

1.1 & 1.3 Impact on Specialty Crops (Vineyards)



Funding



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Specialty Crop Research Initiative
Grant #2011-01413-30937

Collaborating Institutions



Cornell University



UNIVERSITY OF
MARYLAND



Virginia Tech

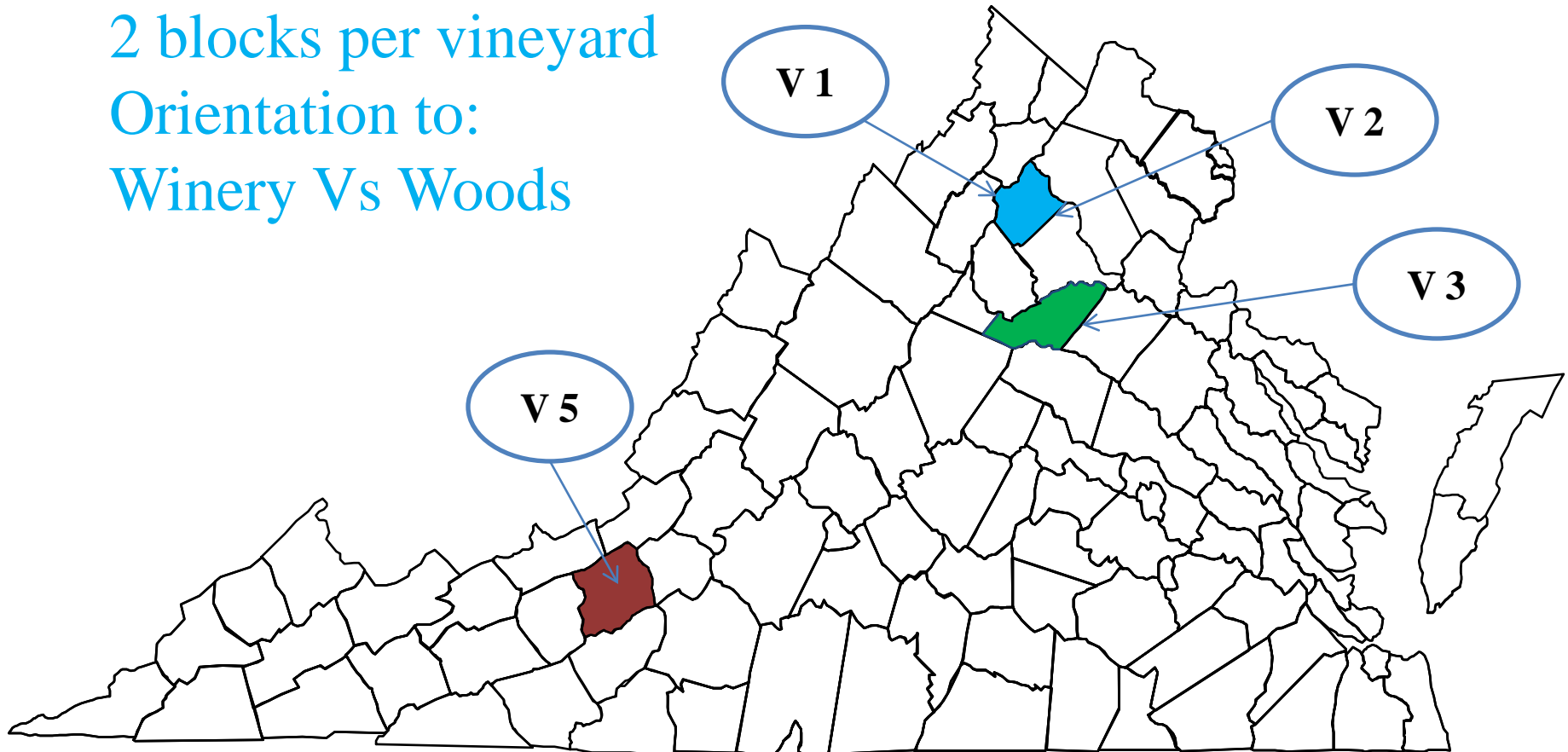


Objectives

To study the distribution pattern, abundance, seasonality and egg characteristics of *H. halys* in Virginia vineyards

