

Brown Marmorated Stink Bug

Current Issues in Invasive/Emerging Pests & Diseases

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Brown Marmorated Stink Bug (*Halyomorpha halys*)

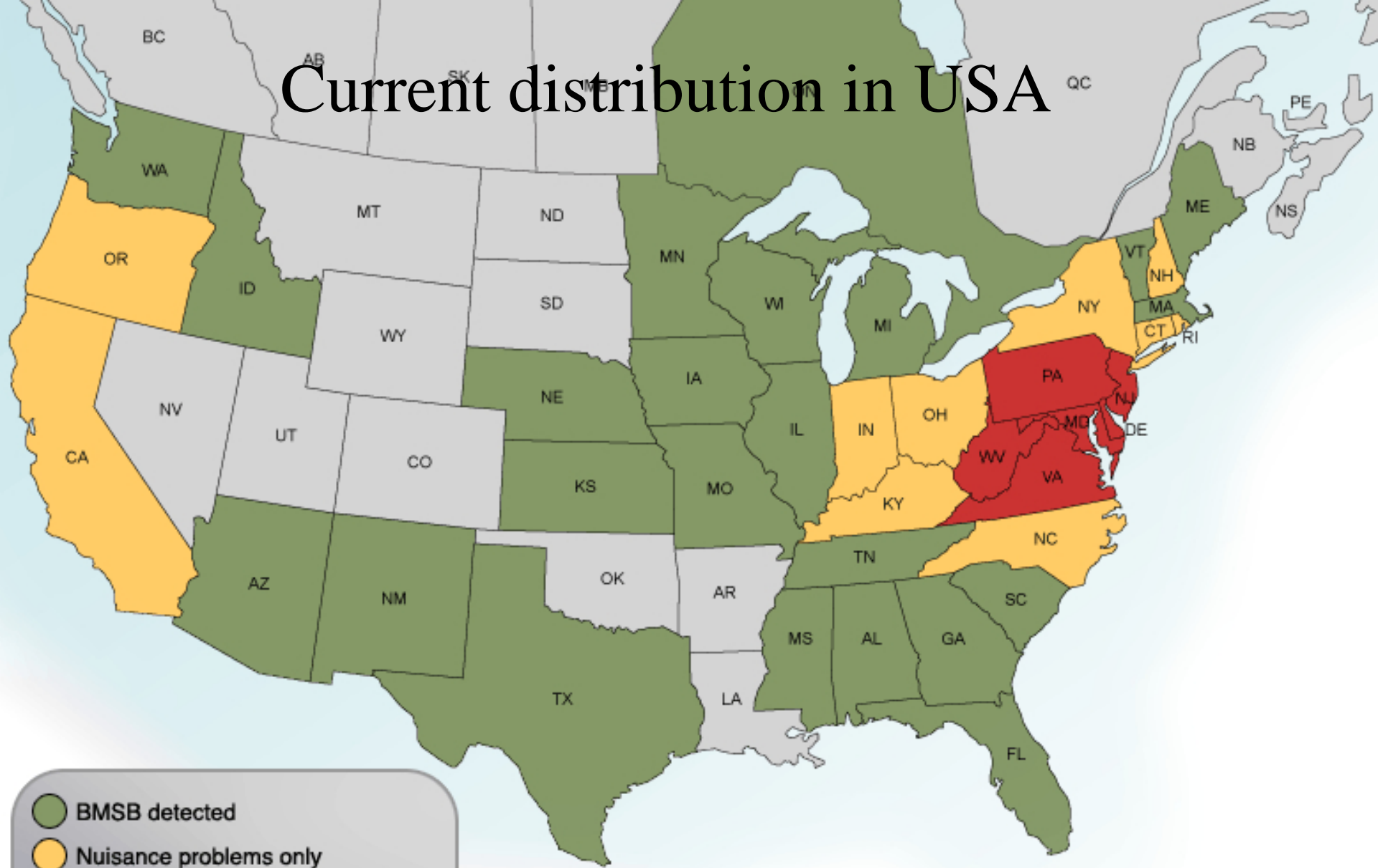


Photos: Baldo Villegas

Brown Marmorated Stink Bug (*Halyomorpha halys*)

- Native to East Asia (China, Japan, Korea, Taiwan)
- A crop pest in its native range and here
- Household nuisance pest in fall, winter
- Host list currently 170 spp., likely to rise

