

BMSB in Western Region California's and Utah's Increasing Concerns

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University



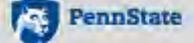
Funding

 **USDA** United States Department of Agriculture National Institute of Food and Agriculture
Specialty Crop Research Initiative

Collaborating Institutions

 **OSU** Oregon State University

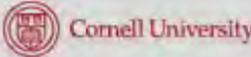
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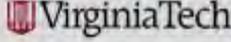
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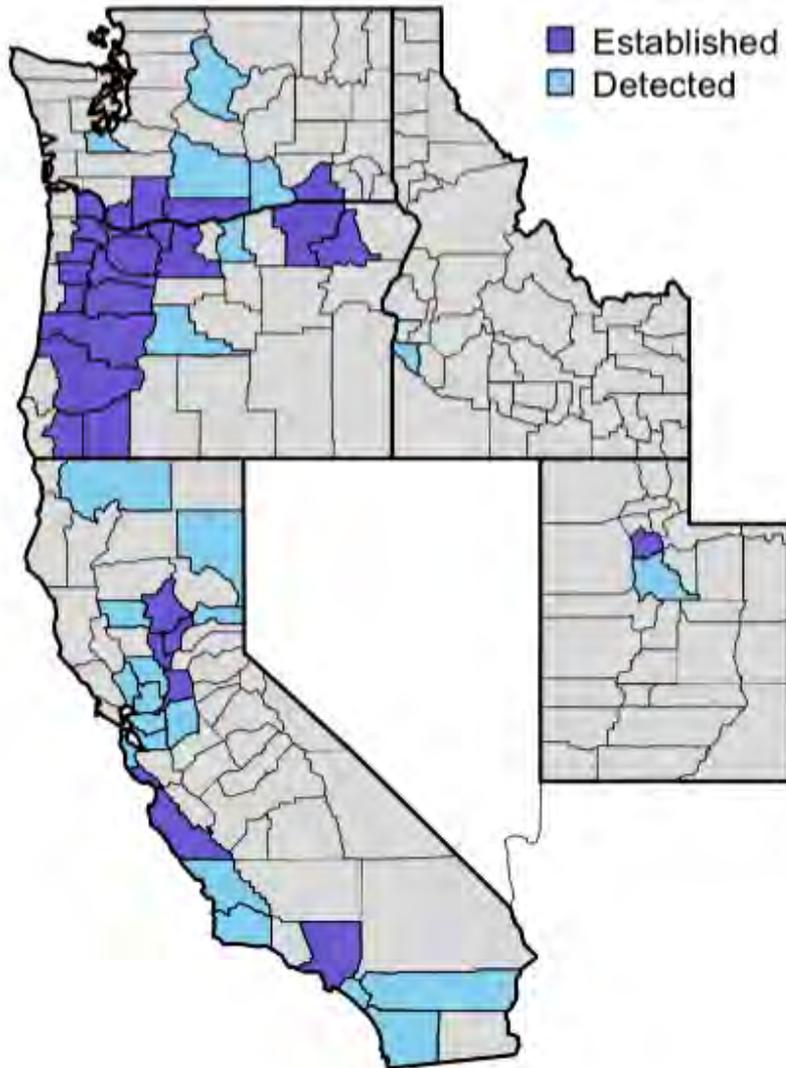
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This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Specialty Crop Research Initiative under award number 2016-51181-25409.

BMSB in Western Region



California:

Frank Zalom (UCD), Mark Hoddle (UCR), Jhalendra Rijal (UCCE Areawide IPM), Emily Symmes (UCCE Areawide IPM), Chuck Ingels (UCCE Sacramento Co.), Monica Cooper (UCCE Napa Co.)

Utah:

Lori Spears (Utah State Univ.)

BMSB in California



>\$50 billion

Top agricultural counties are in the Central Valley, other valuable crops throughout the state

Almonds (\$5.8 B)

Grapes (\$5.2 B)

Walnuts (\$1.8 B)

Pistachios (\$1.6 B)

Oranges (\$950 M)

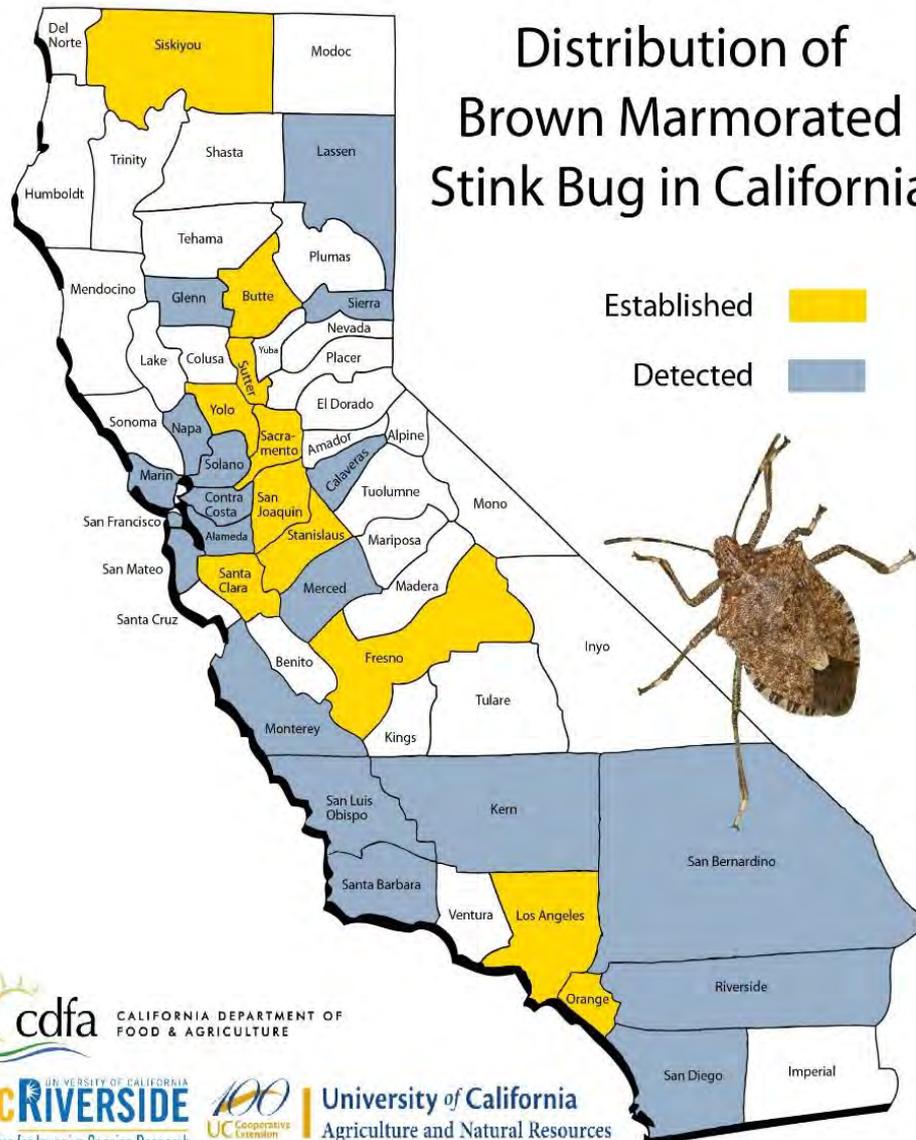
Peaches (\$356 M)

