

Brown Marmorated Stink Bug Working Group Meeting

**Alson H. Smith Research and Extension Center
Virginia Agriculture Experiment Station
Virginia Tech.
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Submitted by:

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Current Brown Marmorated Stink Bug Working Group Membership

	Name	Affiliation		Name	Affiliation
1	Agnello, Art	Cornell	36	Malone, Darrin	DuPont CropProtection
2	Aldrich, Jeff	USDA-ARS	37	Malone, Sean	VA Tech
3	Behling, George	Nob Hill Orchard	38	Marks, Brandon	Clarion Hotel
4	Bergh, Chris	VA Tech	39	Matthew, Clarissa	RedBud Farm
5	Bernhard, Karen	Penn State Ext.	40	Maier, Chris	USDA-Forest Service
6	Biddinger, Dave	Penn State	41	Meck, Elijah	LABServices
7	Biggins, Brian	Miolea Organic Farm	42	Meck, Michelle	LABServices
8	Black, Robert	Catoctin Mt. Orchard	43	Myers, Clayton	EPA
9	Brust, Gerald	UMD	44	Meneley, Jan	AgBio
10	Butler, Bryan	UME	45	Mizell, Russ	UFL
11	Cooper, Rick	VT	46	Nielsen, Ann	Michigan State Univ.
12	Cullum, John	USDA-ARS	47	Orr, Mark	Orr Brothers Tree Fruit
13	Day, Eric	VA Tech	48	Park, Yong-Lak	WVU
14	Dively, Galen	UMD	49	Patton, Terry	UMD
15	Eaton, Alan	UNH	50	Pfeiffer, Doug	VA Tech
16	Fiola, Joe	UMD Extension	51	Polk, Dean	Rutgers
17	Fultz, Stanley	UMD	52	Rane, Karen	UMD
18	Gardenhour, Bill	Gardenhour Orchards	53	Raupp, Mike	UMD
19	Hamilton, George	Rutgers	54	Rice, Eric	Country Pleasures
20	Hancock, Torri	USDA-ARS	55	Reissig, Harvey	Cornell
21	Herbert, Ames	VA Tech	56	Rodriguez-Saona, Cesar	Rutgers
22	Jacobs, Steve	PSU	57	Rose, Robyn	USDA-APHIS
23	Jentsch, Peter	Cornell	58	Seetin, Mark	US Apple Association
24	Kamminga, Kathy	NC State/USDA	59	Shearer, Peter	Oregon State
25	Khrimian, Ashot	USDA-ARS	60	Short, Brent	USDA-ARS
26	Klick, Suzanne	UMD	61	Shrewsbury, Paula	UMD
27	Koplinka-Loehr, Carrie	NE IPM Center	62	Smith, Kent	USDA-OPMP
28	Krawczyk, Greg	Penn State	63	Tatman, Kathy	USDA-ARS
29	Kuhar, Tom	VA Tech	64	Taylor, Philip	USDA-ARS
30	Kunkel, Brian	University of Delaware	65	Whalen, Joanne	UDEL
31	Leggett, John	DuPont CropProtection	66	Walgenbach, Jim	NC State
32	Leskey, Tracy	USDA-ARS	67	Wright, Starker	USDA-ARS
33	Lurvey, Edith	IR-4 Cornell NYSAES	68	Zhang, Aijun	USDA-ARS
34	Macintosh, Bill	Consultant			
35	Malinoski, Mary Kay	UMD-Ellicott City			

Executive Summary

The brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål) continues to spread throughout the United States. Officially, BMSB has been detected in 27 states and the District of Columbia. Large populations are now established in PA, NJ, DE, MD, WV, and VA; each documented severe losses in crops and serious nuisance problems from BMSB in 2010. Established populations also exist in CA, CT, IN, KY, MA, NH, NC, OH, OR, and TN, though crop losses have not yet been reported. In addition, BMSB has been detected in AZ, FL, IL, MA, MN, MS, MO, RI, SC, and WA.

