



Biological Control of Brown Marmorated Stink Bug, an Update

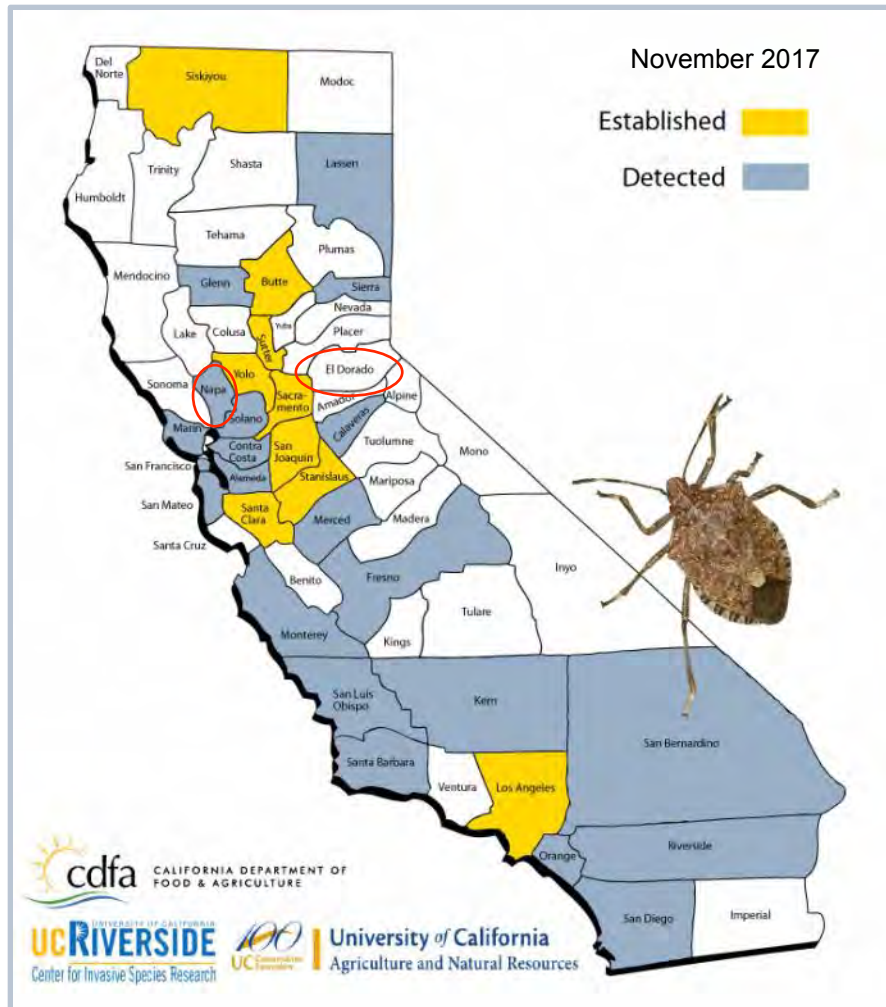
BMSB IPM Working Group Meeting
Winchester, Virginia
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Charlie Pickett (CDFA, Biological Control Program), presenter

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Dani Lightle and Jhalendra Rijal: UC Cooperative Extension (Orland, Modesto)

BMSB In California



- \$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 (\$1.5 B)
- Oranges (\$950 M)
- Peaches (\$356 M)
- Kiwifruit (\$32 M)