Kiwifruit (\$32 M)

2014 summary (CDFA)

BMSB in California

Distribution of Brown Marmorated Stink Bug in California



>\$50 billion
Top agricultural counties are in the Central Valley, other valuable crops throughout the state

Almonds (\$5.8 B)

Grapes (\$5.2 B)

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Pistachios (\$1.6 B)

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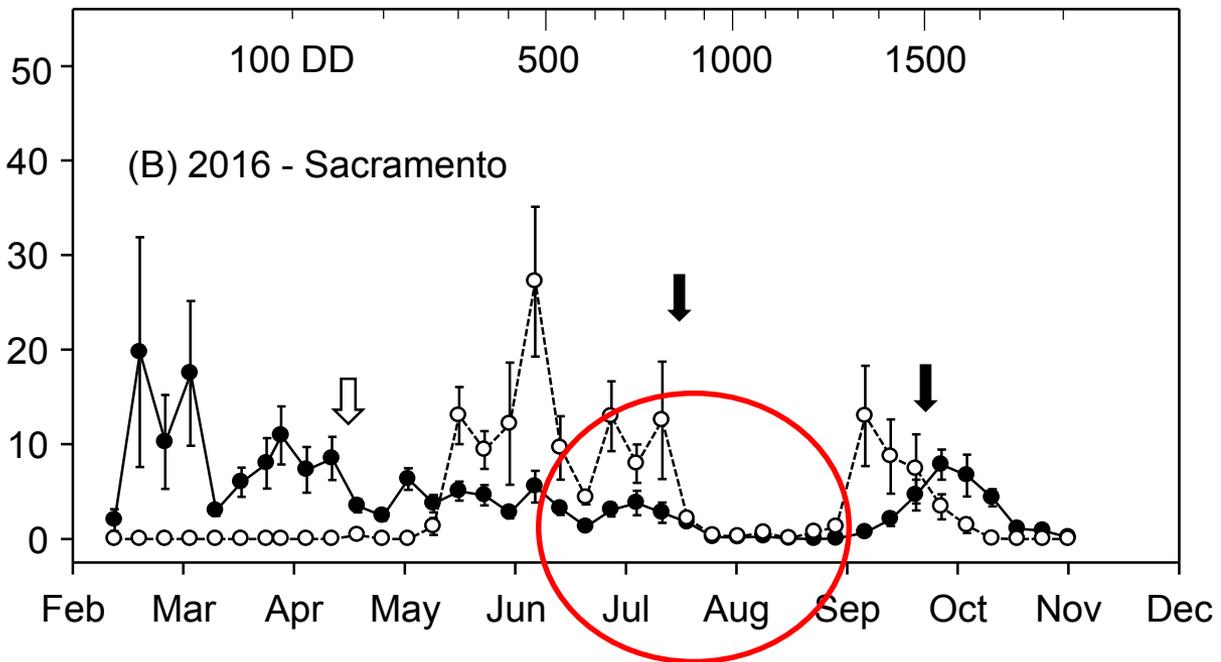
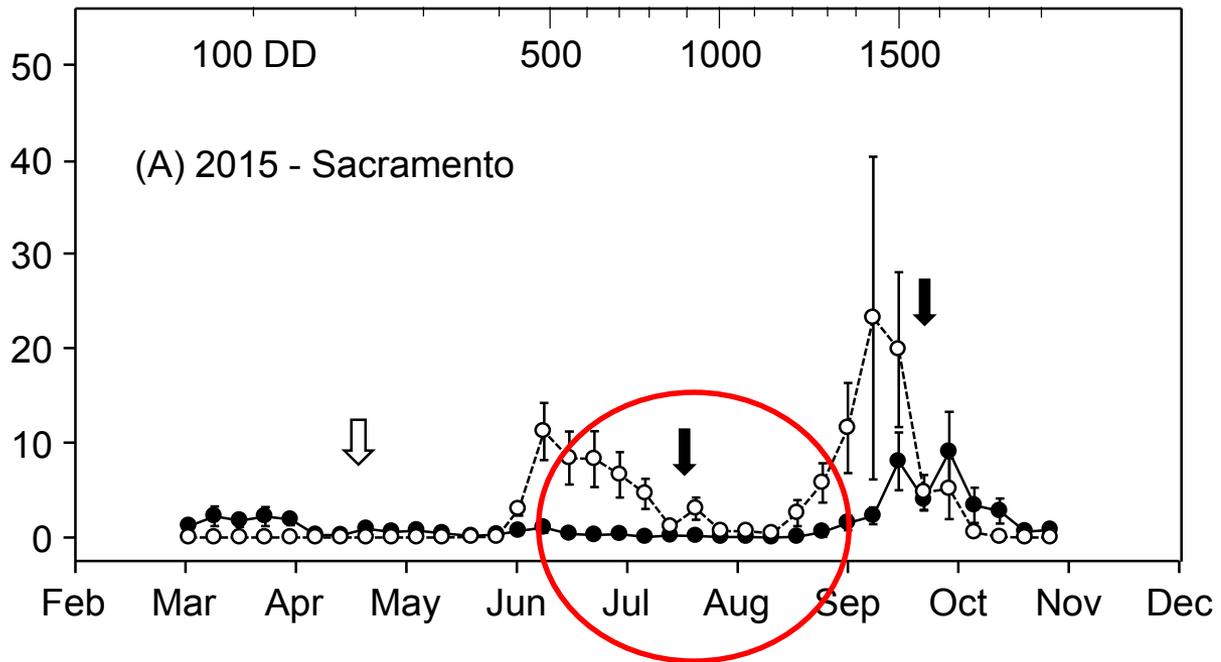
BMSB in California – Urban Areas