The second formal BMSB Working Group meeting was held at the Alson H. Smith Agricultural and Research and Extension Center (AREC) facility in Winchester, VA on November 17, 2010. Research and extension personnel from USDA-ARS, Rutgers University, Penn State University, Cornell University, University of Florida, North Carolina State University, Oregon State University, University of Maryland, and Virginia Tech, as well as commercial research industry professionals, commercial and organic growers, and USDA-APHIS, EPA- IR-4, and Northeastern IPM Center attended the meeting. Participants delivered presentations discussing the impact of BMSB in agriculture and the human environment. Over 80 people were in attendance, and BMSB Working Group membership has doubled since the first meeting held in June.

During the meeting, members related that BMSB has been documented as causing severe economic injury to tree fruit (apples, peaches, nectarines, and Asian and European pears) in the mid-Atlantic during the 2010 growing season. In addition, serious problems were detected in tomatoes, peppers, sweet corn, field corn, soybeans raspberries, and grapes. Conventional and organic growers relayed their concerns regarding the difficulty of managing BMSB on their farms. Increased incidence of rots in stone fruit and grape were reported despite a very dry growing season, with BMSB feeding injury being implicated. The presence of BMSB in vineyards at harvest has led to serious concerns regarding the potential impact of BMSB on wine quality. Similarly, post-harvest problems are emerging on apples placed into cold storage with no detectable injury that subsequently display BMSB injury several weeks later. Concerns regarding the impact of BMSB on the dairy industry have emerged. With 42% of milk coming from states with reported BMSB infestations, research is needed on the effect of BMSB on milk, feed quality, feed palatability, and animal health, given that livestock are likely feeding on silage containing large quantities of BMSB remnants.

In addition to the serious agricultural threat posed by BMSB, homeowners and businesses continue to be plagued by this serious nuisance pest. As BMSB seek overwintering sites in the fall, they also invade human structures. The national and regional press reported on this issue extensively. Extension services throughout the mid-Atlantic reported increased phone call and website activity. There have been reports of BMSB inadvertently probing humans and blisters developing at the site of adults accidentally crushed beneath clothing.

The Working Group participated in a phone call with EPA to discuss candidate compounds for potential Section 18 label exemptions. Many members of the group also worked on development of a Specialty Crop Research Initiative Proposal that will be submitted to USDA-NIFA in January 2011.

BMSB Working Group Meeting Oral Presentation Summaries

G. Hamilton, *Update on the Expansion of BMSB's Range in 2010*

- BMSB just detected in Vancouver, WA. (Peter Shearer)
- BMSB continues to spread throughout the United States with specimens being sent from throughout the country. BMSB established in CA.
- Steve Jacobs reported Hershey Medical Center is working in cooperation with PSU on dermatological effects associated with BMSB bites/irritants.
- Reports by Dave Biddinger and Dean Polk of apple pickers getting blisters from BMSB.
- Steve Jacobs reported 300,000 hits on PSU factsheet for year (19,000 in one day).

T. Leskey, *The Emergence of BMSB as a Severe Pest of Tree Fruit in the mid-Atlantic*

- BMSB spotted in orchard in mid-April.
- Worked with growers in WV and MD to determine severity of damage to peach and apple and to monitor adult and nymph activity.
- Both nymphs and adults caused injury, even with aggressive chemical treatment.
- Greater injury on the perimeter of orchards compared with interior indicating a perimeter-driven population. However, adults can reproduce within the orchard if left unchecked.
- Injury rates greater than 80% reported in some commercial apple and peach orchards.
- Primocane-bearing raspberry growers; Doug Pfeiffer believes will be issue with BMSB for growers in VA.

D. Polk, *The Impact of BMSB on New Jersey Tree Fruit in 2010*

- Early season feeding likely leading to deeper injury in fruit.
- Damage potentially leads to increases in rot.
- Problem with discerning fruit and surface injury to subsurface injury.
- Growers unaware of severity of problem.
- Edge injury appears to be at higher levels than interior injury levels.

G. Krawczyk, *The Impact of BMSB on Pennsylvania Tree Fruit in 2010*

- BMSB mentioned only a few times at Cumberland-Shenandoah meetings in 2008, 2009.
- There were no recommendations available for chemical treatments in 2010.
- PA growers applying more sprays toward end of growing season for apple and peach and still getting up to 50% injury.