Sampling, 2012

2 blocks per vineyard
Orientation to:
Winery Vs Woods



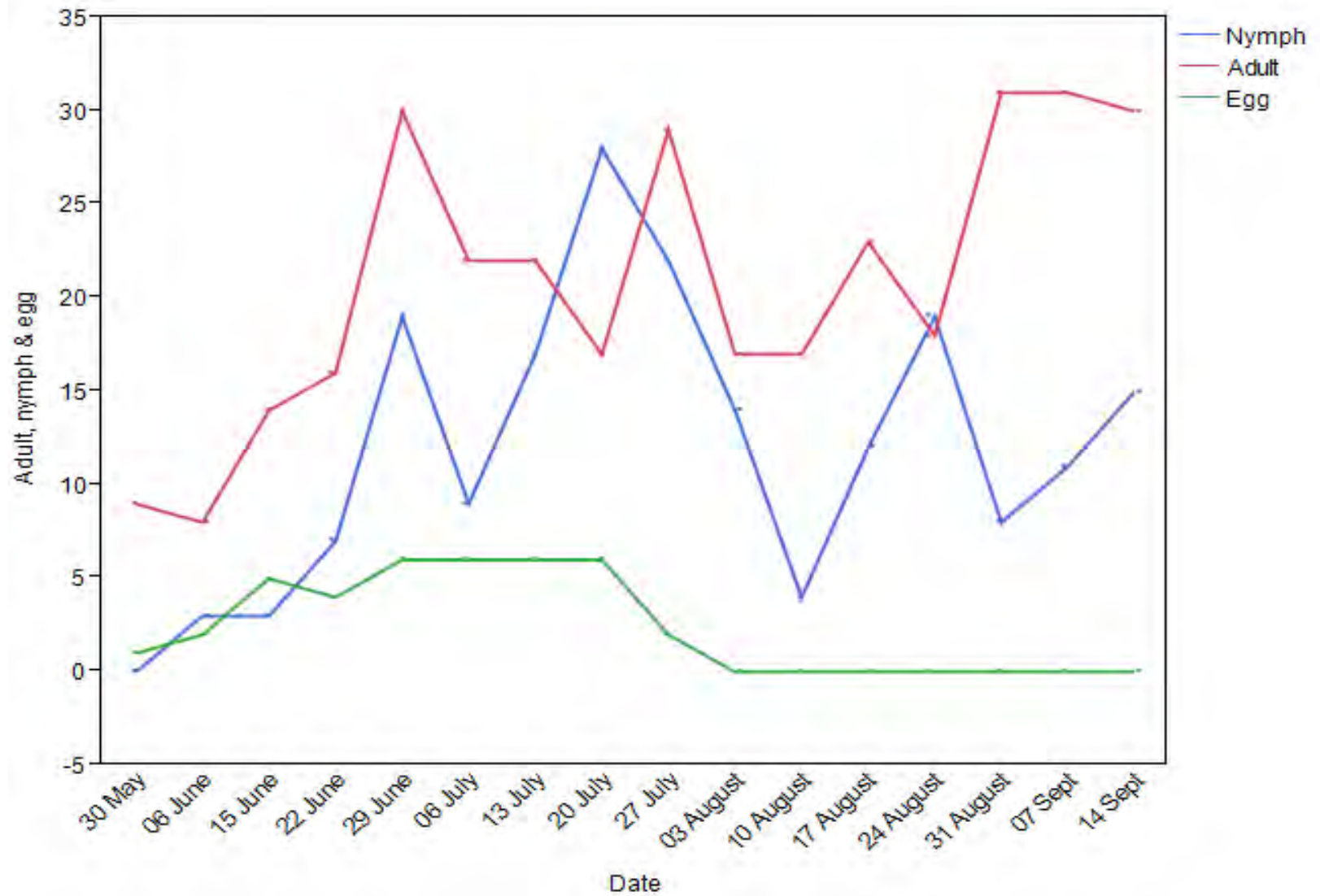
Sampling Procedure, 2012

- Weekly 3 min time count sampling
- Two Blocks : Orientation to winery & woods
- Border section & Middle section:
- 3 Samples at each
Edge & Middle