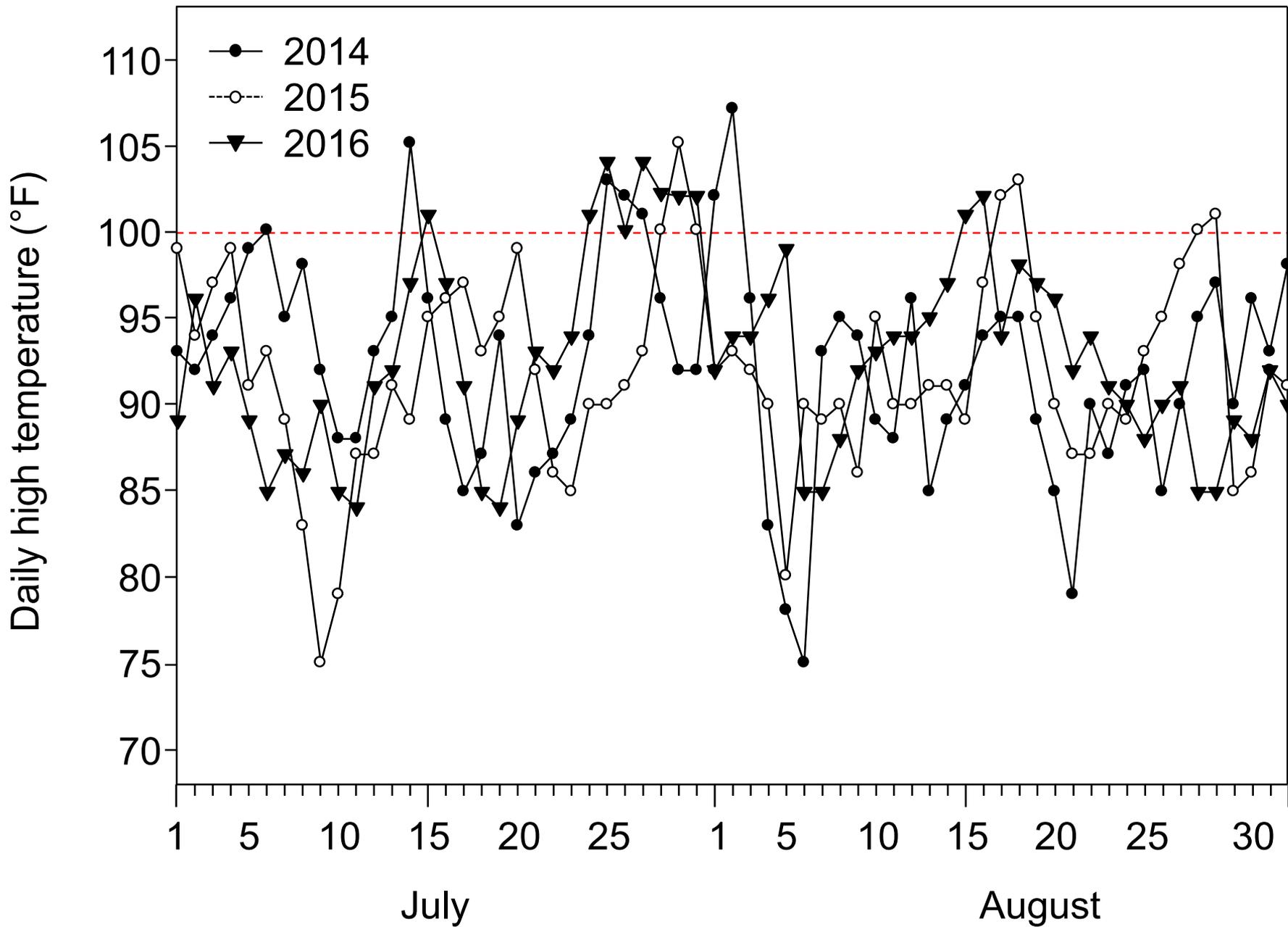


In California, early BMSB finds were in urban areas (Los Angeles, San Jose, and Sacramento), and found in gardens and on landscape trees (e.g., tree of heaven).



BMSB per trap per week (average \pm SEM)



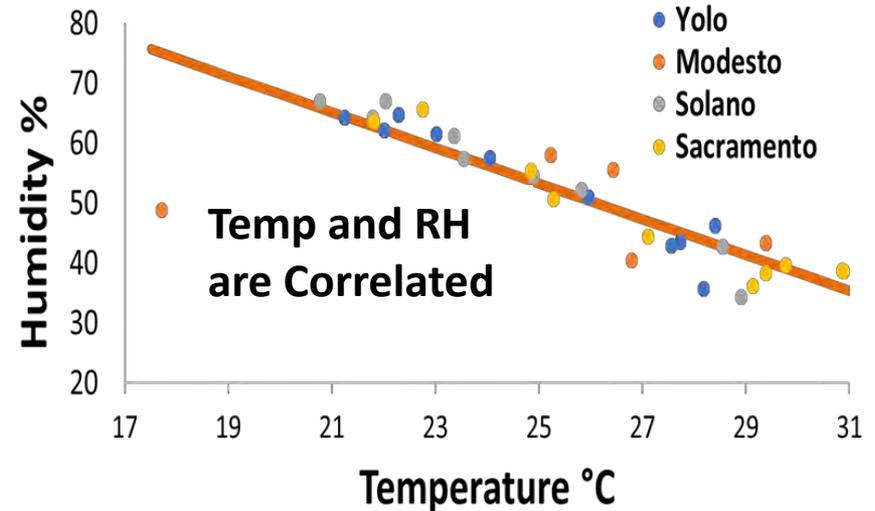


Impact of temperature and humidity on BMSB in the Central Valley

Joanna Fisher, Frank Zalom, Jhalendra Rijal, Chuck Ingels

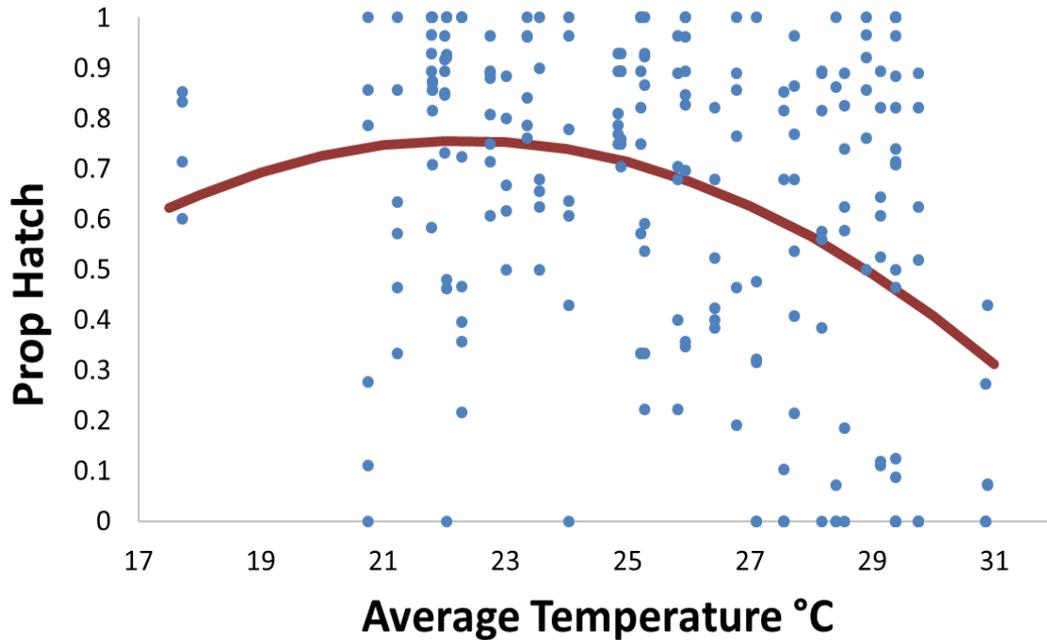
1) Summer 2017 Field Study

- Established colony and obtained regulatory permits
- At 4 sites, placed eggs in trees for 48 hr., then returned to lab
- Reared exposed eggs to 2nd instar, measured mortality



