Trapping Updates for Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål)

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Biology, Ecology, and Management of Brown Marmorated Stink Bug in Orchard Crops, Small Fruit, Grapes, Vegetables, and Ornamentals USDA-NIFA SCRI Coordinated Agricultural Project

Development of Effective Monitoring Tools

- Tools that provide accurate measurements of presence, abundance, and seasonal activity of BMSB.

- Growers can make informed management decisions.

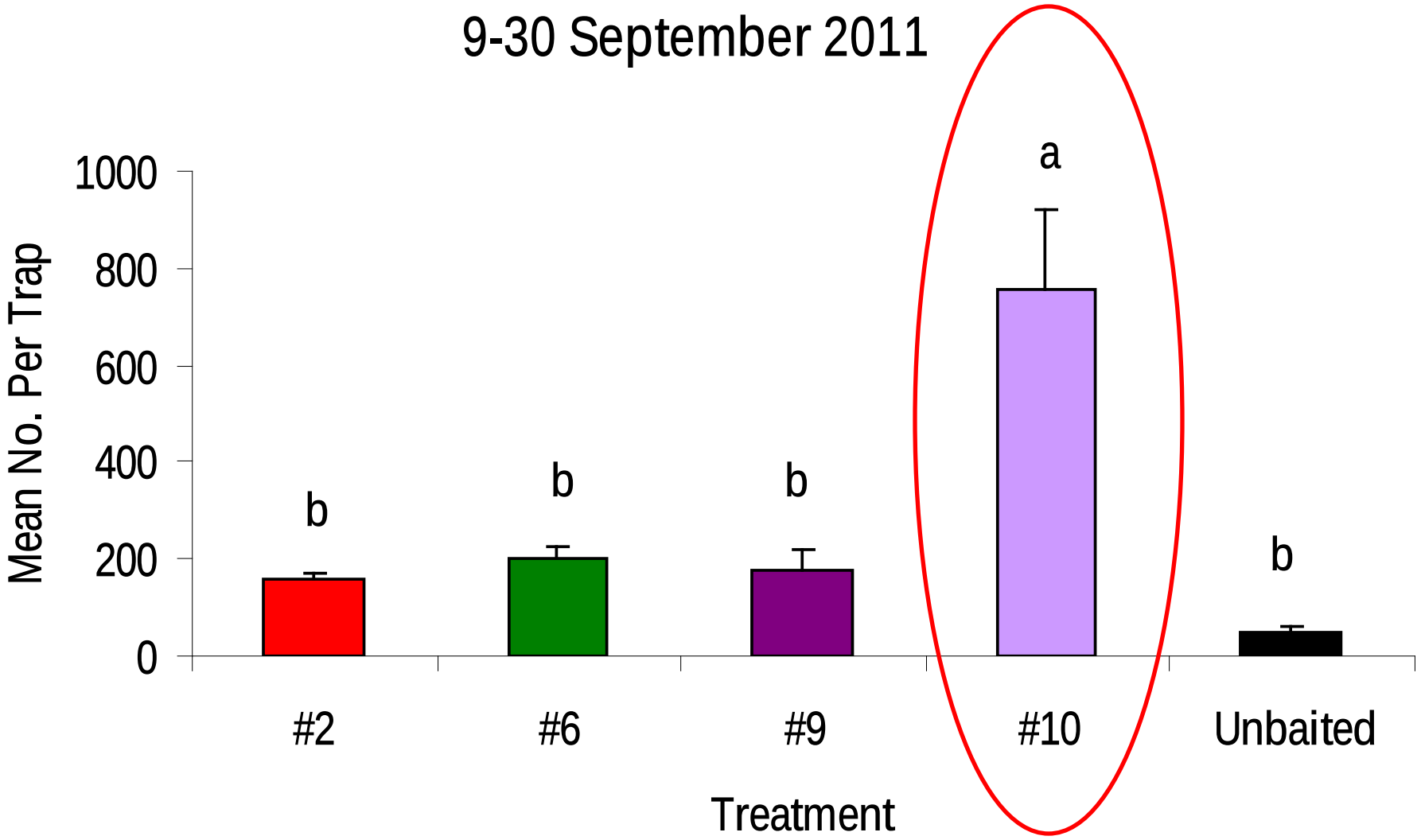
Key Components of Trap-Based Monitoring Tools

- Visual Stimuli
- Olfactory Stimuli
- Capture Mechanism
- Deployment Strategy

Progress Toward Identification of BMSB Aggregation Pheromone

USDA-ARS, Beltsville, MD and Kearneysville, WV

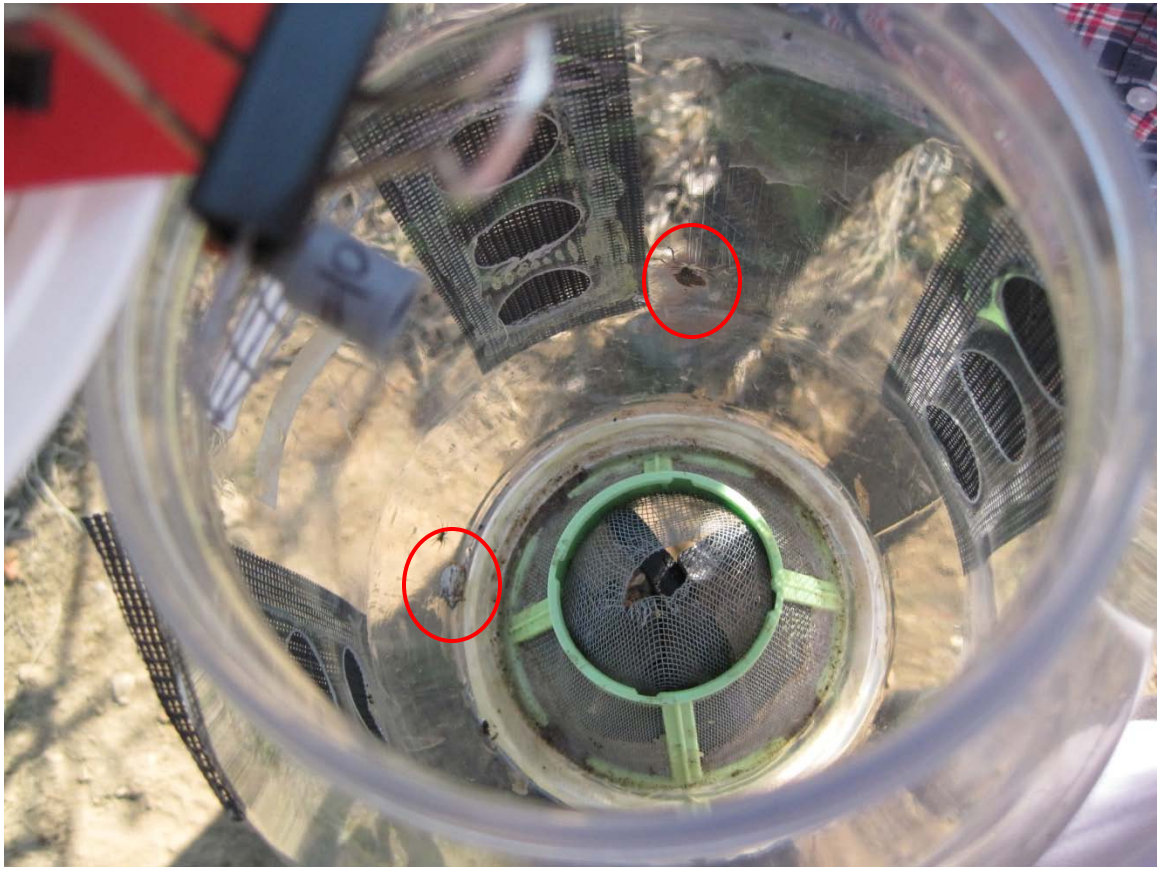
Captures in Traps Baited With #10 Significantly Greater



