Obj. 1.2 & 1.3 Impact on Specialty Crops (Vegetables)

Funding

USDA United States Department of Agriculture

National Institute of Food and Agriculture

Specialty Crop Research Initiative

Grant #2011-01413-30937

Collaborating Institutions

University of Delaware

ars

Penn State

Rutgers

Northeastern IPM Center

Washington State University

Cornell University

University of Maryland

VirginiaTech

OSU Oregon State University

NC State University

Stop BMSB.org

Last night around 9:00 pm

Vegetable Crop Team Members

- Tom Kuhar *Vegetable Commodity Team Leader*
- Galen Dively, Cerruti Hooks, Gerald Brust, Emily Zobel
- Joanne Whalen, Bill Cissel
- George Hamilton, Gerald Ghidiu,
  Joe Ingerson-Mahar, Kris Holmstrom
- Jim Walgenbach, Mark Abney, Mathew Bickerton
- Shelby Fleischer,
- Kathy Kamminga, John D. Aigner

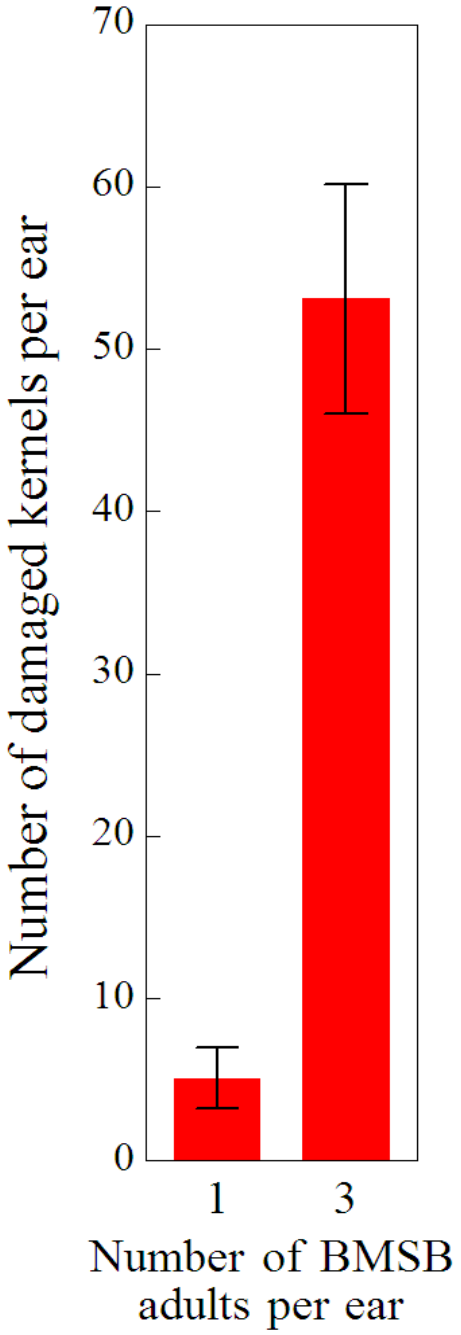
Impact of BMSB on Vegetable Crops

- Sweet corn, peppers, tomatoes, beans, eggplant, and okra are impacted the most (*see 2012 Plant Health Progr.* pub)
- Difficult to assess region-/statewide impact because of the patchiness of BMSB populations
- When bug densities are high on a farm, damage to the aforementioned crops can be severe (devastating)