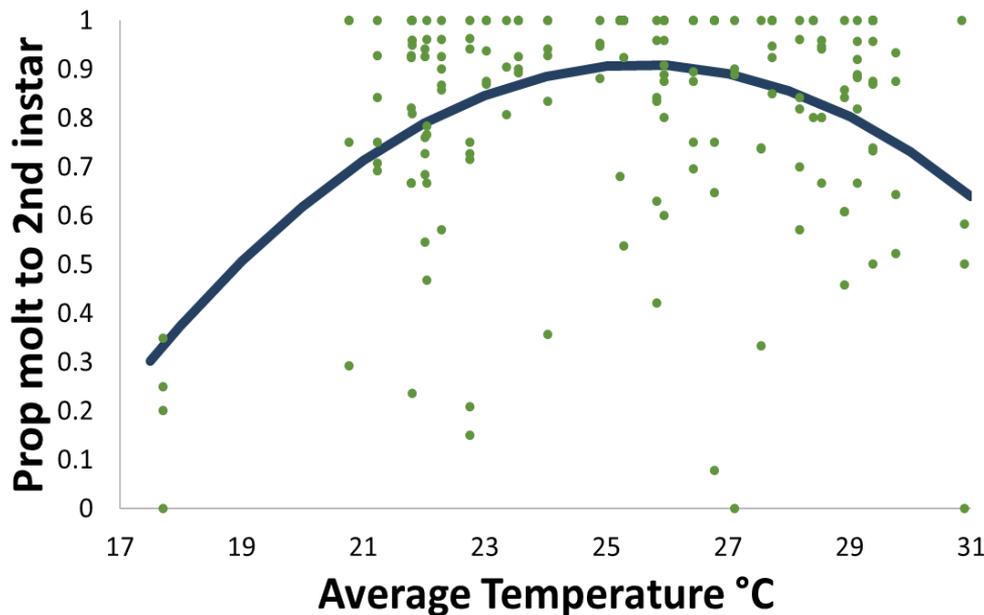
2) On-going research (2017-18)

- Lab studies to separate effects of temperature and humidity
- Field studies of BMSB egg and adult survival in different locations in California



Impact of Temperature and Humidity on BMSB

Hatch rate (Figure 1) and survival to the 2nd instar (Figure 2) decline with high temp (low RH) or low temp (high RH)



Overall finding: High temps in the Central Valley decrease BMSB egg hatch and nymph survival

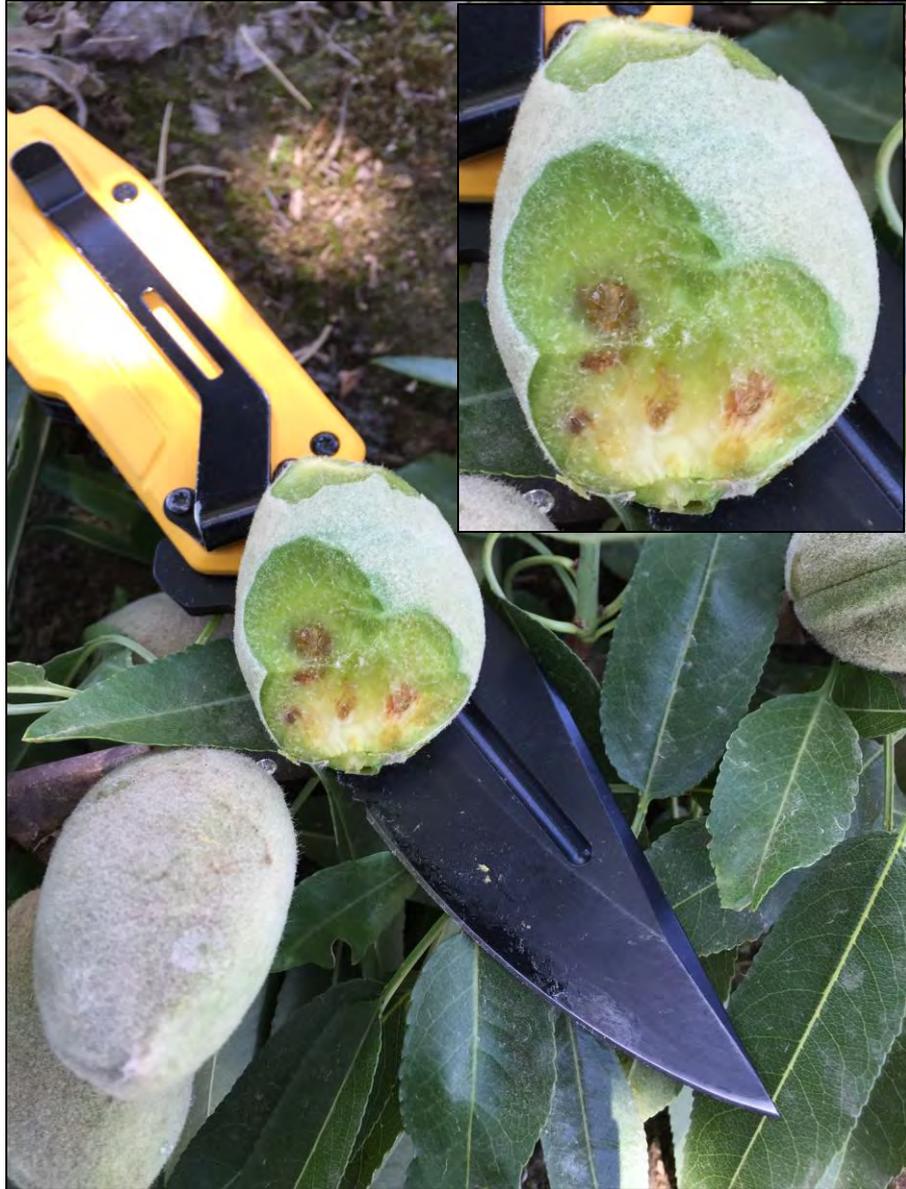
BMSB in California – Agriculture



In 2016 BMSB finds in orchards were reported, and in 2017 crop damage in peaches and almonds were found.