Traps baited with #10 captured ~15x more than control and ~3-4x more than other treatments.

Is #10 Attractive in the Early Season?

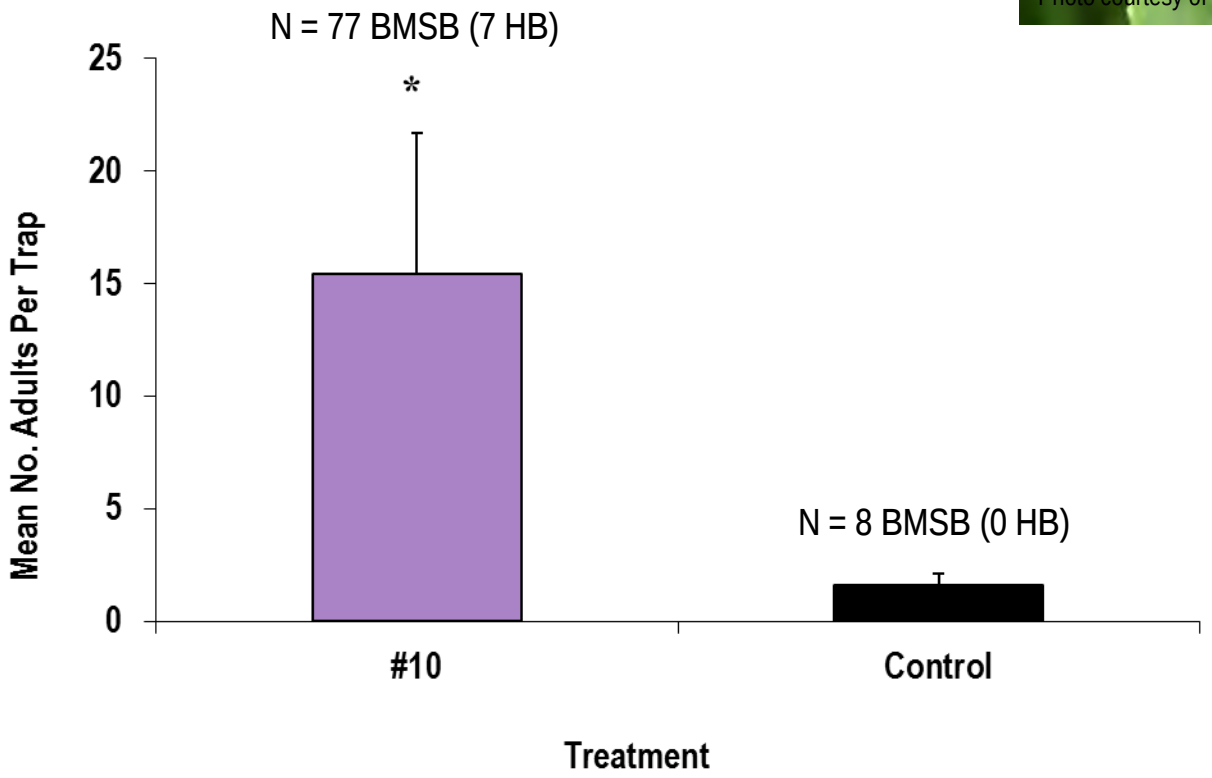
Pre-Trial (March 20-April 17, 2012)



Early Season Attraction Documented for BMSB March 20-April 17, 2012

10:1 Ratio (Baited: Unbaited)