Result

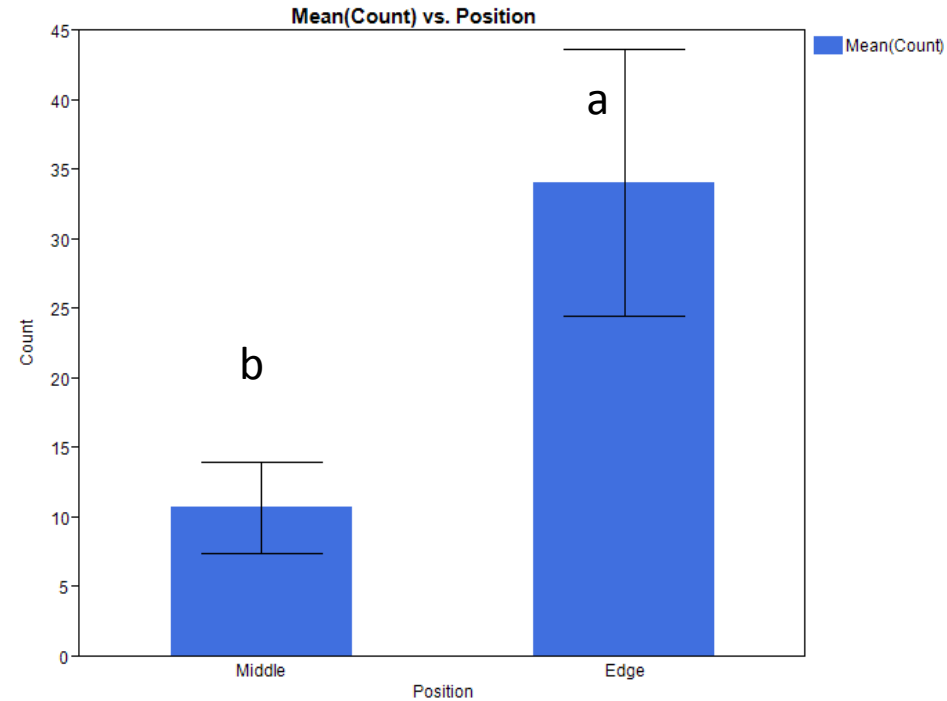
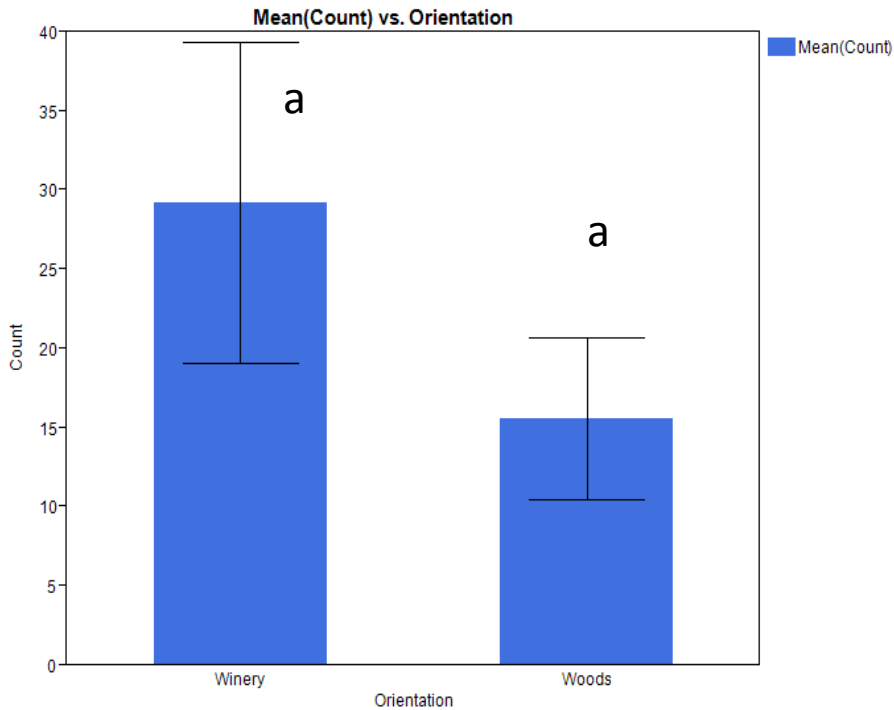
Seasonal phenology of *H. halys* in vineyards



Study of Edge and Orientation effect

- 2 x 2 Factorial design with blocking
- Blocking factor: Individual vineyard
- Factor 1: Orientation of the vineyard
Winery Vs Woods
- Factor 2: Edge effect
Edge Vs Middle
- Response Variable: Adults BMSB
Data transformed as $\text{Log}(x+10)$ and analyzed.