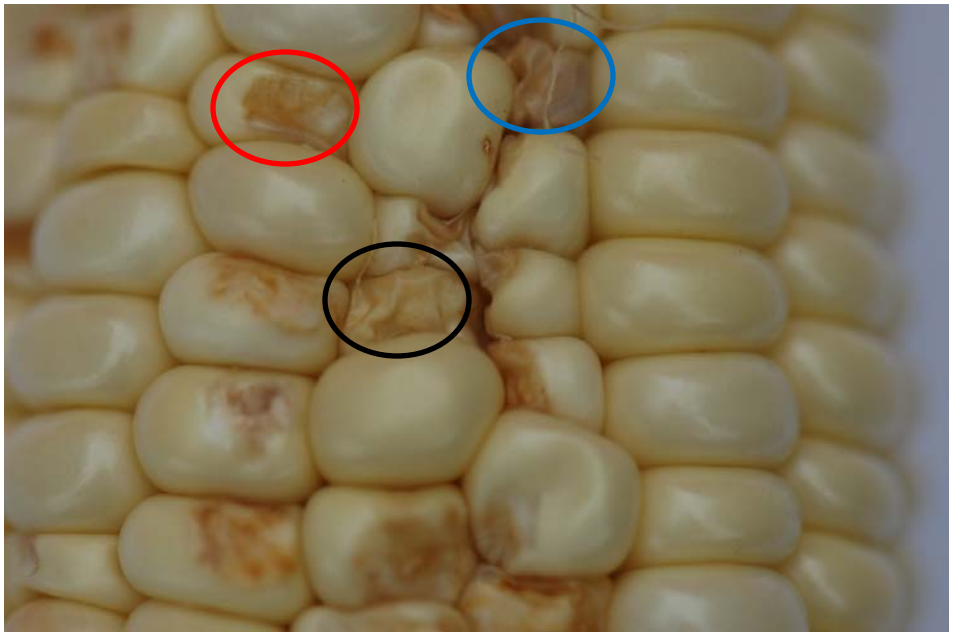
Sweet corn

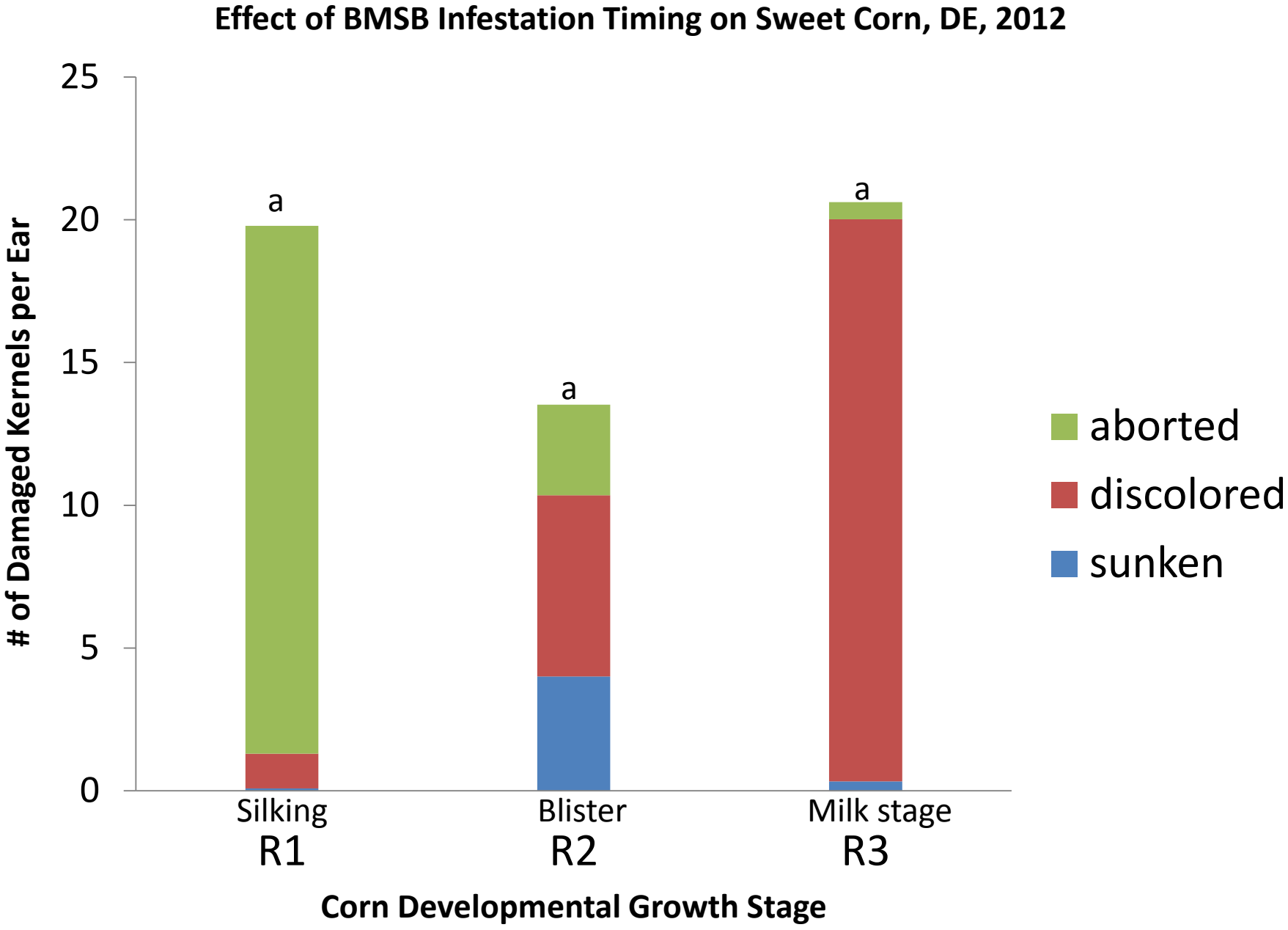
- Damaged ears can exceed 100% for certain planting dates and small fields
- Sweet corn can be attacked as early as late June in VA