Photo courtesy of Anna Wallingford

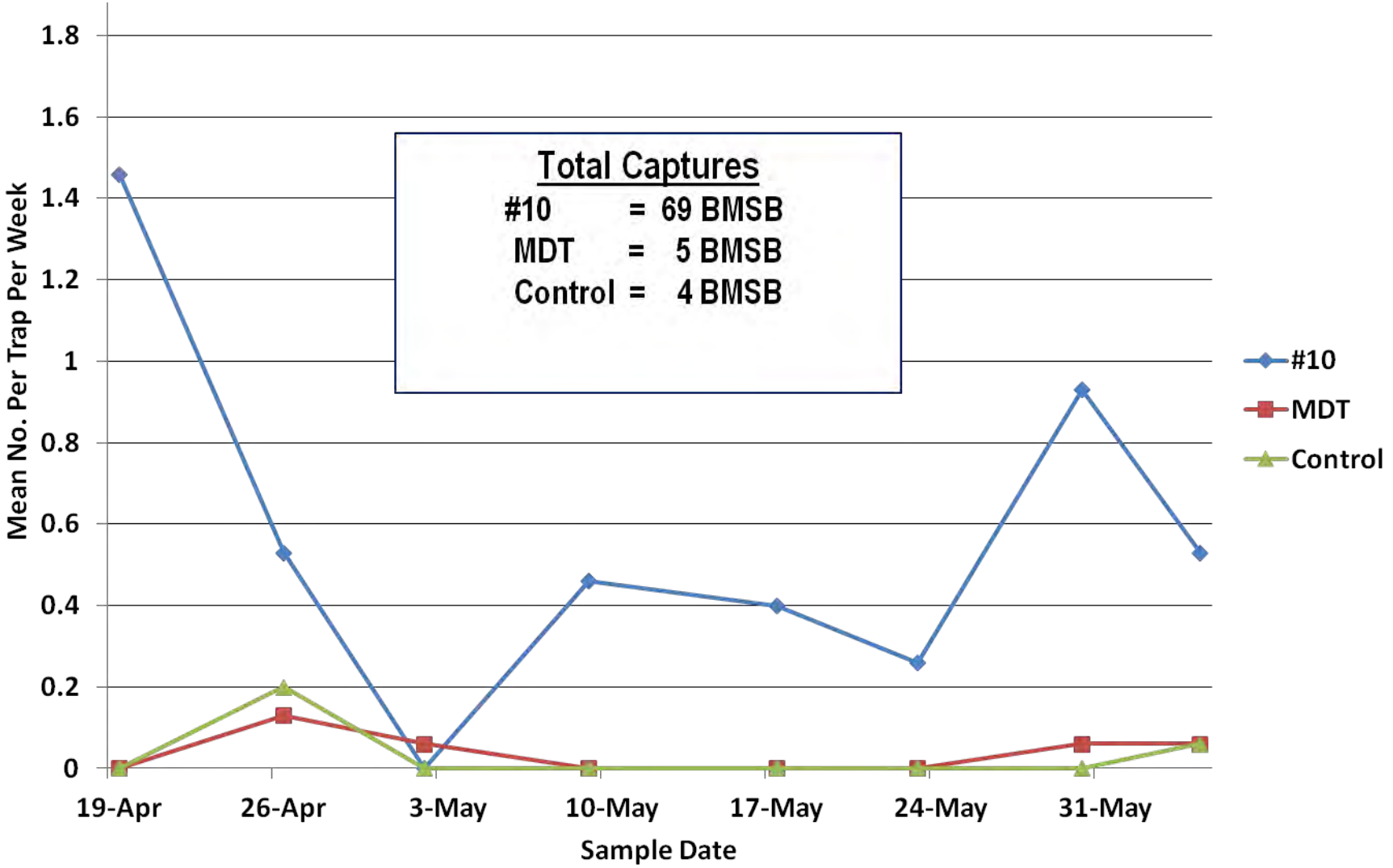


Key Questions for Multi-State Trial

- Is BMSB attracted to #10 in the early season?
- Is BMSB attracted to #10 season-long?
- How attractive is this stimulus relative to MDT and unbaited traps?

Commercial Orchards in WV/MD

10 mg experimental lure 17:1 Ratio (Baited: Unbaited)



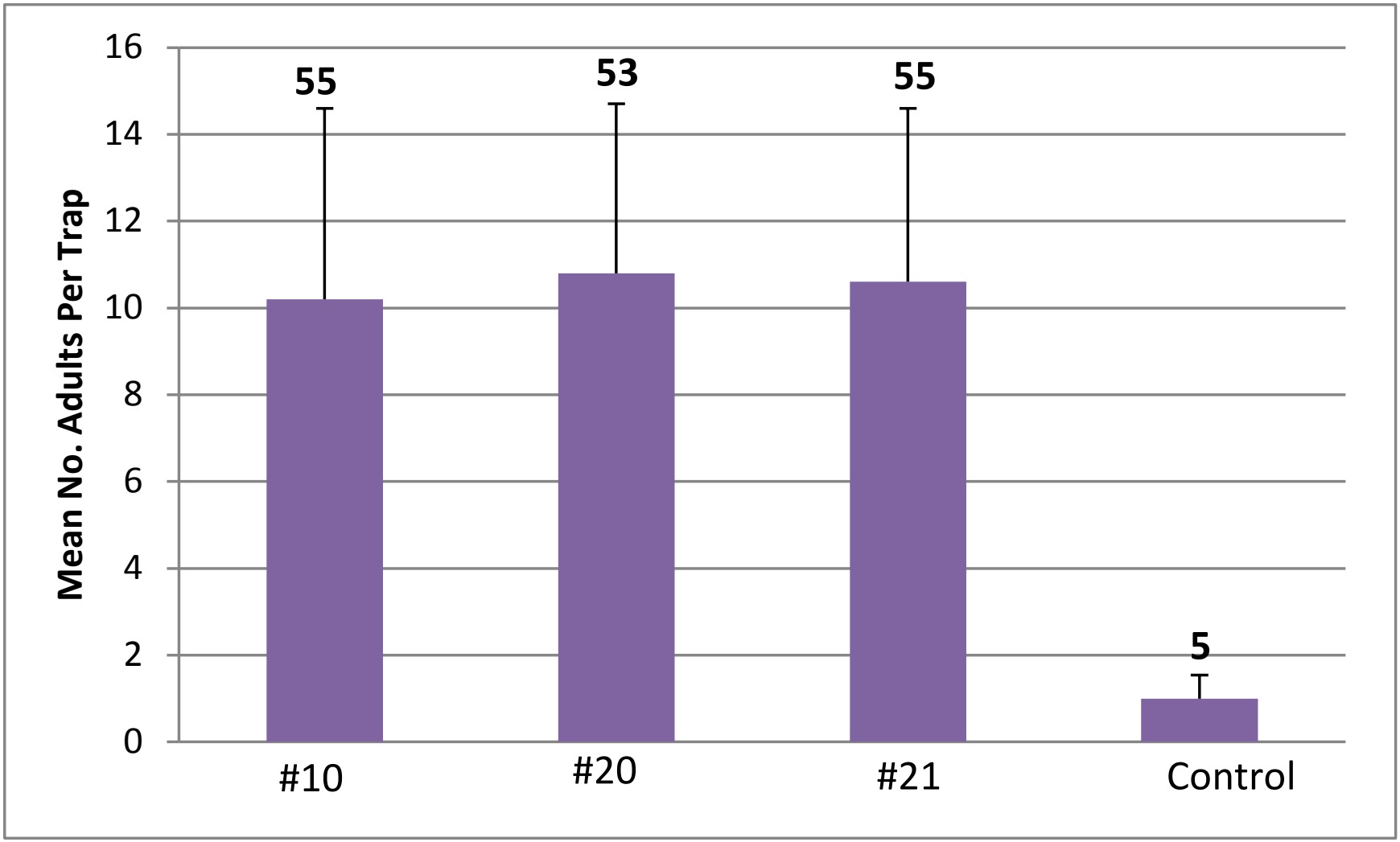
Results To Date
12.5 : 1 Ratio (Baited:Unbaited)

States	Crop	Reps	#10	MDT	Control
WV	Tree Fruit	9	41	2	1
MD	Tree Fruit	6	28	4	3
MD	Ornamentals	6	33	5(1)	1
MD	Vegetables	9	6	2(1)	2
NJ	Blueberry	5	22	1	0
NJ	Peach	5	3	3	0
NJ	Grape	5	40	1	0
DE	Mixed Veg	6	3	0	0
PA	Tree Fruit	15	17	6	5
NY	Tree Fruit	3	10	2	2
VA	Vegetables	5	6	3(1)	1
VA	Tree Fruit	5	14	1	2
VA	Grapes	5			
OR	Mixed Crops	6	3	0	0
NC	Mixed Crops	6	3	2	0
Totals			226	34 (3)	18

Purity Trial

May 14-June 4, 2012

10 mg experimental lure 11:1 Ratio (Baited: Unbaited)