Current distribution in USA



- BMSB detected
- Nuisance problems only
- Severe agricultural and nuisance problems reported

Source - <http://www.stopbmsb.org>
T. Leskey, USDA-ARS May, 2012

BMSB Finds in California

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

Also:
Butte
Monterey
Yolo
San Luis Obispo
Siskiyou
Sutter



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

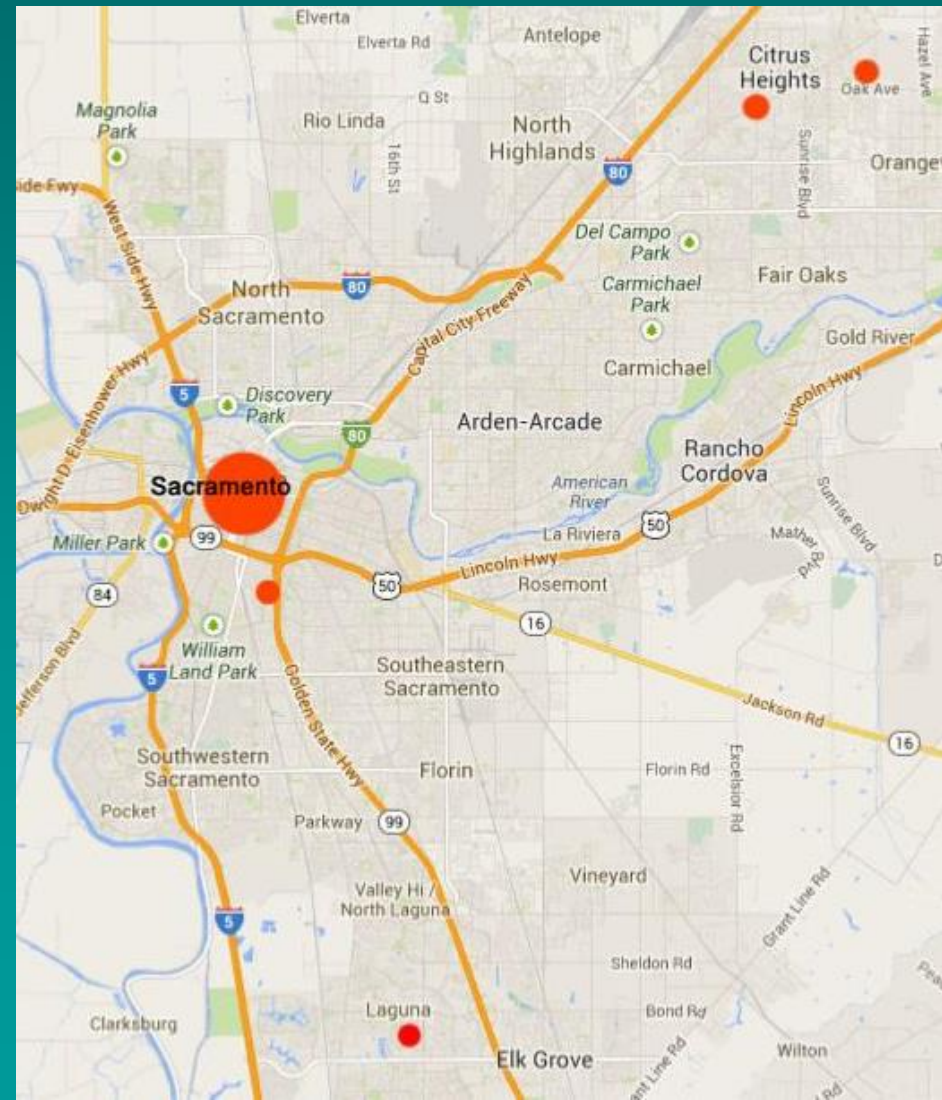
BMSB Finds in Sacramento County



Oct. 15, 2013

Jan. 1, 2014

cesacramento.ucanr.edu



Pest Status in California

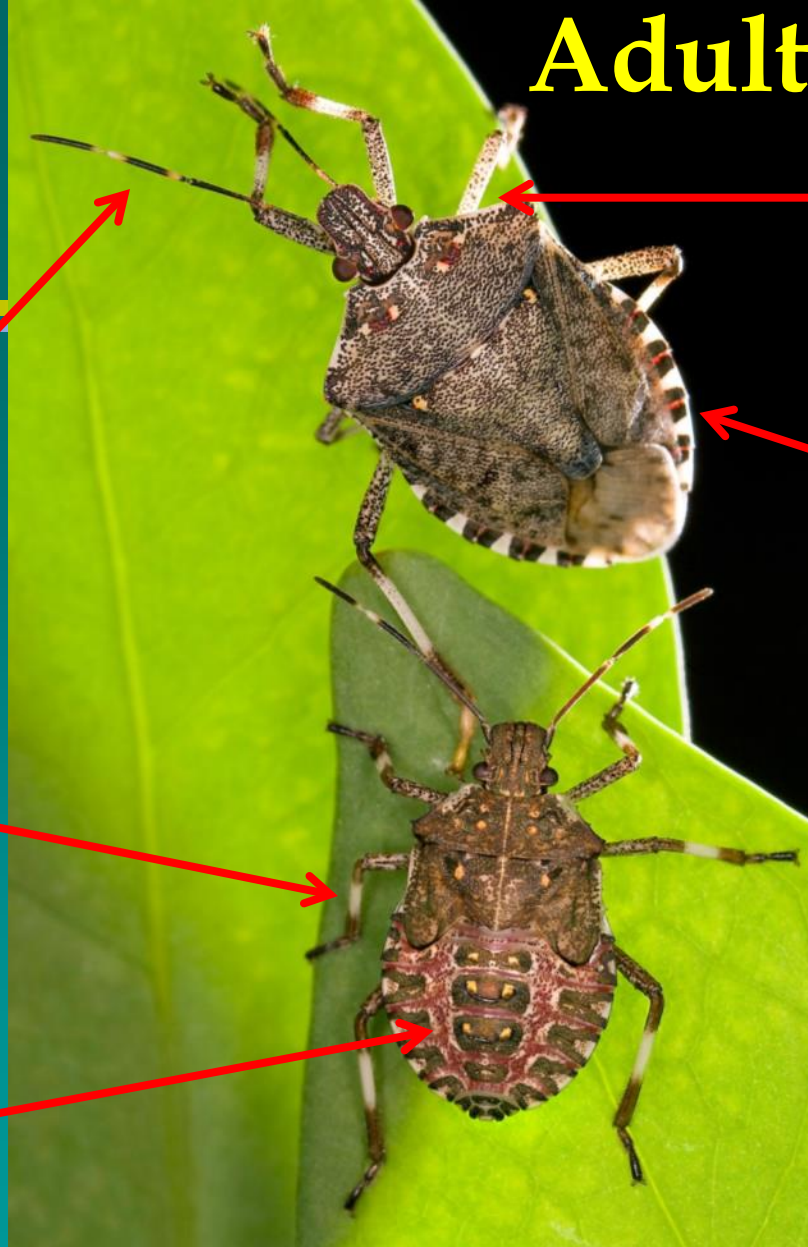
- “B” pest rating
- No major quarantine regulations
- Neither CDFA nor ag. commissioners conducting surveys or treatments

Adult

Smooth
“shoulder” edges

Banded
abdominal edge
extending
beyond wings

Mature nymph (5th instar)



Actual adult size
1/2 to 5/8 inch

Two white bands
on antennae

Banded legs

Rust color with
broad brown
markings

Photo: UC IPM



Eggs (20-30) & nymphs



Nymph (3rd of 5)



Adult



USDA

5 Nymphal Instars

Male

Female

- Each adult lives 6-8 months
- Female can lay about 250 eggs
- Females mate multiple times
- ~2 generations in Mid-Atlantic states, 4-6 in southern China

