

# BMSB Regional Update: Western Region

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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**

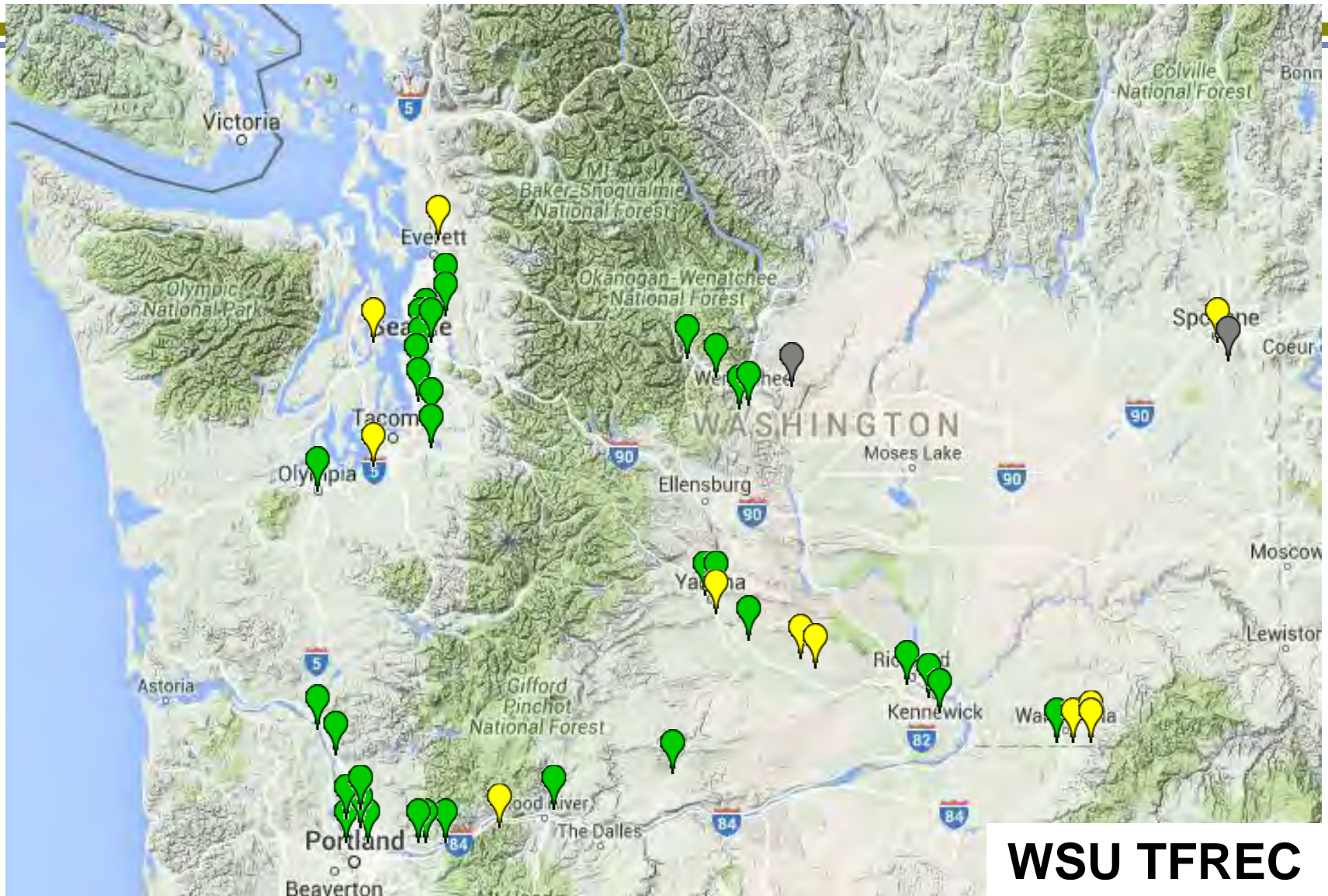
Oregon State Univ.

**Diane Alston & Lori Spears**

Utah State Univ.

# BMSB Finds in Washington

March 2016



# Oregon Update

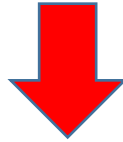
**Nik Wiman**

Oregon State University

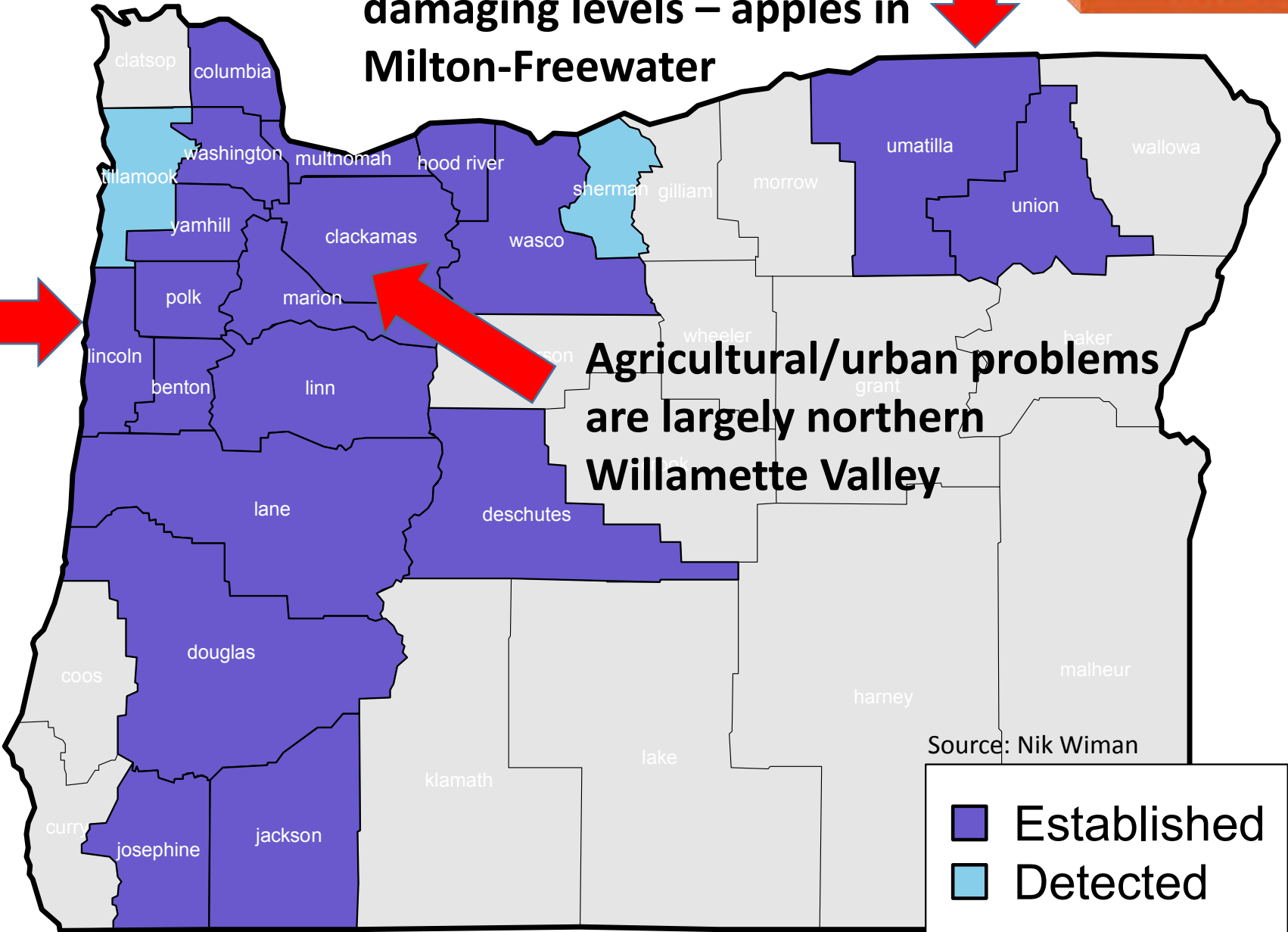
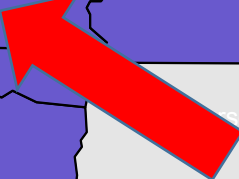
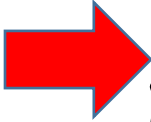
# OREGON



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



New Coastal Populations



Agricultural/urban problems  
are largely northern  
Willamette Valley

Source: Nik Wiman

Legend:

