

How About Brown Marmorated Stink Bug in California?



Frank Zalom

Department of Entomology
University of California, Davis

Special thanks to Peter Shearer and Jeff Aldrich

Halyomorpha halys (Stål)

- Also known as
 - Brown Marmorated Stink Bug
 - Yellow-brown stinkbug
 - East Asian stinkbug
- A major pest of horticultural and agronomic crops in its native range
- Considered a nuisance pest when it overwinters in large numbers inside houses



Brown Marmorated Stink Bug

Halyomorpha halys

- First observed in Allentown, Pennsylvania, in 1996
- It was not identified until 1999
- Native to east Asia - China, Japan, Korea, Taiwan
- 1-? generations in most eastern states
- 4-5 generations in southern China
- Could spread readily because of habit of entering houses and garages
- Intercepted numerous times from 1973 to 1998 on baggage, aircraft, cargo, crating, and other shipped materials



Egg mass



Identification - looks a lot like other native stink bugs

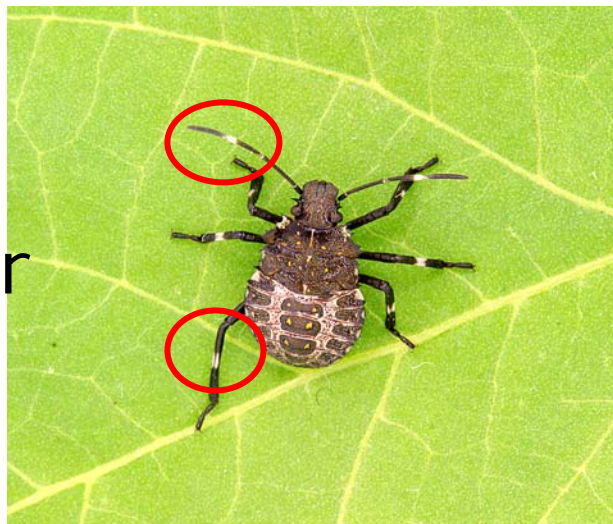
1st instars



2nd instar



3rd
instar



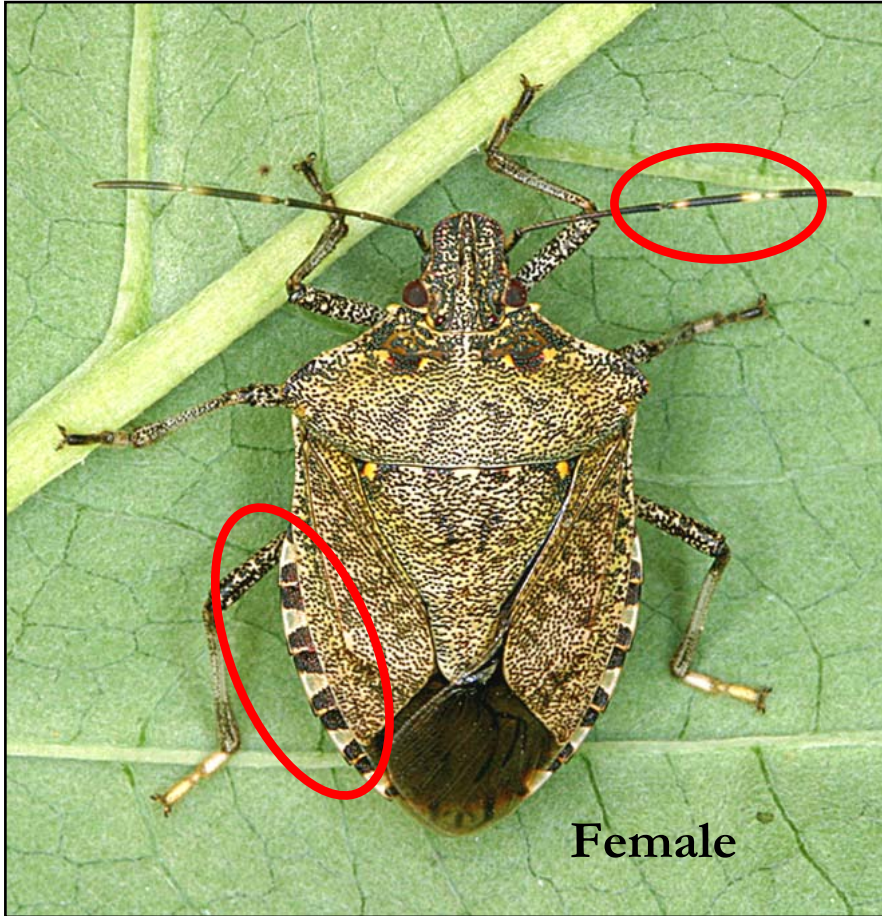
4th instar

5th instar

