Brown Marmorated Stink Bug Host-Use in Organic Vegetables with Trap Crop

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Small-scale, **highly diverse organic** farm, Berkeley County, WV

red bud farm
Speciality Organics

- Need BMSB strategy that does not disrupt **agroecosystem stability**

Preliminary Observations: 2011

- Green amaranth (*Amaranthus spp.*) and sunflower highly attractive … **trap crop?**
- Organic pyrethrin (Pyganic) **ineffective**
- Baited trap **effective late season**

Potential BMSB Sources

- Surrounding woods, tree rows

2012 Field Study Objectives

- Identify **directional source** of BMSB before crop colonization
- Evaluate effectiveness of **trap crop buffer**
- Determine **host-use patterns** throughout growing season
- Determine overall **host-plant preferences**

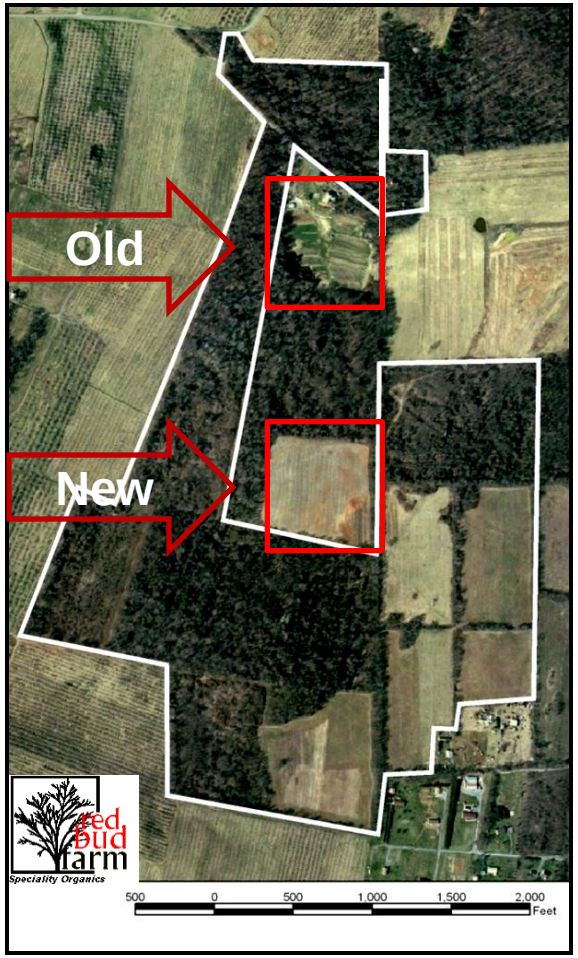
Methods

- **Cash crops:** okra ('Clemson Spineless'), sweet pepper ('Red Ace'), tomato ('Big Boy'), summer squash ('Zephyr')
- **Trap crops:** green amaranth (*Amaranthus spp.*) and sunflower (open pollinated mixture)
- **Pheromone traps:**

'Rescue' dual lure (Sterling International, Inc.)

Methods

- RCBD with two blocks
  ('old' and 'new')
- Two replicates per block



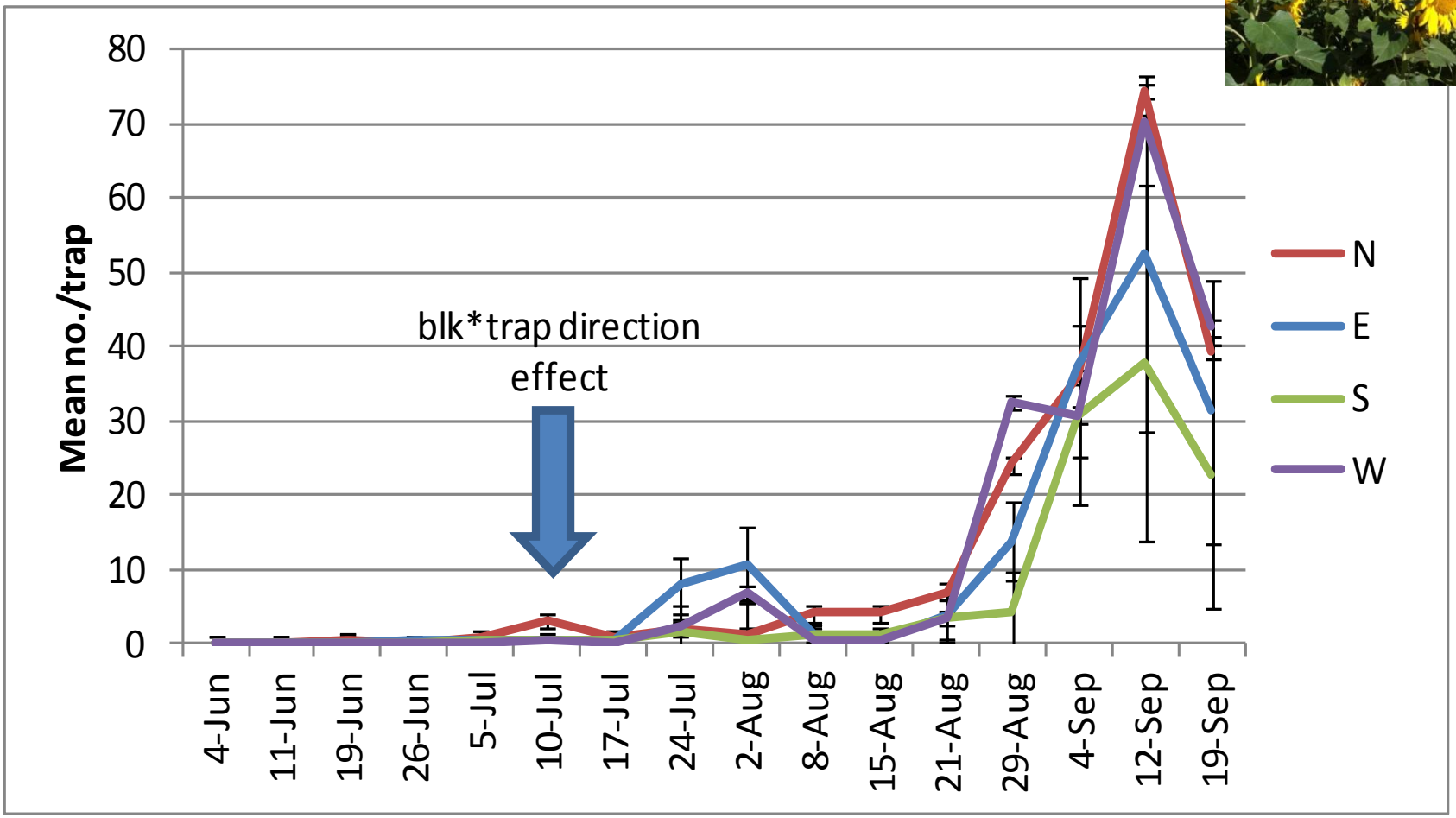
1 Replicate (900 sq ft)