- Established
- Detected



# Agricultural issues

Damage to sweet cherries – OW adults



Willamette Valley



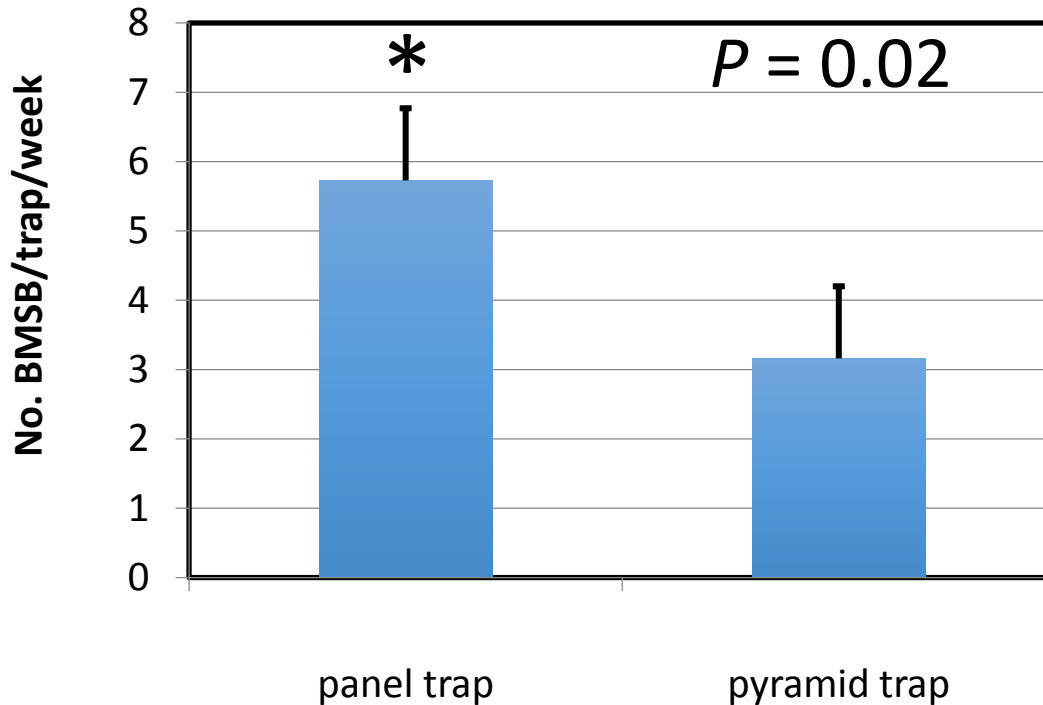
# Trap comparison trials





# 2015 trap trials – repeat in 2016

## Season-long captures



**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](mailto:vaughn.walton@oregonstate.edu)



# Field observations 2013



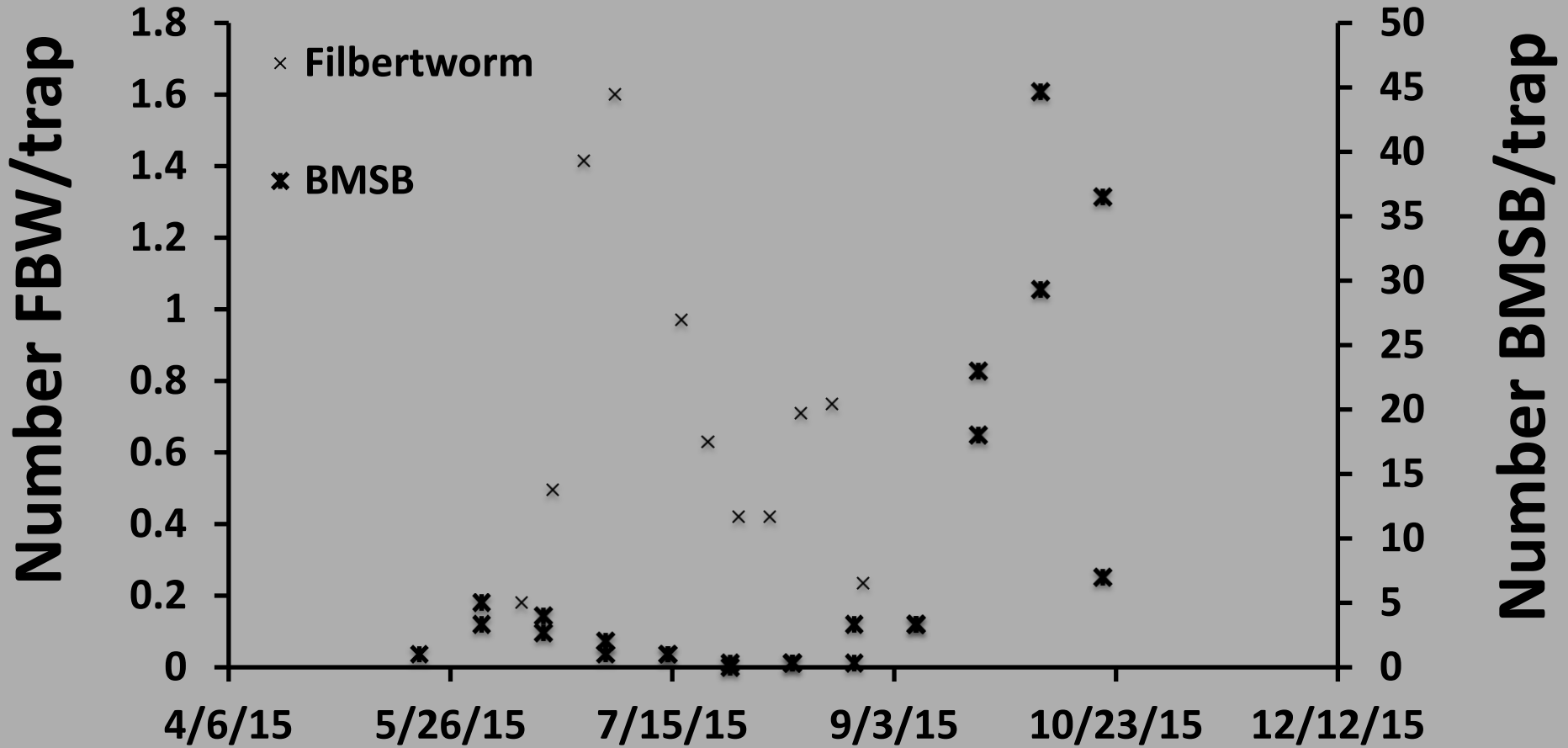
# Field observations 2014



Found in two commercial orchards



# Two key pests 2015



# Brown Marmorated Stink Bug:

## A New Threat to Utah Agriculture

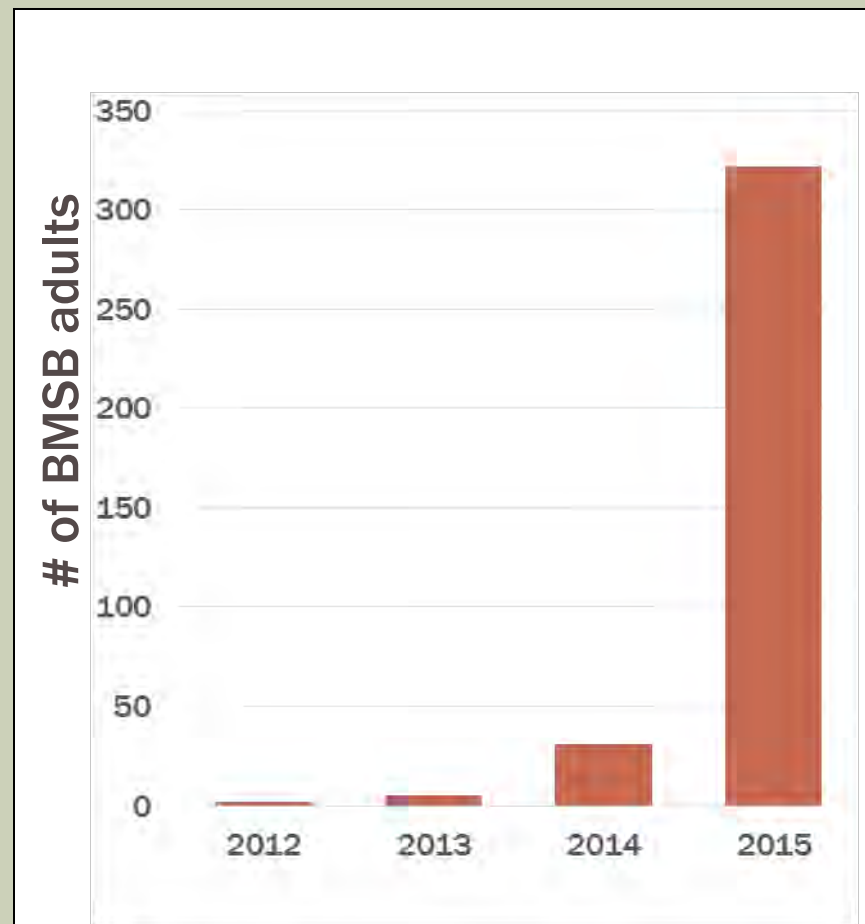


**Lori Spears &  
Diane Alston**  
Department of Biology  
Utah State University



# 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

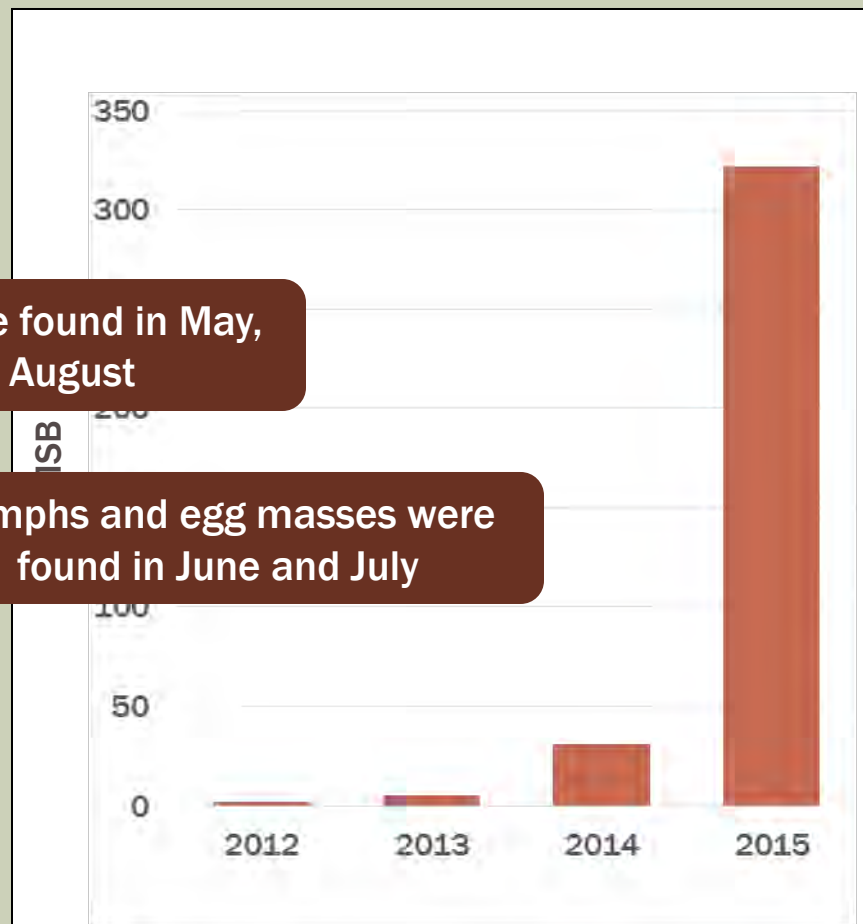
- New county detections

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

- Massing adults and breeding populations

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

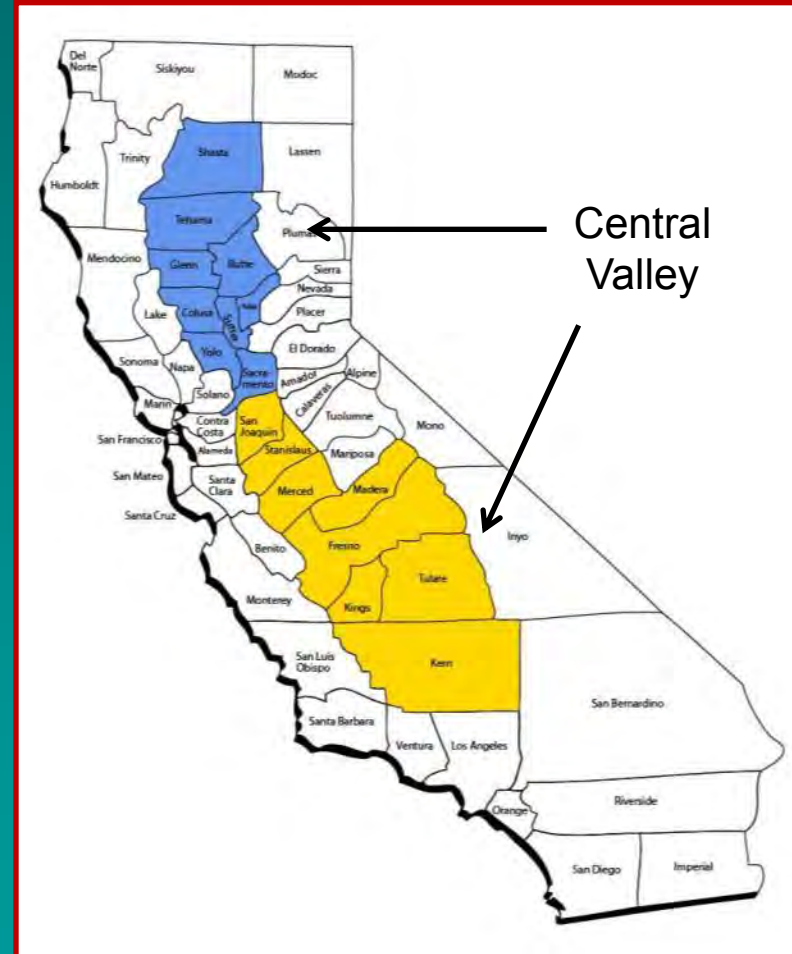


- **Catalpa**
- **Honeysuckle**
- **Downey Japanese Maple**
- **Siberian peashrub**