BMSB in California – Agriculture



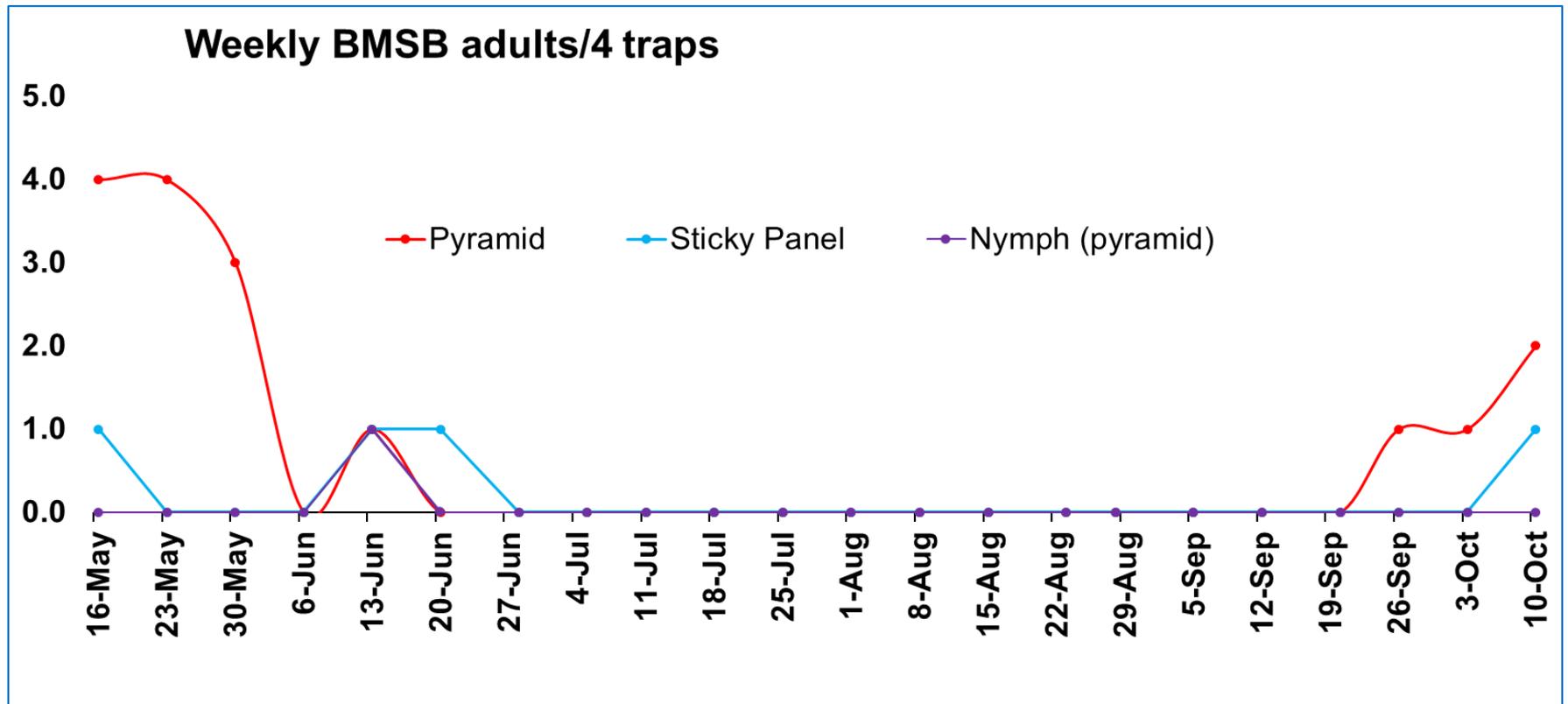
Ongoing studies:
Jhalendra Rijal, Frank Zalom

BMSB damage to almonds



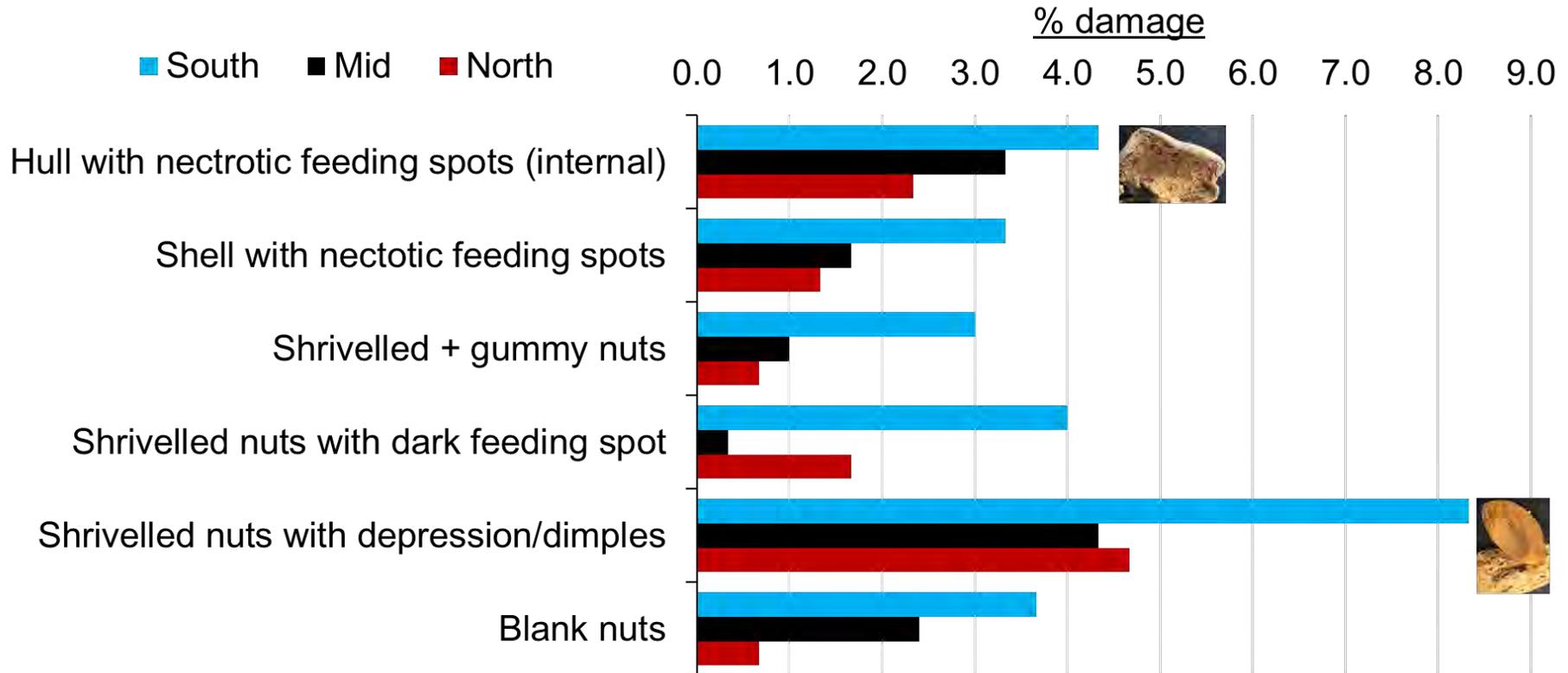
BMSB in California – Agriculture

Almond – BMSB adult trap counts (var. non-pareil)



BMSB in California – Agriculture

Almond - % damage at harvest (var. non-pareil)



400 nuts from each of the northern, middle, and southern portions of the orchard

BMSB in California – Agriculture

Napa – collected 0 (2015), 1 (2016) and 47 (2017)



BMSB Parasitoid Studies in California

Mark Hoddle & Jesus (Ricky) Lara

- Complement national efforts being led by Kim Hoelmer (USDA) and other lab teams
- Non-target stink bugs, including exotic and native species
- Expose *T. japonicus* to different stink bugs and categorize encounters