Established in 9, detected in 22 counties

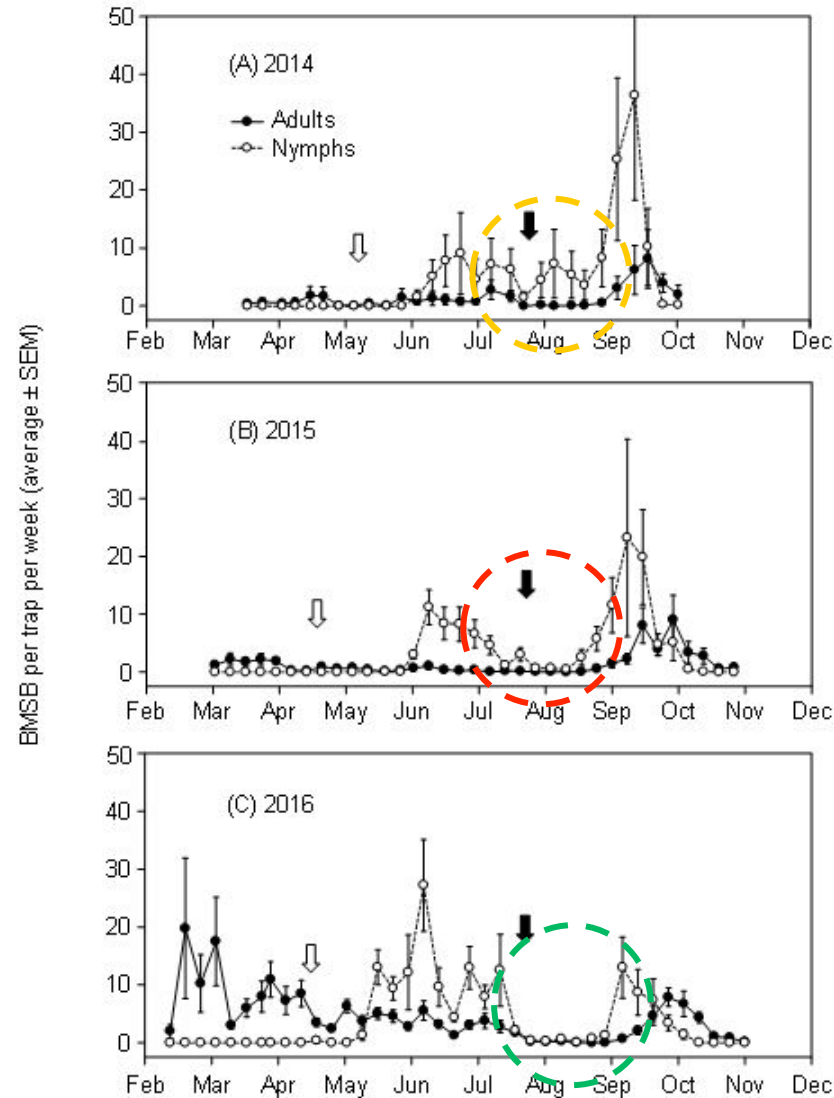
Economic Damage?



- Jhalendra Rijal
UCCE, Modesto
- 37.6° N latitude

Effect of High Temperatures on BMSB:

BMSB Population in Sacramento, 2014 to 2016 (Ingels and Daane, unpubl.)



High Summer Temperatures
Depress BMSB Population?