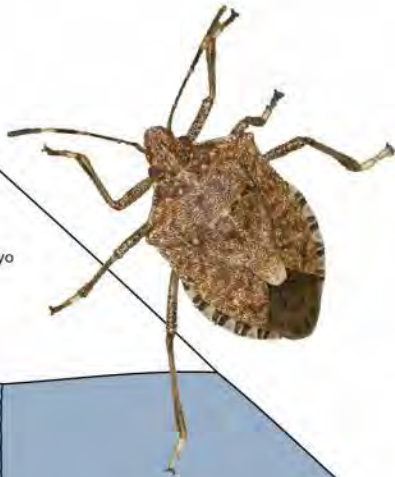
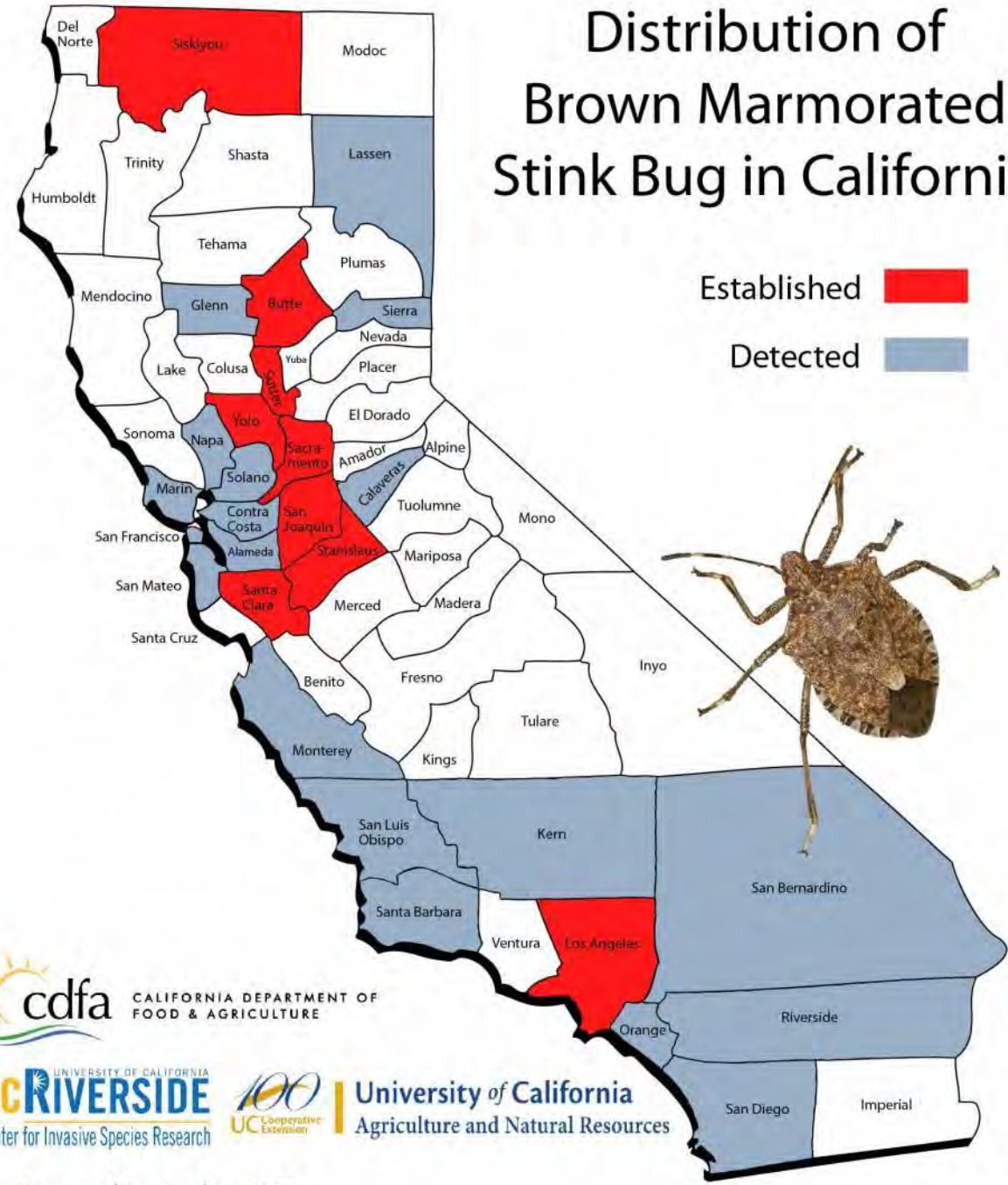
# California Agriculture