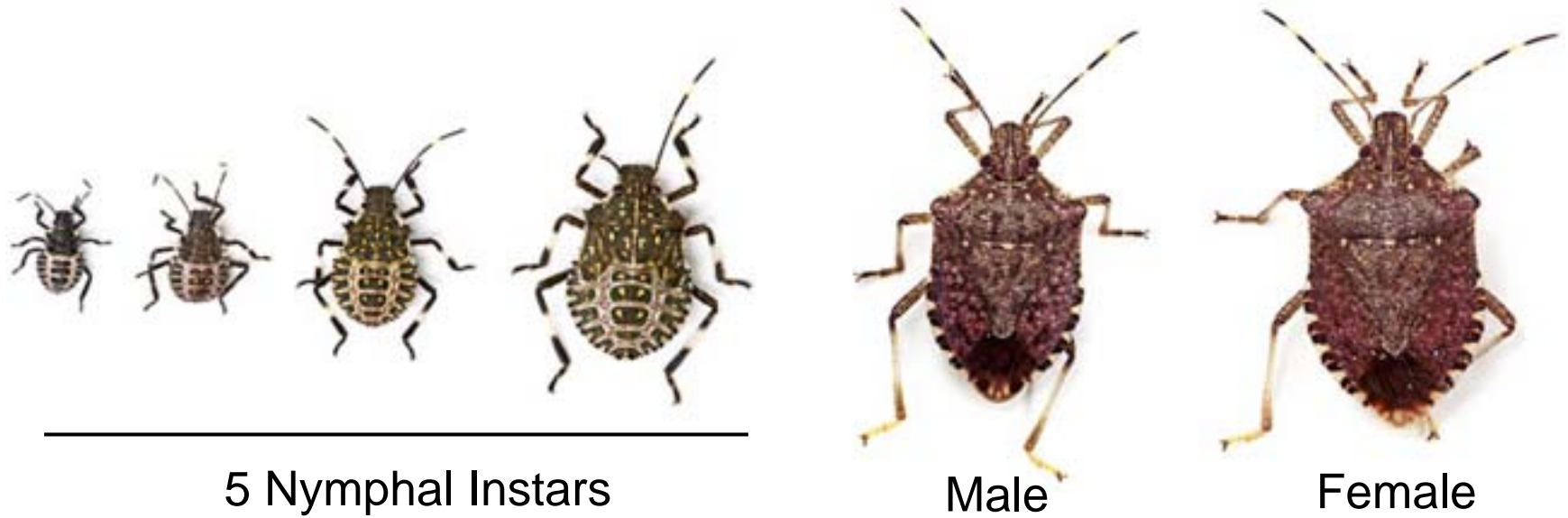


G Hamilton

Adults



12-17 mm in length, 7-10 mm in width



Females mate multiple times

Female can lay ~ 250 (as many as 486) eggs

Host plants

Agricultural Crops

Grapes

Orchard crops -

Apple, Apricot, Cherry,
Peach, Pear, Hazelnut

Small fruit -

Blackberry, Blueberry,
Raspberry

Vegetables -

Eggplant, Tomato, Okra,
Pepper, Sweet corn,
Lima/Snap/Green beans,
Cucurbits

Others mentioned in literature -

Persimmon, Citrus, Fig

Ornamentals

Acer sp. (Maple)

Catalpa

Holly

Juneberry

Mulberry

Pyracantha

Rose

Tree of heaven *

Honeysuckle





Feeding creates pitted and discolored surfaces on fruits and vegetables:



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Damage



Adult Aggregation

During the cooler months, the adults overwinter by aggregating in houses, underneath the eaves, or in leaf litter (like many other stink bugs).

Their aggregation behavior indoors is similar to box elder bug and the Asian ladybird beetle.

Causes an annoyance to homeowners, especially due to their offensive odor when disturbed and spotting by defecation.