San Jose trap (Aug, Sept. Oct) :
Fall 2016.....109 BMSB
Fall 2017..... 6 BMSB

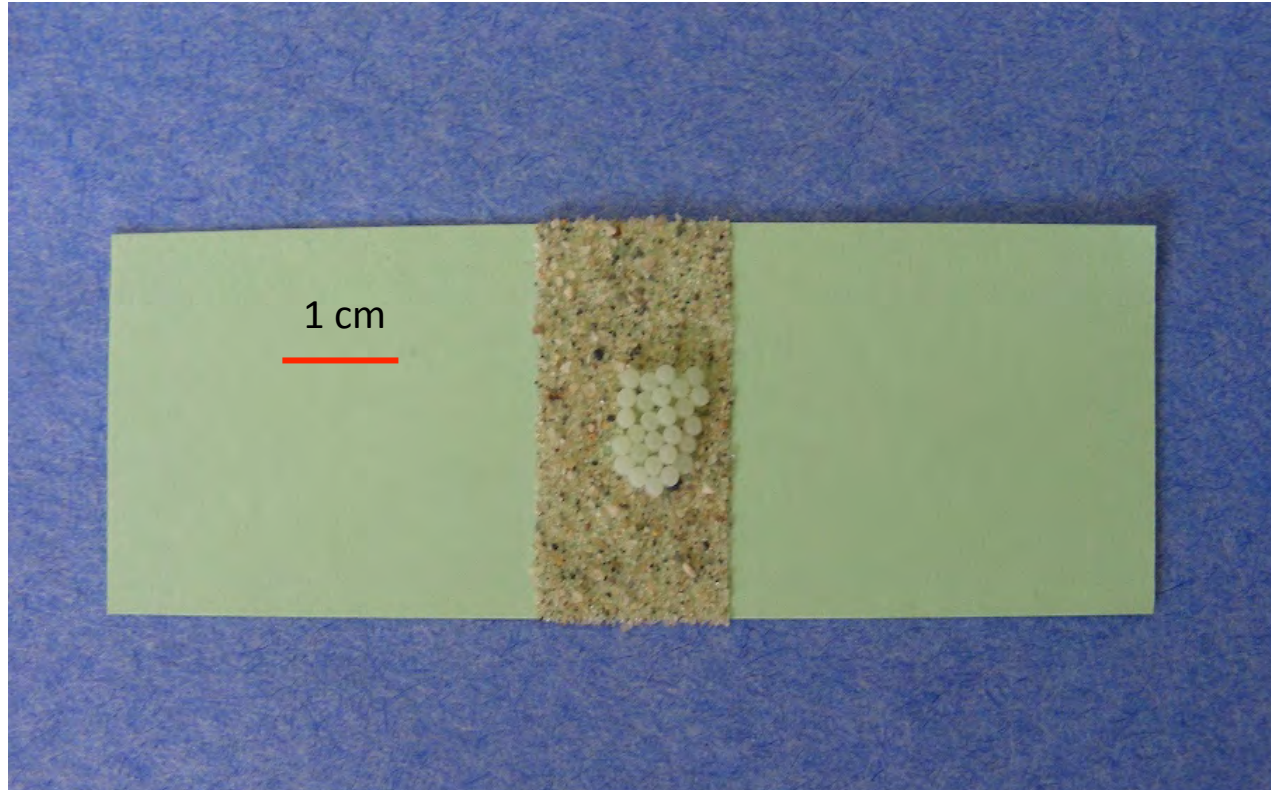
Role for Biological Control in California?

- List of known, native parasitoids found attacking BMSB
 - *Trissolcus euschisti*
 - *Ooencyrtus johnsoni*
 - *Anastatus sp.*

Resident Egg Parasitoids



Brown Marmorated Stink Bug sentinel egg mass



sentinel egg mass on tree trunk



Photo by J. Hernandez

Placement of Sentinel Cards in California, 2017



1. Los Angeles County
2. Central Valley
3. San Jose city
4. Sacramento/Davis /Chico
5. Yreka, city

49 locations, 729 cards

Resident Parasitoids:

Trissolcus euschisti

Ooencyrtus johnsoni

Anastatus sp.

Year	% egg <u>masses</u> attacked	%eggs parasitized	Number of sentinel cards placed in field
2015	0.7	0.3	286
2016	1.96	0.8	306



Percent and number of eggs consumed through predation of sentinel eggs, mean \pm SEM, Sacramento Region*.

WHAT IS FEEDING ON EGGS?

Year	% damage	N = # sentinel cards
2014	5.3 \pm 2.1	49
2015	11.2 \pm 2.1	218
2016	21.7 \pm 3.2	184

*June through October

List of Native Predators Attacking BMSB in California

- Predacious ground beetle, *Laemostenus complanatus*
- Spiders, *Trachelas*
- Earwigs: ring legged and European
- Oriental cockroach
- Thread-waisted wasps: *Astata occidentalis* and *A. unicolor*
- Rat