- \$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



 **cdfa** CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

 **UC RIVERSIDE**  
UNIVERSITY OF CALIFORNIA  
Center for Invasive Species Research

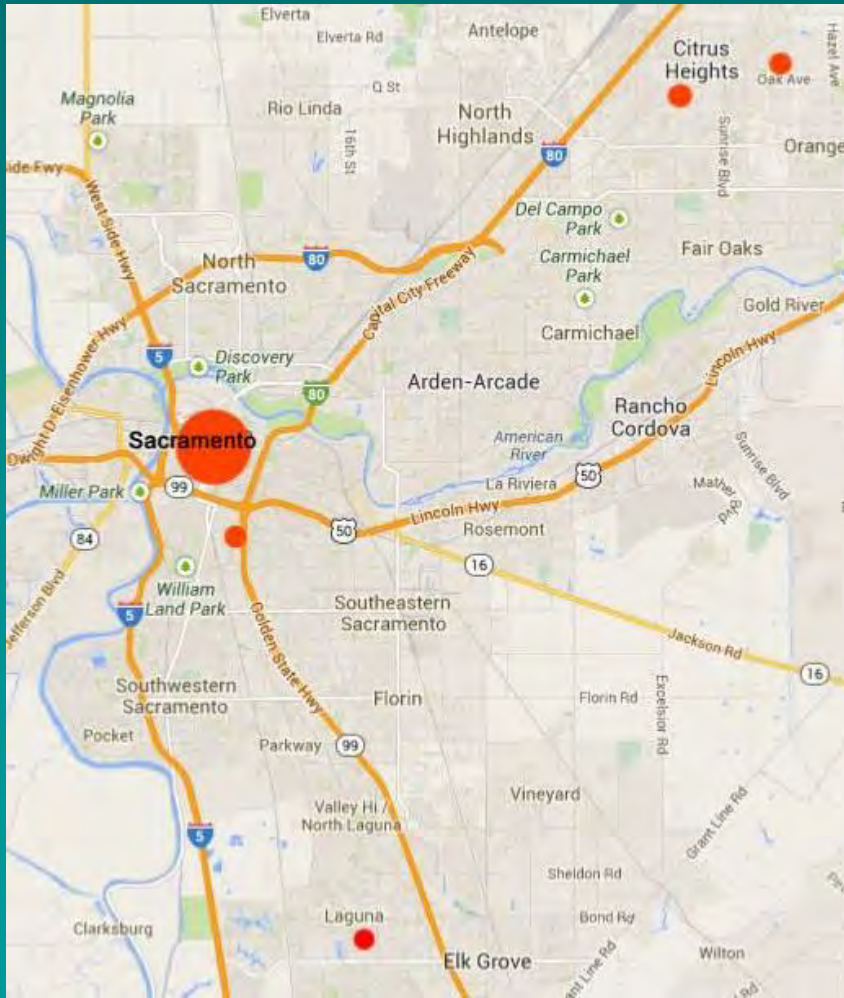
 **100**  
UC Cooperative Extension

 **University of California**  
Agriculture and Natural Resources

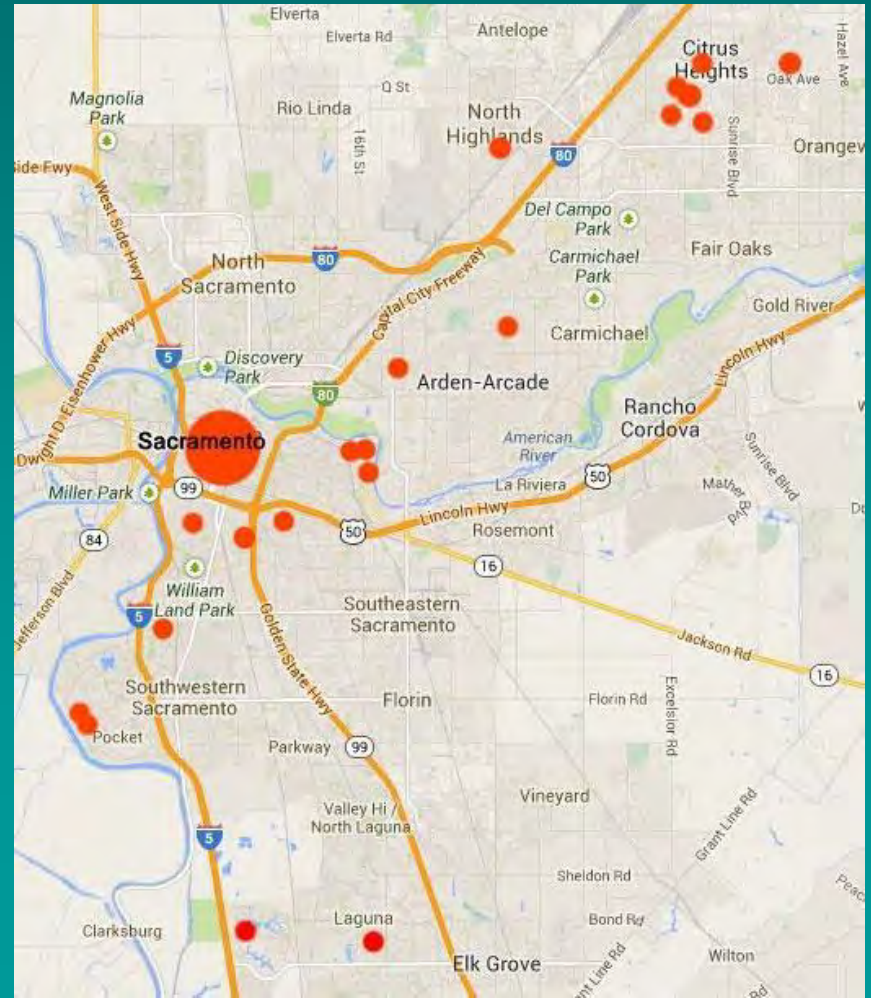


# BMSB Finds Sacramento County

Jan. 1, 2014

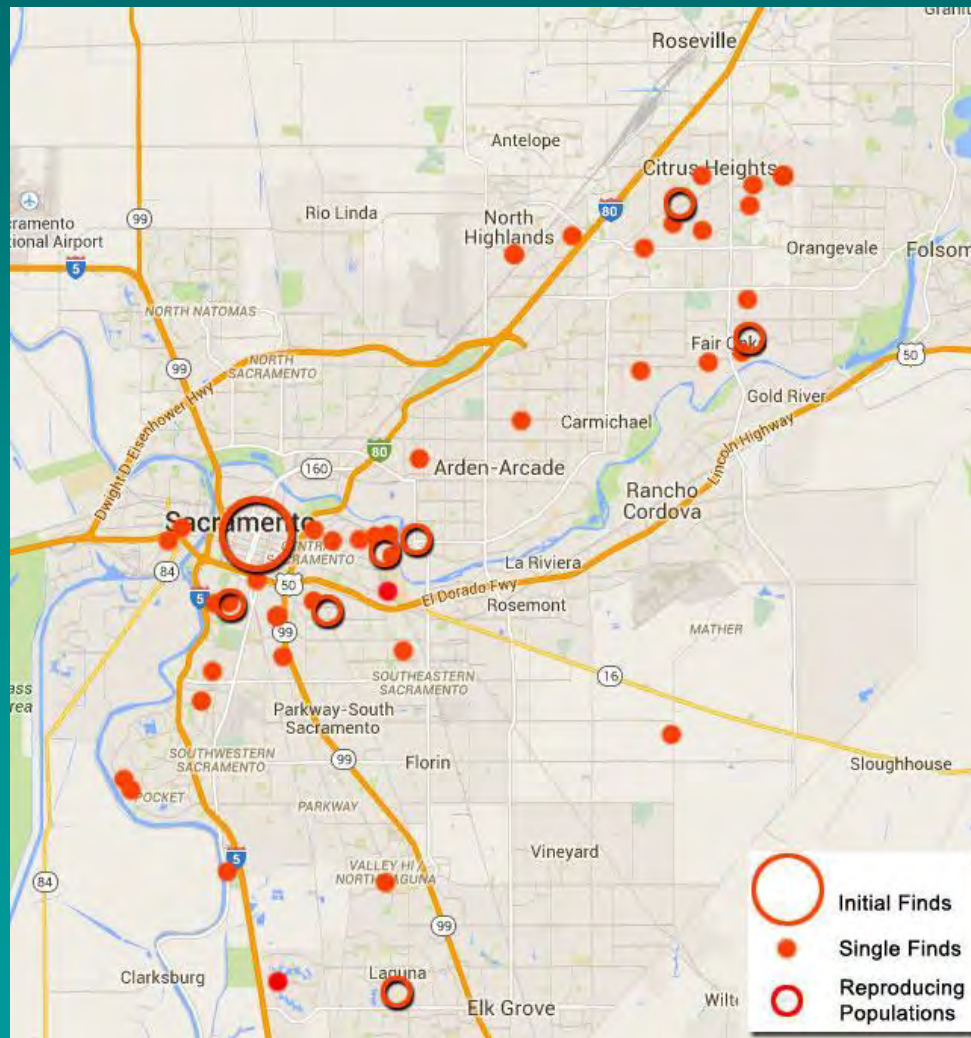


Jan. 1, 2015



# BMSB Finds

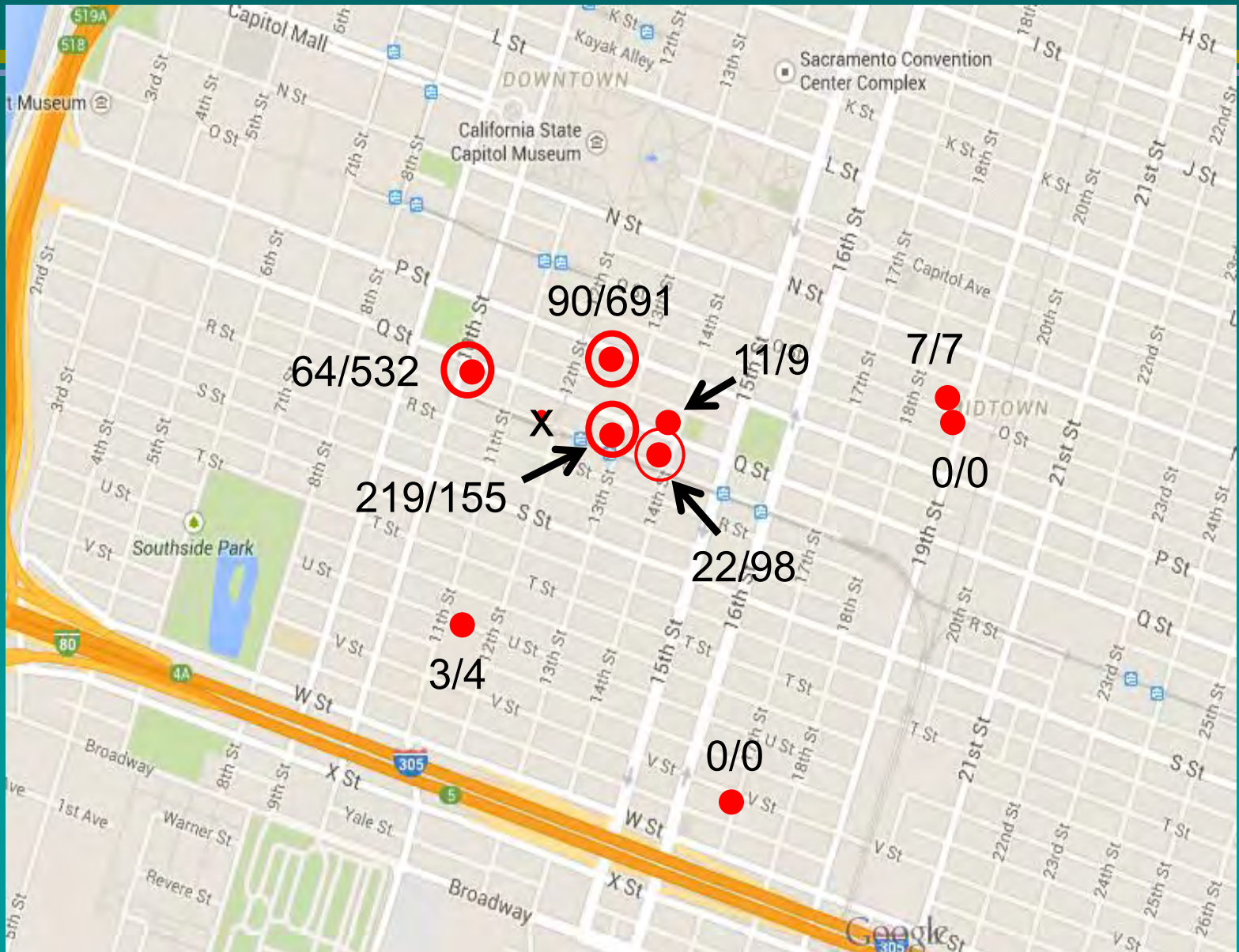
Sacramento County – Jan. 1, 2016





# 2014 Trap Locations & Counts

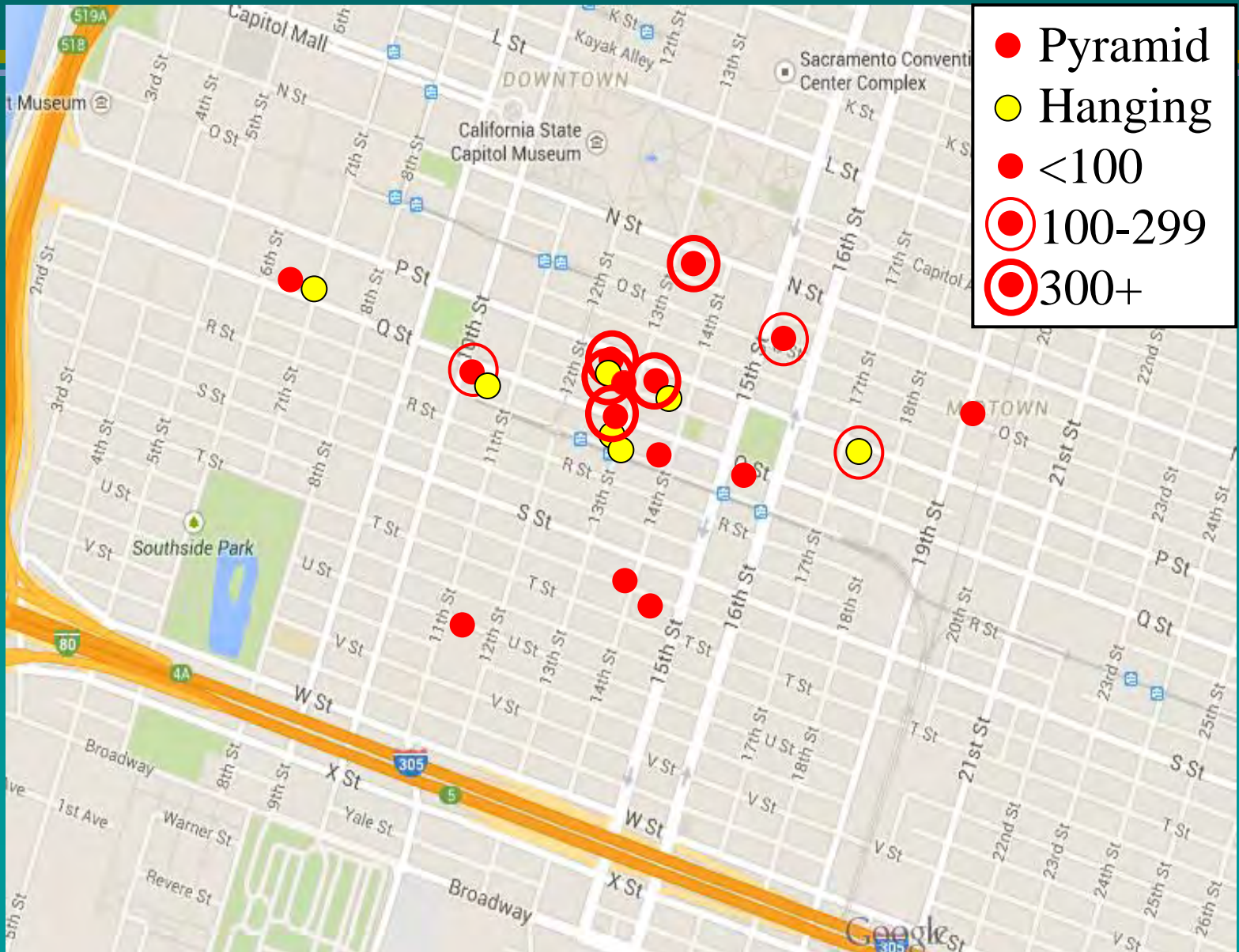
## Adults/Nymphs





# 2015 Trap Locations & Counts

## Total Number of BMSB Trapped



# Traps Used in Sacramento Monitoring 2015

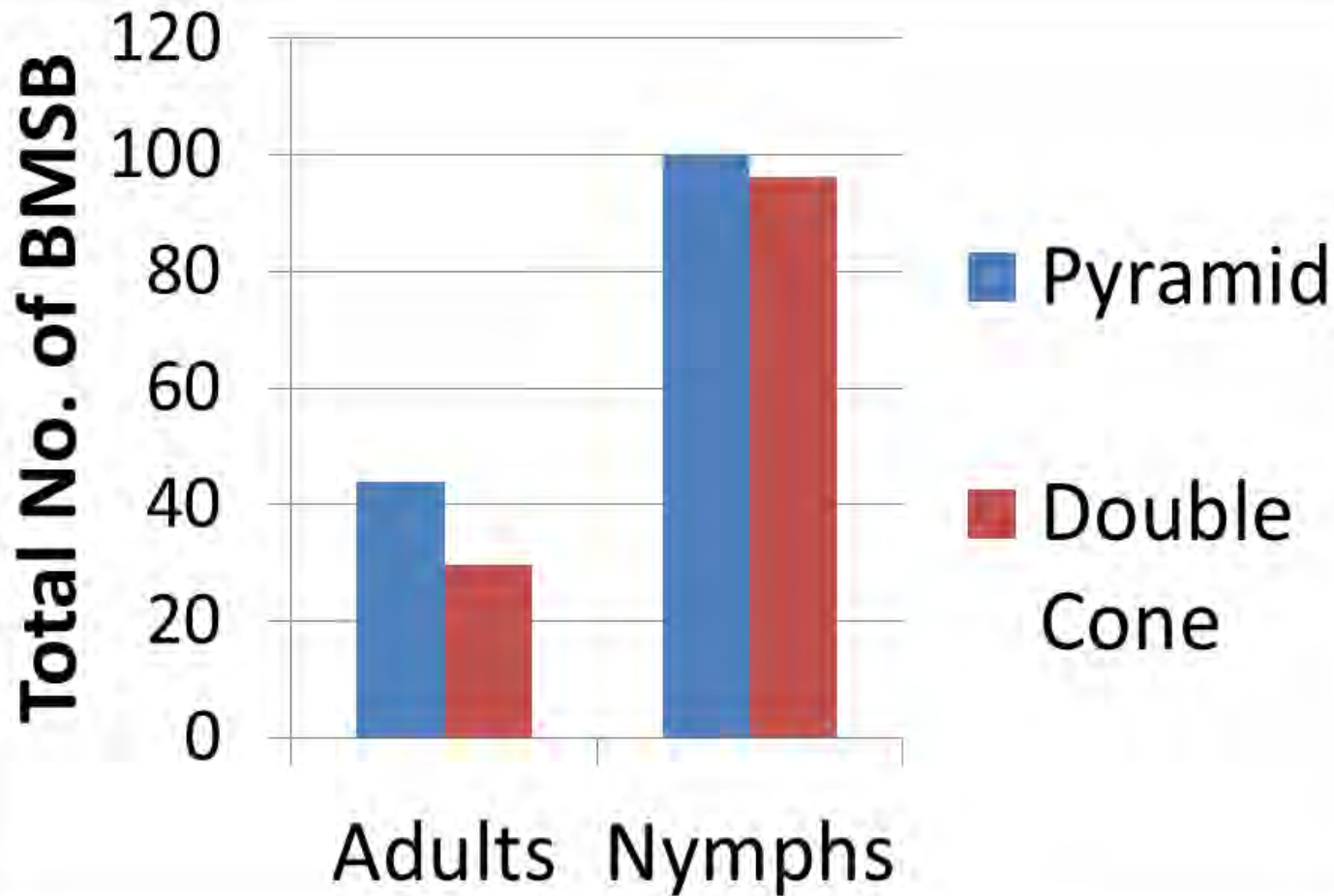
AgBio  
Pyramid Trap



Double Cone  
(1-gal.)