Some Other True Bugs



Rough stink bug



BMSB



Photos:
UC IPM



Red shouldered stink bugs



Consperse stink bug

Rough Stink Bug vs. BMSB

Rough stink bug

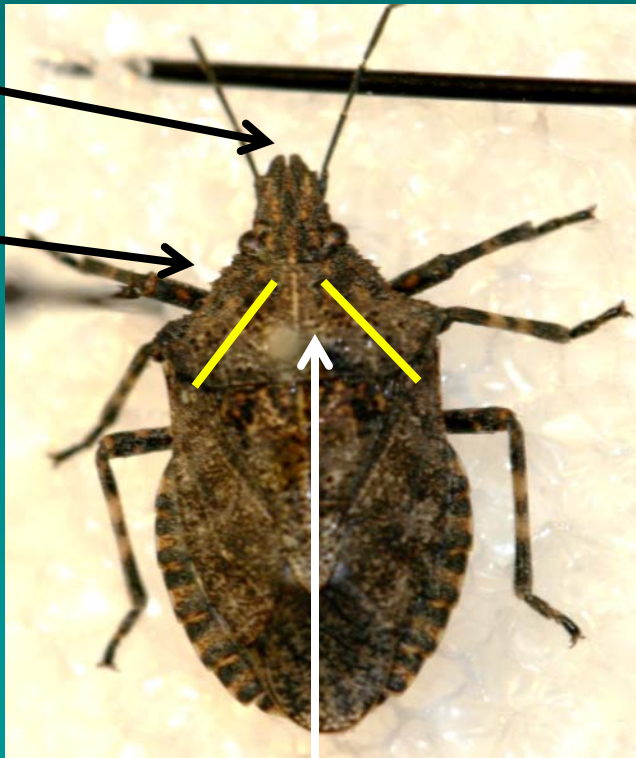


BMSB



Rough Stink Bug vs. BMSB

Rough stink bug



Narrower angle

BMSB



Wider angle

Host Plants

Crops

- Stone fruits (esp. peach), pome fruits, citrus, persimmon, fig
- Berries
- Grapes (not a major host)
- Eggplant, tomato, okra, pepper, corn, beans (esp. soy), cucurbits, sunflower

Host Plants

Selected Ornamentals

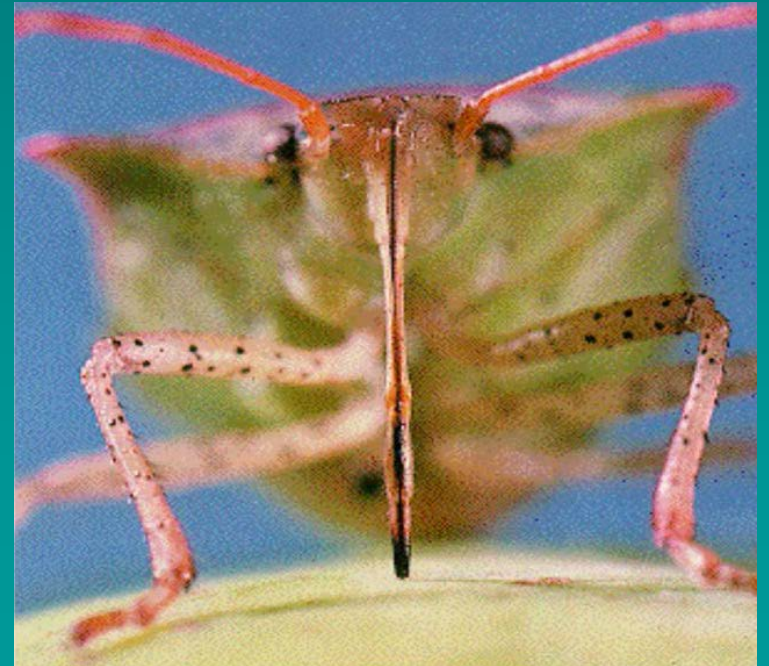
- Catalpa
- Chinese pistache
- Elm
- Maple
- Holly
- Mulberry
- Princess tree (*Paulownia*)
- Pyracantha
- Redbud
- Rose
- Southern magnolia
- Tree-of-heaven