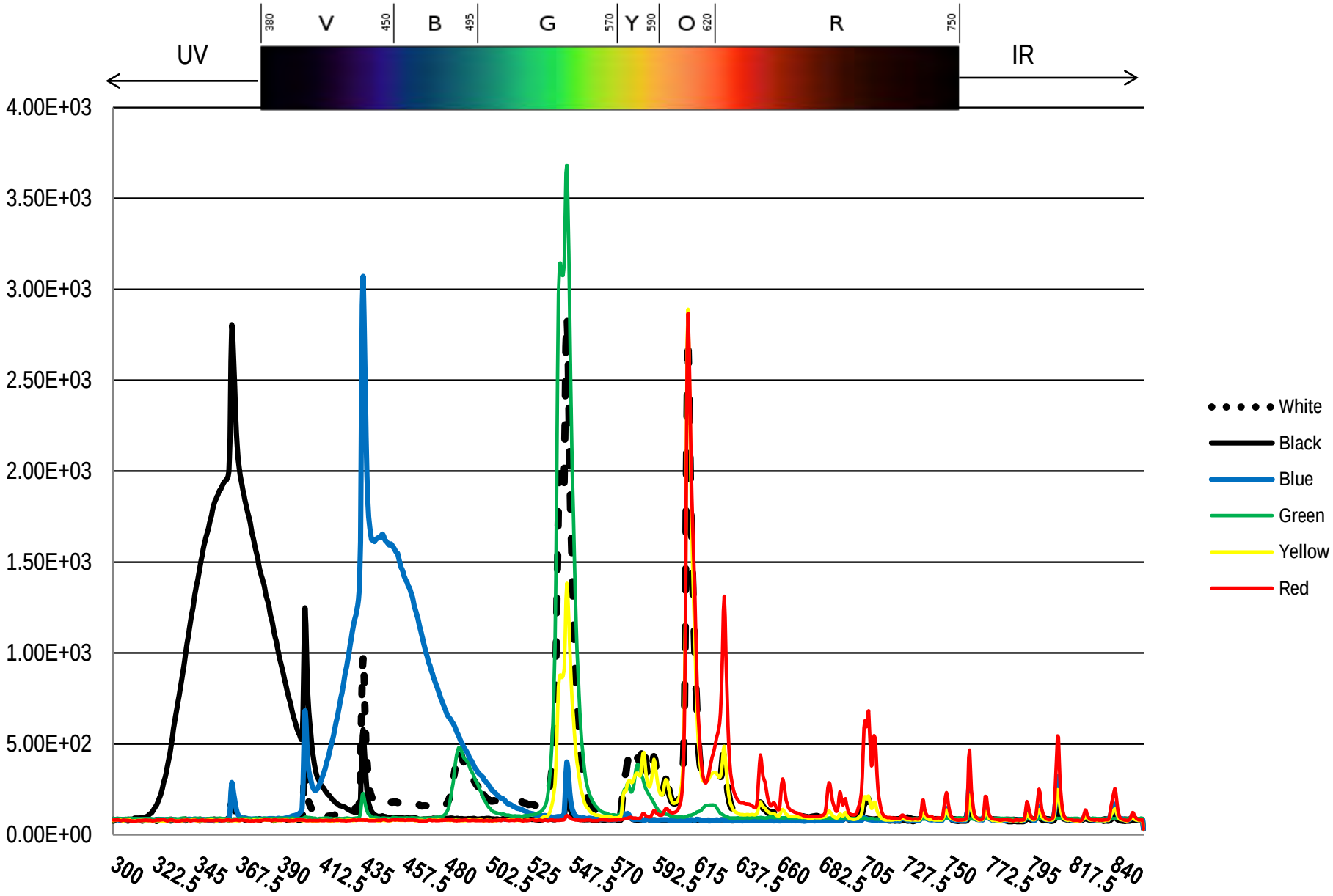
Visual Cues

Identifying Optimal Wavelengths and Intensities of Light

2011 Field Trial

- Are particular wavelengths of light more stimulating/attractive to BMSB under competitive field conditions?
- Can we augment ordinary pyramid traps with light sources and capture BMSBs reliably?
- Stimuli included white, black, blue, green, yellow, and red compact fluorescent bulbs and control

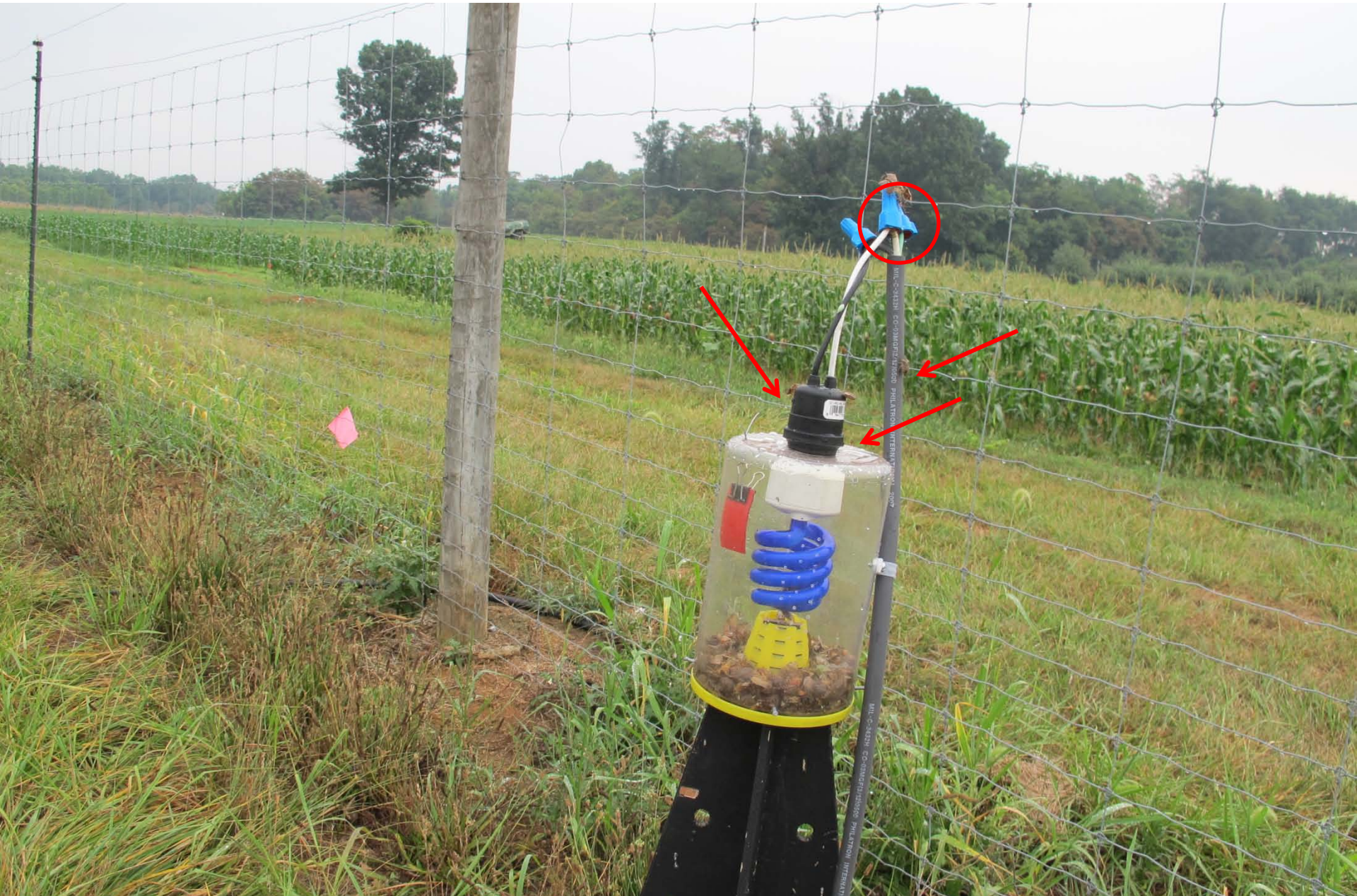
Compact Fluorescent Light, 25W (100W Equivalent)