D. Biddinger, *The Impact of BMSB on Pennsylvania Tree Fruit in 2010*

- Agrees control measures needed to control BMSB are detrimental to IPM.

Commercial Tree Fruit Growers' Perspectives on BMSB Injury and Management

George Behling, Nob Hill Orchards

- 70 acres of apples and 5 acres of peaches much of which sold at DC farmer's markets.
- 2009 was first year when BMSB problems were detected.

- In 2010, treated with Tombstone+Lannate every Monday for 4 Mondays starting late July.
- Assail early for RAA, mating disruption for CM and OFM.
- Delegate for 1st gen of TABM, nothing for 2nd gen.
- Concerned processors won't take BMSB injured apples.
- Highest injury in RubINETTE surrounded by Fuji and Jonagold, with 50 injury sites per RubINETTE apple.
- First planting of corn turned to fodder because of BMSB, second planting of corn had high yields.

Bob Black, Catoctin Mountain Orchard

- In 2009, stink bug injury was likely present in orchards, but was not notable due to extensive frost and hail damage.
- Endosulfan sprayed on tomato; minimal BMSB injury and still saw lacewings in tomatoes.
- 60% damage from BMSB in Pink Lady apple.
- Is very concerned for 2011 and beyond. Counting on the research community to find solutions.
- George Behling noted that Jonathan apples in cold storage at Nob Hill are now rotting because of extensive BMSB injury.

Bill Gardenhour, Gardenhour Orchards

- 90 acres apples/5 acres peaches
- Using Lannate, Guthion in mid-Aug to mid-Sept for BMSB.
- Thinks snow cover protected overwintering BMSB.
- Used Delegate early for lep.
- BMSB injury rates were 95% on Stayman, 75% Fuji, 80-90% Golden Delicious.
- Minimal injury on Red Delicious and Gala.
- Does not think Guthion kills BMSB.
- Plums not being affected.
- Thinks movement and abundance of SB outside of orchard is source and would like to see landscape level behavioral control strategies pursued.

Commercial Organic Growers' Perspectives on BMSB Injury and Management

Brian Biggins, Miolea Organic Farm

- Grows small fruits, organic chickens for eggs.
- 100% loss in sweet corn (late planting) from BMSB.
- Early corn planted in March/April was fine, harvested in July.
- Pepper crop lost to BMSB, and Roma tomatoes rotting on vine. Reported that Cherry tomatoes were fine.
- Strawberries, raspberries, blueberries made some revenue.
- Parsley, cilantro, basil fine.
- New planting method being considered to protect tomatoes for next year.

Eric Rice, Country Pleasures Farm

- 12 acres fruit/1 acre vegetables.

- Cherry tomatoes, Asian pear, late blueberries, fall red raspberries, soybeans, and fig crops lost due to BMSB damage.
- Early cherry, blackberry and blueberry, plum crops OK.
- “Value added” products (jellies, scones, butters) being salvaged from damaged fruit that cannot be sold in fresh markets.
- Killed 1st instars with low concentration of Ivory soap and Dr. Bronner’s.
- Found most eggs on pears and blueberries.
- Found most damage at top (vs. bottom) of trees in Asian pear and raspberry canes.

M. Malinoski, *From Simple Nuisance to Candidate for Worst Pest of the Year: The Impact of BMSB on Homeowners*

- Extension website total for contacts about BMSB in 2010: 426, peak occurring 9/23-9/24.
- Searchable submitted questions available on UMD website.

Kim Hoelmer, *Update on Discovery and Development of Potential Biocontrol Agents for BMSB*

- Indigenous parasitoids, predators and pathogens can attack BMSB. Indigenous specialist egg parasitoids belonging to the genus *Trissolcus* (Hymenoptera: Scelionidae) attack eggs and tachnid flies attack adults. Parasitism rates measured in ornamental gardens have been less than 5%.
- Ants, earwigs, spiders and birds are known predators.
- At least four *Trissolcus* species (Hymenoptera: Scelionidae), collected in Asia are currently in quarantine and being screened in Newark, DE.
- If *Trissolcus* species currently in quarantine also attack beneficial pentatomids such as the spined soldier bug, this could lead to difficulty in APHIS approving a permit for release.