Predacious Ground Beetle, good guy



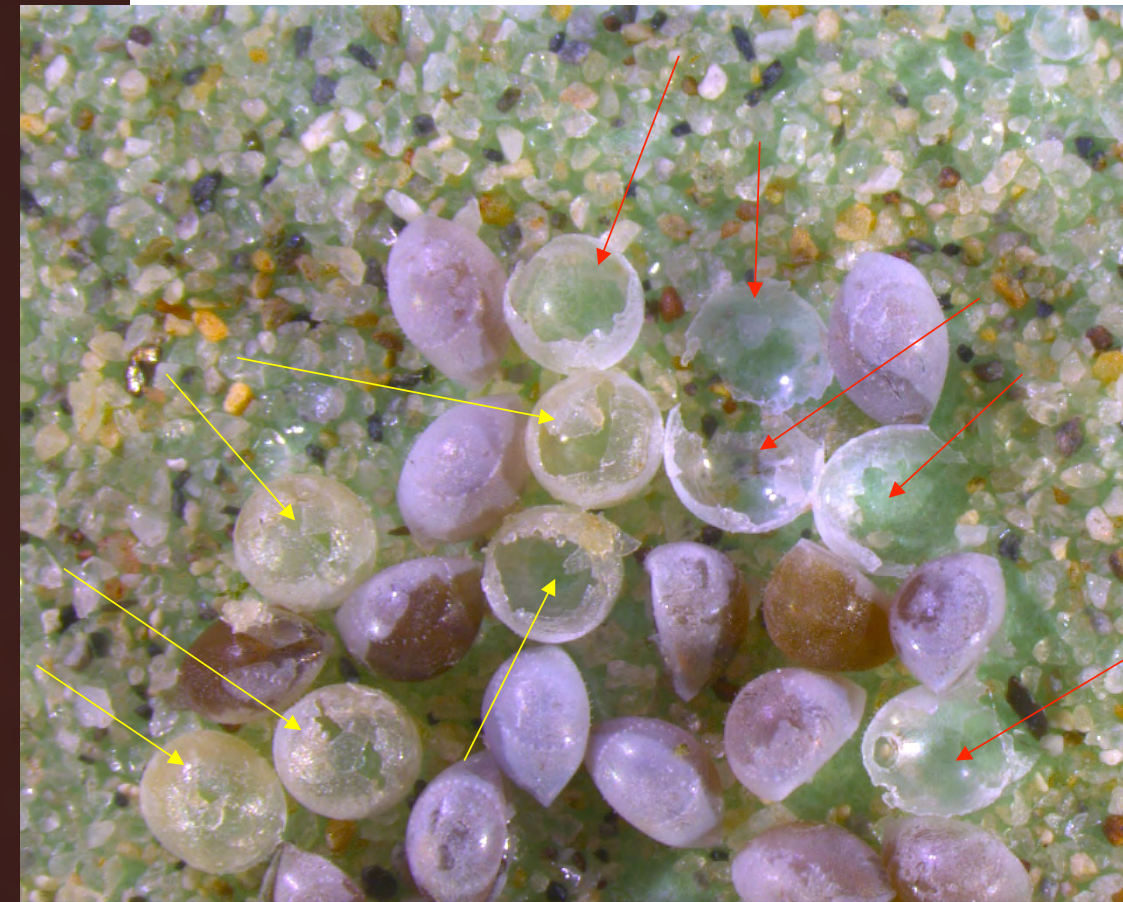
Laemostenus complanatus

Carabid Feeding on BMSB Sentinel Eggs, Sacramento 2015



- over 8 hr period
- middle of night
- 5 minute sequences

Damage to eggs by both Spider Trachelas and Earwig



Oriental Cockroach



Thread-waisted Wasp Dragging Prey BMSB into its Den



SEC BIRDCAM 26 AUG 15 11:07 AM

BMSB



Summary

Samurai Wasp
(*T. japonicus*)



- BMSB not yet an economic pest to production agriculture.
- High temperatures may be limiting.
- Generalists predators play a role.
- Samurai wasp coming to California.

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