BMSB Regional Update: Western Region

June 16, 2016

Chuck Ingels
UC Cooperative Extension, Sacramento County

Charlie Pickett
Calif. Dept. of Food & Ag.

Ricky Lara
UC Riverside

Vaughn Walton & Nik Wiman
Oregon State Univ.

Diane Alston & Lori Spears
Utah State Univ.
BMSB Finds in Washington
March 2016

[Map showing locations of BMSB finds in Washington, with pins indicating specific sites.]
Oregon Update

Nik Wiman
Oregon State University
New Coastal Populations

Eastern Populations now at damaging levels – apples in Milton-Freewater

Agricultural/urban problems are largely northern Willamette Valley

Source: Nik Wiman
Agricultural issues

Damage to sweet cherries – OW adults

Willamette Valley
Trap comparison trials
2015 trap trials – repeat in 2016

Season-long captures

<table>
<thead>
<tr>
<th>No. BMSB/trap/week</th>
<th>Panel Trap</th>
<th>Pyramid Trap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Season-long captures *</td>
<td>$P = 0.02$</td>
<td></td>
</tr>
</tbody>
</table>

Trap sensitivity – 2 sites
Oregon Hazelnut IPM in the context of the invasive pest, Brown Marmorated Stink Bug

Vaughn M. Walton, Betsey Miller and Daniel T. Dalton
Department of Horticulture, Oregon State University, Corvallis, Oregon

vaughn.walton@oregonstate.edu
Field observations 2014

Found in two commercial orchards
Two key pests 2015

- Filbertworm
- BMSB

Number FBW/trap
Number BMSB/trap

Brown Marmorated Stink Bug: A New Threat to Utah Agriculture

Lori Spears & Diane Alston
Department of Biology
Utah State University
BMSB is here and most likely will be an important and serious threat to Utah’s agriculture.

- New county detections
  - Salt Lake (2012)
  - Utah (2013)
  - Davis (2015)
  - Weber (2015)
  - Cache (2016)

- Massing adults and breeding populations

It is unclear how BMSB captures relate to density or damage potential.
BMSB is here and most likely will be an important and **serious threat** to Utah’s agriculture

- **New county detections**
  - Salt Lake (2012)
  - Utah (2013)
  - Davis (2015)
  - Weber (2015)
  - Cache (2016)

- **Massing adults and breeding populations**

  ![Bar chart showing BMSB detections from 2012 to 2015]

  - Most adults were found in May, June, and August
  - Nymphs and egg masses were found in June and July

  It is unclear how BMSB captures relate to density or damage potential
Detection Approaches

- **Surveys**
  - Passive (traps)
    - Less effective in Utah
  - Active (beating trays)
    - Very effective in Utah

- **Reports**
  - Citizens
    - Workshops
    - Overwintering bugs
  - Growers
    - Our highest concern

- **Catalpa**
- **Honeysuckle**
- **Downey Japanese Maple**
- **Siberian peashrub**
California Agriculture

- $54 billion output in 2014
- Top agricultural counties are in San Joaquin Valley
- **Almonds** ($5.8 B)
- **Grapes** ($5.2 B)
- **Walnuts** ($1.8 B)
- **Pistachios** ($1.6 B)
- **Oranges** ($950 M)
- **Peaches** ($356 M)
Distribution of Brown Marmorated Stink Bug in California

Established
Detected

Prepared December 2015
BMSB Finds
Sacramento County

Jan. 1, 2014

Jan. 1, 2015
2014 Trap Locations & Counts
Adults/Nymphs

Trap Locations:
- 3/4
- 64/532
- 219/155
- 90/691
- 11/9
- 22/98

Counts:
- Adults: 0/0
- Nymphs: 0/0

Other locations:
- 7/7
- 2014
- Southside Park
2015 Trap Locations & Counts
Total Number of BMSB Trapped

- **Pyramid**
- **Hanging**
- **<100**
- **100-299**
- **300+**
Traps Used in Sacramento Monitoring 2015

AgBio Pyramid Trap

Double Cone (1-gal.)
2015 Avg. Seasonal Trap Counts
Pyramid vs. Double Cone

Overall: 14% more in pyramid traps
Adults and Nymphs Trapped
Avg. of 4 traps, 2014

First predicted 2nd gen. eggs: July 11
First eggs: May 5
Nymphs

No./Trap/Day

17-Mar, 31-Mar, 14-Apr, 28-Apr, 12-May, 26-May, 9-Jun, 23-Jun, 7-Jul, 21-Jul, 4-Aug, 18-Aug, 1-Sep, 15-Sep, 29-Sep
Adults and Nymphs Trapped
Avg. of 7 traps with 100+ for season, 2015