- 3 x 36 ft crop rows, black plastic
- 3 ft aisles, straw mulch
  - **Treatment:** 3 ft wide perimeter, sunflower and amaranth (broad-cast 23 May), 4 Rescue traps, 3 ft height (6 June)

Methods: Arthropod Sampling

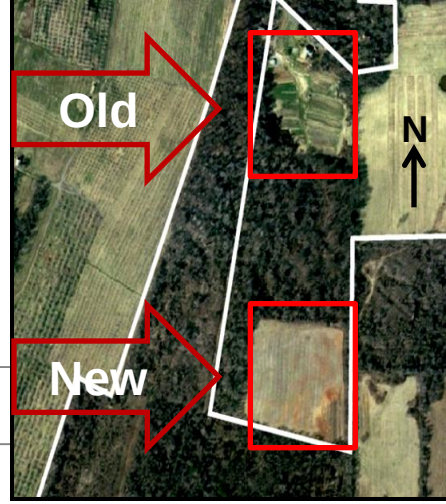
- **Weekly** (4 Jun –19 Sep)
- **Cash Crop:** Whole plant visual sample (3/row), BMSB, native stinkbug and predator densities
- **Trap Crop:** Trap contents recorded, removed

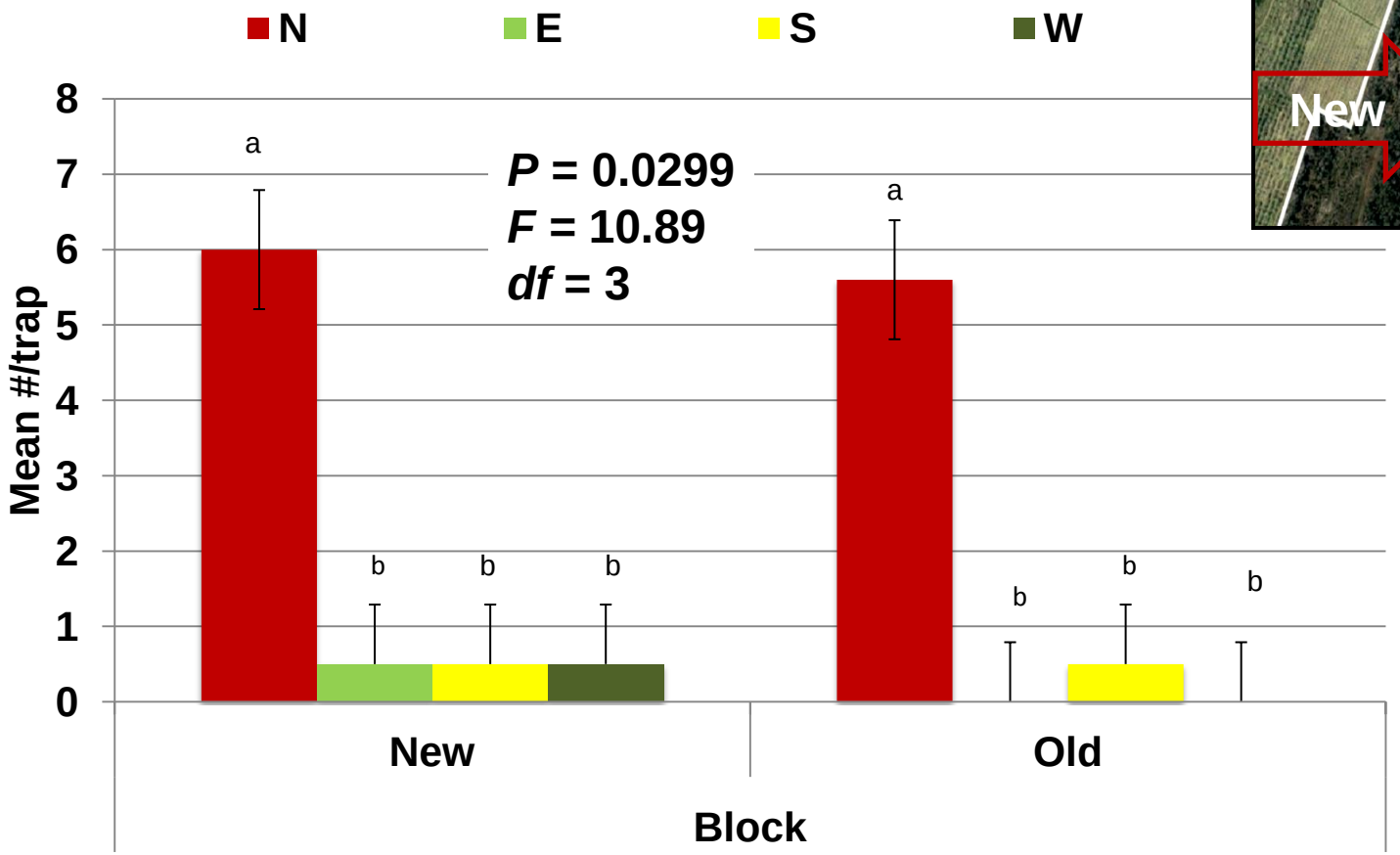
Directionality of BMSB in Trap Crop



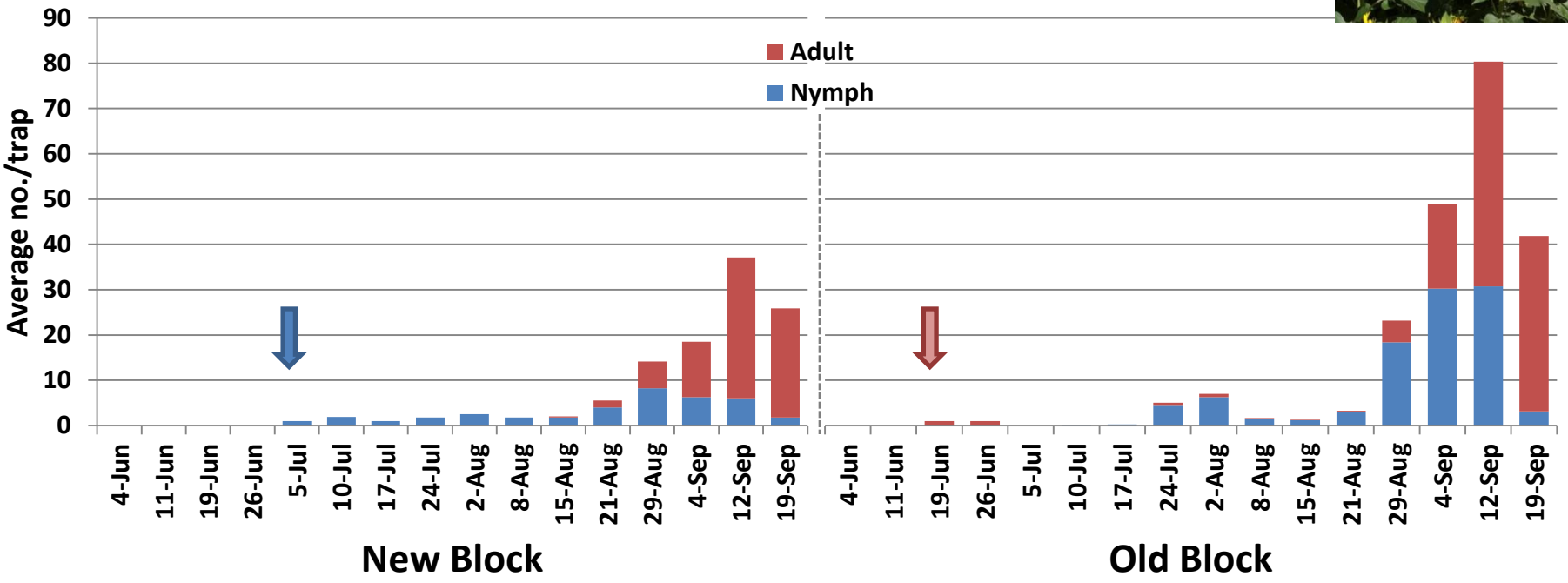
- No effect of trap placement within sample dates