B. Butler, *The Impact of BMSB on Raspberries and Blackberries in 2010*

- Killed adults with bifenthrin.
- Botrytis emerged from raspberries with BMSB feeding injury.

D. Pfeiffer, *The Impact of BMSB on Grapes*

- BMSB crawling in bins after harvest.
- Increased injury and rot noted this year.
- Pyganic knocked bugs off vines so clusters could be harvested without adult BMSB present.
- To determine the potential for tainting of wine by BMSB, grape juice containing 10 BMSB/ 25 pounds was detected by all individuals. Sensitive tasters could detect fewer (J. Fiola, UMD).

T. Kuhar, *Status of BMSB in Field Crops in Virginia, Delaware, and Maryland*

- Soybean cage study introduced 5th instar SB to R4 and R6 growth stage soybeans.
- Plants stayed greener longer than rest of crop after cages removed.

S. Fultz, *BMSB Impact on Corn, Corn Silage, and the Dairy Industry*

- 42% of milk coming from states with reported BMSB infestations
- Edge effect being noted--soybean plants remaining green on edges of fields where damage is occurring, resulting in differential harvest patterns. Edge cut for green chop for cattle and centers of field harvested normally.
- Research needed: effect on milk, feed quality, feed palatability, and on animal health based on silage containing BMSB remnants.
- Cows refused to eat silage from soybean field infested with BMSB in Pennsylvania (Steve Jacobs).

P. Shearer, *Current Status and Threat of BMSB Invasion of the Pacific Northwest*

- Cold hardiness and degree days in Oregon similar to mid-Atlantic.
- Infestation first reported with homeowners, and now moved to vineyards and filbert orchards.
- Confirmed in apple, pear, wine grapes, filberts in Oregon.

R. Rose, *Regulatory Perspectives on BMSB*

- APHIS-regulatory.
- In 2005, convened new pest advisory group to assess pest status of BMSB.
 - Internal APHIS review group to provide recommendations.
 - Decided not to quarantine pest.
 - Reconvened in 2010; recommended no regulatory changes until risk assessment completed by end of year.
- Does not meet definition of quarantine pest.
- CAPS may incorporate surveying if decided to be done at state level.
- No current surveys being done by APHIS.
- States can pursue, without regulatory status change, section 18 on own.
- Believe that biological control offers a long term solution.
- Partnering with ARS thru cooperative agreements, could assist in mass rearing methods and support host range testing of bio control: 200,000 dollars/year estimated cost.
- 22 tractor trailers loaded in Baltimore went to Wisconsin and BMSB were inside (Steve Jacobs). Points to problem if this pest were quarantined – not in favor of quarantine work.

EPA Section 18 Conference Call

These candidate compounds were put forward by WG Members and were selected based on their merit as promising compounds, without regard to where they stand with their current labels.

1. formetanate hydrochloride (Carzol)
2. diflubenzuron (Dimilin)
3. pyriproxyfen (Esteem)
4. flonicamid (Beleaf)
5. buprofezin
6. novaluron (Diamond)
7. oxamyl (Vydate)
8. methomyl (Lannate)
9. bifenthrin (Brigade)
10. All pyrethroids
11. endosulfan (Thionex/Thiodan)
12. acephate (Orthene)
13. dinotefuran (Scorpion)
14. methyl parathion
15. beta-cyfluthrin (Baythroid)

Others that were proposed by WG members that would require some label modifications include:

1. clothainidin (Belay)—needs label on stone fruit
2. thiacloprid (Calypso)—needs label for stone fruit, reductions in PHI in pome fruit
3. thiamethoxam (Actara)—reduction in PHI on pome fruit

George Hamilton, Dean Polk and others at Rutgers are currently reviewing labels to put together a more targeted list based on: 1) materials already registered in targeted crops for bugs, 2) materials having activity on similar pests but not labeled for a particular crop; or 3) likely activity but NOT registered for any specific crop. They hope to have this completed in the next two weeks.