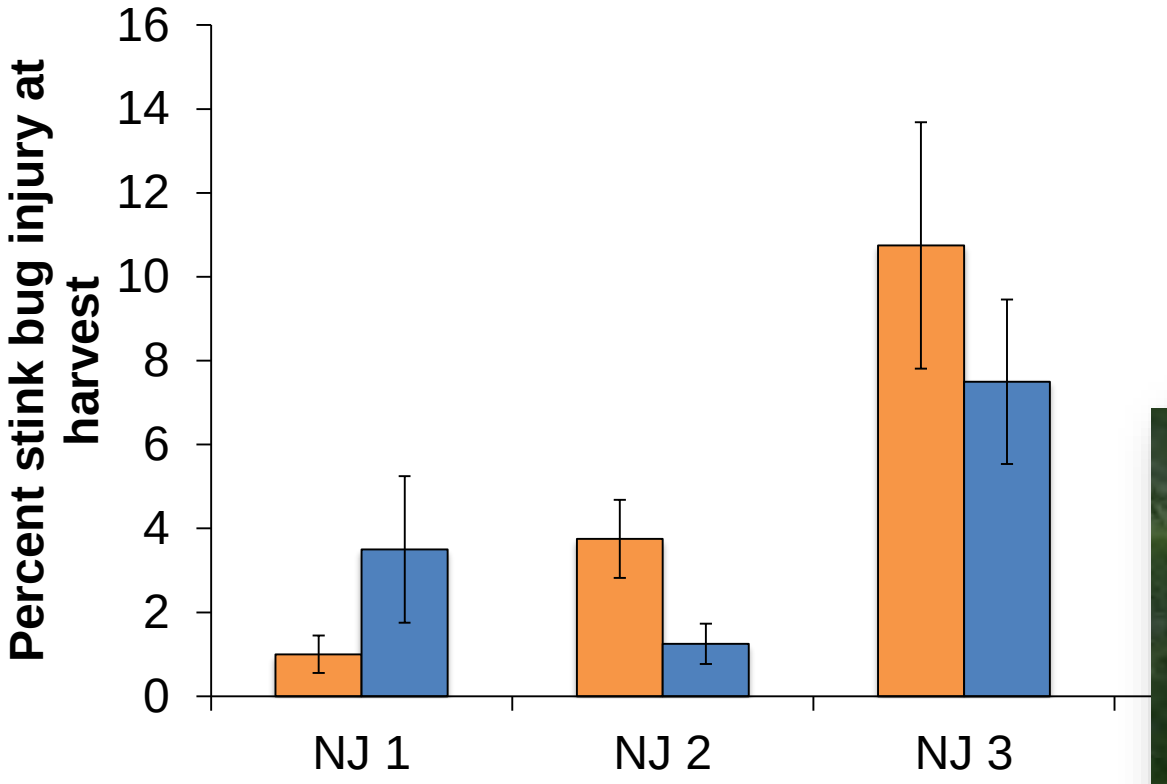


Blaauw, Polk, and Nielsen. 2014 *Pest Management Science*

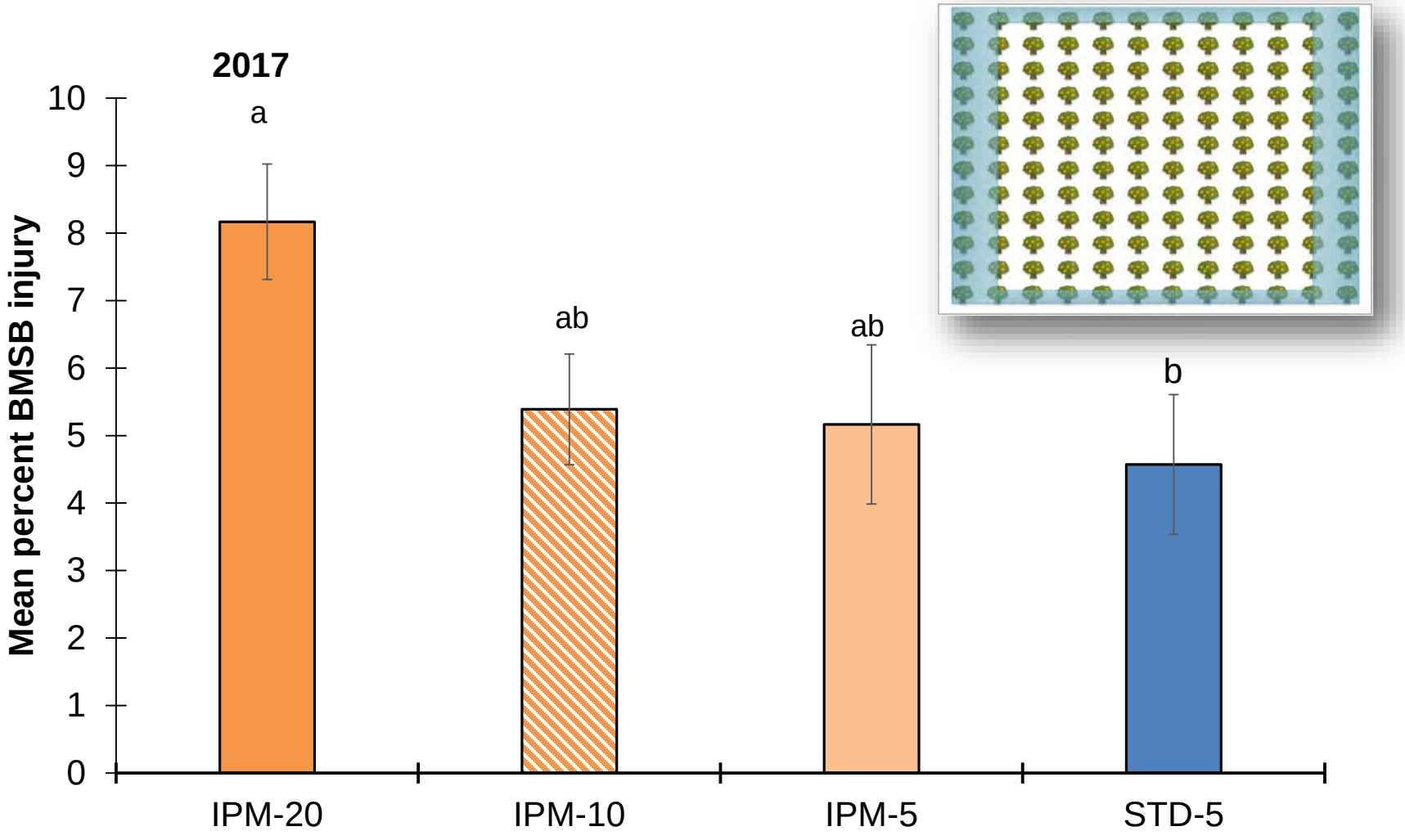
Active Ingredient Applied



2017 Results in Peach

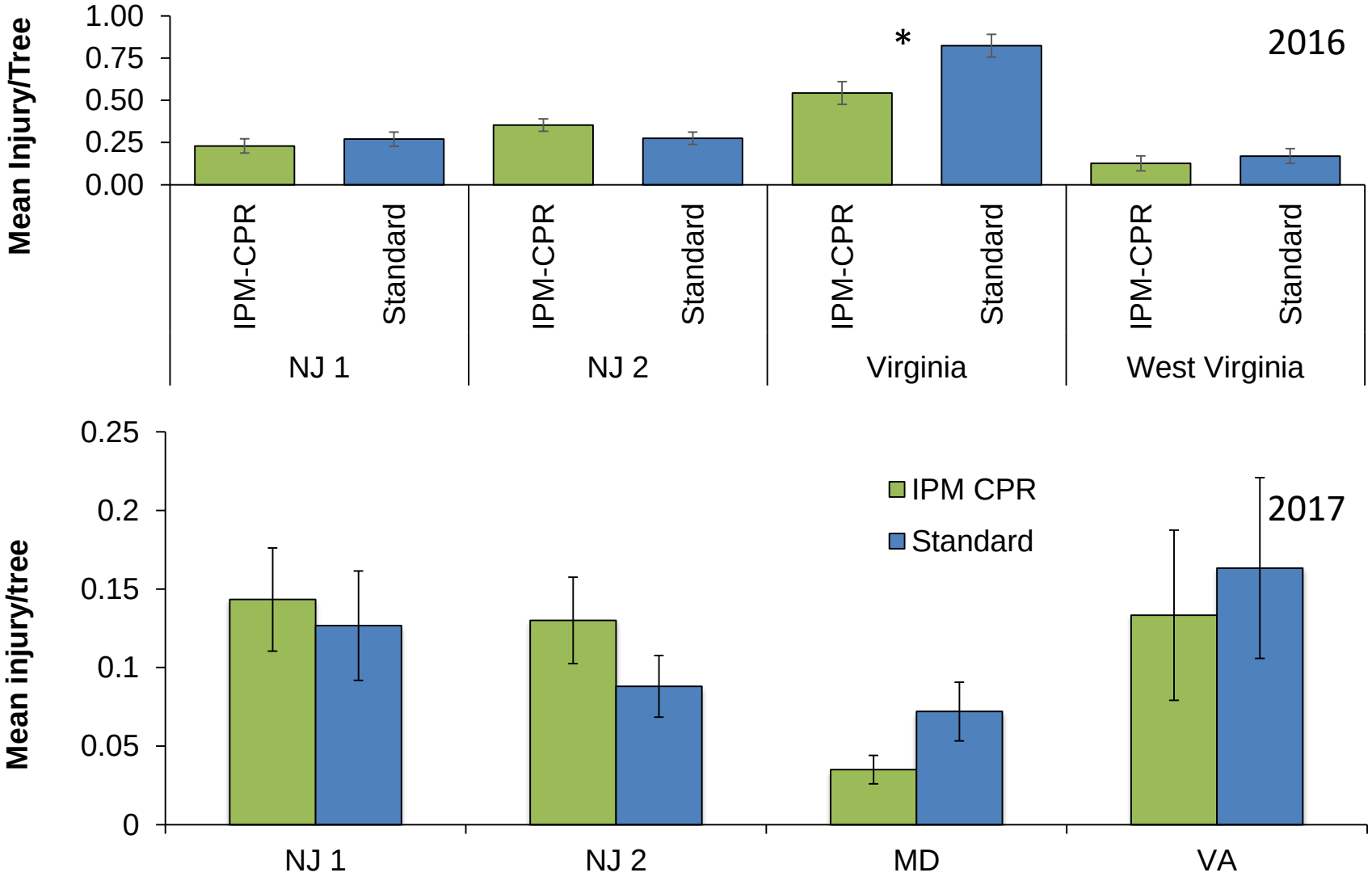


Effect of Border Size on IPM-CPR



Lead: C Akotsen-Menash

Injury at Harvest in Apple



Border Sprays in NY Apples

- BMSB has 1-2 gen. in NYS each year, documented to have caused over 10% crop injury in pepper, stone and pome fruit. The native green stink bug, *Chinavia halaris* (Say), contributes to fruit injury.
- In 2012 commercial orchards in Orange Co. demonstrated BMSB migration from arboreal hosts to tree fruit. Highest injury assessed along the agricultural woodland interface.
- In 2016, a 10 adult BMSB / week threshold occurred in late August in Highland, NY.
- A **single perimeter orchard application** made along the SE wooded edge in one of two, 5-acre orchard blocks, using 12.8 fl. oz. of Bifenture EC,/A. Both blocks received three applications of Assail 30SG in 14d intervals at 6.0 oz./A.
    - 100 Red Delicious fruit samples were harvested and assessed from 5 trees fruit in four quadrants.
- **Border management was shown to be highly effective in reducing both insecticide use and SB injury.**