Block*Trap Placement: 10 July



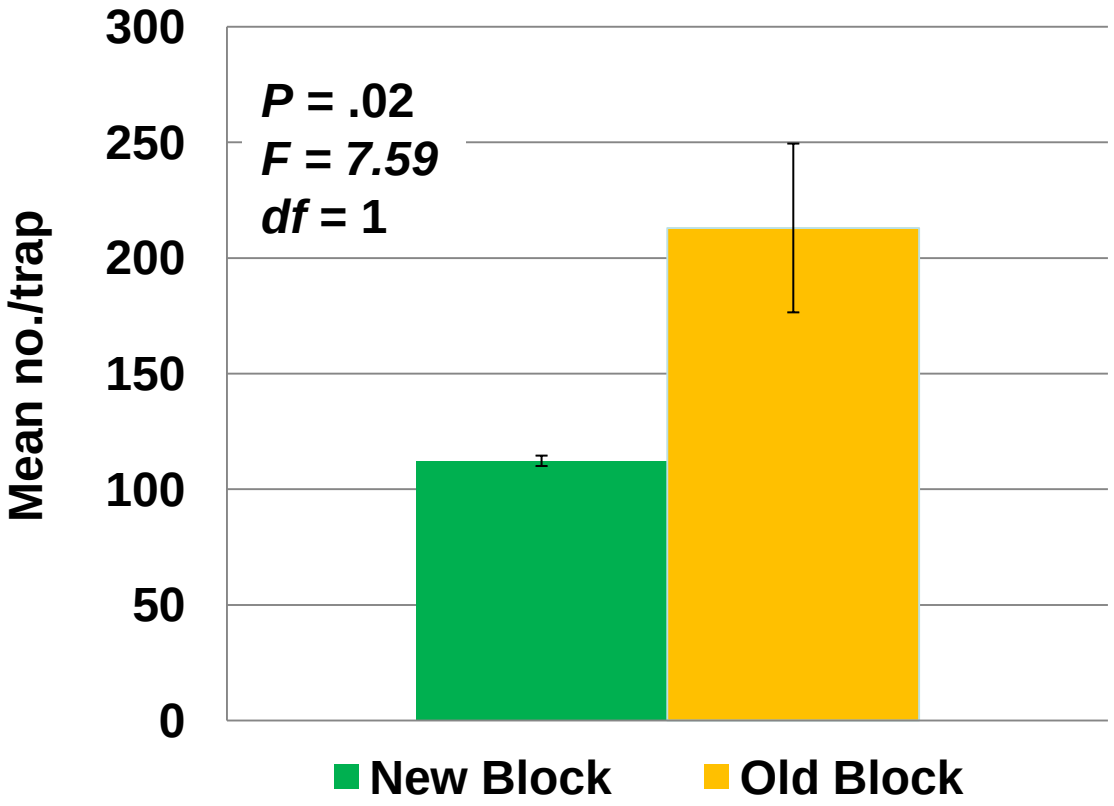


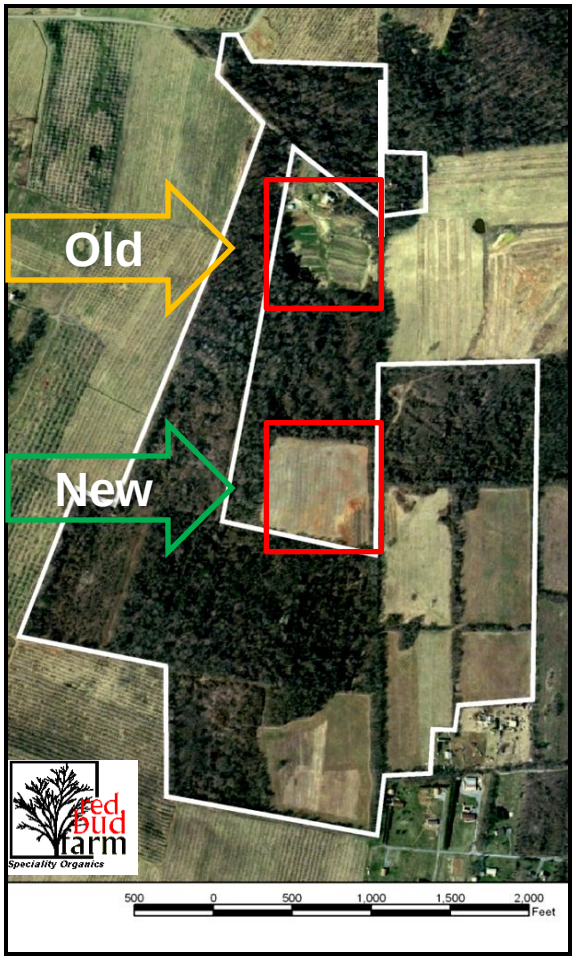
BMSB Colonization & Use of Trap Crop (nymph and adult)