# 2015 Avg. Seasonal Trap Counts Pyramid vs. Double Cone

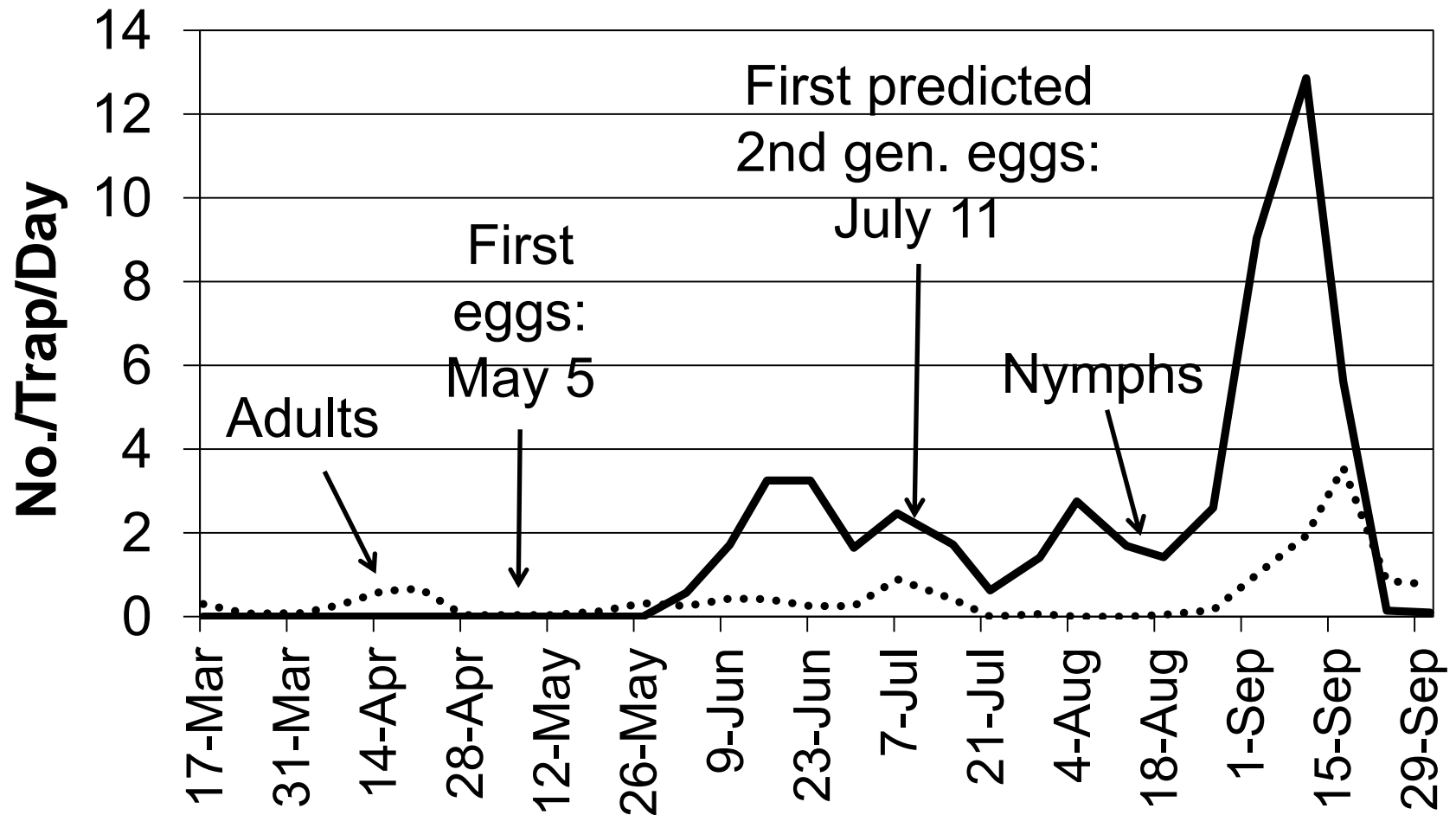


Overall:  
14% more  
in pyramid  
traps



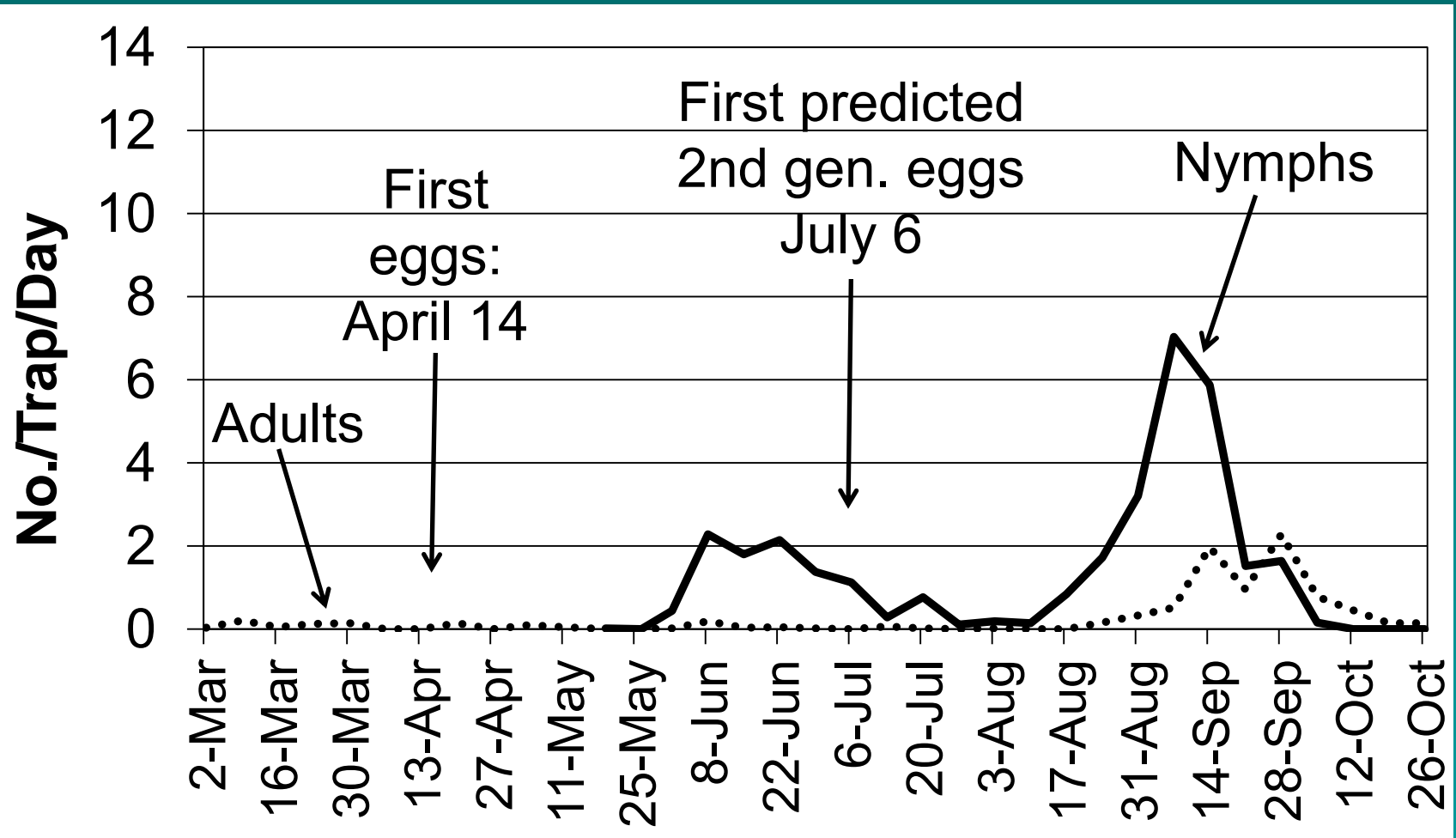


# Adults and Nymphs Trapped Avg. of 4 traps, 2014

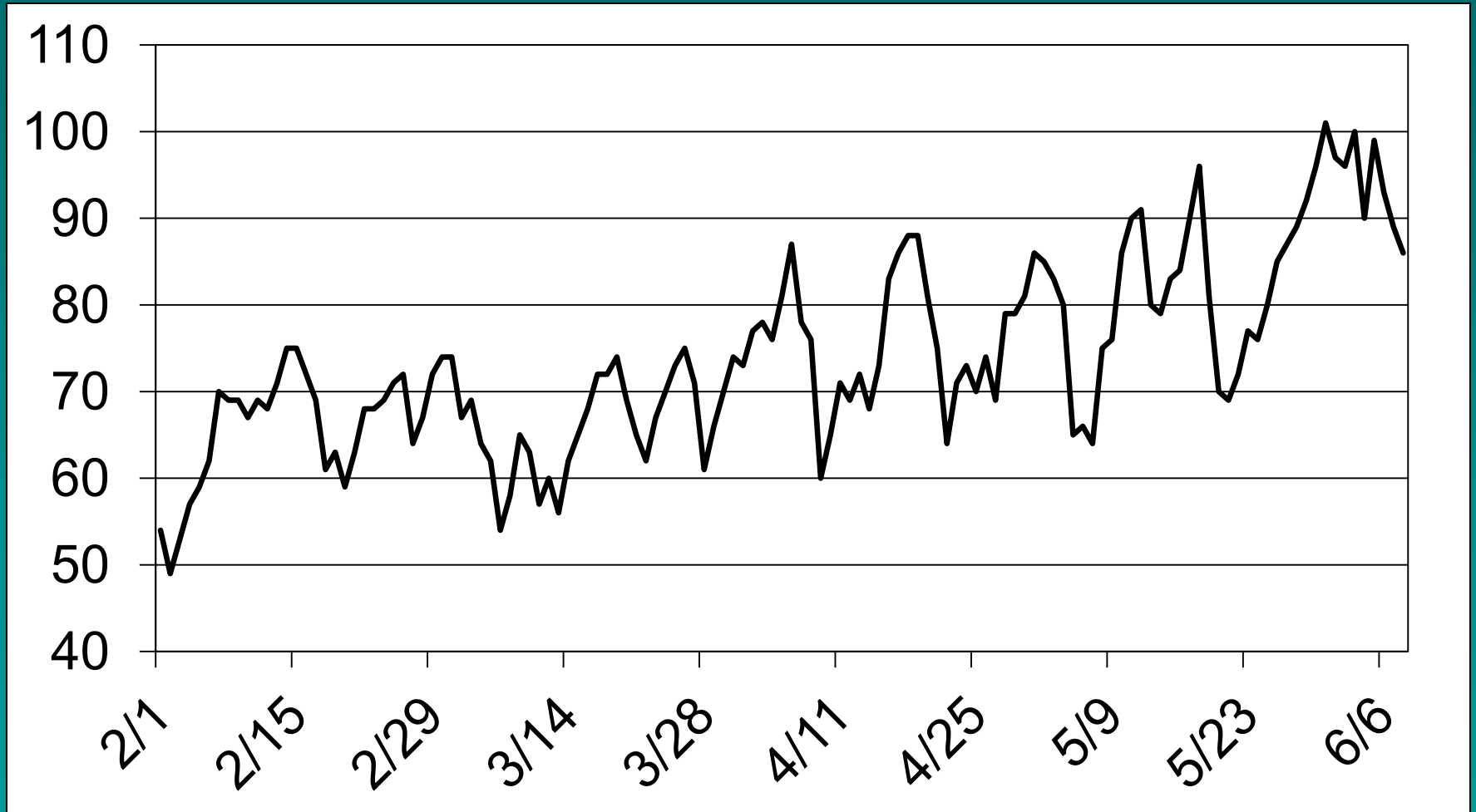