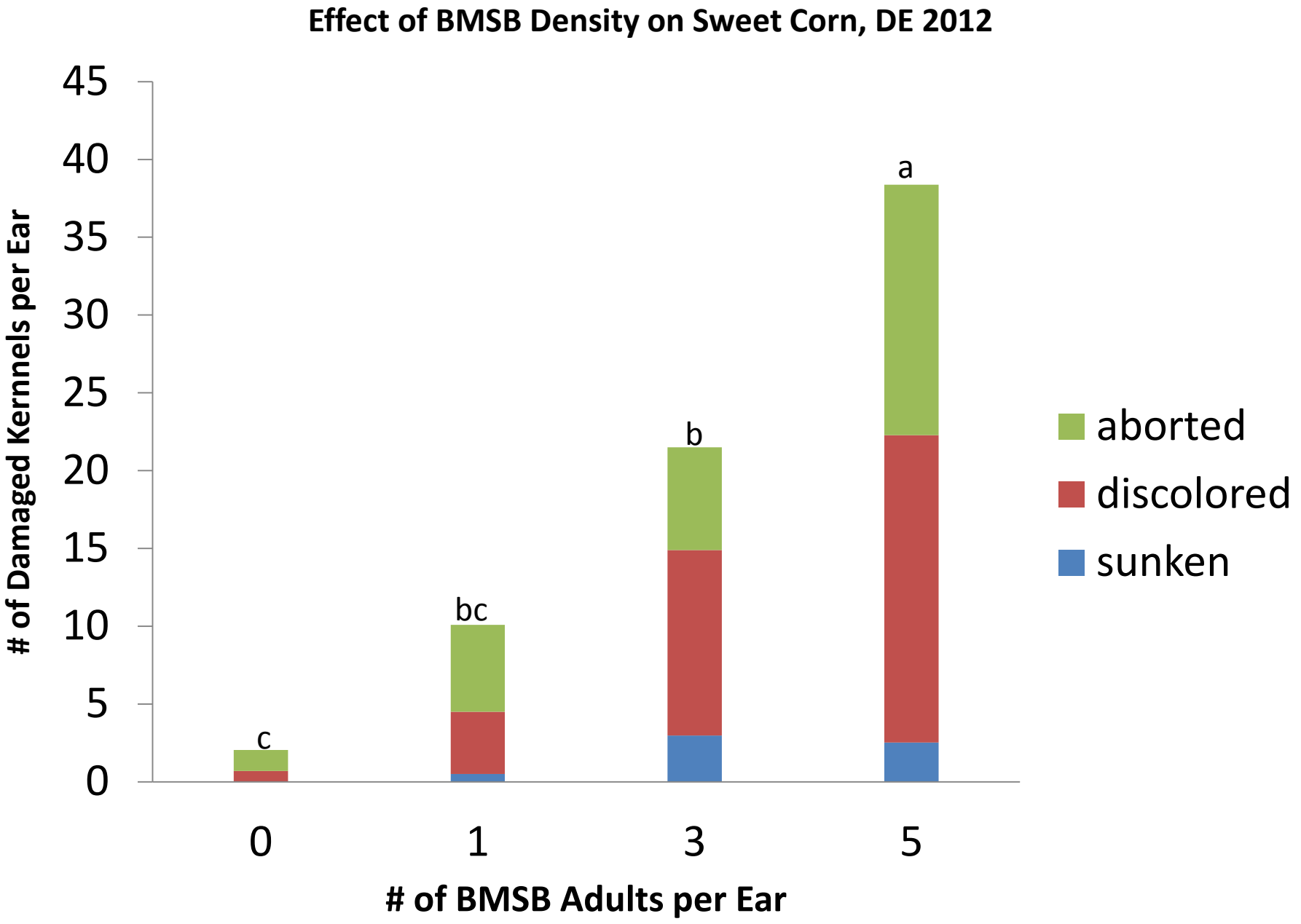
Kernel damage caused by BMSB adults enclosed on ears 10 days prior to harvest in MD (Dively)