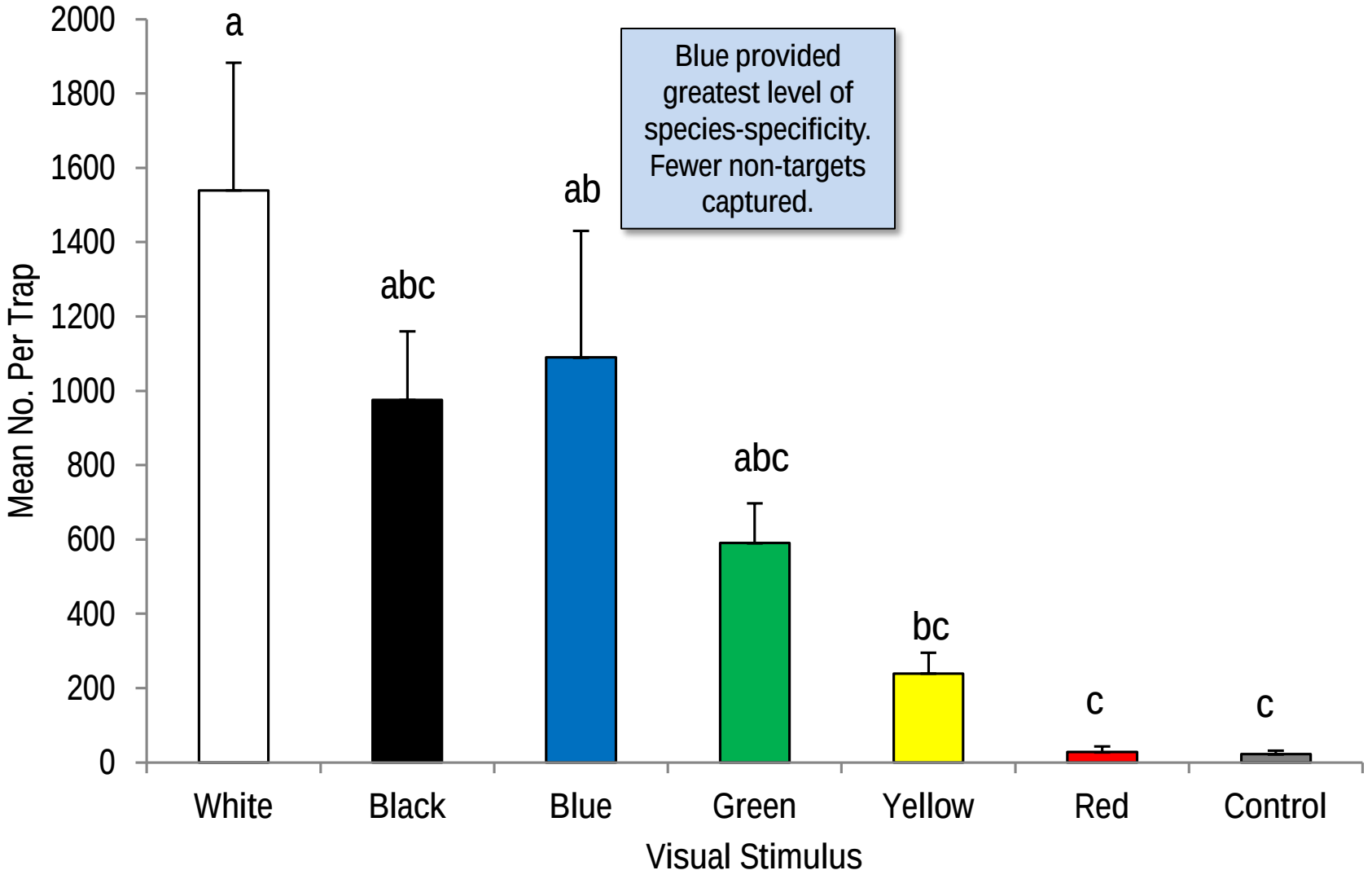
Field Trial Set-Up

Night View

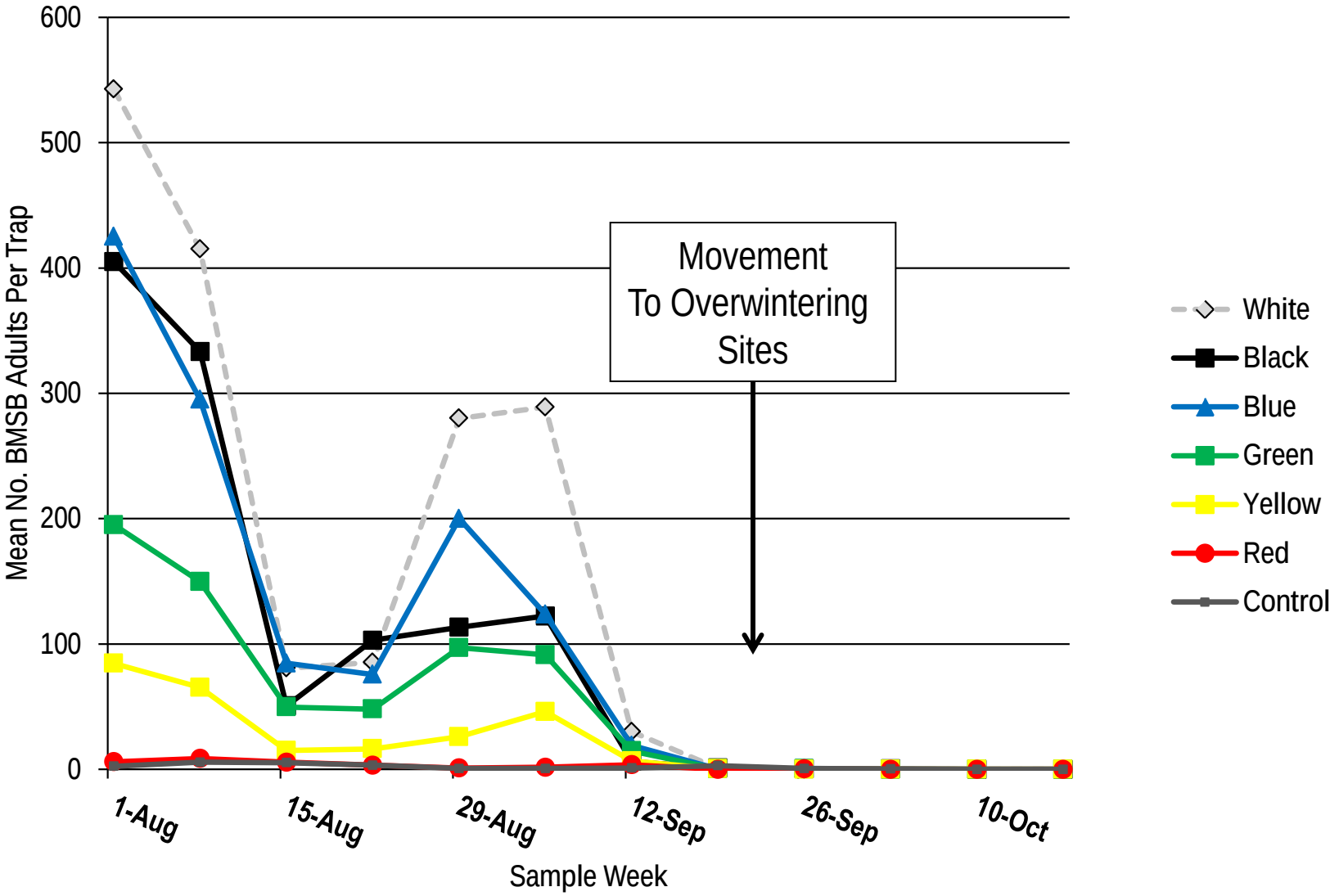
High Captures and Apparent Vicinity-Based Responders



A Total of 21 Traps Baited With Light-Based Stimuli Captured 13,457 Adult BMSB in ~6 Weeks During Late Summer

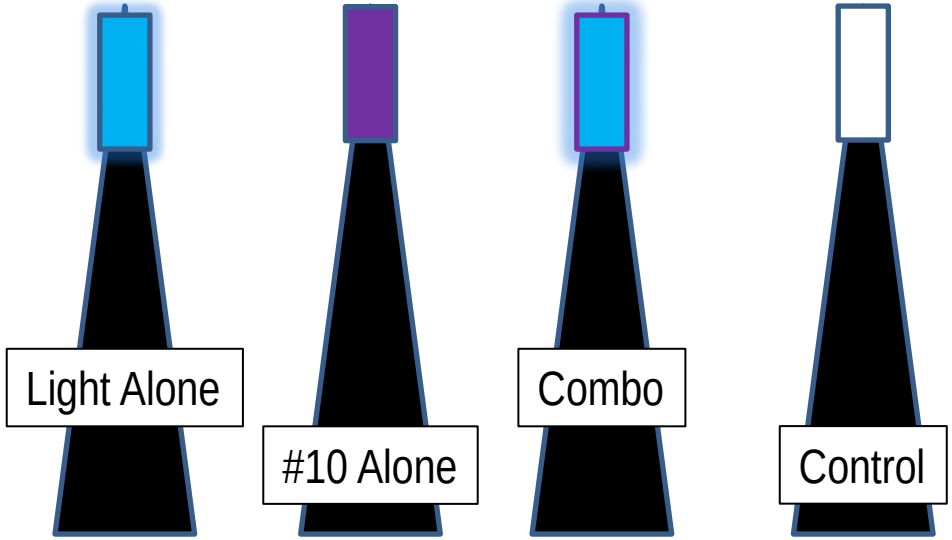


Very Large Numbers of Adults Captured and Consistent Capture Patterns Recorded Through Mid-September



Light-Based Trapping 2012