Aggregation Behavior



Aggregation Behavior



Overwintering behavior



H. halys Finds

Alameda
Los Angeles
Riverside
Sacramento
San Diego
San Francisco
San Joaquin
Solano
Santa Clara

★ Monterey
Yolo
San Luis Obispo



Source - CDFA Plant Health and Pest Prevention Services Database, 2010

California Chronology

2002 - Riverside, CA, Public Storage facility

2005 - Vallejo, CA, Public Storage facility, items shipped from Pennsylvania, then San Francisco

2006 - First established in Los Angeles County in the cities of Pasadena (2006), San Marino (2006), Alhambra (2007), Los Angeles (2008), Temple City (2008)

2002-2010 - turned in by residents or collected by agricultural inspectors 14 other times in 9 counties

2006-2010 - intercepted 24 times at state border inspection stations in vehicles from the eastern US

2010 - turned in by a PCO from Monterey County

March, 2011 - Davis... found by Yolo Ag Commissioner inspecting for Gypsy Moth

Nov., 2011 - San Luis Obispo County

March, 2012 - Davis... found by an undergrad student

Current Infestation in Oregon

2004 - Breeding populations found in
Portland and adult captured in Salem
2010 distribution:



+ Medford in 2011

Pest Status in California

- B pest rating
- Nursery stock found infested must be cleaned before it can be sold
- Border stations can require treatment or reject infested shipments
- There are no additional quarantine regulations
- CDFA is not conducting any surveys or treatments for brown marmorated stink bug

Several native stinkbugs closely resemble *H. halys*



H. halys



Rough stinkbug,
Brochymena quadripustulata



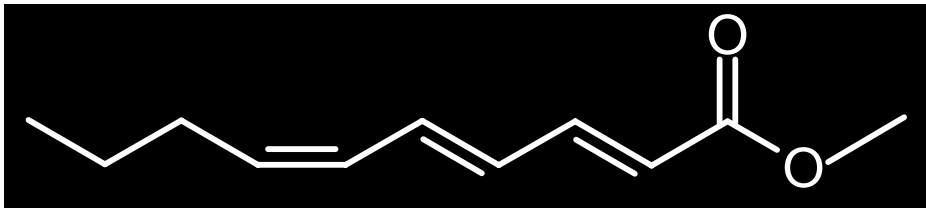
Red-shouldered stinkbug,
Thyanta palidovirens



Conspere stinkbug,
Euchistus conspersus
and other *Euchistus*

Pheromones??

Cross attraction to aggregation pheromone of the Asian brown-winged green bug, *Plautia stali*