# Adults and Nymphs Trapped

Avg. of 7 traps with 100+ for season, 2015

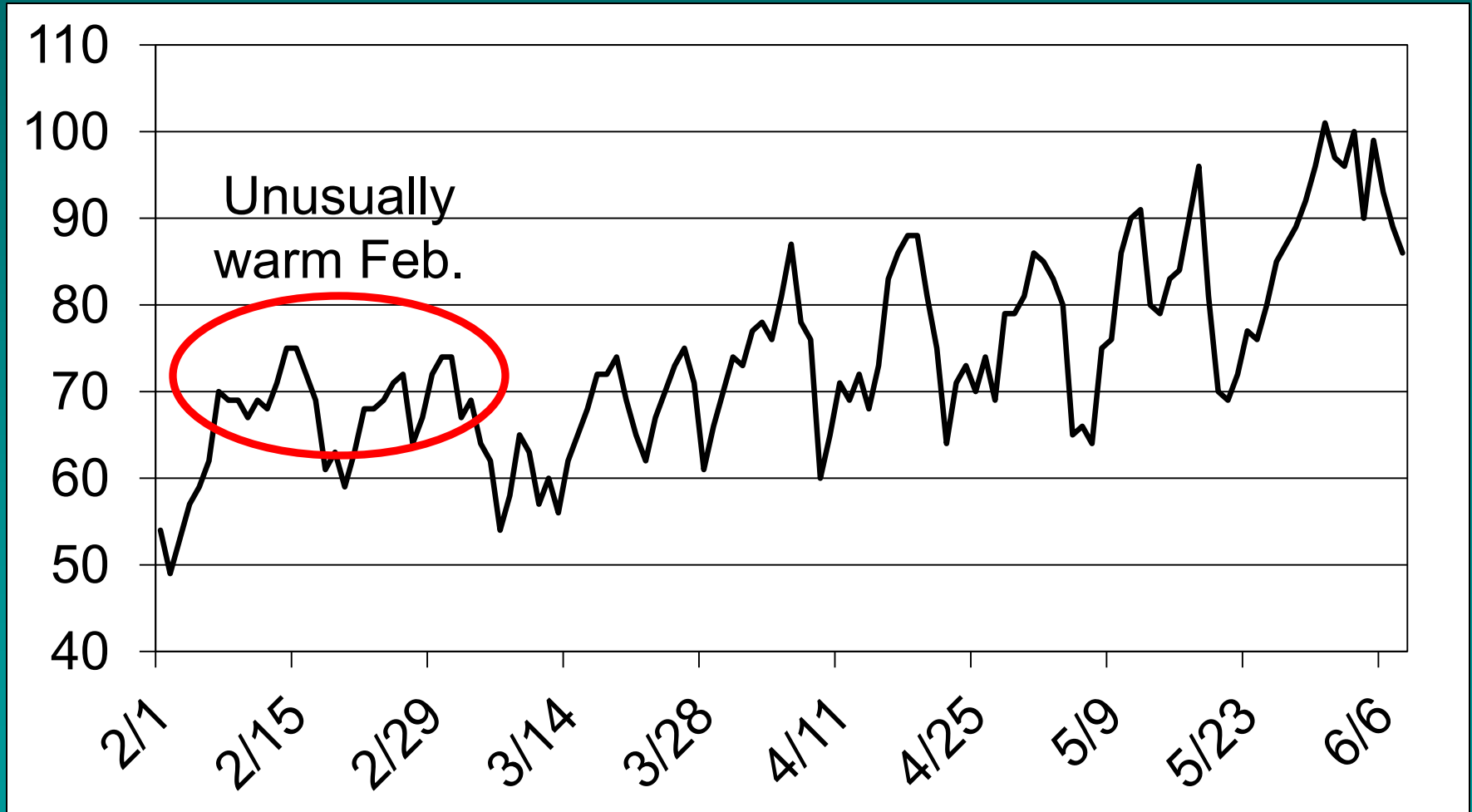


# Daily High Temperatures (°F) Sacramento, 2016

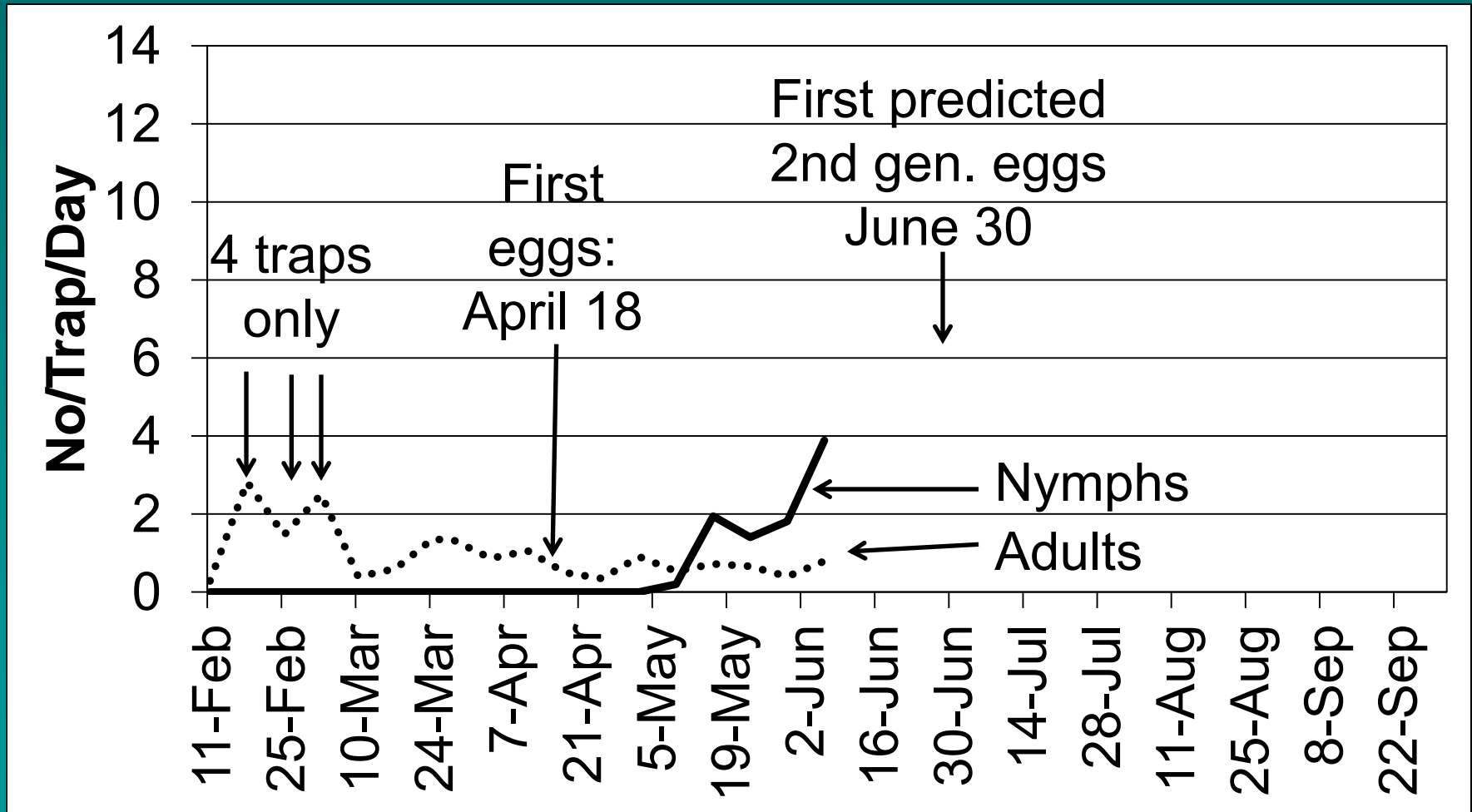




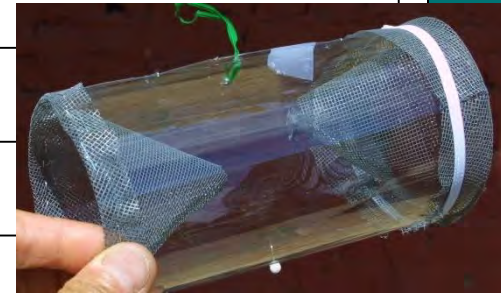
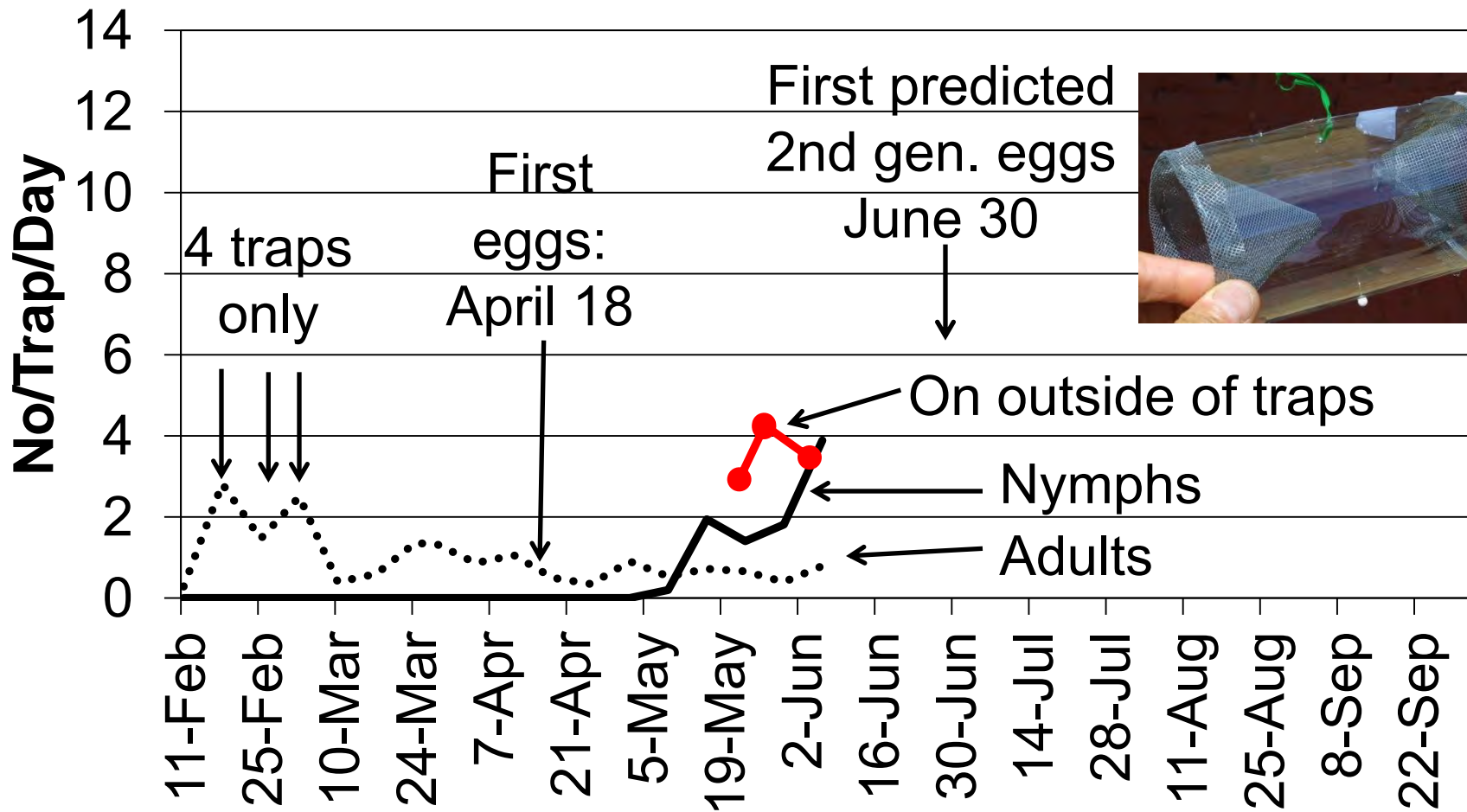
# Daily High Temperatures (°F) Sacramento, 2016