- If we combine light and #10, can we increase trap sensitivity? Will we observe a synergistic response?
- Species-specificity of most attractive visual stimuli?
- From what distance do light- based stimuli attract BMSBs?
- What is the physiological state of responders?


Light Alone
#10 Alone
Combo
Control


Rep 1 Light Only

Fw: New Message

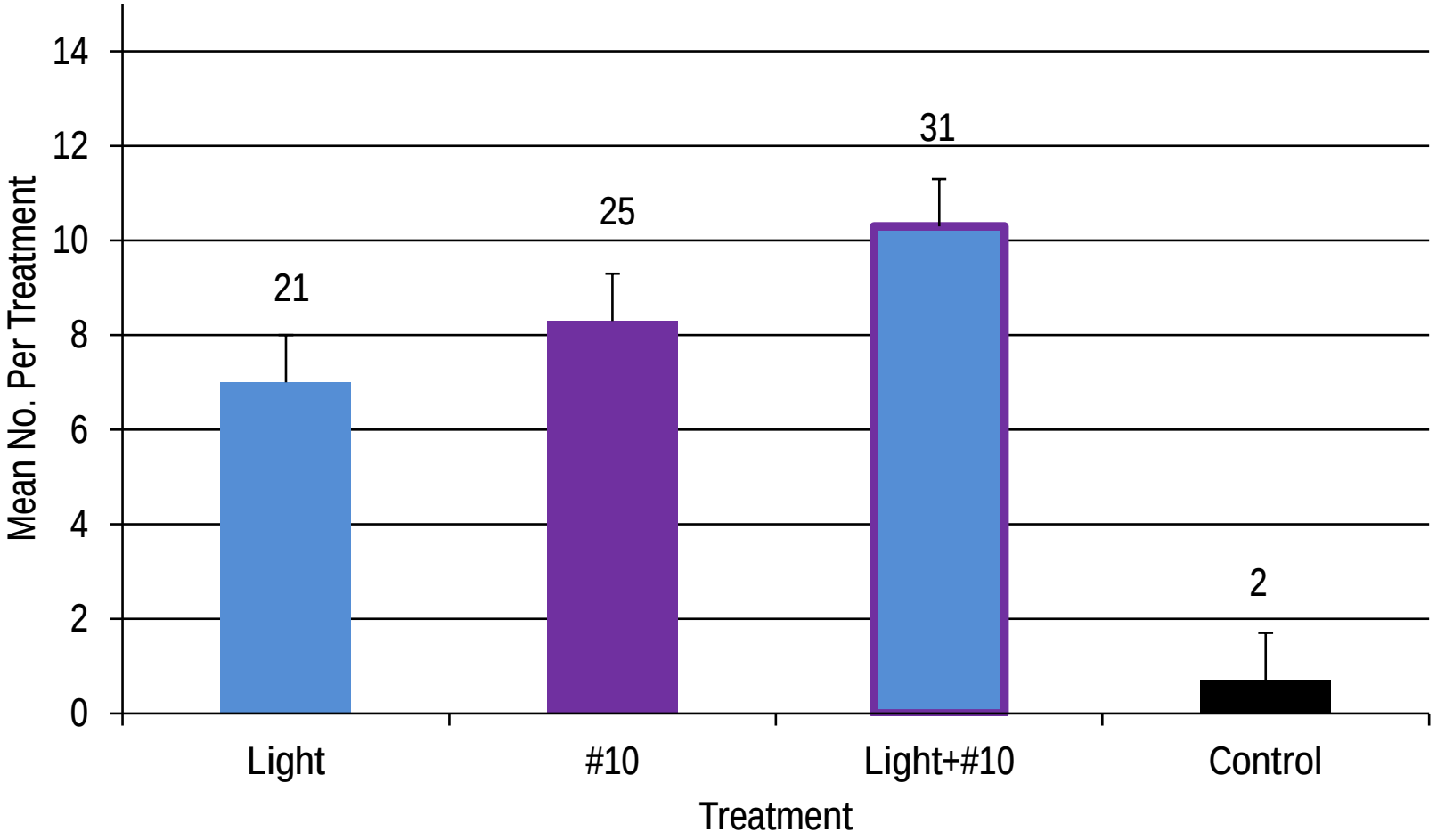
(304)995-1768 to Tracy Leskey <Tracy.Leskey@ARS.USDA.GOV>
Received: Jun 10, 2012
Expires in 60 days