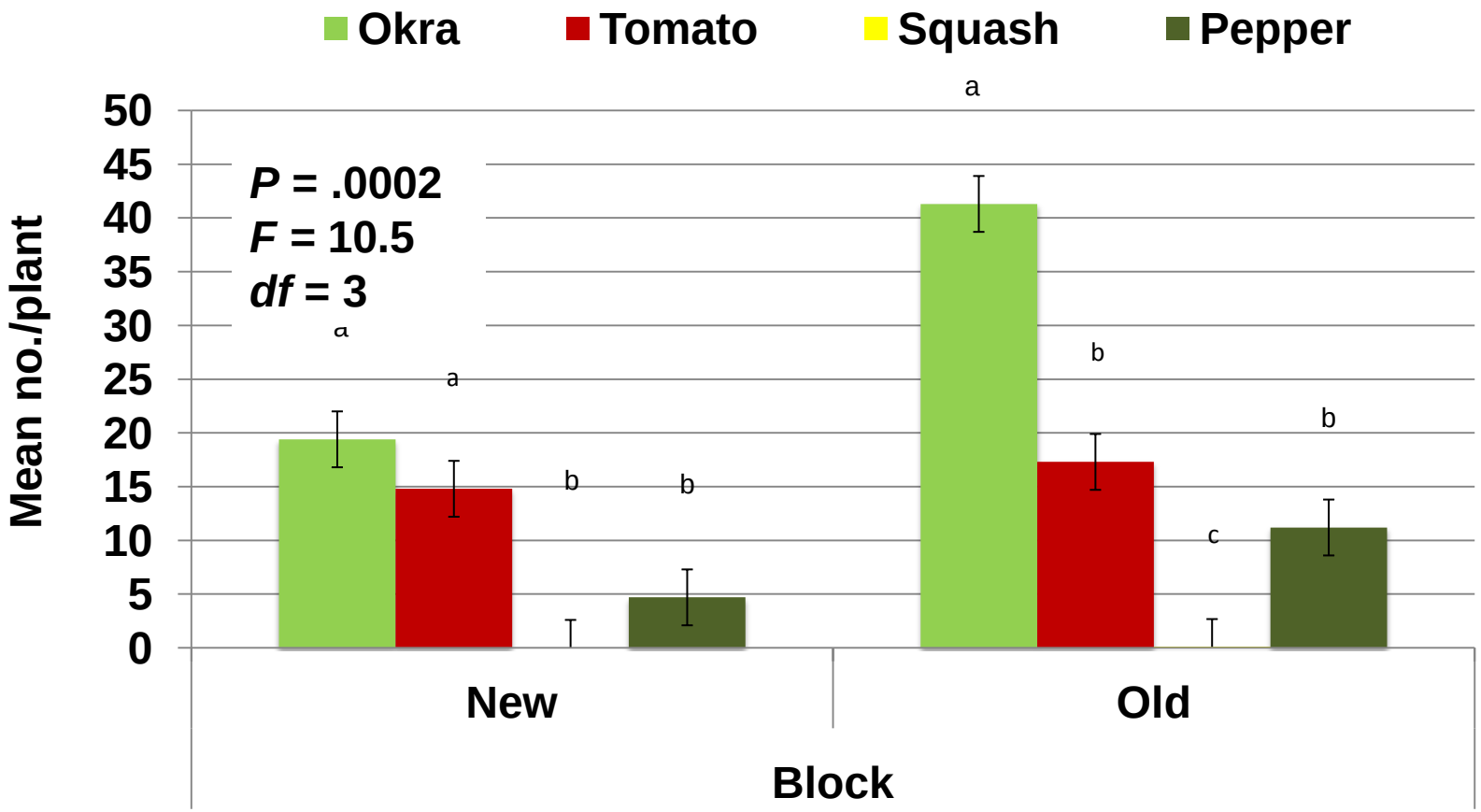
- Earlier colonization and 2-fold increase by 12 Sept, in block with production history