Agonoscelis



Antheminia



Bagrada



Banasa



Chlorochroa



Mecidea



Nezara



Podisus



Thyanta

BMSB Parasitoid Studies in California



Eclosed Nymphs



Dead nymph



Undeveloped Nymphs



Undeveloped Parasitoids

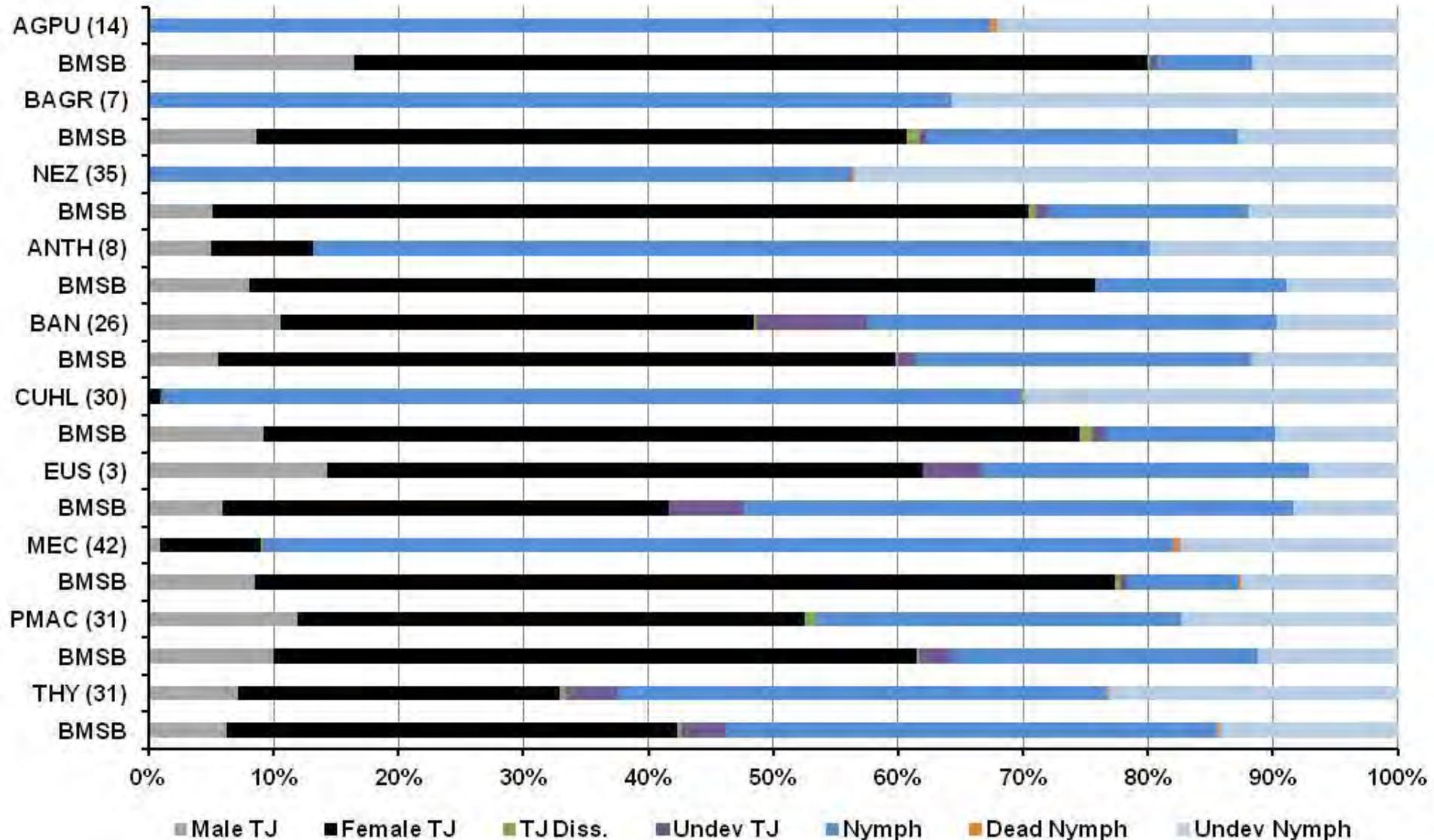


Failed Adult Emergences



Eclosed Parasitoids

BMSB Parasitoid Studies in California



BMSB in Utah

Diane Alston, Lori Spears,
Cody Holthouse*, Zach
Schumm* & Cami Cannon**

Utah State University

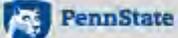
- *Graduate students, **Vegetable IPM Associate



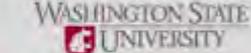
Funding

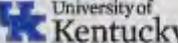
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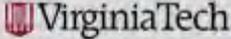
Collaborating Institutions