- Damage Evaluations in DE (Whalen & Cissell)
  - **Discolored Kernels**
  - **Sunken Kernels**
  - **Blasted Kernels**
    - **Collapsed**
    - **Aborted**

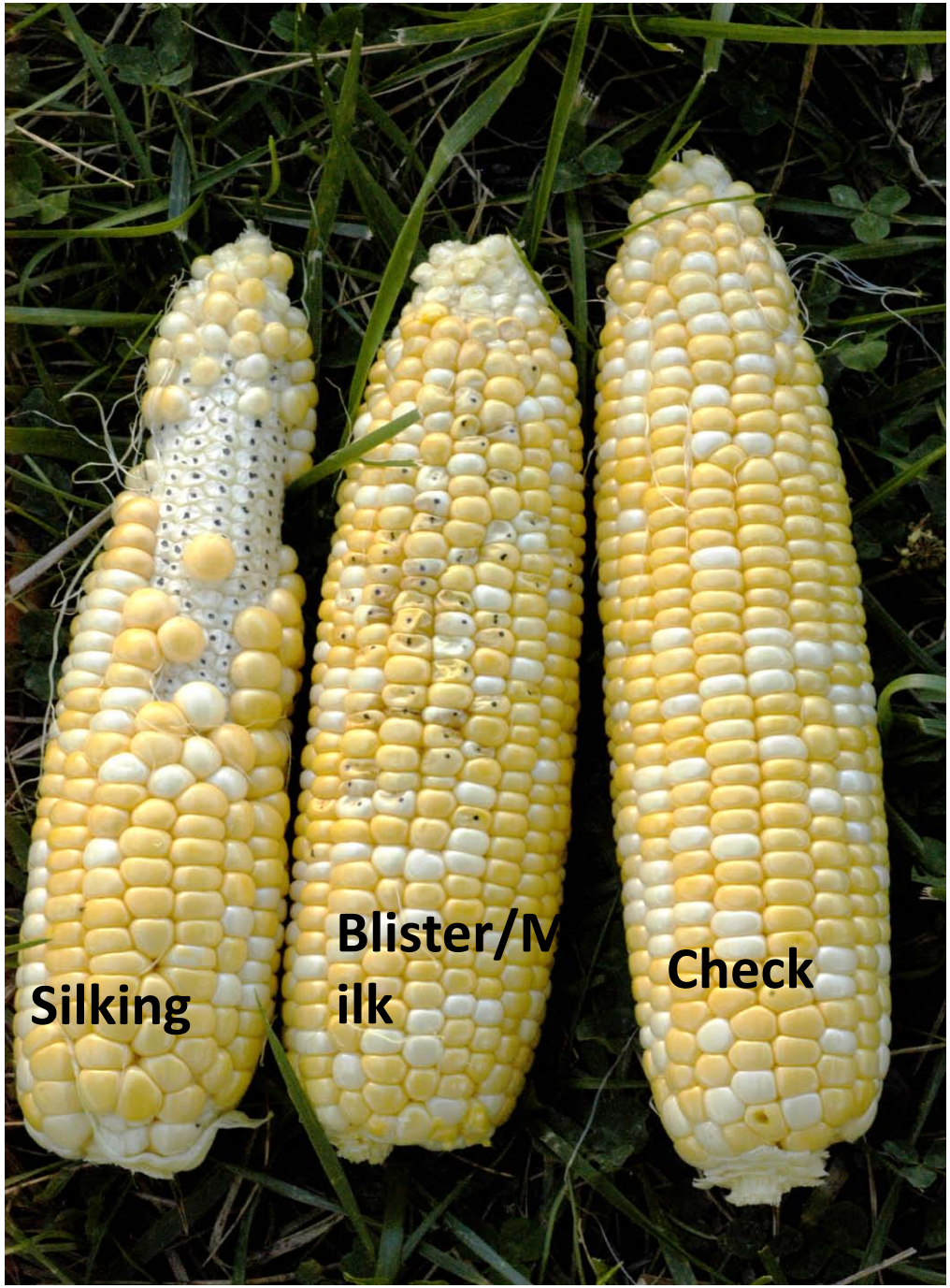



Effect of BMSB Infestation Timing on Sweet Corn, DE, 2012
# of Damaged Kernels per Ear
25
20
15
10
5
0
a
a
a
Silking
R1
Blister
R2
Milk stage
R3
Corn Developmental Growth Stage
aborted
discolored
sunken