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



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





# On Apt. Wall

Feb. 25, 2016





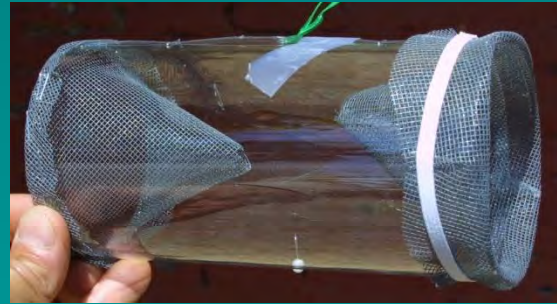
# On Apt. Wall

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



- Alpha Scents



- Rescue



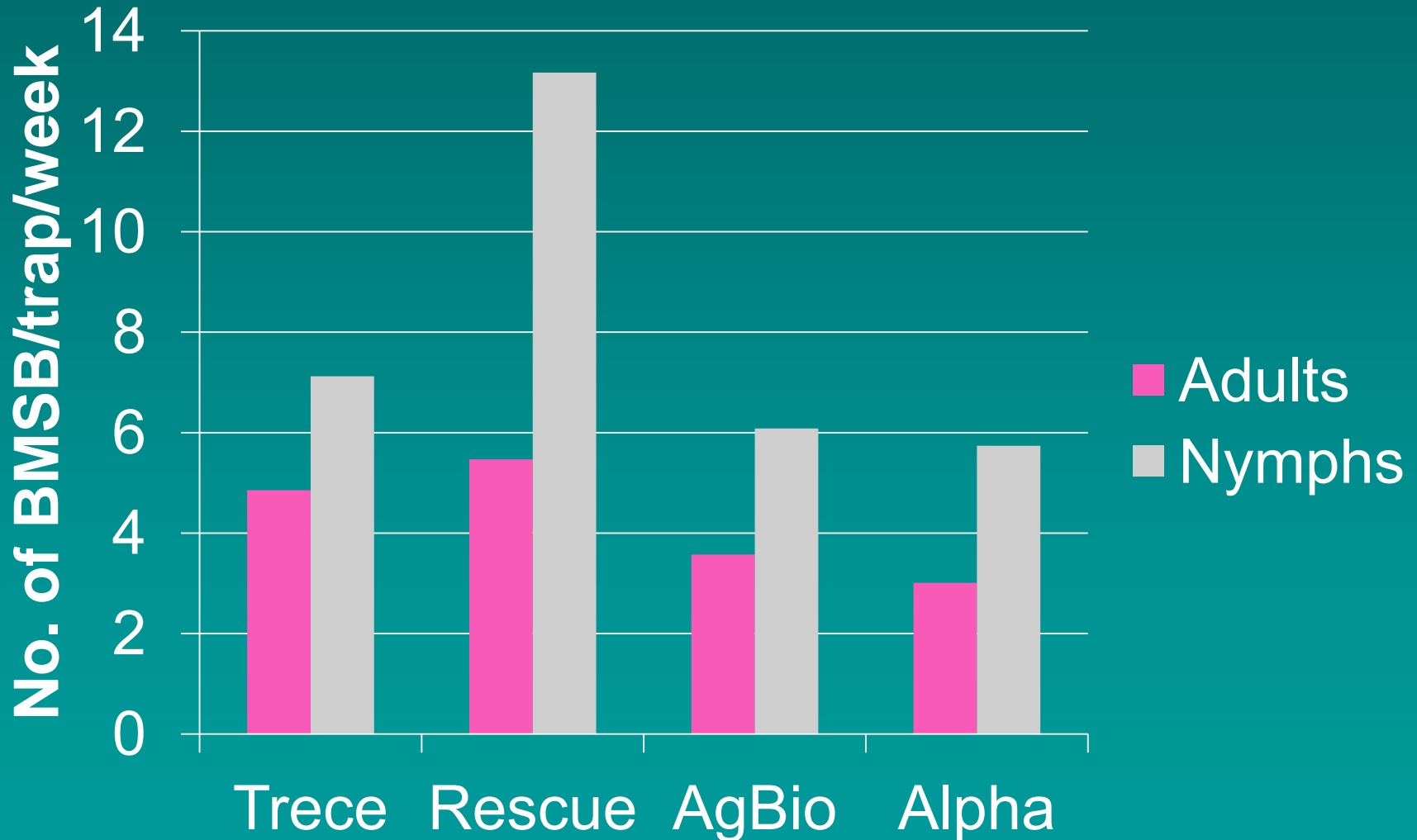
Some melted  
in sun

- AgBio Combo



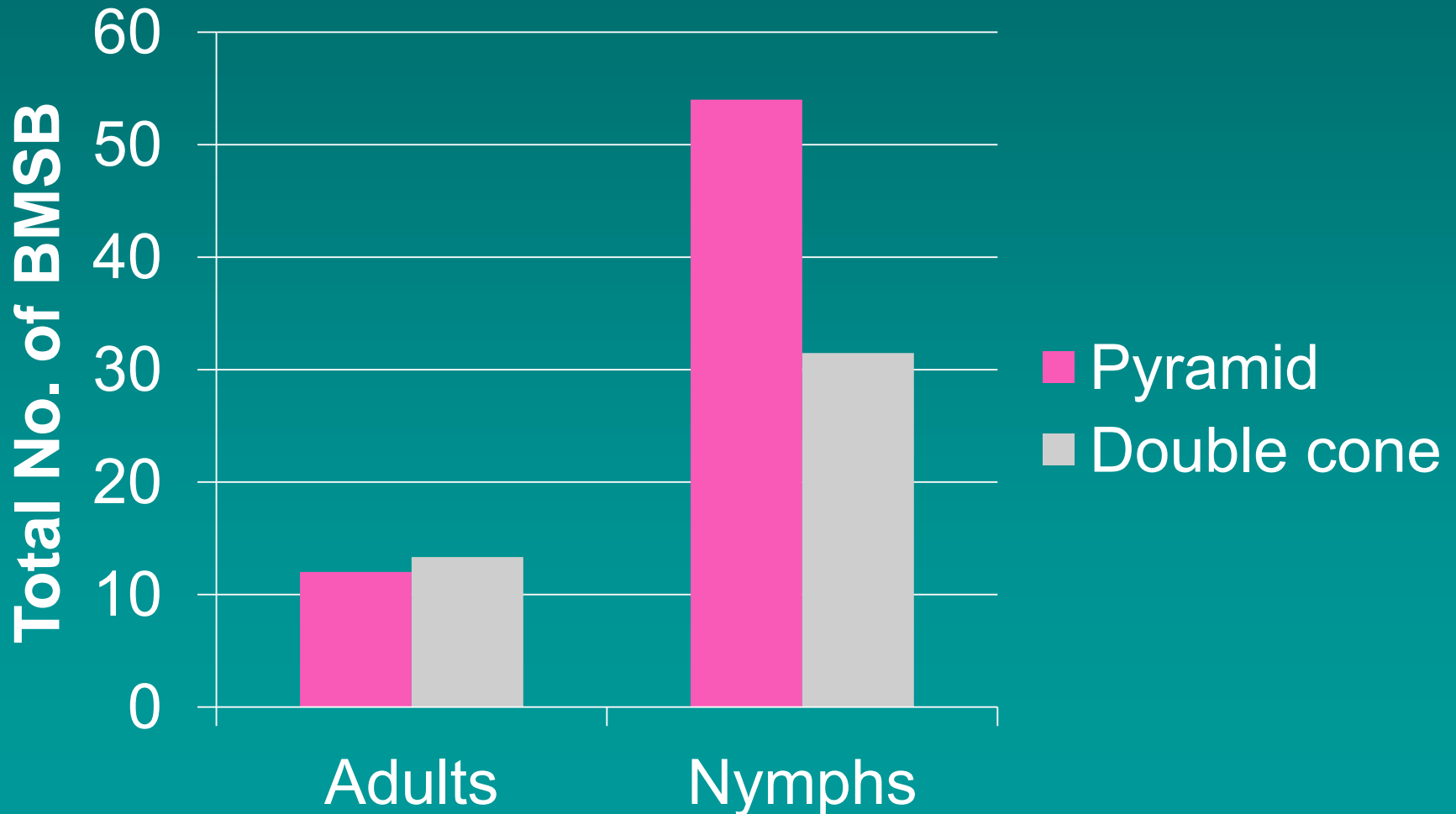
# Trap Counts by Lure Type

Sacramento, 4/18 to 6/6/2016



# Trap Counts by Trap Type

Sacramento, 4/18 to 6/6/2016





# Total No. of Carabid vs. BMSB

Sacramento, 5/2 to 6/6/16

Carabid	BMSB
0	21
1	44
5	80
2	69
3	62
3	60
5	37
5	70
21	177
2	132
8	75
9	61

Double  
cone  
traps

Pyramid  
traps



Correlation  
 $P = 0.044$   
 $R \text{ value} = 0.41$

Carabid	BMSB
1	119
2	80
4	392
1	83
0	55
3	95
2	95
12	243
0	13
1	27
2	30
1	34

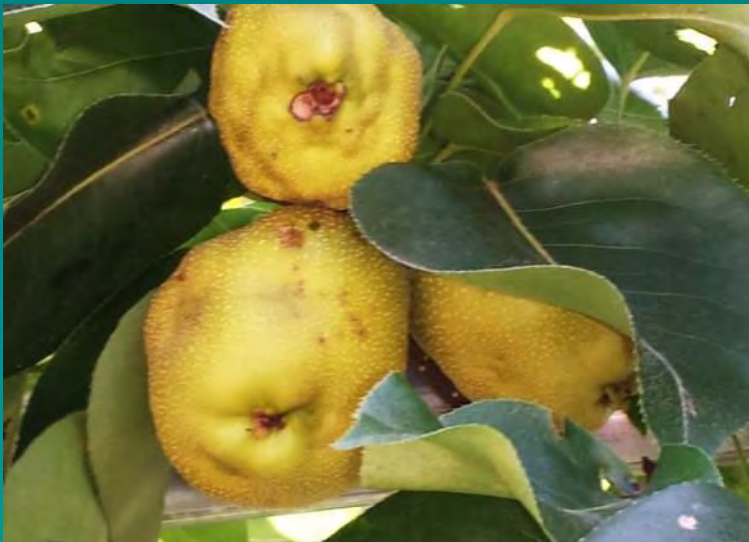
# BMSB Damage 2014



Peach, 5/22



Nectarine, 6/3



Asian pear, 7/11



Plum –  
no  
damage

# On Apples

Sept. 2015





# On Persimmons

Sept. 2015

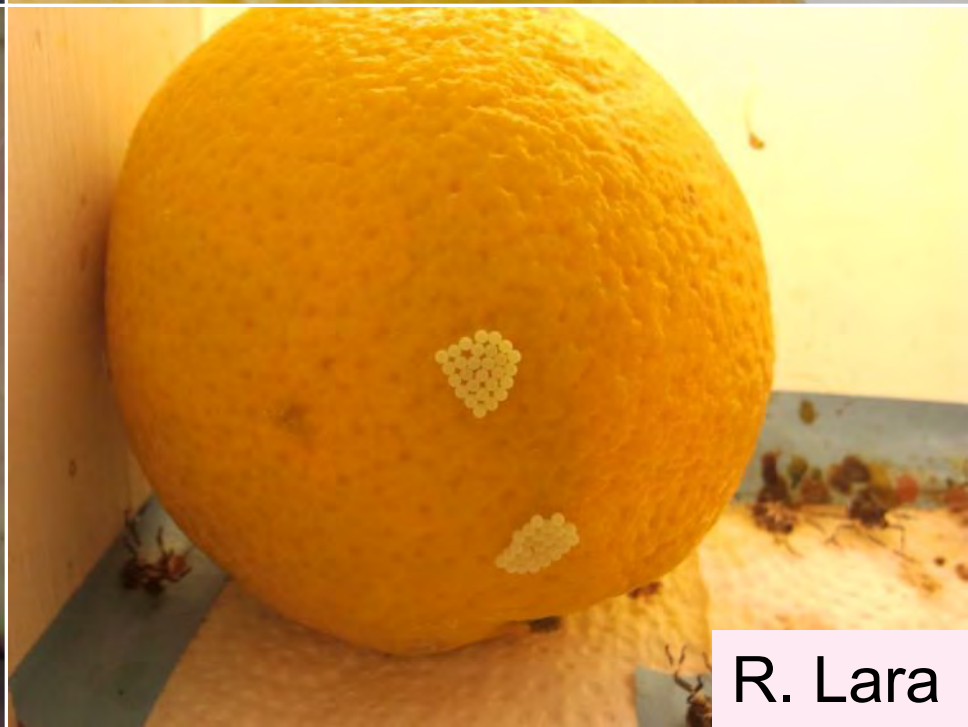


C. Ingels

# Avocados



# Citrus



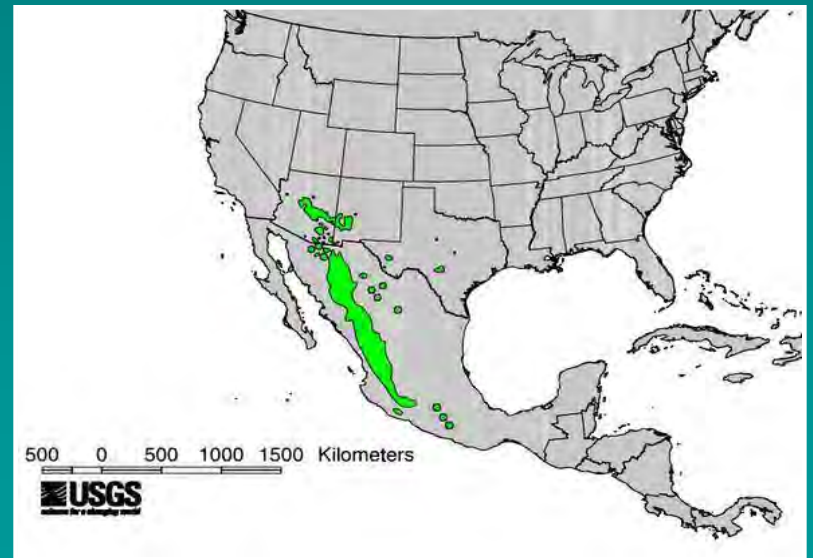


# Feeding on Cracked Citrus Sacramento, Aug. 2015





# Arizona Walnut



# Trunk Feeding and Damage

Cherry  
Sept. 2015



C. Ingels



# Trunk Feeding and Damage



Orange  
Sept. 2015



C. Ingels



# Trunk Feeding

Shamel ash  
Sept. 2015

Crape myrtle  
Sept. 2015





# Trunk Feeding

Zelkova  
Sept. 2015



C. Ingels

# Monitoring for Natural Enemies

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Charlie Pickett

Calif. Department of Food & Agriculture

# Predacious Ground Beetle (Carabidae: *Laemostenus complanatus*)





# Astata sp. Dragging BMSB into Nest Sacramento, 2015



**26 AUG 15 11:07 AM**



**26 AUG 15 11:08 AM**

Photos: Ryan Fernandez

# Rat eating BMSB eggs on sentinel card

Sacramento, October 2015

Imaging by M. Stadtherr (CDFFA)



# BMSB Parasitoid Testing



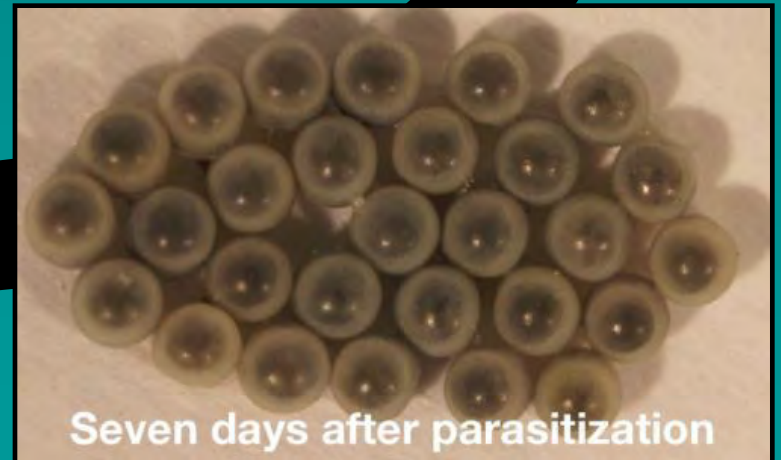
Ricky Lara

Dept. of Entomology, UC Riverside





## BMSB Egg-Parasitoid Life Cycle



Seven days after parasitization



Approx. three weeks after parasitization (20°C)



*Agonoscelis puberula*



*Antheminia remota*



*Bagrada hilaris*



*Banasa dimiata*



*Chlorochroa uhleri*



*Mecidea sp.*



*Nezara viridula*