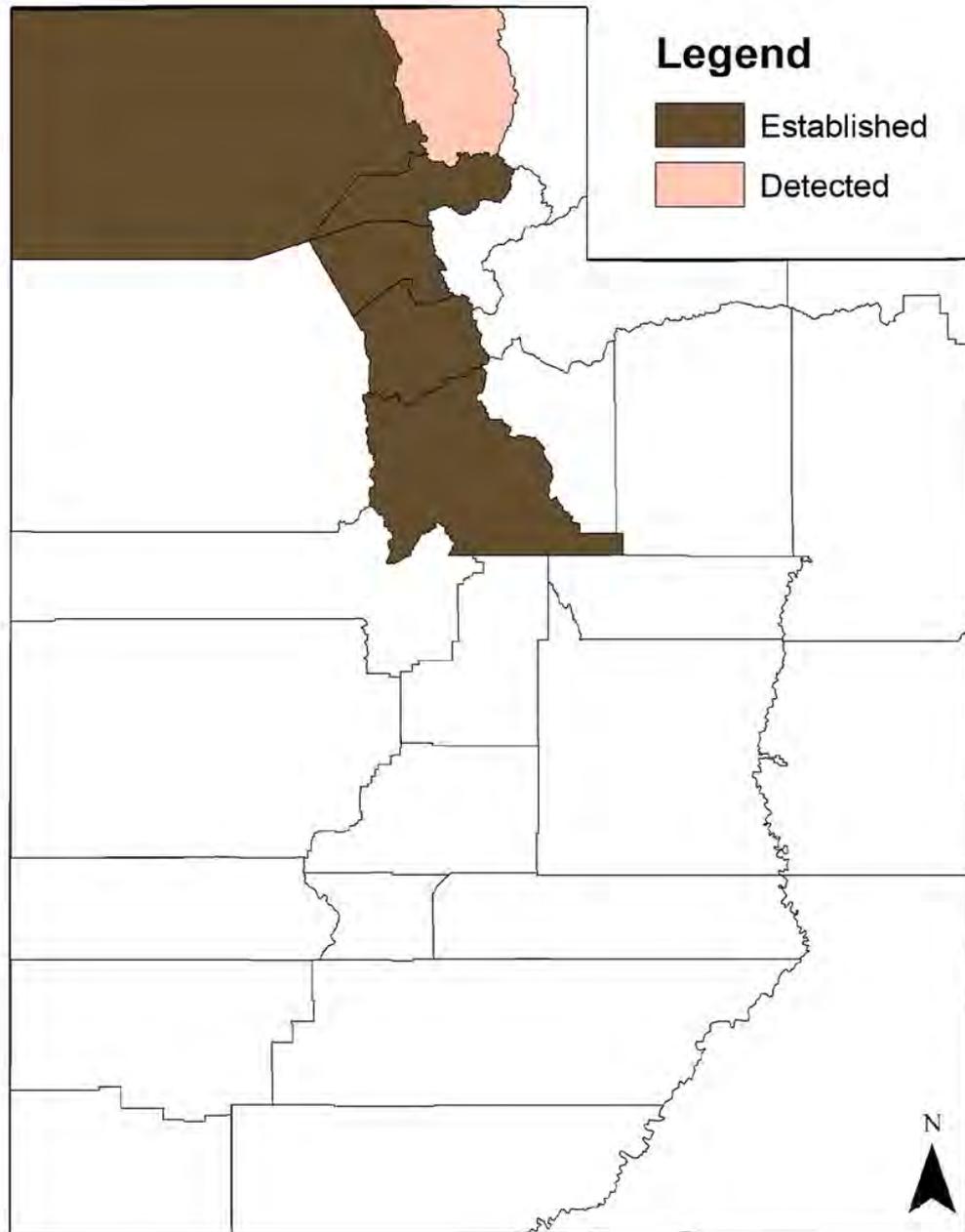
  

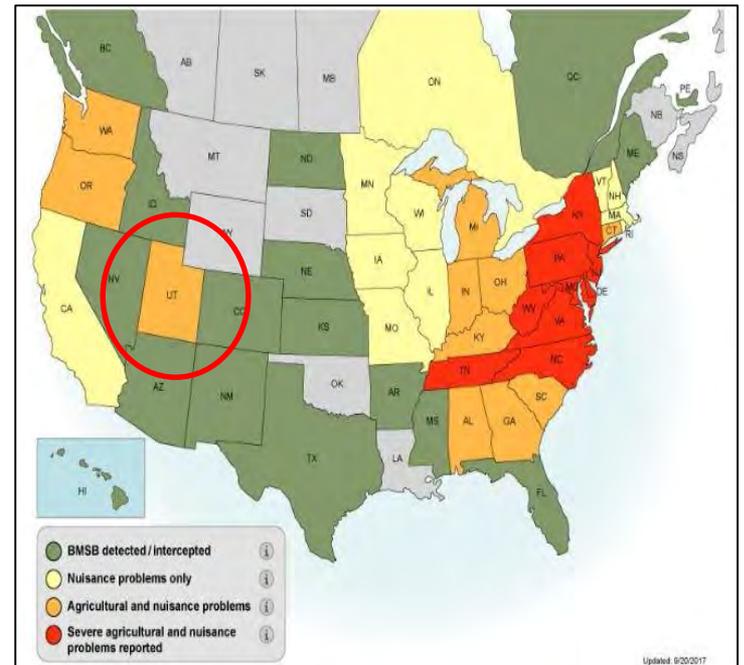
  

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Utah BMSB Distribution by County

6 counties: Cache (USU, Logan – detection only), Box Elder, Weber, Davis, Salt Lake, Utah



CROP DAMAGE (1ST CONFIRMATION)

2017: First detection of agricultural economic damage

Peach



Commercial &
Small-scale Orchards,
Multiple Counties

Apple



Popcorn

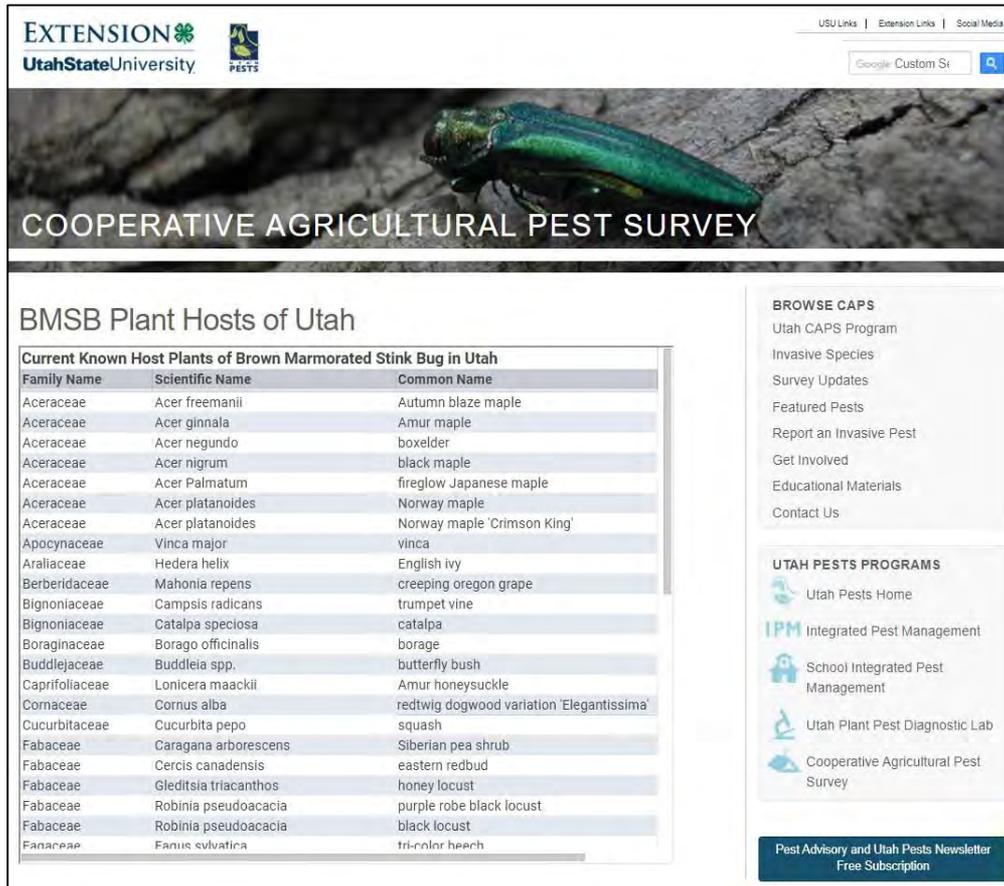


Community Garden,
Salt Lake City

Squash



BMSB in Utah: Host Plant Use



EXTENSION Utah State University PESTS

USU Links | Extension Links | Social Media

Google Custom Search

COOPERATIVE AGRICULTURAL PEST SURVEY

BMSB Plant Hosts of Utah

Current Known Host Plants of Brown Marmorated Stink Bug in Utah

Family Name	Scientific Name	Common Name
Aceraceae	Acer freemanii	Autumn blaze maple
Aceraceae	Acer ginnala	Amur maple
Aceraceae	Acer negundo	boxelder
Aceraceae	Acer nigrum	black maple
Aceraceae	Acer Palmatum	fireglow Japanese maple
Aceraceae	Acer platanoides	Norway maple
Aceraceae	Acer platanoides	Norway maple 'Crimson King'
Apocynaceae	Vinca major	vinca
Araliaceae	Hedera helix	English ivy
Berberidaceae	Mahonia repens	creeping oregon grape
Bignoniaceae	Campsis radicans	trumpet vine
Bignoniaceae	Catalpa speciosa	catalpa
Boraginaceae	Borago officinalis	borage
Buddlejaceae	Buddleia spp.	butterfly bush
Caprifoliaceae	Lonicera maackii	Amur honeysuckle
Cornaceae	Cornus alba	redtwig dogwood variation 'Elegantissima'
Cucurbitaceae	Cucurbita pepo	squash
Fabaceae	Caragana arborescens	Siberian pea shrub
Fabaceae	Cercis canadensis	eastern redbud
Fabaceae	Gleditsia triacanthos	honey locust
Fabaceae	Robinia pseudoacacia	purple robe black locust
Fabaceae	Robinia pseudoacacia	black locust
Fanaceae	Fanus sylvatica	tri-color beech

BROWSE CAPS
 Utah CAPS Program
 Invasive Species
 Survey Updates
 Featured Pests
 Report an Invasive Pest
 Get Involved
 Educational Materials
 Contact Us

UTAH PESTS PROGRAMS
 Utah Pests Home
 IPM Integrated Pest Management
 School Integrated Pest Management
 Utah Plant Pest Diagnostic Lab
 Cooperative Agricultural Pest Survey