Effect of BMSB Density on Sweet Corn, DE 2012
# of Damaged Kernels per Ear
45
40
35
30
25
20
15
10
5
0
c
bc
b
a
0
1
3
5
# of BMSB Adults per Ear
aborted
discolored
sunken

Infestation initiated at silking stage, 3-5 BMSB Adults/Ear

B. Cissel, University of DE



Conclusions

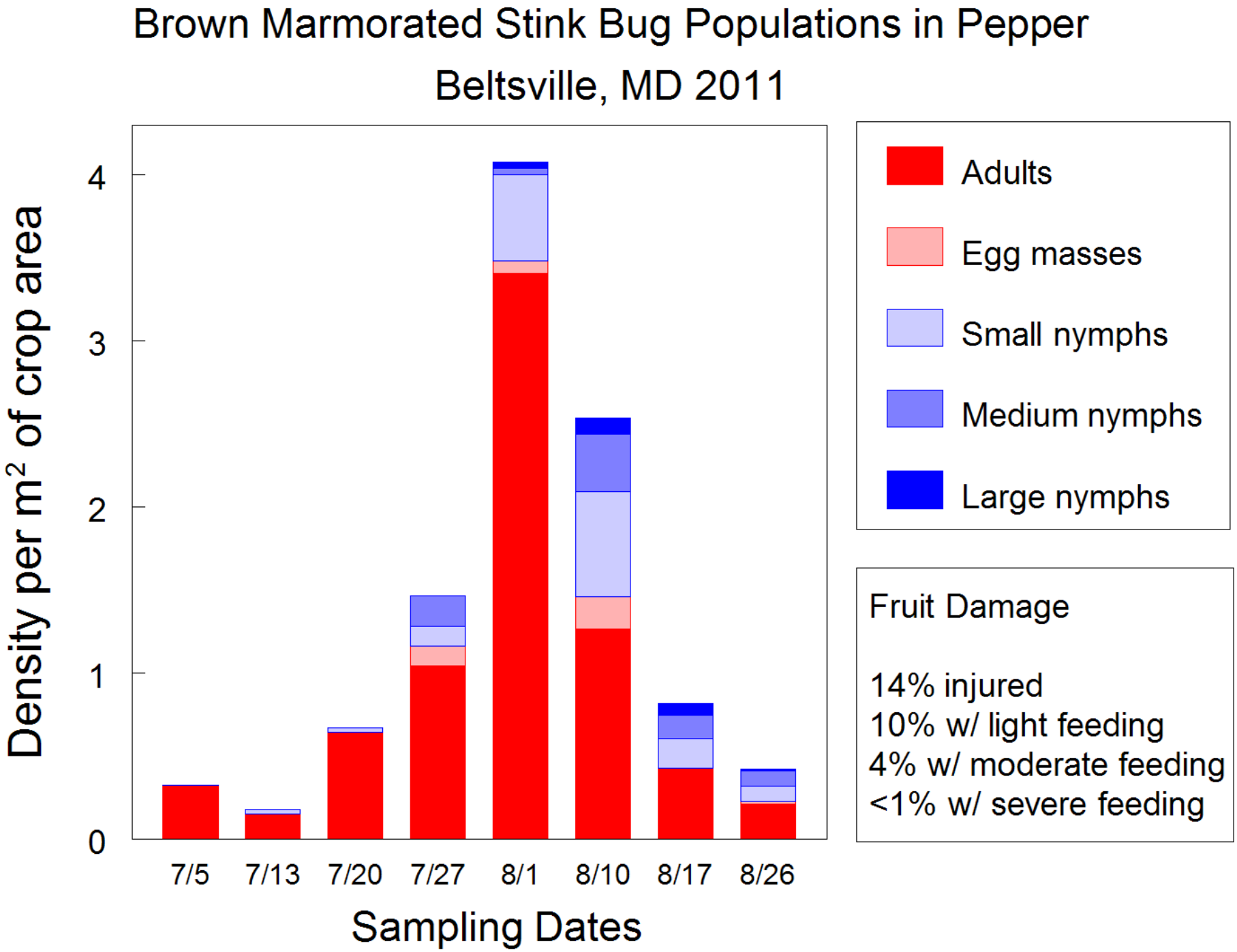
- Infestations occurring prior to pollination may result in incomplete kernel fill
- BMSB must be managed from ear shank emergence to harvest

