

BMSB Small Fruit Stakeholder Report

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Photo's this page: Bernadine Strik

Biology, Ecology, and Management of Brown Marmorated Stink Bug in Orchard Crops, Small Fruit, Grapes, Vegetables, and Ornamentals: USDA-NIFA SCRI Coordinated Agricultural Project



Virginia Raspberry

Table 1. Species composition (%) of stink bugs in raspberry plantings in southwestern Virginia in 2006, 2009, 2011-2013.

Species	Common Name	2006	2009	2011	2012	2013
<i>Heteromegilla halyis</i>	Brown marmorated stink bug	0.0	0.0	27.2	12.8	38.2
<i>Euschistus servus</i>	Brown stink bug	30.8	58.3	54.0	27.5	18.2
<i>Cosmopepla striatellae</i>	Twelve-spotted stink bug	3.8	37.5	14.6	26.1	10.9
<i>Chinavia pallida</i>	Dusky stink bug	56.1	1.3	1.5	5.9	5.3
<i>Chinavia pallida</i>	Green stink bug	3.5	0.7	3.4	18.9	9.3
<i>Murgantia histrionica</i>	Harpagium bug	0.0	0.0	3.4	3.4	5.3
<i>Pediacus maculiventris</i>	Spine soldier bug	0.0	0.0	4.9	0.0	0.0
<i>Euschistus servus</i>	Cosmopepla stink bug	3.4	0.0	0.0	0.0	0.0
<i>Thyanta custator</i>	Red-shouldered stink bug	2.2	0.0	0.0	0.0	0.0
<i>Stenusa exulans</i>	Juniper stink bug	0.4	0.0	0.0	0.0	0.0
<i>Thyanta custator</i>	NA	0.2	0.0	0.0	0.0	0.0
<i>Chinavia pallida</i>	NA	0.4	0.0	0.0	0.0	0.0
<i>Stenusa exulans</i>	NA	0.0	0.3	0.0	0.0	0.0
<i>Chinavia pallida</i>	NA	0.0	0.3	0.0	0.0	0.0
<i>Stenusa exulans</i>	Stough stink bug	0.0	0.3	0.0	0.0	1.3
<i>Heteromegilla halyis</i>	NA	0.0	0.8	0.0	0.0	0.0

Basnet et al. 2014. J. Entomol. Sci. 49(3): 304-312

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Key Findings: Virginia Raspberry

- Found from mid July to September—corresponds to the presence of fruit
- Nymphal and adult feeding on the fruiting structures of raspberry
- Most were adults, and no egg masses were collected from raspberry plants
- No evidence raspberry is a reproductive host for nymphal development
- *H. halyis* displacing *E. servus* populations in Virginia raspberry plantings

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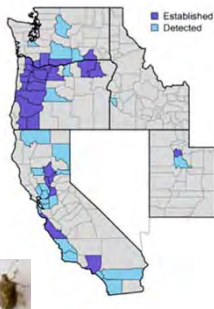
BMSB in New Jersey Blueberries

- In 2014, BMSB populations in New Jersey blueberry farms remained low.
- Control measures have not been implemented.
- Spotted wing drosophila has become the main target of insecticide sprays during harvest.
- Participated in the multistate evaluation of commercial pheromone lures.

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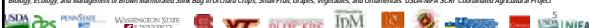
Regional distribution: Pacific region



BMSB is becoming economically important in Western States



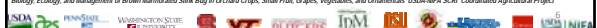
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Distribution along Interstates



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Willamette Valley reports

2012-2014

Increasing reports from *outside urban areas*

- Natural areas
- Farms
- Rural structures

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Controlled small fruit studies

- Blackberry (2013-2014)
- Blueberry (2012-2013)

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Controlled exposure - Blackberry

- Black Diamond 2013
- Mixed varieties 2014

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BMSB exposure - stylet sheaths

BLACK DIAMOND

Density of BMSB	Mean no. stylet marks
0	0
2	~5.5*
5	~8*

- Increasing the number of BMSB per cluster increased feeding pressure.