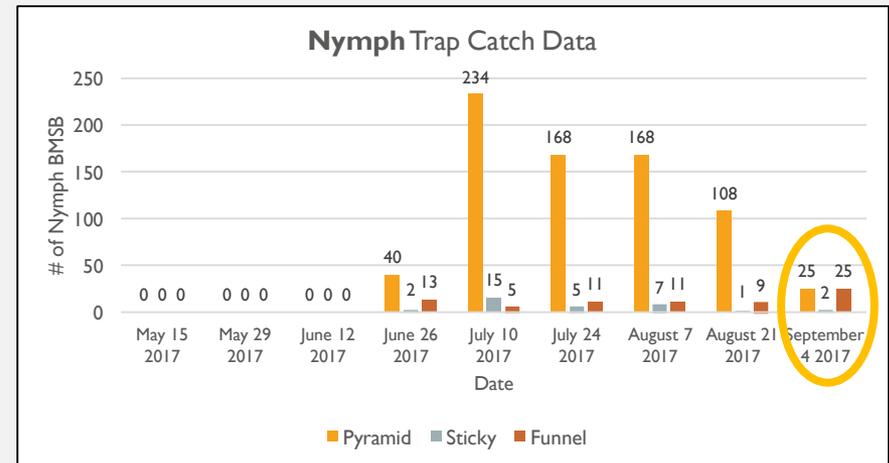
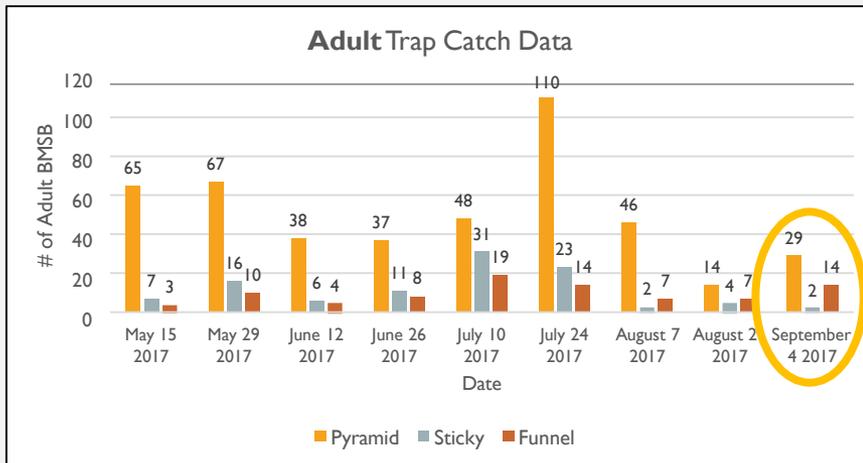
Pest Advisory and Utah Pests Newsletter
 Free Subscription

Residential surveys in 4 counties (northern UT) 49 plant species and 20 plant families.

Most common:
 Aceraceae (maple, boxelder),
 Bignoniaceae (catalpa, trumpet vine)
 Fabaceae (Siberian pea shrub, locust)
 Oleaceae (privet, lilac),
 Rosaceae (apple, cherry, plum, peach)

<https://utahpests.usu.edu/caps/bmsb-host-plants>

BMSB in Utah: Phenology / Voltinism

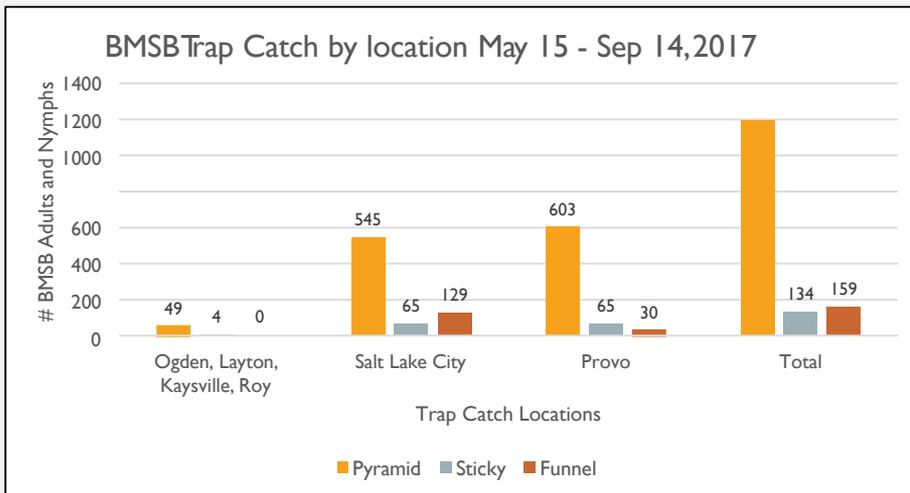


Partial 2nd generation?

High numbers of
late-instar nymphs
in the fall in
catalpa trees

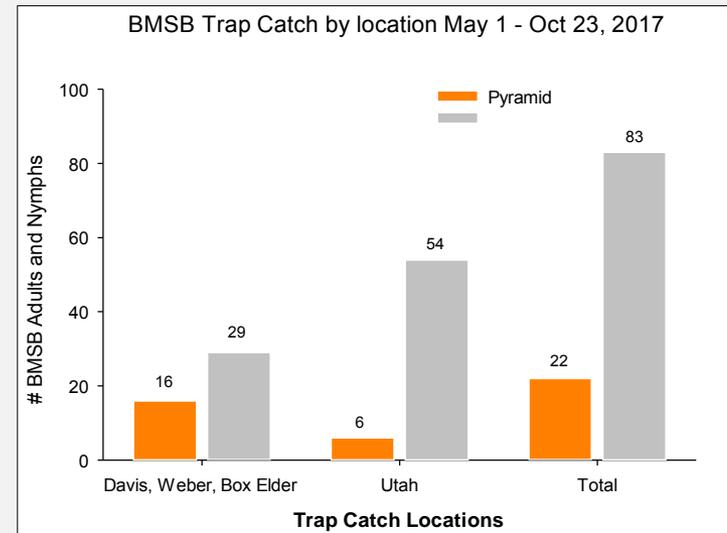
BMSB in Utah: Trap Efficiency

Residential Ornamental Sites



**Pyramid >> Dual Funnel, Dual Sticky Panel
(adults & nymphs)**

Commercial Orchard Sites



**Dual Sticky Panel >> Pyramid
(few nymphs)**

BMSB in Utah: Egg Parasitism

- **118 BMSB egg masses deployed (lab-reared) & monitored (wild)**
 - Residential & agricultural landscapes (June-September)
 - Catalpa, boxelder, Russian olive, apple, peach elderberry & corn
- **8 egg masses parasitized (6.8%)**



Anastatus mirabilis

Trissolcus sp.

T. euschisti

Killed BMSB eggs, developed & emerged



T. utahensis

Telenomus sp.

Psix tunetanus

Killed BMSB eggs, but no emergence

BMSB in Utah: Next Generation Training / Outreach

- 2 graduate & 5 undergraduate students
- 3 extension publications (invasive fruit pest guide, updated BMSB, first detector guide)
- 1 newsletter article (Utah Pests News)
- 4 conference presentations
- 5 public talks
- 1 grower field day (Utah Tree Fruit Field Day)
- 2 extension agent in-service workshops
- 9 farmers' market displays (booths with hand-outs & interactive displays)
- 1 radio broadcast (Utah Public Radio)
- 3 USU Extension website additions/updates