Tracy, here is the picture I had to post to my facebook page to explain the lights. My phone was blowing up with texts and e-mails from fiends. Christopher Black

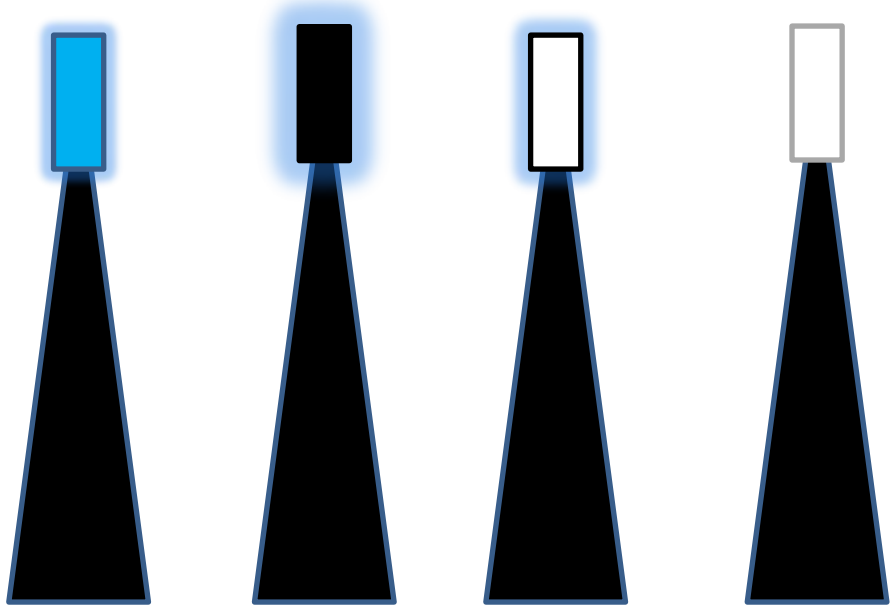
Synergy Trial Trap Captures

May 10-June 4, 2012

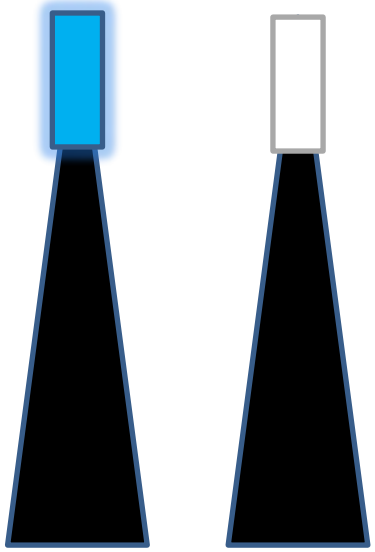
10.5 – 15.5 : 1 Ratio (Baited: Unbaited)



Species Specificity of Most Attractive Light-Based Stimuli vs. Unlit Control



Species Specificity of Blue Alone vs. Unlit Control

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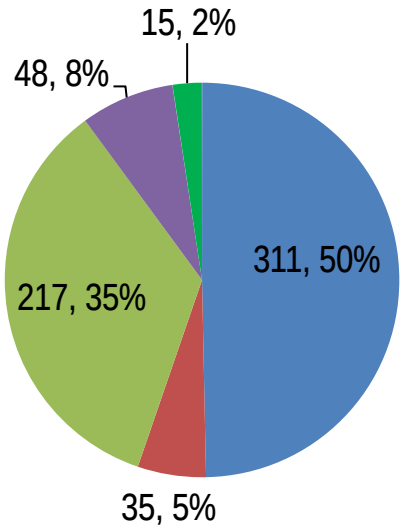
Preliminary Species Specificity
May 24-June 4, 2012