Seasonal BMSB Densities (nymph and adult) in Trap Crop



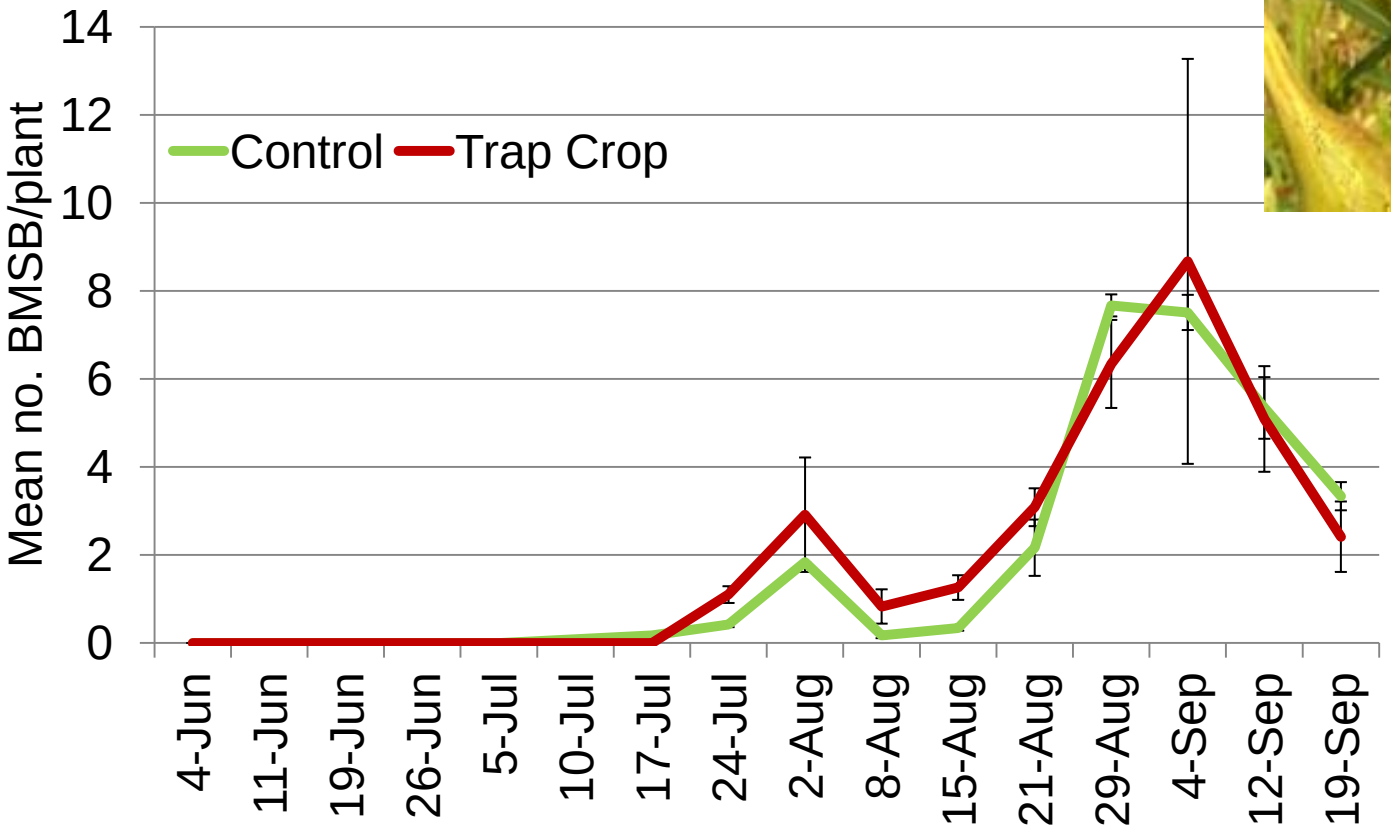


Seasonal BMSB Densities (all stages) in Cash Crops: Block*Crop Effect

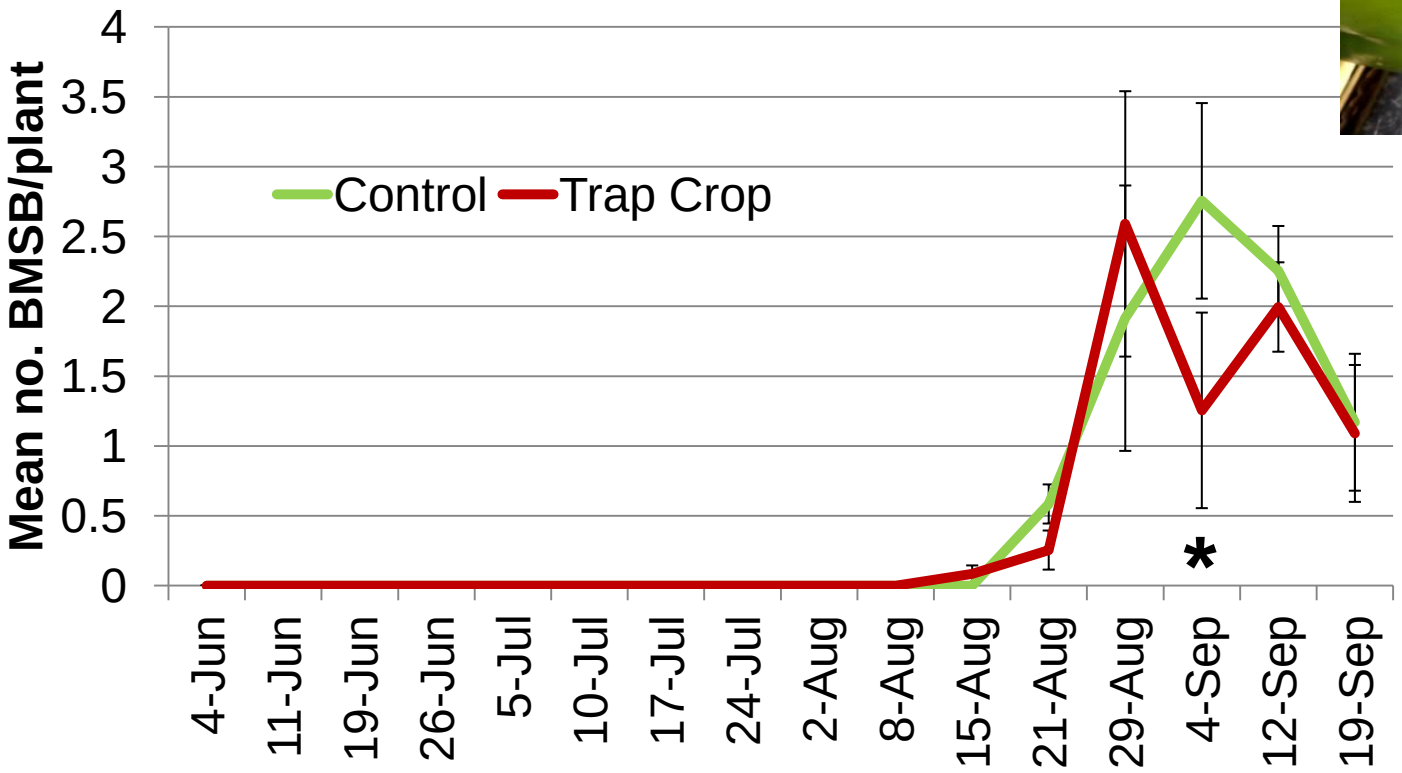


• Same host-plant preference profile, but higher magnitude in plot with history of production