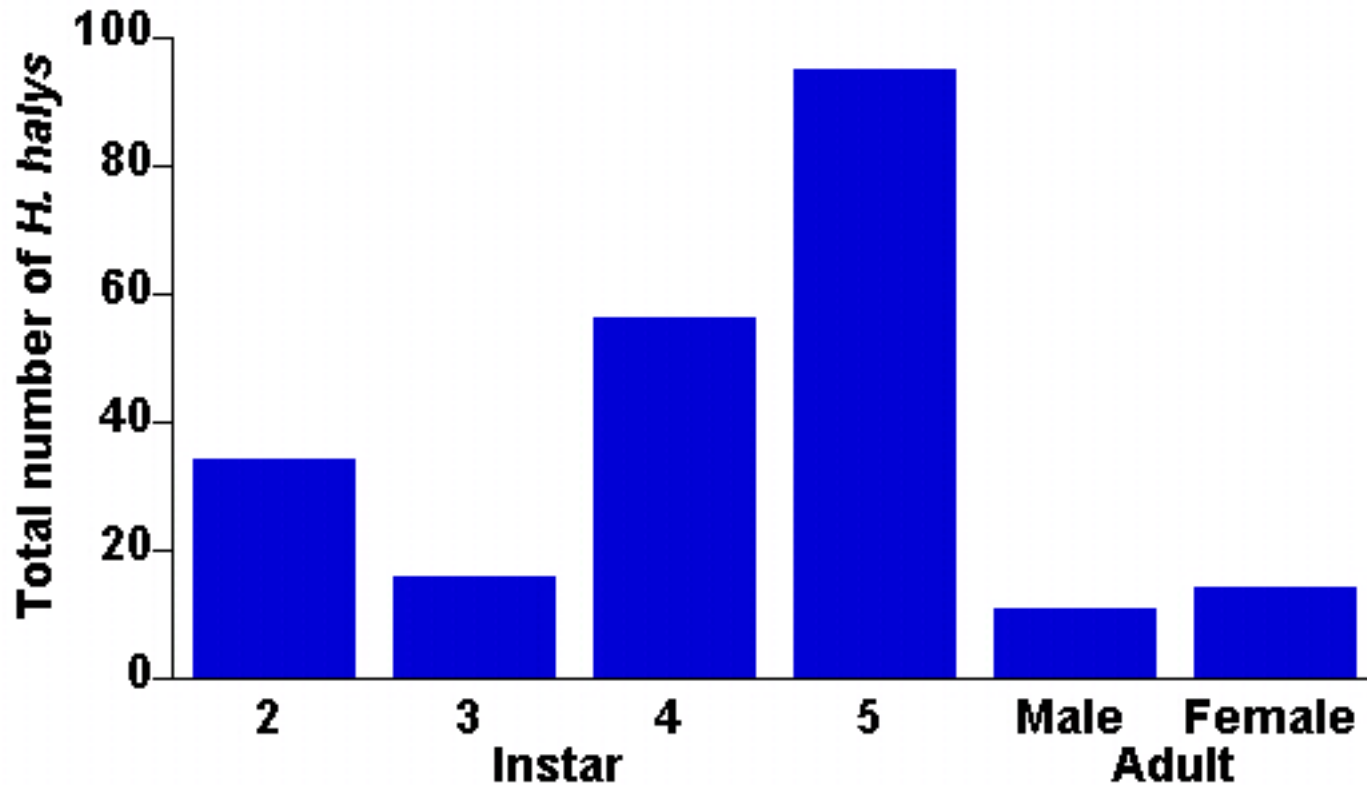


2E,4E,6Z-10:COOMe



Jeff Aldrich
USDA-ARS

Pheromone attracts males, females and nymphs



Total number of *H. halys*/trap, May 15 – Aug 6, 2004



Football



"Apple"