Orientation and Edge Effect



- No significant effect of orientation
- Significant edge effect
- No significant interaction between orientation and edge effect

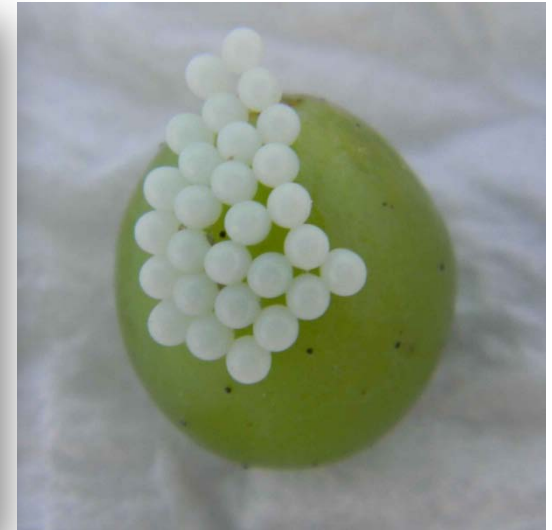
Egg Characteristics

- Av. eggs/mass: 27.72 (N= 203 masses)
- Median no. of eggs: 28 (53.69%)
- Eggs/egg mass: 14-32
- Conspicuous black bursters after egg hatch



Egg Characteristics

- Eggs laid underside of the leaves
- Occasional deposition on rachis & grape berry
- Av. egg hatchability in field condition 82.1% (N=80 masses)