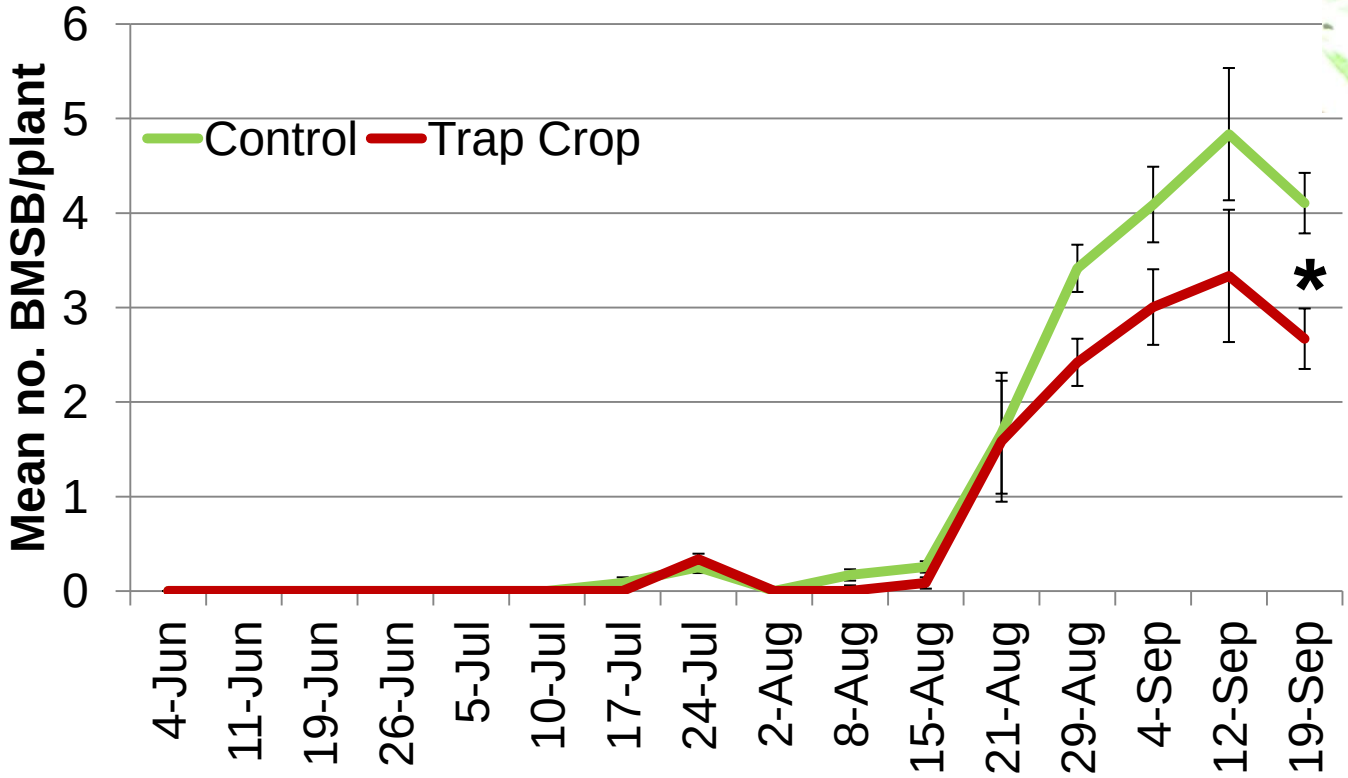
Trap Crop Effectiveness: Okra



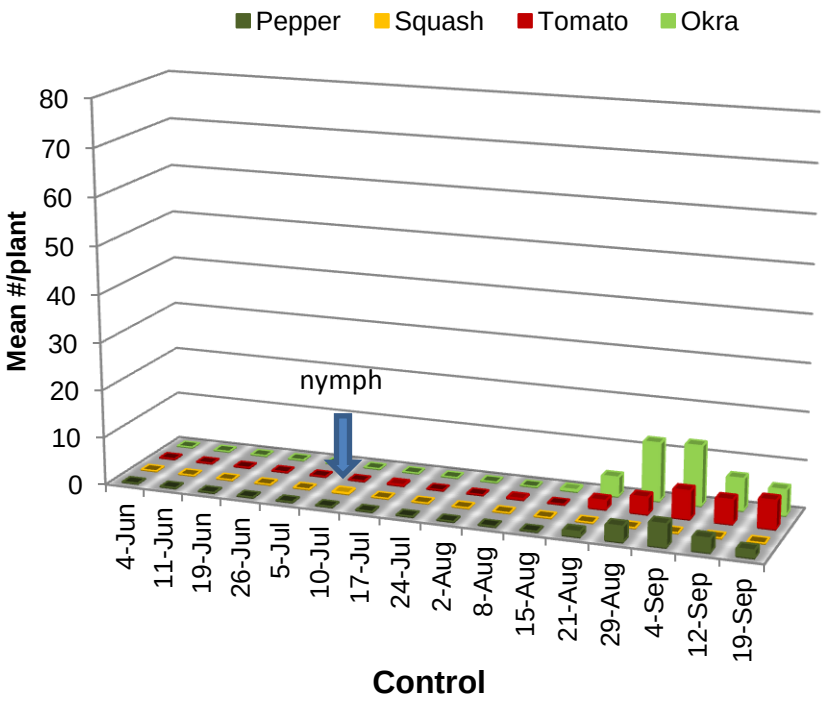
Trap Crop Effectiveness: Pepper

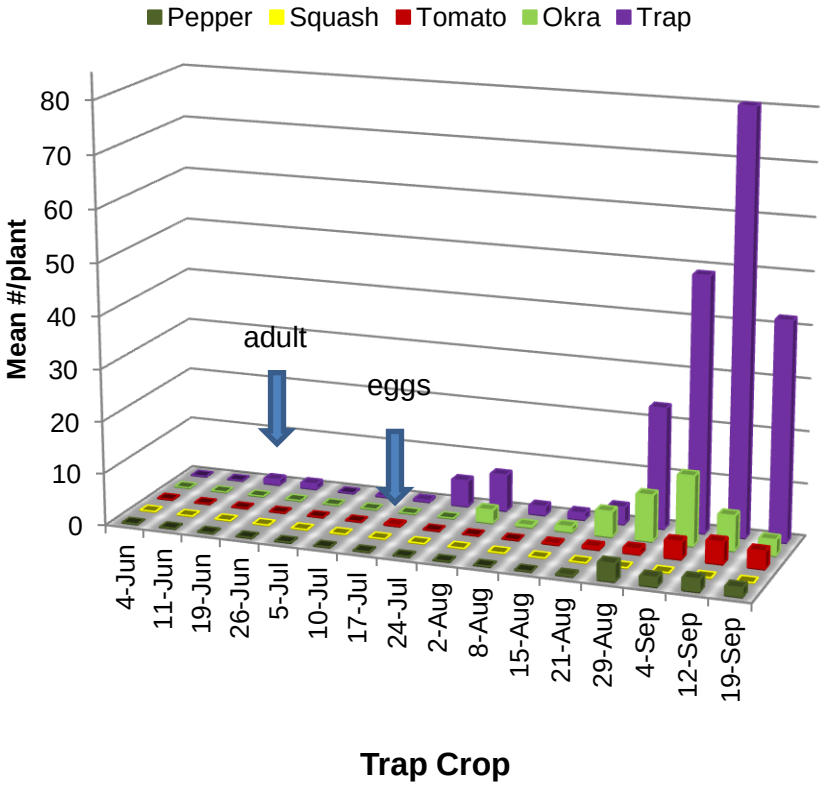


Trap Crop Effectiveness: Tomato



BMSB Colonization & Use of Cash Crops: Old Block