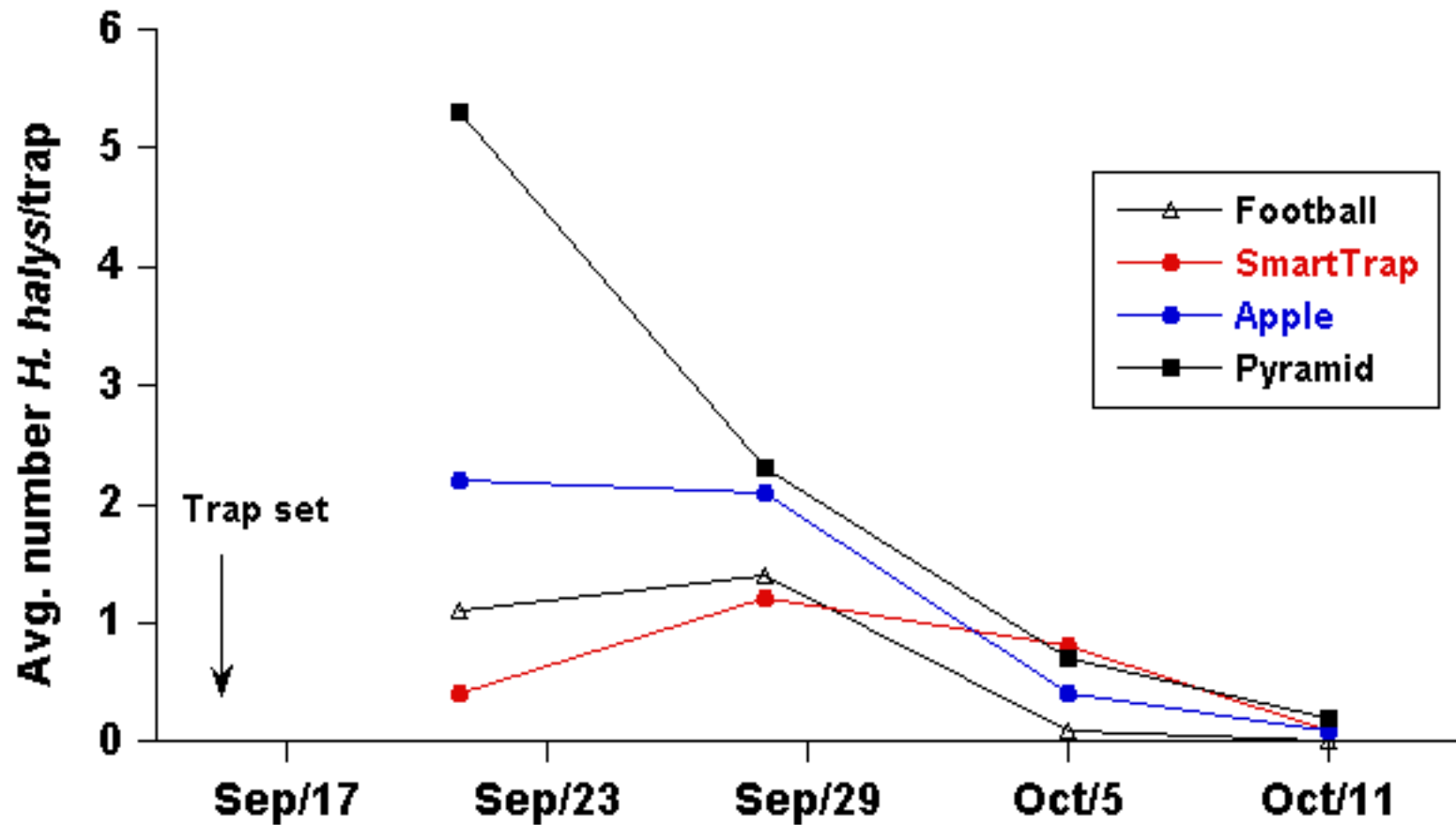


Smart trap

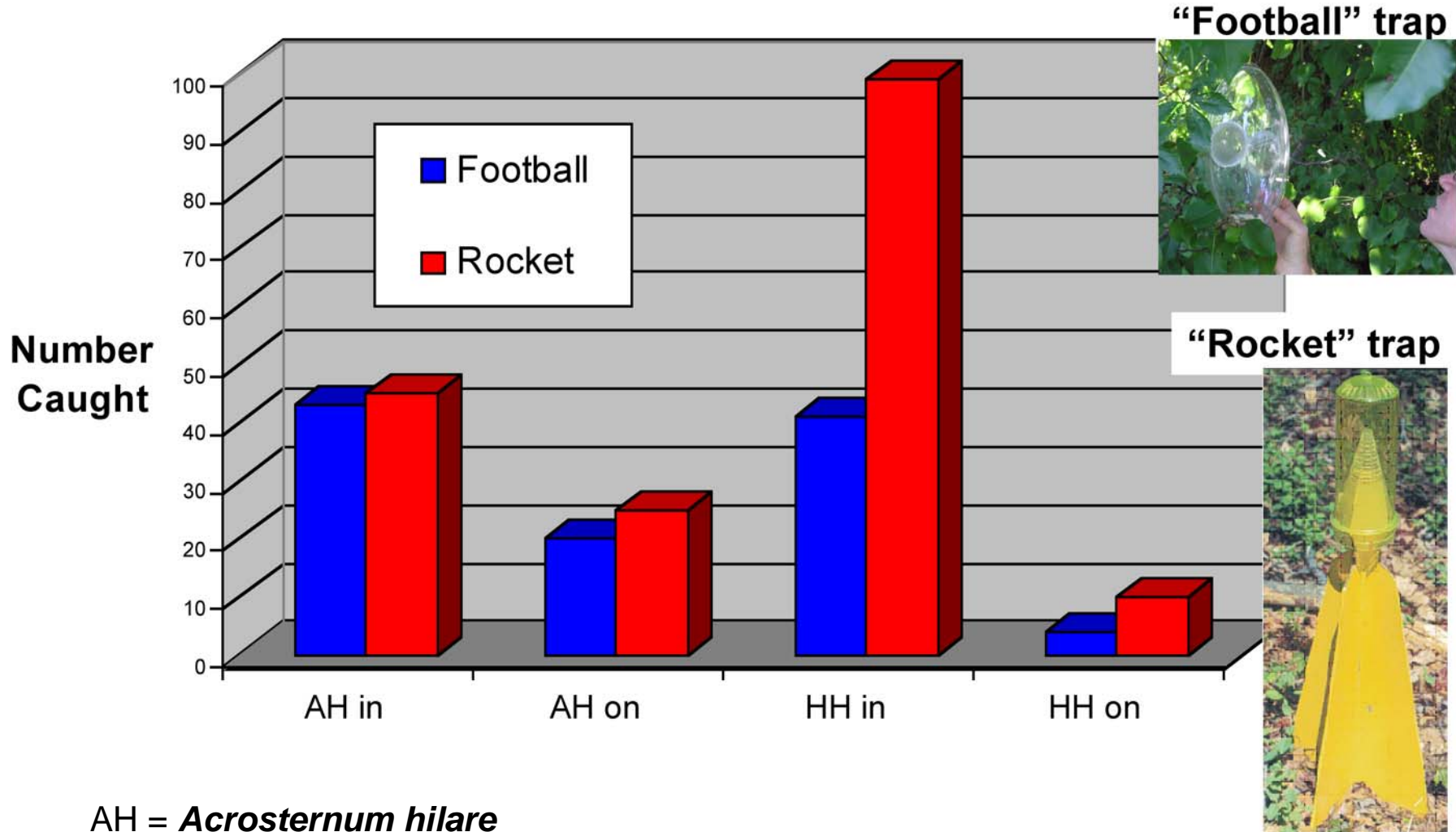


Pyramid/
Teddar

Avg. Number of *H. halys*/Trap Type/Week



Adult Stink Bugs Inside vs. Outside as a Function of Trap Type, Beltsville MD, 2006



AH = *Acrosternum hilare*
HH = *Halyomorpha halys*

'True' pheromone for the brown marmorated stink bug has been identified and is being patented by the USDA-ARS



Commercial version of the 'rocket trap'

Biological Control?

Prospects may be good given this is an exotic insect
Foreign exploration being done by USDA

Egg parasitoids - *Trissolcus* spp.

Native Tachinid fly found on BMSB on East Coast



Insecticide Bioassay Results

BMSB lethality (4.5 hr exposure to dry residue, glass containers)

Active Ingredient	Lethality Index	Active Ingredient	Lethality Index
Dimethoate	93.3	Cyfluthrin	49.0
Malathion	92.5	Oxamyl	46.8
Bifenthrin	91.5	Esfenvalerate	43.3
Methidathion	90.4	Imidacloprid	40.0
Endosulfan	90.4	Tolfenpyrad (SC)	36.5
Methomyl	90.1	Tolfenpyrad (EC)	33.3
Chlorpyrifos	89.0	Pyrifluquinazon	28.3
Acephate	87.5	Kaolin Clay	23.1
Fenpropathrin	78.3	Diazinon	20.4
Permethrin	77.1	Phosmet	20.0
Azinphosmethyl	71.3	Acetamiprid	18.8
Dinotefuran	67.3	Thiacloprid	18.3
Kaolin Clay + Thiamethoxam	66.7	Abamectin	16.3
Formetanate HCl	63.5	Indoxacarb	11.3