Blue

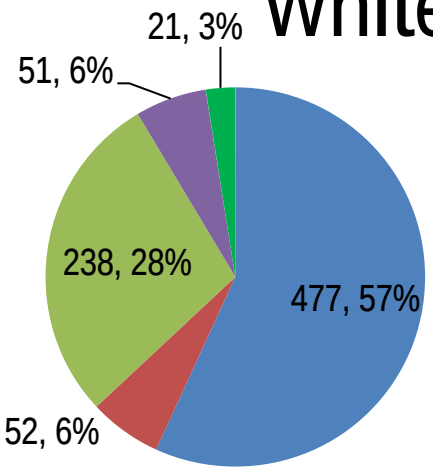
N = 626



Lepidoptera
Coleoptera
Diptera
Hymenoptera
BMSB

White

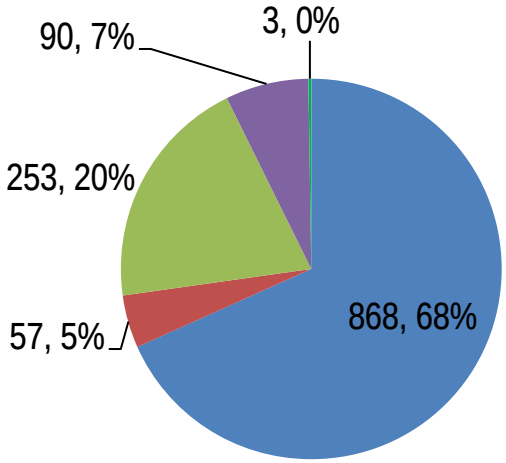
N = 839



Lepidoptera
Coleoptera
Diptera
Hymenoptera
BMSB

Black

N = 1271



Lepidoptera
Coleoptera
Diptera
Hymenoptera
BMSB

Capture Mechanism

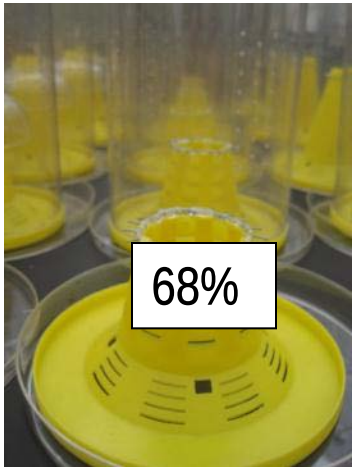
- Natural tendency to walk up surfaces.
- Collection jar used for native SBs. Fringed opening to reduce escape.
- By including kill strip, BMSB trap captures increased 250%.

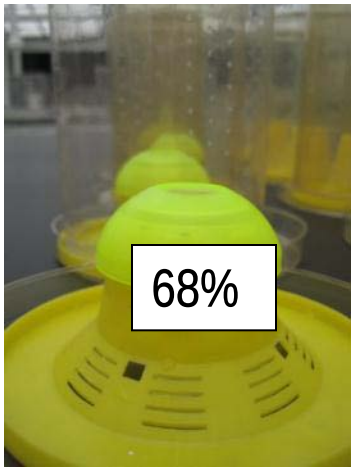
- Tapered pyramid to inverted funnel jar with DDVP toxicant strip (replaced every 4 weeks)

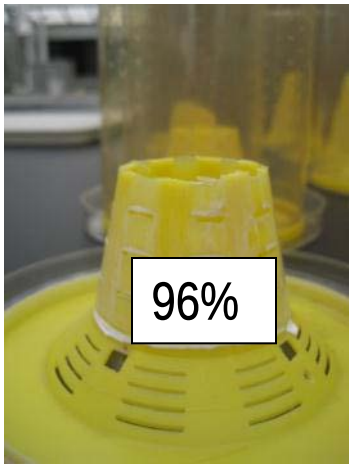
Can We Improve Capture Mechanism and Reduce Escapism?

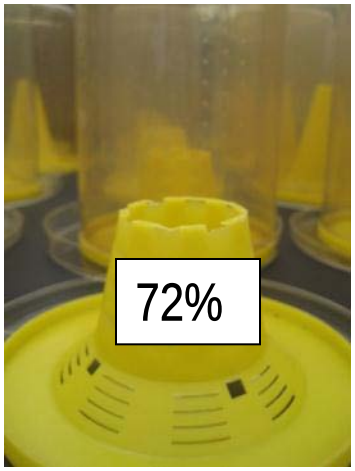
- Treatments
  - Standard trap top
  - Standard trap top + DDVP strip
  - Standard trap top + mushroom
  - Standard trap top + fringe
  - Standard trap top + fluon
- Semi-field and field experiments.
- Add BMSBs to trap tops and measure escape.

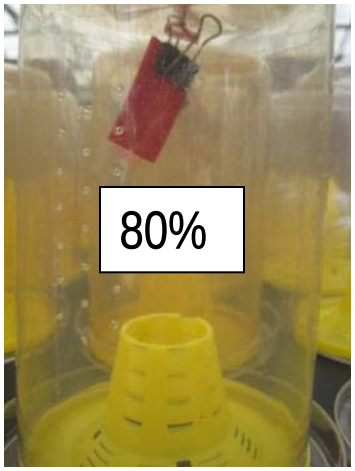
Can We Improve Capture Mechanism and Reduce Escapism?



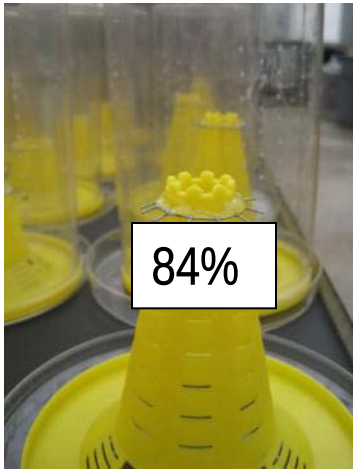




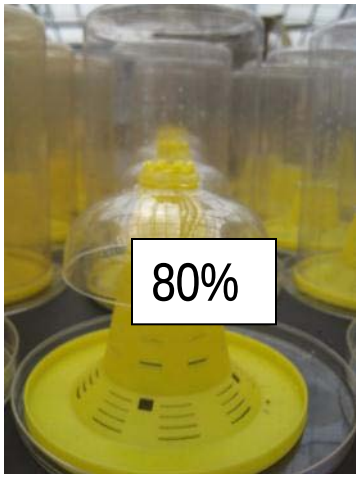




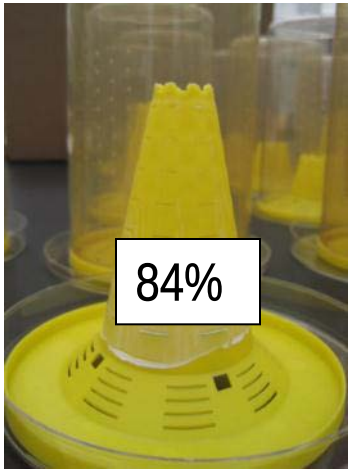
Standard



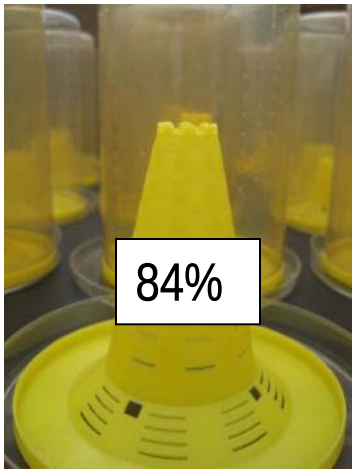
Fringe



Inverted Bowl



Fluon



Control

Can we improve release of olfactory stimuli and increase trap captures?

- Trap Tops
  - No Vents
  - Standard Venting
  - Maximum Venting

- Lure Position
  - Inside Trap Top
  - Outside Trap Top

Deployment Strategy

- Traps aimed at farmscape or block-level monitoring.
- As with other invading pests, traps placed in peripheral row of orchard, monitored weekly for the full season.
- Where, when and how do we deploy traps?

Acknowledgements

- USDA-ARS, USDA NIFA SCRI# 2011-51181-30937, and USDA-APHIS