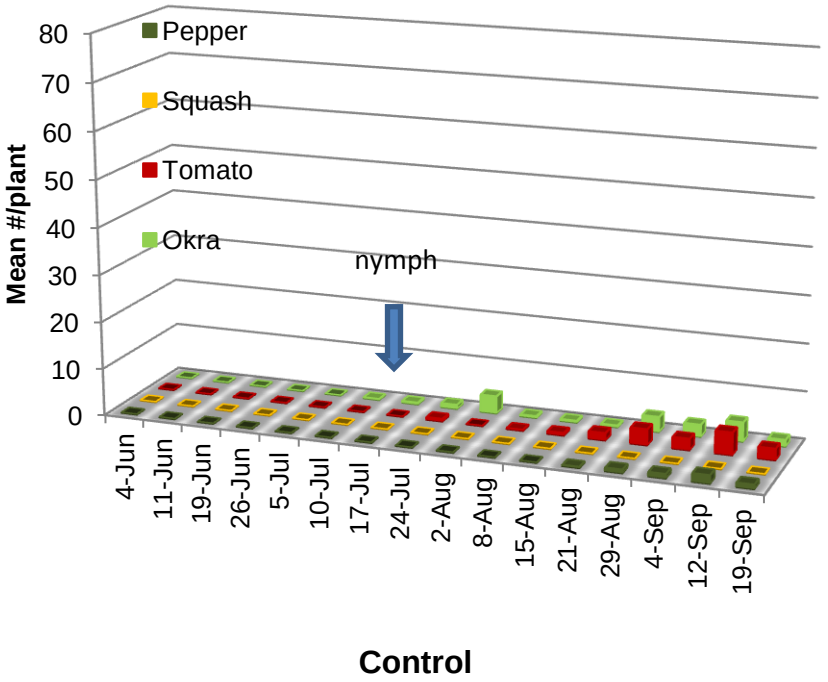


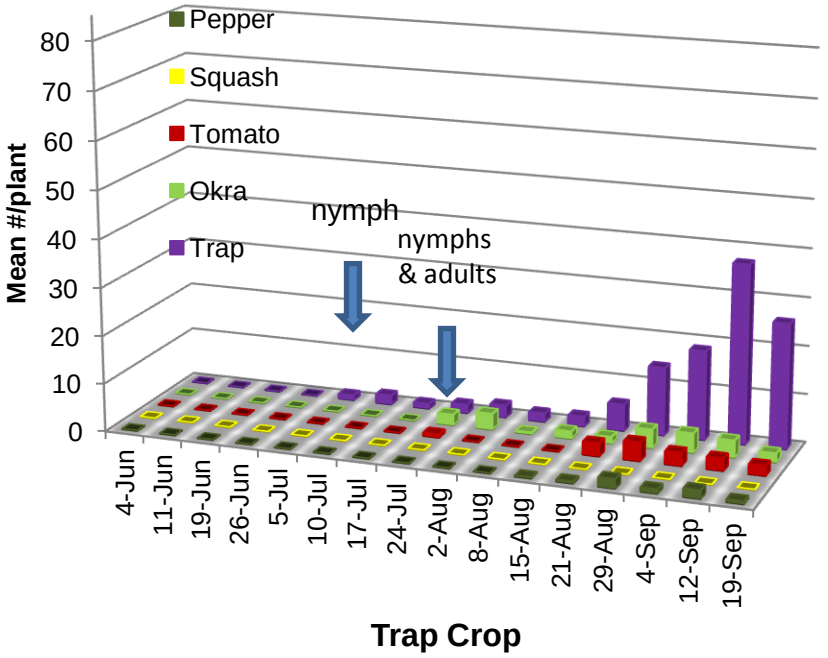


- Colonization of cash crops delayed 14 d in Trap Crop vs. Control; okra used before other cash crops
- Early colonization and consistent use of trap through season