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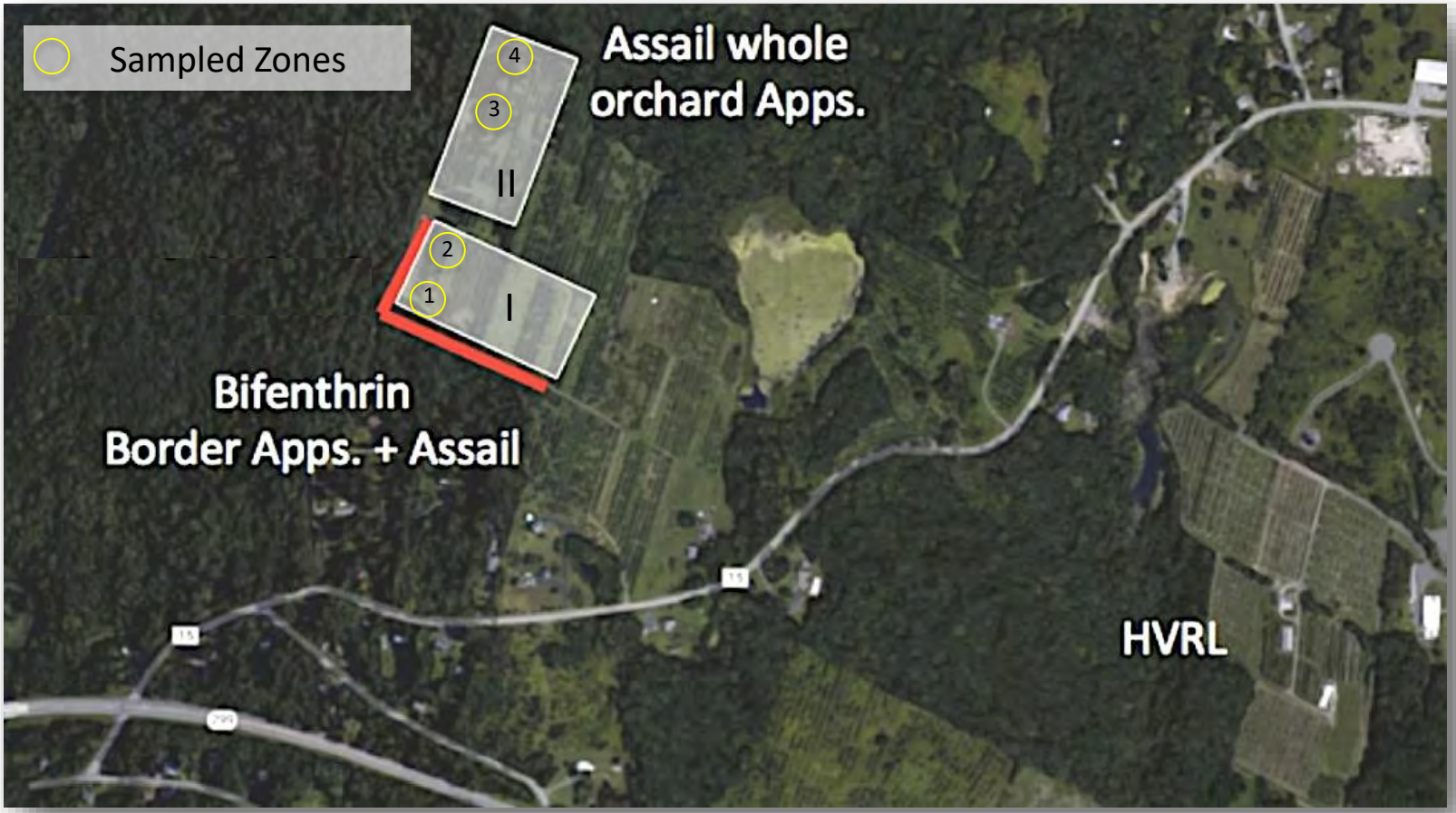
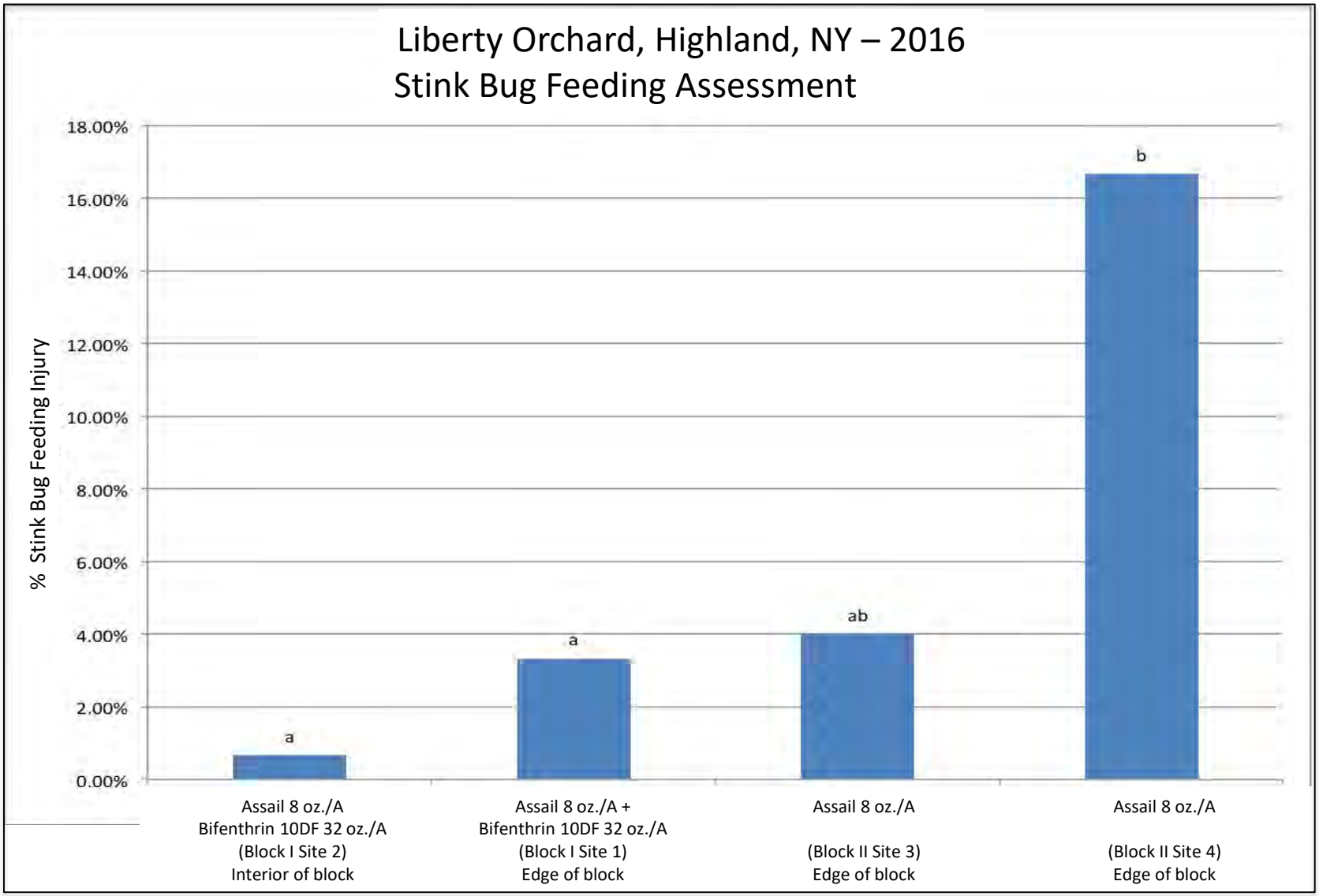


Liberty Orchard, Highland, NY, 2016



Border applications

Grower standard

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When Do Border Sprays Work Best?

- 5-10 acre blocks
- When frequent applications can be made during pressure
- Can be used as an early season tactic or when only BMSB is being managed
  - IPM-CPR internal worms are managed with mating disruption and/or reduced-risk materials
  - IPM-CPR native stink bugs and tarnished plant bugs are controlled with groundcover management
- Research perspective: comparisons within the same variety
- Grower perspective: ease of compatibility with other management tactics (other pests, fungicides)
- Significantly reduce insecticide inputs
  - May be important for balancing management with T. japonicus populations