Status of Brown Marmorated Stink Bug in NC and VA

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Host Use in USA:

- Bernon (2004) documented > 60 wild host plants in PA

- Nielsen & Hamilton (2009) studied population dynamics in ornamentals and found that densities in PA were highest in
  - Early season: *Paulownia tomentosa*
  - Mid- late season: *Viburnum, spp.*, *Fraxinum americanum; Paulownia tomentosa*
  - Late season: *Pyrus, spp.* (Pear), *Paulownia tomentosa*
Objectives:

Determine the role of wild plants on population biology of BMSB

1. Determine important host plants of BMSB across geographic regions in its southern range

2. Determine effect of BMSB on native stink bug spp

3. Determine sequence of host use in Wild Plants

4. Determine whether wild plants augment or reduce population growth in agricultural habitats
Methods:

• 3 min timed samples performed every 2 wk
  • 5 reps (crop sampling)
  • Variable # reps for wild hosts
  – Visual
  – Beat sheet
    • 3 whacks / branch
  – Sweep net
    • 20 sweeps/ sample x 30
E. servus
56%

North Carolina

E. tristigmus

Virginia

E. servus
73%

BMSB
< 1%

North Carolina

E. tristigmus

Eastern Coastal Plain

E. servus
73%

Eastern Shore

E. servus
56%

A. hilare
43%

A. hilare
22%

Thyanta, sp
Species composition

**Virginia**
- **BMSB**: 84%
- **E. servus**: 56%
- **A. hilare**: 43%
- **E. tristigmus**: > 1%
- **Bronchymena, sp**

**North Carolina**
- **BMSB**: 73%
- **E. servus**: 73%
- **A. hilare**: 26%
- **E. tristigmus**: 22%
- **Thyanta, sp**

**Northern VA**
- **BMSB**: 84%
- **E. servus**: 56%
- **A. hilare**: 43%
- **E. tristigmus**: > 1%
- **M. histrionica**

**Eastern Shore**
- **E. servus**: 56%
- **A. hilare**: 43%
- **E. tristigmus**: 26%
- **BMSB**: > 1%

**Central NC**
- **BMSB**: 32%
- **A. hilare**: 26%
- **E. servus**: 22%
- **E. tristigmus**: 73%
- **Bronchymena, sp**

**Eastern Coastal Plain**
- **E. servus**: 73%
- **A. hilare**: 22%
- **E. tristigmus**: 26%
- **Thyanta, sp**
Species composition

- **Western VA**: BMSB 99.6%
- **Western NC**: BMSB 88%
- **Central NC**: BMSB 32%
- **Virginia**: BMSB 84%
- **Northern VA**: BMSB 88%
- **Eastern Shore**: E. servus 56%, A. hilare 43%
- **North Carolina**: BMSB 73%
- **Eastern Coastal Plain**: E. servus 73%, A. hilare 22%

**Common Species**
- BMSB
- E. servus
- E. tristigmus
- A. hilare
- M. histrionica
- Thyanta, sp
- Euschistus, sp
- Bronchymena, sp
## Wild and Cultivated Host Plants

<table>
<thead>
<tr>
<th>Location</th>
<th># Wild Plant Species w/ BMSB</th>
<th># Crop Species w/ BMSB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2011</td>
<td>2012</td>
</tr>
<tr>
<td>Virginia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>North</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>West</td>
<td>45</td>
<td>46</td>
</tr>
<tr>
<td>North Carolina</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Central</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>West</td>
<td>11</td>
<td>28</td>
</tr>
</tbody>
</table>
Major Host Plants in NC and VA
(Early to Mid-Season)

Sassafras:
*Sassafras albidium* Nutt

Black Cherry:
*Prunus serotina* Ehrh.
Major Host Plants in NC and VA (Mid- to Late Season)

- **Tree of Heaven**
  - *Ailanthus altissima* Mill. (Swingle)

- **Bradford Pear**
  - *Pyrus calleryana* Decne.

- **Paulownia, spp**

- **Catalpa, spp.**
Population Dynamics in Agriculture

A) Wild Tree Border

B) Soybeans

Sample Date

Mean # BMBS / Sample

Adults

Nymphs
## Similar Host Plants Among Sites in VA and NC

<table>
<thead>
<tr>
<th>Plant Species</th>
<th># of sites with BMSB -ALL YEARS-</th>
<th>% of sites with BMSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell Pepper</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Field Corn</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td><strong>Soybean</strong></td>
<td>4</td>
<td>80%</td>
</tr>
<tr>
<td>Redbud</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Wild Grape</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Sassafras</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Red Maple</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Cherry (Prunus Spp)</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Paulownia (Princess tree)</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Ailanthus (Tree of Heaven)</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td><strong>Catalpa</strong></td>
<td>4</td>
<td>80%</td>
</tr>
</tbody>
</table>
Conclusions

• Wild hosts are an important part of BMSB’s life cycle.

• BMSB present in > 29 cultivated plants in Virginia and 11 in North Carolina.

• Presence of wild host plants around agricultural areas may contribute greatly to BMSB densities in crops at certain periods.

• Catalpa and soybean were the most common host plants associated with BMSB in VA and NC.
Conclusions (cont.)

• Similar host species used by BMSB in the Southeast compared with Northeast (e.g. *Paulownia, Pyrus, spp.*) but at slightly different times.

• BMSB has a major impact on pentatomid species composition, increasing from < 1% in the east to up to 99% of all species captured in the western areas.
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References

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• Holtz, T., and K. Kamminga. 2010. USDA- APHIS- PPQ.