Peppers

Bagged Pepper Plant Study - 2011

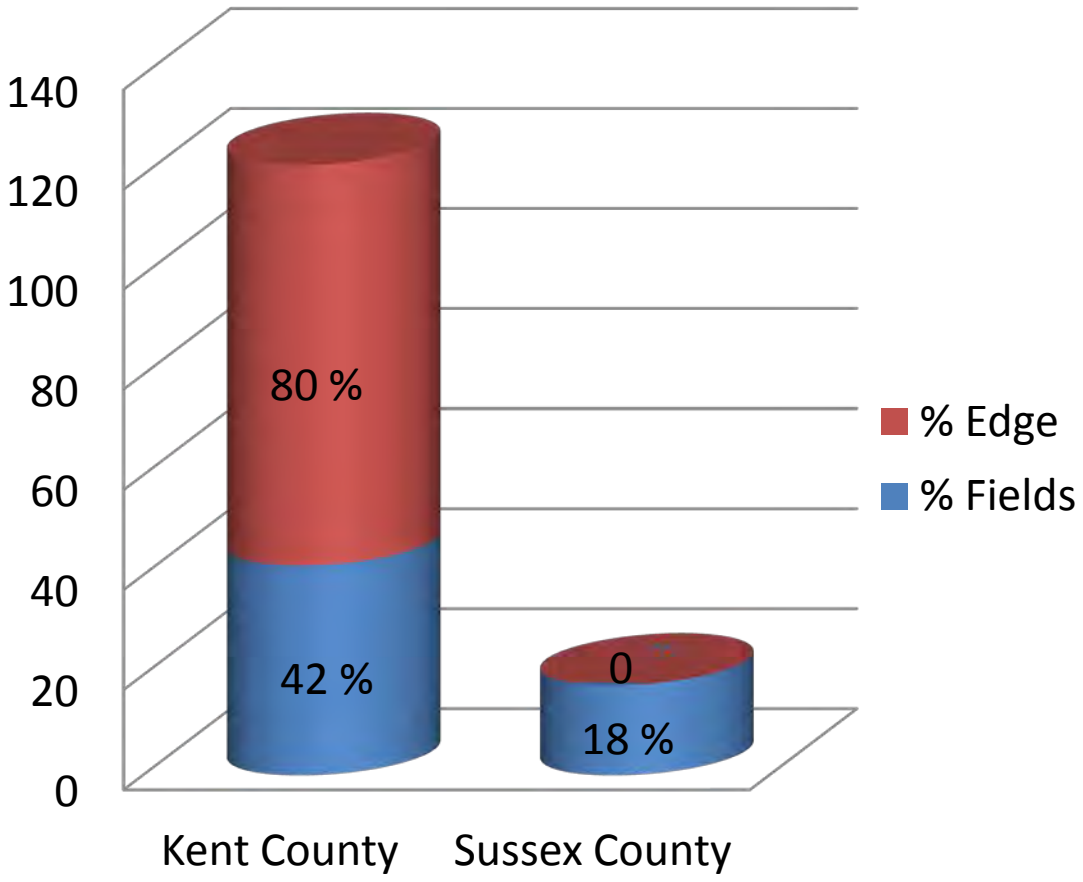
Control Plants

Infested Plants


Brown Marmorated Stink Bug Populations in Pepper
Beltsville, MD 2011
Density per m2 of crop area
0
1
2
3
4
7/5
7/13
7/20
7/27
8/1
8/10
8/17
8/26
Sampling Dates
Adults
Egg masses
Small nymphs
Medium nymphs
Large nymphs
Fruit Damage
14% injured
10% w/ light feeding
4% w/ moderate feeding
<1% w/ severe feeding

Edible-podded beans

Lima Bean BMSB Survey DE – 2012 (J. Whalen)



