Stink bugs in soybean

Green adult

Green nymph

Spined soldier bug

Brown adult

Brown nymph

BMSB

M. Spellman

L. Schimming

Russ Ottens, UGA
www.InsectImages.org

M. Spellman
• Stink bugs begin to migrate in large numbers into soybean fields at the R4 (full pod) soybean development stage
• Injury to soybeans includes undeveloped (flat) pods, punctured and deformed seed
Stink bug feeding can also delay maturity, causing ‘stay green’ syndrome.

Undamaged, maturing

BMSB damaged, ‘stay-green’
Stink bug “stay-green” injury—Orange Co., VA, 2011
Brown marmorated stink bug (Halyomorpha halys Stahl)

A new pest in VA soybeans
White bands on antennae
Brown marmorated stink bug (BMSB) survey: 2010 range in Virginia soybean fields

- BMSB detected in soybean (Accomack, Augusta, Brunswick, Caroline, Clarke, Culpeper, Gloucester, Greensville, Loudoun, Middlesex, Northampton, Rockingham, Stafford, Warren, Westmoreland)

- Soybean-producing counties
Brown marmorated stink bug (BMSB) survey: 2011 range in Virginia soybean fields

- 240 field visits from 2 Aug – 10 Oct
- First found on 2 Aug at growth stage R3 in Fauquier and Orange Co.; also found at R2 in Fauquier Co. on 9 Aug

- BMSB detected in soybean, > 3 per 15 sweeps (Augusta, Campbell, Clarke, Culpeper, Fauquier, Frederick, Madison, Orange, Rappahannock, Spotsylvania, Stafford)
- BMSB detected in soybean, ≤ 3 per 15 sweeps (Bedford, Caroline, Essex, Goochland, Middlesex, Nelson, New Kent, Rockingham, Shenandoah)
- County was surveyed, but BMSB has not yet been found in soybean this season (Accomack, Appomattox, Chesapeake, Dinwiddie, Gloucester, Greensville, Isle of Wight, King & Queen, King William, Lancaster, Mathews, Northampton, Northumberland, Pittsylvania, Prince George, Richmond, Southampton, Suffolk, Surry, Sussex, Virginia Beach, Westmoreland)
- Soybean-producing counties not surveyed
BMSB Efficacy Trials 1 and 3 in Soybean—Orange Co., VA, 2011

- Cobalt Advanced @ 25 oz
- Cobalt Advanced @ 22 oz
- Vydate L @ 1 pt
- Cobalt Advanced @ 31 oz
- Vydate L @ 3 pt
- Lannate LV @ 2.25 pt
- Vydate L @ 1.5 pt
- Lannate LV @ 1.5 pt
- Lannate LV @ 1 pt
- Belay @ 2 oz + Kaiso 24WG @ 1.3 oz
- Baythroid XL @ 2.8 oz
- Brigade 2EC @ 5.12 oz
- Belay @ 2 oz + Baythroid XL @ 2.8 oz
- CMT 4586 @ 8 oz + MSO+ UAN
- Endigo ZC @ 5 oz
- Orthene 97 @ 8 oz
- Belay @ 4 oz
- Belay @ 3 oz

% control based on cumulative BMSB days

Herbert, 2011
Virginia Tech
BMSB Soybean Field Infestation Gradient Grower # 1

# of BMSB per 25 Sweeps

Cissel & Whalen, 2011
BMSB Soybean Field Perimeter v/s Interior, Grower #2

# of BMSB per 25 Sweeps

- Perimeter
- Interior

Native SB Economic Threshold

Cissel & Whalen, 2011
Tree of Heaven *Ailanthus altissima* (Mill.)
BMSB also colonizes and moves from corn fields
Effectiveness of Field Perimeter Treatments

- 12 commercial soybean fields
- Culpeper, Madison, Orange, Clarke, Stafford, Fauquier, and Augusta Cos.
# BMSB edge treatments—2011