Result Seasonality of BMSB in Vineyard 1

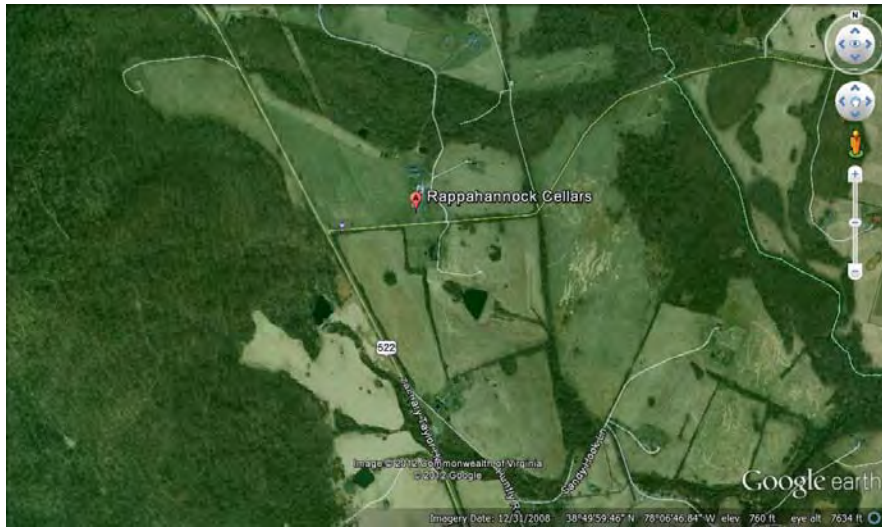
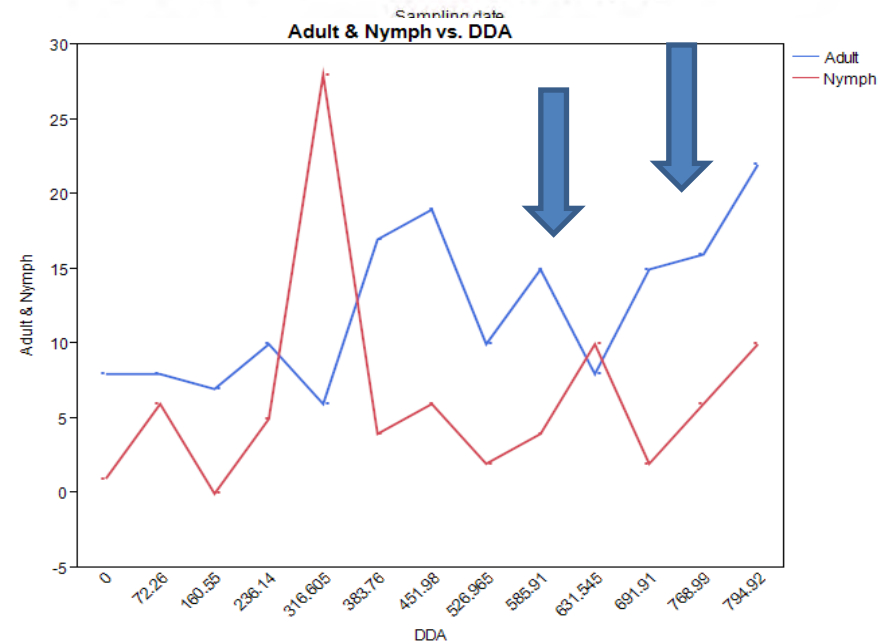
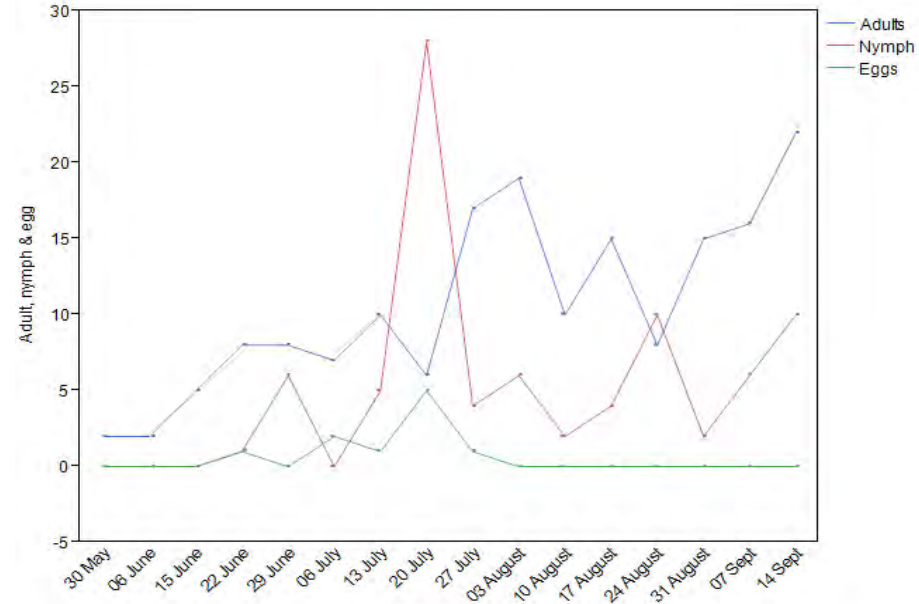


Fig. Map of the vineyard 1

Bio fix: first egg mass found, June 22
 Temperature threshold: 14.17 (°C)
 Total Development: 537.63DD
 Pre-oviposition period 147.65DD
 (Nielson et al. 2008)