Gamma-cyhalothrin	59.0	Spirotetramat	9.8
Thiamethoxam	56.3	Carbaryl	9.2
Clothianidin	55.6	Flonicamid	7.7
Beta-cyfluthrin	54.8	Water (Control)	5.8
Lambda-cyhalothrin	52.9	Cyantraniliprole	1.7
Zeta-cypermethrin	52.1		

Tracy Lesky. 2011. The Challenges Posed by the Invasive Brown Marmorated Stink Bug, *Halyomorpha halys* (Stal), to U.S. Agriculture. USDA-ARS Appalachian Fruit Research Station, Kearneysville, WV

How about brown marmorated stink bug in California?

- Detection - where is it and how widespread?
- How many generations per year?
- Are viable chemicals registered on potential host crops?
- Optimal timing of sprays.
- Nonchemical alternatives to reduce populations.

Bagrada bug - *Bagrada hilaris*

- New pest established in southern California
- Strawberries and caneberries?



A close-up photograph of a brown marmorated stink bug (Hemiptera: Pentatomidae) feeding on a cluster of ripe raspberries. The bug is positioned in the center-right of the frame, with its body and legs clearly visible as it interacts with the fruit. The raspberries are a vibrant red color, and the background consists of green leaves and stems, slightly out of focus. The text is overlaid on the top left and bottom center of the image.

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