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

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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

9-30 September 2011

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)

N = 77 BMSB (7 HB)
N = 8 BMSB (0 HB)

* 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)

Total Captures

#10   = 69 BMSB
MDT   =  5 BMSB
Control =  4 BMSB

Sample Date

Mean No. Per Trap Per Week
## Results To Date

### 12.5 : 1 Ratio (Baited:Unbaited)

<table>
<thead>
<tr>
<th>States</th>
<th>Crop</th>
<th>Reps</th>
<th>#10</th>
<th>MDT</th>
<th>Control</th>
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<td><strong>226</strong></td>
<td><strong>34 (3)</strong></td>
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Purity Trial
May 14-June 4, 2012
10 mg experimental lure  11:1 Ratio (Baited: Unbaited)

Mean No. Adults Per Trap

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<tr>
<th></th>
<th>#10</th>
<th>#20</th>
<th>#21</th>
<th>Control</th>
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<td>55</td>
<td>53</td>
<td>55</td>
<td>5</td>
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Mean No. Adults Per Trap
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
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

Blue provided the greatest level of species-specificity. Fewer non-targets captured.
Very Large Numbers of Adults Captured and Consistent Capture Patterns Recorded Through Mid-September

**Graph:**
- **X-axis:** Sample Week
- **Y-axis:** Mean No. BMSB Adults Per Trap
- **Legend:**
  - White
  - Black
  - Blue
  - Green
  - Yellow
  - Red
  - Control

**Graph Description:**
- Movement To Overwintering Sites
- White data points show a significant drop in adults captured from August to September, indicating a large movement to overwintering sites.
- Black, Blue, Green, Yellow, and Red lines show a similar pattern but at different levels, indicating varying numbers of adults captured.
- Control line remains relatively flat, showing minimal changes in adult capture numbers.
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?
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 friends. 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
Preliminary Species Specificity
May 24-June 4, 2012

White

N = 839

Blue

N = 626

Black

N = 1271
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?

Fringe Inverted Bowl Fluon Control

68% 68% 96% 72%

84% 80% 84% 84%

Fringe Inverted Bowl Fluon Control

80% Standard
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

Doo-Hyung Lee  
Starker Wright  
Torri Hancock  
Cameron Scorza  
Sean Wiles  
Brent Short  
Rebecca Posa  
John Cullum