- 1 Generation found



Result

Seasonality of BMSB in Vineyard 2

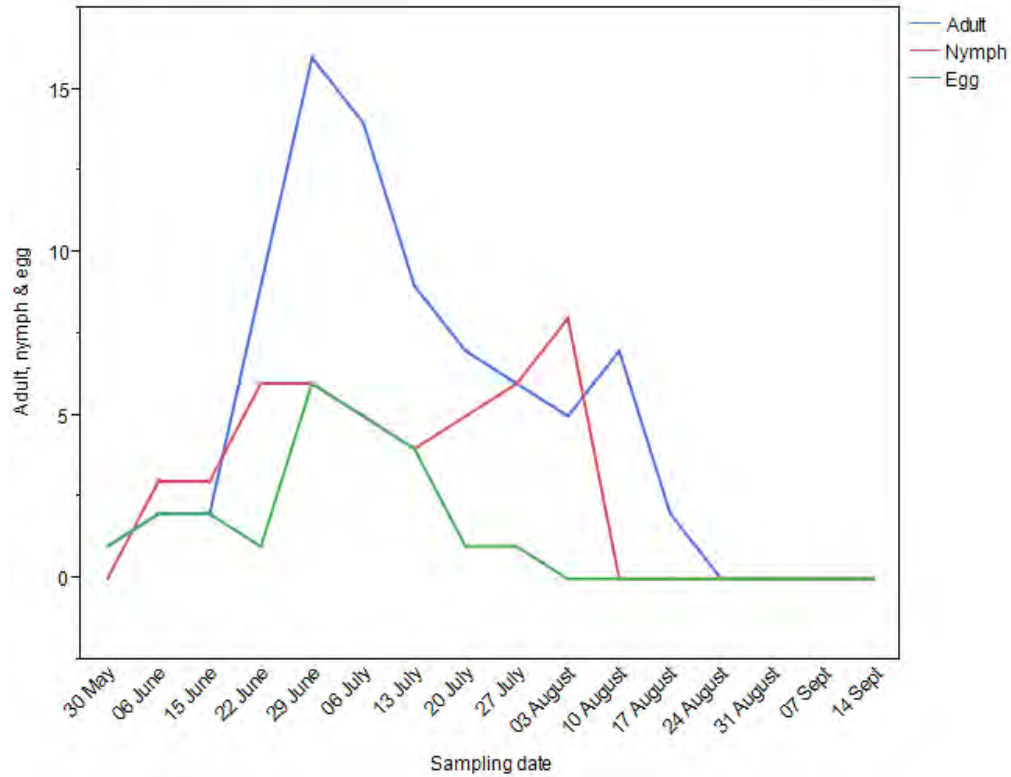


Fig. Map of the vineyard 2

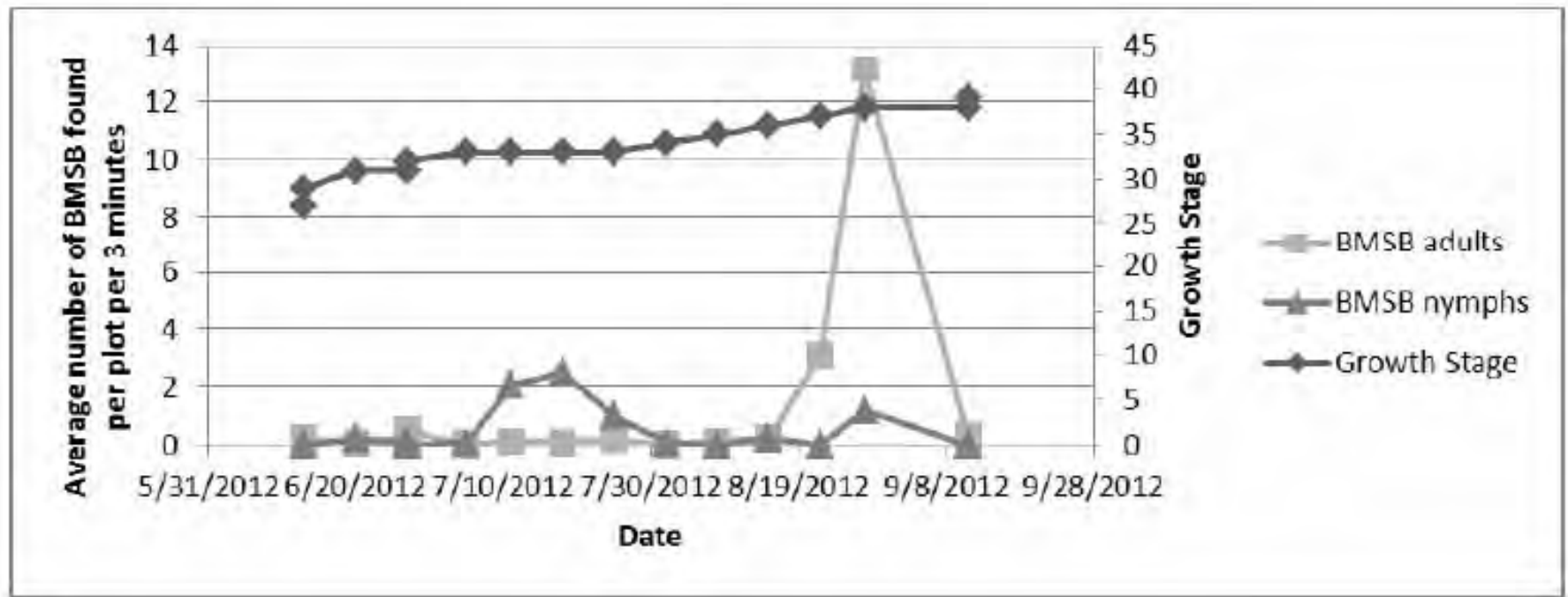
Conclusions

- Grape is both reproductive host and feeding host of *H. halys*
- Distribution and abundance are greatly influenced by geography and surroundings
- Pronounced edge effect in vineyards when the population density is high
- No significant effect on the orientation of the vineyard plot on abundance of *H. halys*
- Movement of *H. halys* to preferred host plants
- Only one generation in Virginia vineyards