17 July

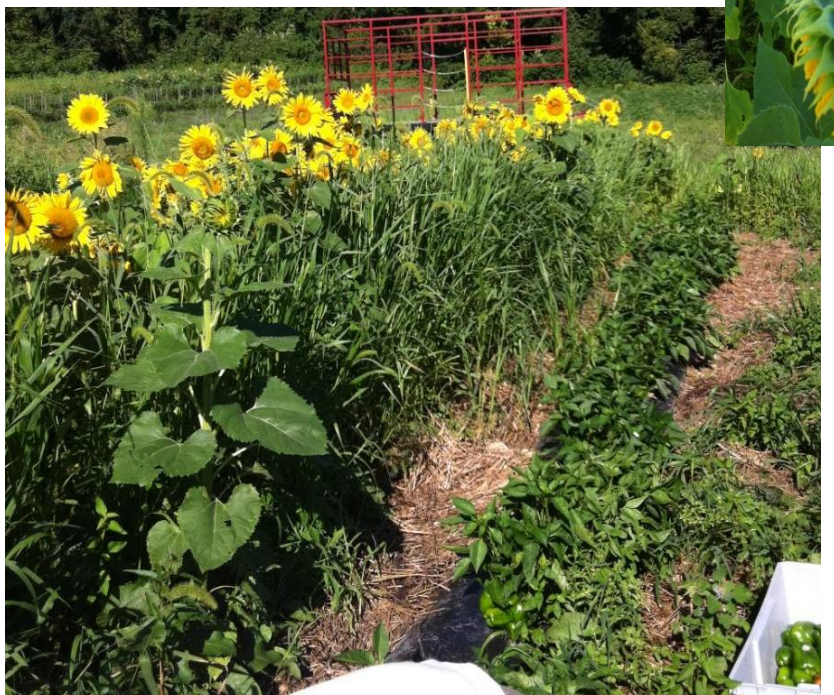
BMSB Colonization & Use of Cash Crops: New Block



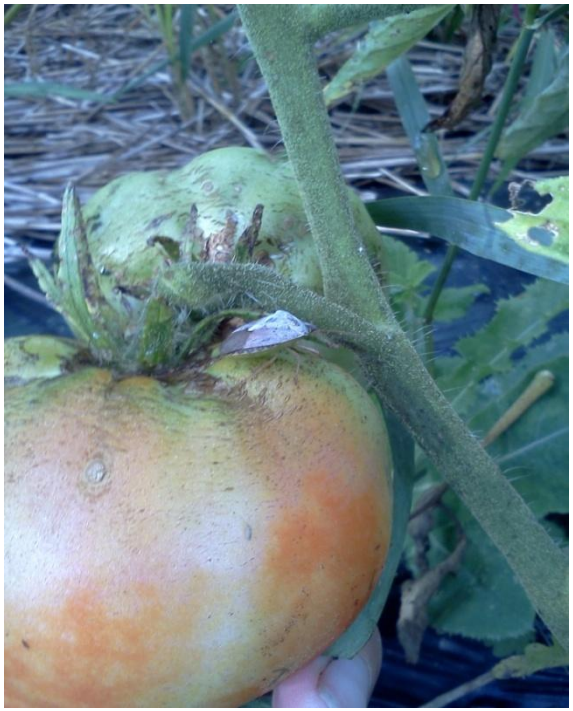
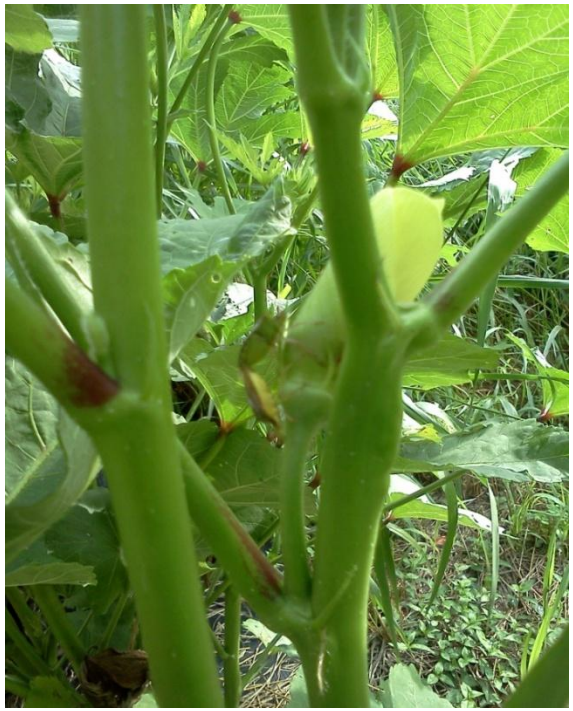


- Colonization of cash crops delayed 7 d in Trap Crop vs. Control; okra used before other cash crops
- Early colonization and consistent use of trap through season


24 July



17 Aug


25 August

19 September

Conclusions

- BMSB colonize earlier, use hosts more effectively in **habitats with prior production** (14 d earlier colonization and 2-fold higher density in old vs. new block)
- **Sunflower trap more attractive** than cash crops (> 2-fold increase, as compared to cash crops)
- Trap crop system **removed average 112, 213 BMSB** (new, old blocks respectively) across the season, **delayed colonization** and **lowered densities** for tomato, pepper (late season only)

Conclusions

- BMSB colonize **sunflower** first and consistantly use the trap even after senescence, then move to **okra** before other cash crops; no preference for squash
- First BMSB detection on **Northern side** (both blocks)

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