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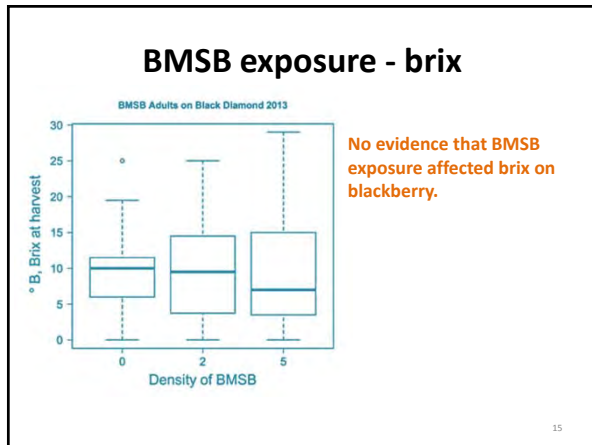
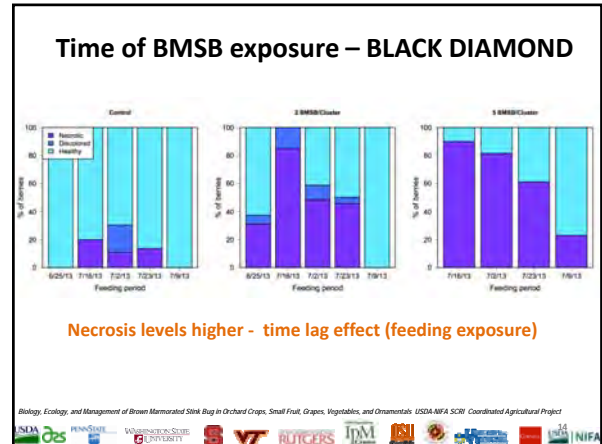
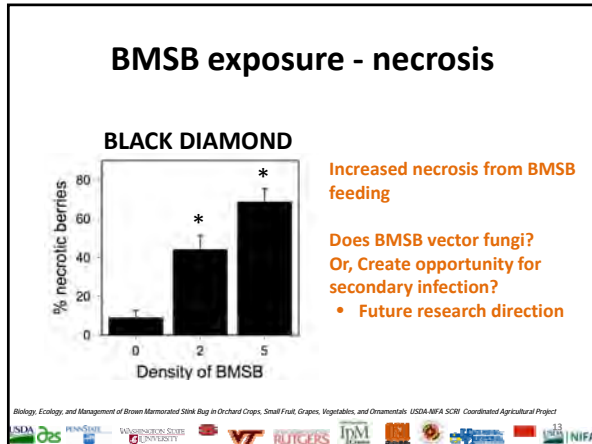
BMSB exposure – berry weight

BLACK DIAMOND

Density of BMSB	Mean berry weight (g)
0	~1.5
2	~1.6
5	~1.0*

Increased BMSB feeding exposure resulted in reduced berry weight

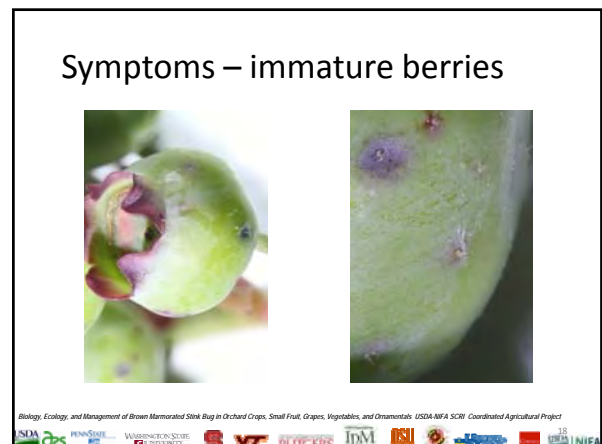
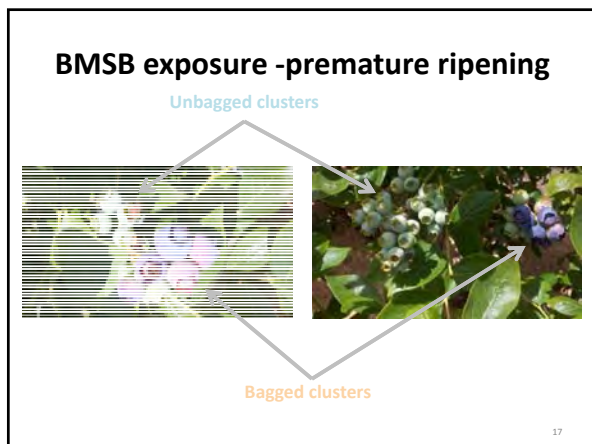
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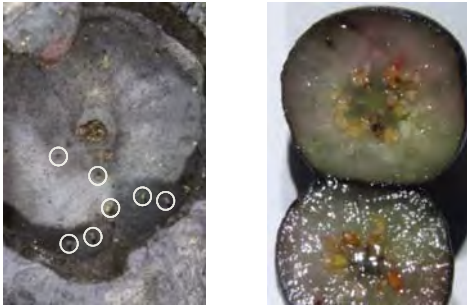
Controlled small fruit studies