First eggs: April 14
First predicted 2nd gen. eggs July 6
Nymphs

No./Trap/Day
Daily High Temperatures (°F)
Sacramento, 2016
Daily High Temperatures (°F)
Sacramento, 2016

Unusually warm Feb.
Adults and Nymphs Trapped
Avg. of 24 traps, 2016

First predicted
2nd gen. eggs
June 30

First eggs:
April 18

No/Trap/Day

14
12
10
8
6
4
2
0


Nymphs

Adults
Adults and Nymphs Trapped
Avg. of 24 traps, 2016

First predicted 2nd gen. eggs: June 30
First eggs: April 18

4 traps only

On outside of traps

Nymphs
Adults
On Apt. Wall

Feb. 25, 2016
Lure Comparison
Sacramento, 2016

- 4 lure types, 3 reps each, rotated within reps
  - AgBio Pyramid traps (grower model)
  - Trece double cone trap (in Tree of H.)
Lure Comparison
Sacramento, 2016

- Trece – “Jerky” lure
- Rescue
- AgBio Combo
- Alpha Scents

Some melted in sun
Trap Counts by Lure Type
Sacramento, 4/18 to 6/6/2016

No. of BMSB/trap/week

<table>
<thead>
<tr>
<th></th>
<th>Adults</th>
<th>Nymphs</th>
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<tbody>
<tr>
<td>Trece</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Rescue</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>AgBio</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Alpha</td>
<td>2</td>
<td>4</td>
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</table>

- Pink bars represent Adults
- Gray bars represent Nymphs
### Total No. of Carabid vs. BMSB
Sacramento, 5/2 to 6/6/16

<table>
<thead>
<tr>
<th>Carabid</th>
<th>BMSB</th>
<th>Double cone traps</th>
<th>Pyramid traps</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
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<td>9</td>
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</table>

**Correlation**

\[ P = 0.044 \]

\[ R \text{ value} = 0.41 \]
BMSB Damage 2014

Peach, 5/22

Nectarine, 6/3

Asian pear, 7/11

Plum – no damage

C. Ingels
On Apples
Sept. 2015

C. Ingels
On Persimmons
Sept. 2015

C. Ingels
Feeding on Cracked Citrus
Sacramento, Aug. 2015
Trunk Feeding and Damage

Cherry
Sept. 2015
Trunk Feeding and Damage

Orange
Sept. 2015

C. Ingels
Trunk Feeding

Zelkova
Sept. 2015

C. Ingels
Monitoring for Natural Enemies

Charlie Pickett
Calif. Department of Food & Agriculture
Predacious Ground Beetle
(Carabidae: *Laemostenus complanatus*)
Astata sp. Dragging BMSB into Nest
Sacramento, 2015

Photos: Ryan Fernandez
Rat eating BMSB eggs on sentinel card
Sacramento, October 2015
Imaging by M. Stadtherr (CDFA)
BMSB Parasitoid Testing

Ricky Lara
Dept. of Entomology, UC Riverside
BMSB Egg-Parasitoid Life Cycle

Access to BMSB Eggs

Parasitoid Life Cycle

Approx. three weeks after parasitization (20°C)

Seven days after parasitization

C. Hedstrom (OSU)
No Choice Tests

Non-Target + *T. japonicus*

BMSB + *T. japonicus*

24hrs daily observations

After 24 hrs

Ideally, no parasitism

Only parasitoids emerge!
Ideally, no parasitism

Only parasitoids emerge!
Empress Tree

Walnut

Tree of Heaven

Citrus
Key to Nearctic species of *Trissolcus* Ashmead (Hymenoptera, Scelionidae), natural enemies of native and invasive stink bugs (Hemiptera, Pentatomidae)

Elijah J. Talamas¹, Norman F. Johnson², Matthew Buffington³

1 Systematic Entomology Laboratory, USDA/ARS/MSU, Smithsonian Institution, Washington DC, USA
2 Department of Evolution, Ecology and Organismal Biology, The Ohio State University, Columbus, OH 43210, USA

Corresponding author: Elijah J. Talamas (elijah.talamas@ars.usda.gov)

Academic editor: M. Xoder | Received 5 September 2014 | Accepted 10 March 2015 | Published 27 March 2015

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What attacks BMSB in CA?

- *Trissolcus japonicus*
- *Trissolcus euschisti*
- *Anastatus pearsalli*

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Trissolcus euschisti

Anastatus pearsalli
Acknowledgments

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California Pistachio Research Board

Consolidated Central Valley Table Grape Pest and Disease Control District
Questions?

California BMSB Web Sites

ucipm.ucdavis.edu

cisr.ucr.edu/brown_marmorated_stinkbug.html

cesacramento.ucanr.edu