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Phenology in Maryland Vineyards – Lamp, O’Leary, Delay, UMd

Figure 1. Average number of BMSB adults and nymphs found per plot per 3 minutes and growth stage of grapevines in each plot over the course of the monitoring period, WMREC.



Spike in adult numbers coincides with harvest ripeness

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BMSB feeding within clusters – Lamp, O’Leary, Delay, UMd

Figure 2. Photo of BMSB adult on a grape berry inside a cluster, WMREC. Photo courtesy B. DeLay.



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Bagged BMSB on Concord clusters – Timer, PSU

Control (0 bugs)

1 bug

2 bugs

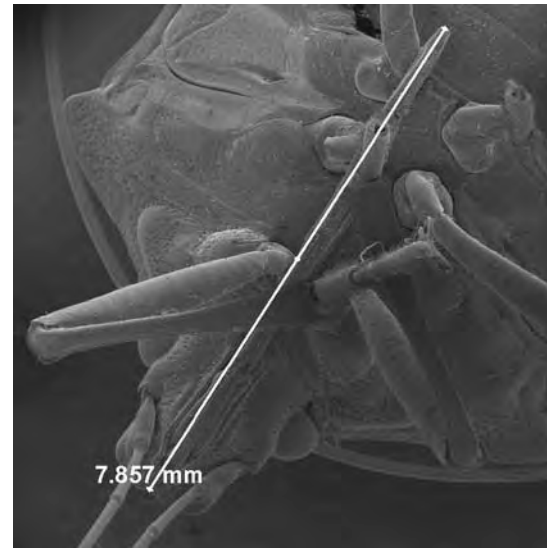
Time of Bagging	% Damaged	% Dropped	% Damaged	% Dropped	% Damaged	% Dropped
Pea-size	2.1	0.7	14.3	1.3	14.7	2.4
Veraison	2.3	0	7.5	1.1	7.5	0.3
PreHarvest	3.8	0	15.2	3.4	14.1	2.0

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Varietal comparison for BMSB presence – Nielsen, RU

Stage	Chamb	Chard	Lemb	Merlot	Tempr	Tramin	Vermen	Vidal
Nymph	6	0	2	0	1	1	1	28
Adult	1	0	3	0	5	0	1	2

Background



Direct injury to the berries Length of stilet sheath



Stylets



[H. halys feeding on grape](#)



Stink bug taint?

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Effects on grape juice/wine quality (“stink bug taint”)

– Joe Fiola, Univ. Md.

In 2011, there were fewer BMSB invading VA and MD vineyards at harvest, however they were still present in numbers that lead to problems including increasing sorting/handling issues, juice contamination, and potential off-flavors in finished wine. We will determine the severity of post-harvest problems from BMSB in wine grapes and assess the impacts of BMSB on vineyard and winery operations.

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Effects on grape juice/wine quality (“stink bug taint”)

– Joe Fiola, Univ. Md.

Fermentations were conducted in 2011 to determine the relationship between the presence of high numbers of BMSB (25) per 25 lb. lug and juice taint, the carry through of contaminants to finished wine, and the stability of any negative gustatory/olfactory characteristics on wine.

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Effects on grape juice/wine quality (“stink bug taint”)

– Joe Fiola, Univ. Md.

Evaluations of fermentations conducted in 2010 to determine the relationship between the number of BMSB (0, 1, 5, 10, 20) per 25 lb. lug and juice taint, showed no persistence of the taint in the wine after fermentations compared to uninoculated control samples.

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Effects on grape juice/wine quality (“stink bug taint”)

– Joe Fiola, Univ. Md.

Replicated fermentations with known numbers of BMSB per lug of fruit are in progress. (UMD).

Juice/wine will be evaluated at crush and at intervals after fermentation, using evaluation panels in triangle or other blind evaluation formats and to identify contaminated samples.

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