- Blackberry (2013-2014)
- Blueberry (2012-2013)

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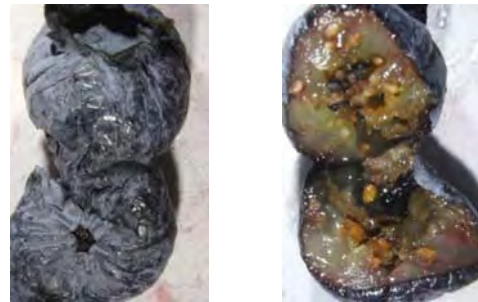


Symptoms - mature berries



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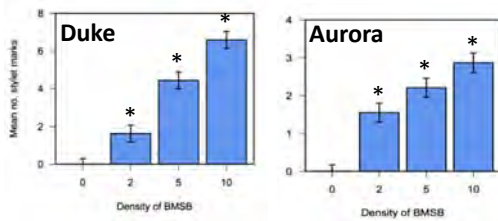
Symptoms, mature berries — shrivel & necrosis



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BMSB exposure - stylet sheaths

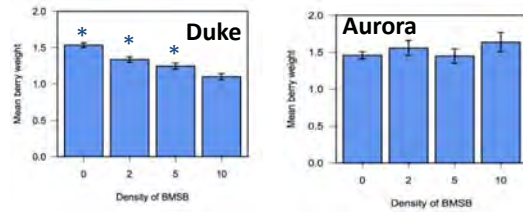


Increasing the number of BMSB per cluster increases feeding pressure. Less pronounced on AURORA.

Wiman et al. 2015 in rev.

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BMSB exposure - weight

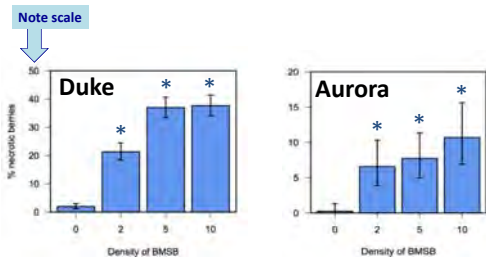


Increasing the number of BMSB per cluster decreased berry weight at harvest (DUKE only)

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BMSB exposure - necrosis

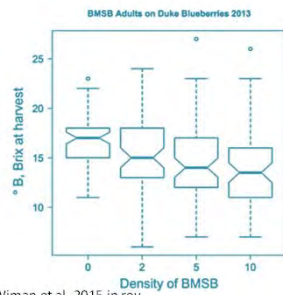


Berry necrosis was a key feeding symptom. Necrosis more pronounced on DUKE.

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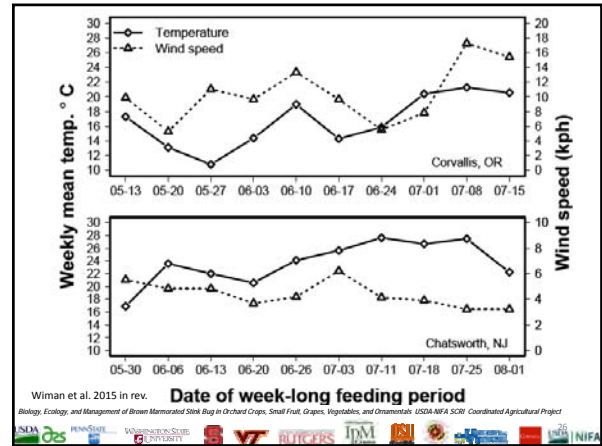
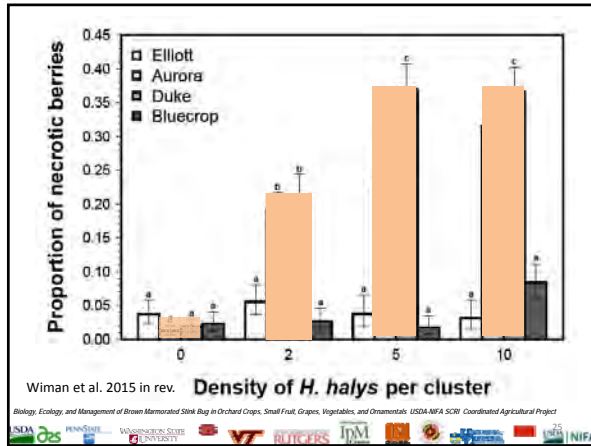
BMSB exposure - brix