*Podisus maculiventris*



*Thyanta pallidovirens*

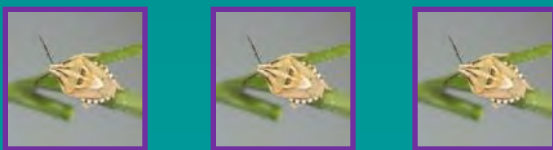


# No Choice Tests

Non-Target + *T. japonicus*

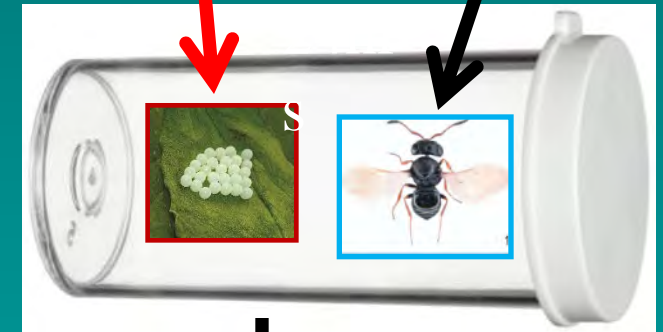


daily observations



Ideally, no parasitism

BMSB + *T. japonicus*



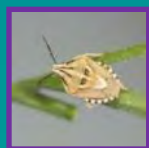
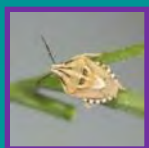
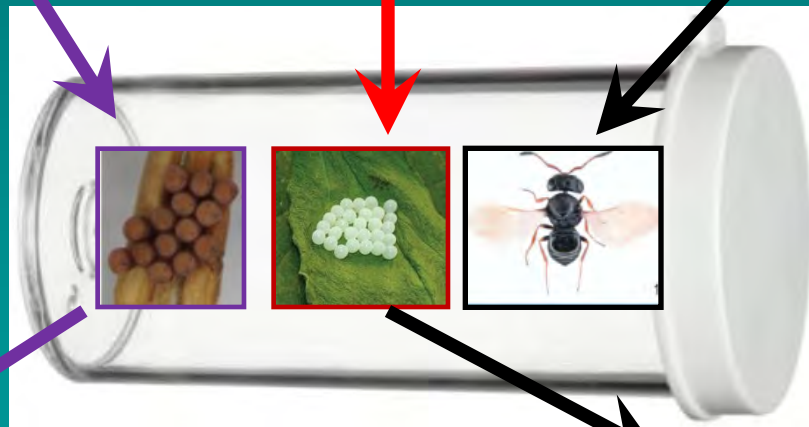
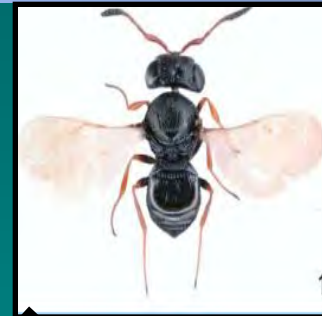
daily observ.



Only parasitoids emerge!



# Choice Tests



Ideally, no parasitism



Only parasitoids emerge!

**Empress Tree**



**Walnut**



**Tree of Heaven**



**Citrus**





# What attacks BMSB in CA?

doi: 10.3897/JHR.43.8560

<http://jhr.pensoft.net>

MONOGRAPH



Hymenoptera  
RESEARCH

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

Elijah J. Talamas<sup>1</sup>, Norman F. Johnson<sup>2</sup>, Matthew Buffington<sup>1</sup>

<sup>1</sup> Systematic Entomology Laboratory, USDA/ARS c/o NMNH, Smithsonian Institution, Washington DC, USA

<sup>2</sup> Department of Evolution, Ecology and Organismal Biology, The Ohio State University, Columbus, OH 43212, USA

Corresponding author: *Elijah J. Talamas* ([elijah.talamas@ars.usda.gov](mailto:elijah.talamas@ars.usda.gov))

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

<http://zoobank.org/400CDA04-5BB0-4653-9A87-535B5CA22D0C>

**Citation:** Talamas EJ, Johnson NF, Buffington M (2015) Key to Nearctic species of *Trissolcus* Ashmead (Hymenoptera, Scelionidae), natural enemies of native and invasive stink bugs (Hemiptera, Pentatomidae). *Journal of Hymenoptera Research* 43: 45–110. doi: 10.3897/JHR.43.8560

# *Trissolcus japonicus*



# *Trissolcus euschisti*



# *Anastatus pearsalli*





# Acknowledgments

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Calif. funding has been provided by:

CDFA Specialty Crop Block Grant Program

Pear Pest Management Research Fund

USDA Farm Bill (Section 10007)

California Pistachio Research Board

Consolidated Central Valley Table Grape Pest  
and Disease Control District

# Questions?

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## California BMSB Web Sites

[ucipm.ucdavis.edu](http://ucipm.ucdavis.edu)

[cisr.ucr.edu/brown\\_marmorated\\_stinkbug.html](http://cisr.ucr.edu/brown_marmorated_stinkbug.html)

[cesacramento.ucanr.edu](http://cesacramento.ucanr.edu)