<table>
<thead>
<tr>
<th>Location</th>
<th>Product/rate</th>
<th>Acres (entire field)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culpeper et1</td>
<td>Lambda @ 5 oz</td>
<td>300</td>
</tr>
<tr>
<td>Madison et1</td>
<td>Acephate 97UP @ 12 oz</td>
<td>150</td>
</tr>
<tr>
<td>Madison et2</td>
<td>Acephate 97UP @ 12 oz</td>
<td>150</td>
</tr>
<tr>
<td>Orange et1</td>
<td>Acephate 97UP @ 12 oz</td>
<td>100</td>
</tr>
<tr>
<td>Orange et2</td>
<td>Acephate 97UP @ 12 oz</td>
<td>50</td>
</tr>
<tr>
<td>Fauquier et01</td>
<td>Acephate 97UP @ 12 oz</td>
<td>300</td>
</tr>
<tr>
<td>Fauquier et02</td>
<td>Acephate 97UP @ 12 oz</td>
<td>220</td>
</tr>
<tr>
<td>Stafford 01</td>
<td>(Lannate @ 1.5 pt) Sniper @ 6.4 oz</td>
<td>300</td>
</tr>
<tr>
<td>Augusta et02</td>
<td>Sniper @ 6 oz + Warrior @ 2.5 oz</td>
<td>400</td>
</tr>
<tr>
<td>Madison 01</td>
<td>Bifenthrin @ 6 oz</td>
<td>300</td>
</tr>
<tr>
<td>Clarke et02</td>
<td>Endigo @ 4.5 oz</td>
<td>150</td>
</tr>
<tr>
<td>Clarke et03</td>
<td>Endigo @ 4.5 oz</td>
<td>250</td>
</tr>
<tr>
<td>Location</td>
<td>Date treated</td>
<td>R-stage</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>Culpeper et1</td>
<td>25-Aug</td>
<td>5</td>
</tr>
<tr>
<td>Madison et1</td>
<td>25-Aug</td>
<td>5</td>
</tr>
<tr>
<td>Madison et2</td>
<td>25-Aug</td>
<td>5</td>
</tr>
<tr>
<td>Orange et1</td>
<td>25-Aug</td>
<td>5</td>
</tr>
<tr>
<td>Orange et2</td>
<td>25-Aug</td>
<td>5</td>
</tr>
<tr>
<td>Fauquier et 01</td>
<td>30-Aug</td>
<td>4</td>
</tr>
<tr>
<td>Fauquier et02</td>
<td>5-Sep</td>
<td>5</td>
</tr>
<tr>
<td>Stafford 01</td>
<td>28-Sep</td>
<td>6</td>
</tr>
<tr>
<td>Augusta et02</td>
<td>28-Sep</td>
<td>6</td>
</tr>
<tr>
<td>Madison 01</td>
<td>28-Sep</td>
<td>6</td>
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<tr>
<td>Clarke et02</td>
<td>28-Sep</td>
<td>6</td>
</tr>
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<td>28-Sep</td>
<td>6</td>
</tr>
</tbody>
</table>
## Thresholds and sampling

<table>
<thead>
<tr>
<th>Row spacing</th>
<th># per row foot</th>
<th># per 15 sweeps</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-21” rows</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Above 21”</td>
<td>1</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Stink bugs

- 1
- 1
- 2.4
- 3.6
# Economic Thresholds

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Soybean type or stage</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 per 6 row feet</td>
<td>Seed</td>
<td>LA, NC</td>
</tr>
<tr>
<td>1 per 3 row feet</td>
<td>Grain, bloom to mid pod fill</td>
<td>GA, TN, MS</td>
</tr>
<tr>
<td>1 per 1 row foot</td>
<td>Grain, mid pod fill to harvest</td>
<td>GA, NC, LA, TN, AK, VA</td>
</tr>
</tbody>
</table>

- Have not changed much in the last couple of decades
- Based on native stink bugs
Based on Native Stink Bug Species

- Infestations occurring between R3 to R7 most damaging

### Economic Thresholds

**Action Thresholds For Native Stink Bugs in Soybeans During the Pod Development and Pod Fill Stages**

<table>
<thead>
<tr>
<th>Area</th>
<th>Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used currently in DE, MD</td>
<td>1 per foot of row</td>
</tr>
<tr>
<td></td>
<td>5 per 25 sweeps</td>
</tr>
<tr>
<td>Some mid-south states</td>
<td>2 per foot of row</td>
</tr>
<tr>
<td></td>
<td>9 per 25 sweeps</td>
</tr>
</tbody>
</table>

B. Cissel & J. Whalen
University of Delaware, 2011
Megacopta cribraria
“Kudzu Bug”

Wayne Gardner, Phillip Roberts, & Dave Buntin, Univ. of Georgia
Jeremy Greene, Clemson University
Kudzu bug biology

• 1-3 generations per year in China
• Overwinter in China but are active year-round in India
• First found in the U.S. in Georgia, 2008; soybeans in 2009
• Can overwinter in north Georgia
• Feed on soybean leaves, stems, and pods
• Kudzu and Wisteria are also a hosts
The home invasion

Photographs courtesy of Daniel R. Suiter, University of Georgia, College of Agriculture & Environmental Sciences
Megacopta cribraria (kudzu bug) occurrence in the Southeastern United States

- Confirmed in 2009
- Confirmed in 2010
- Confirmed in 2011

Distribution map courtesy of W. Gardner, Univ. of Georgia
Images by J. Greene, Clemson Univ.
Kudzu bug in North Carolina, 2010-2011

Confirmed in 2010
Confirmed in 2011
Confirmed in soybean in 2011

Distribution map courtesy of W. Gardner, Univ. of Georgia, edited by Dominic Reisig, NCSU
Soybean grain yield in untreated and season-long control of *M. cribraria* using Endigo insecticide in 6 trials in Georgia, 2010

-4.52 Bu/acre (-18.4%)
Range 11-23%

*Means significantly different, F test, α = 0.05*
Questions?