- DUKE**
- Increasing densities of BMSB resulted in significantly lower brix @ harvest
 - Salivary enzymes dissolving solids?
 - 10.78 on 3 and 249 d.f., p-value: 1.101e-06

Wiman et al. 2015 in rev.



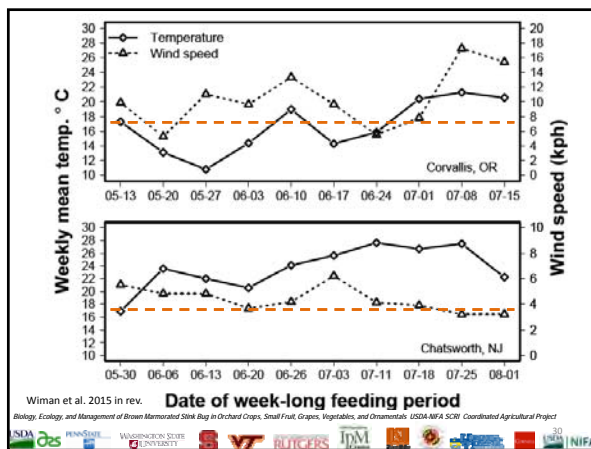
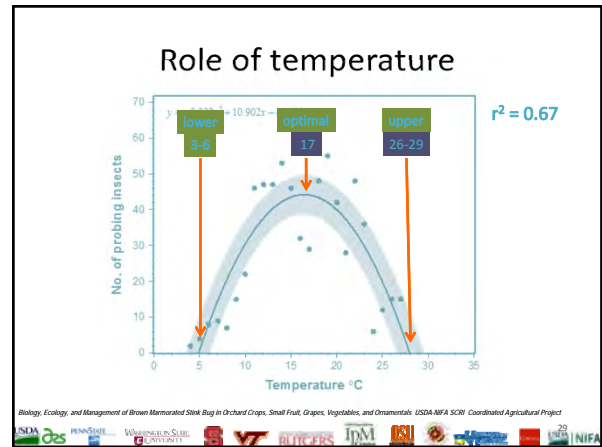


Environmental cues

- Feeding activity
 - Nutritional status
 - Other intrinsic cues
 - Environment
 - Temperature
 - Photoperiod
 - Humidity

Feeding table experiments: feeding activity of BMSB under range of temps & photoperiods

Wiman et al. 2015 in rev. **Biology, Ecology, and Management of Brown Marmorated Stink Bug in Orchard Crops, Small Fruit, Grapes, Vegetables, and Ornamentals** USDA-NIFA SCW Coordinated Agricultural Project



Conclusions – blueberry & raspberry

- Increased BMSB exposure levels (for Oregon)
 - increased necrosis
 - decreased sugar levels in blueberry
 - decreased weight (Duke blueberry, Black Diamond raspberry)
 - Discoloration
- Other:
 - Increased dropped berries
 - Necrosis increases after BMSB exposure
 - Less synchronized ripening (Blueberry)

Wiman et al. 2015. Characterizing damage and impacts of brown marmorated stink bug, *Halyomorpha halys* (Hemiptera: Pentatomidae) on commercial blueberries. *Econ Entomol.* (in revision)

Oregon acknowledgements

- USDA-NIFA-SCRI #2011-51181-30937
- Oregon Raspberry and Blackberry Commission
- Bernadine Strik, David Bryla, Chad Finn, Dave Smith, Becky McClusky



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