Host Plants

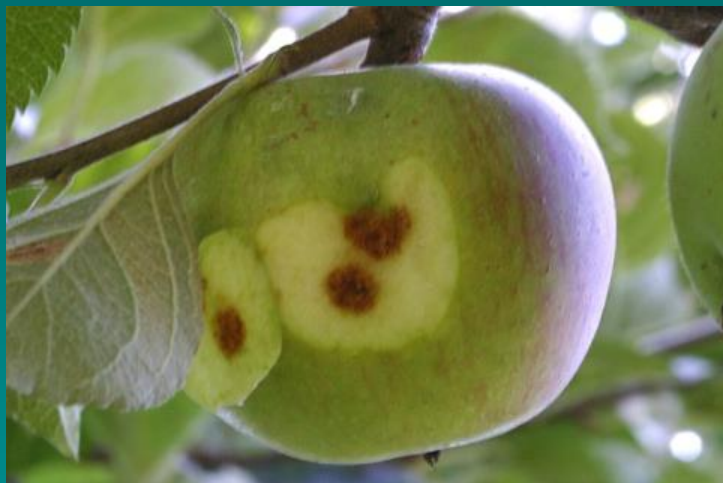
Nursery Plant Hosts

- *Abelia*
- *Acer* (maple)
- *Buddleia* (butterfly bush)
- *Celosia*
- *Cercis* (redbud)
- *Gleditsia* (honey locust)
- *Hibiscus rosa-sinensis*
- *Lonicera* (honeysuckle)
- *Malus* (crab apple)
- *Platanus* (sycamore)
- *Prunus serotina* (black cherry)
- *Quercus* (oak)
- *Syringa* (lilac)
- *Ulmus* (elm)
- *Zelkova serrata*

Stink Bug Feeding



BMSB Damage



BMSB Damage

Sweet Corn a High-Preference Crop

Up to 100% of ears with injury, Beltsville MA 2011



Tracy Leskey, USD/



Adult Aggregation

- Late summer/fall – adults seek overwinter sites in houses, under eaves, in leaf litter
- Annoys residents, odor when disturbed

BMSB

An Arboreal Species



Aggregation Season, Pennsylvania



Photos:
Tracy Leskey

Aggregation Behavior



Photos:
Tracy Leskey



Phermone Trap

Lures

AgBio, Inc.: \$4.25 (30 days)
Rescue: \$6 (4 wks.), \$10 (9 wks.)



Vaportape (kill bugs in trap)



Phermone Trap

Dead-Inn Traps (AgBio, Inc.)

Grower
48" tall, \$30

Professional
24" tall, \$20

Homeowner
16" tall, \$17



Pheromone Traps Rocket Trap (Rescue)

\$17



Insecticide Bioassay Results

- BMSB “lethality index” (immediate mortality with little or no recovery)
 - » 4.5 hrs. exposure to dry residue, glass containers
 - » Field efficacy may differ

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	Cyantranilprole	1.7
Zeta-cypermethrin	52.1		

Tracy Leskey. 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

Insecticide Bioassay Results – Top 10

Active Ingredient	Trade Name (Example)	Insecticide Class	Lethality Index
Dimethoate	Dimethoate	OP	93.3
Malathion	Malathion	OP	92.5
Bifenthrin	Brigade	Pyrethroid	91.5
Methidathion	Supracide	OP	90.4
Endosulfan	Thiodan	Organochlor.	90.4
Methomyl	Lannate	Carbamate	90.1
Chlorpyrifos	Lorsban	OP	89.0
Acephate	Orthene	OP	87.5
Fenpropathrin	Danitol	Pyrethroid	78.3
Permethrin	Pounce	Pyrethroid	77.1

Pesticide Efficacy

Field Study (Leskey et al., 2013)

- High mortality on BMSB adults exposed on the day of application: Endosulfan (e.g., Thiodan), methomyl (Lannate), thiamethoxam (Actara), and bifenthrin (e.g., Brigade)
- Fenpropathrin (Danitol) and dinetofuran (Venom) did not result in high mortality, but they had a strong anti-feeding effect for 7+ days
- Peaches in Mid-Atlantic: 10-12 weekly applications, alternate-row, late May-harvest using pyrethroids and neonicotinoids

Organically Acceptable Insecticides

Partial to fairly good control
of nymphs only:

- Pyrethrum
- Azadirachtin
- Spinosad
- Sabadilla
- Insecticidal soap
- Combinations

Pesticide Efficacy

Conclusions

- Wide range of effects within chemical classes
 - » No chemical class outperformed all others
- Even at highest rates, BMSB very hard to kill via incidental/walking contact
- Effective insecticides in lab: only 60% average mortality in the field when applied late early July, 40% in Aug., and 20% in September

Alternative BMSB Management

Penn. State Univ., Rutgers Univ.

- Border applications
 - Use strong residual products
- Treat surrounding vegetation, if feasible
- Alternative crop plantings
 - Possible trap crops (e.g., beans, Paulownia trees)
 - Spray trap crops

Biological Control?

- Foreign exploration done by USDA
- Egg parasitoids - *Trissolcus* spp.
- Expected release in Calif. in 2016



Gymnosoma par

Questions?

Important Web Sites

StopBMSB.org

ucipm.ucdavis.edu

cesacramento.ucanr.edu