Surveyed 23 fields (2,000 acres) processing lima beans - sweep net sample - July 5 to Sept 11

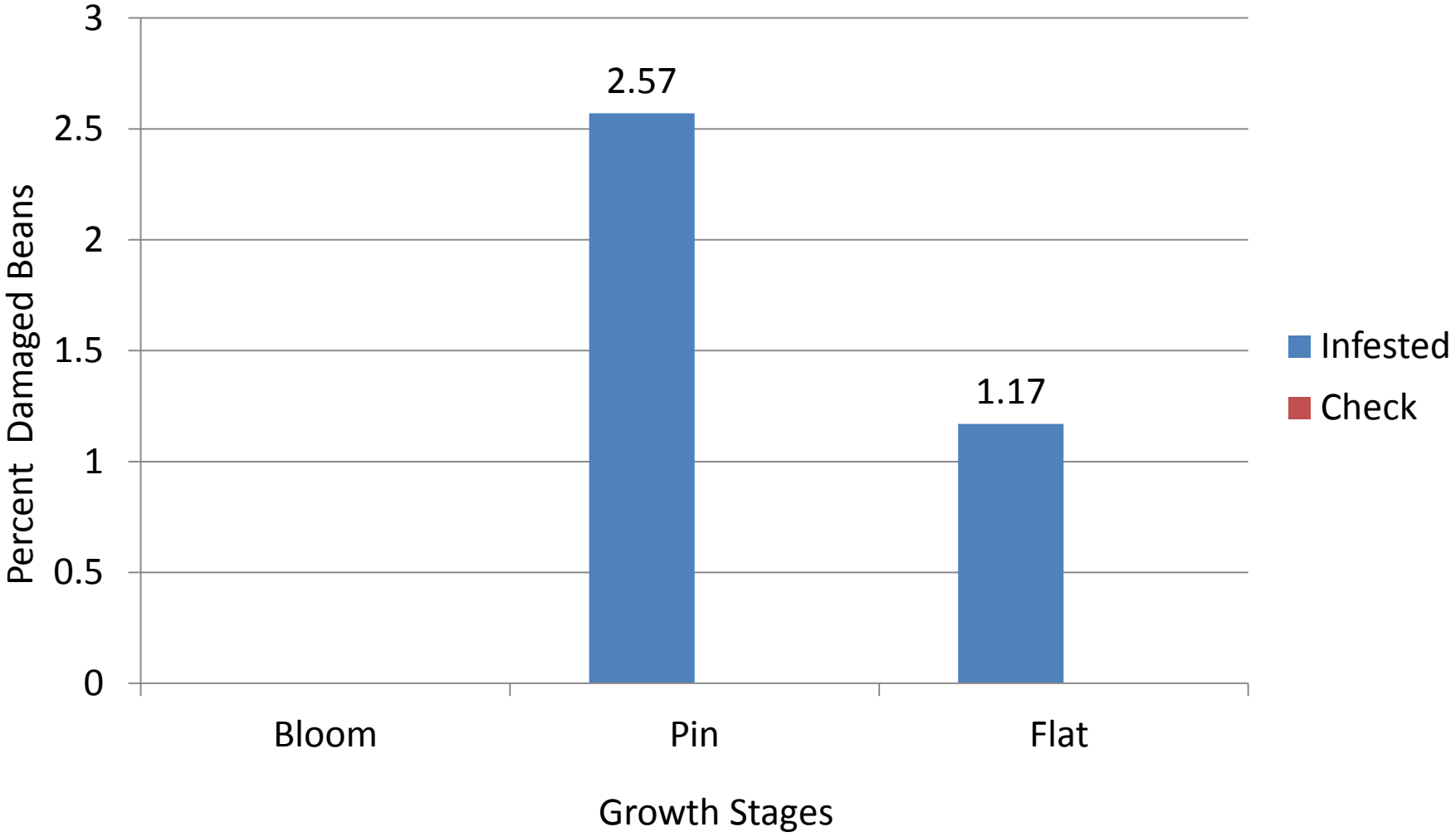
Lima Bean Cage Study – Sentinel Plot

- Bags placed on plants – 3 plants/foot of row - first bud
- Four reps per growth stage
- One BMSB adult per bag
- Left bugs in bags for 7 days– checked for live bugs 3 times
- Harvest Data : puncture wounds on pods and shelled beans

BMSB Damage to Lima Beans

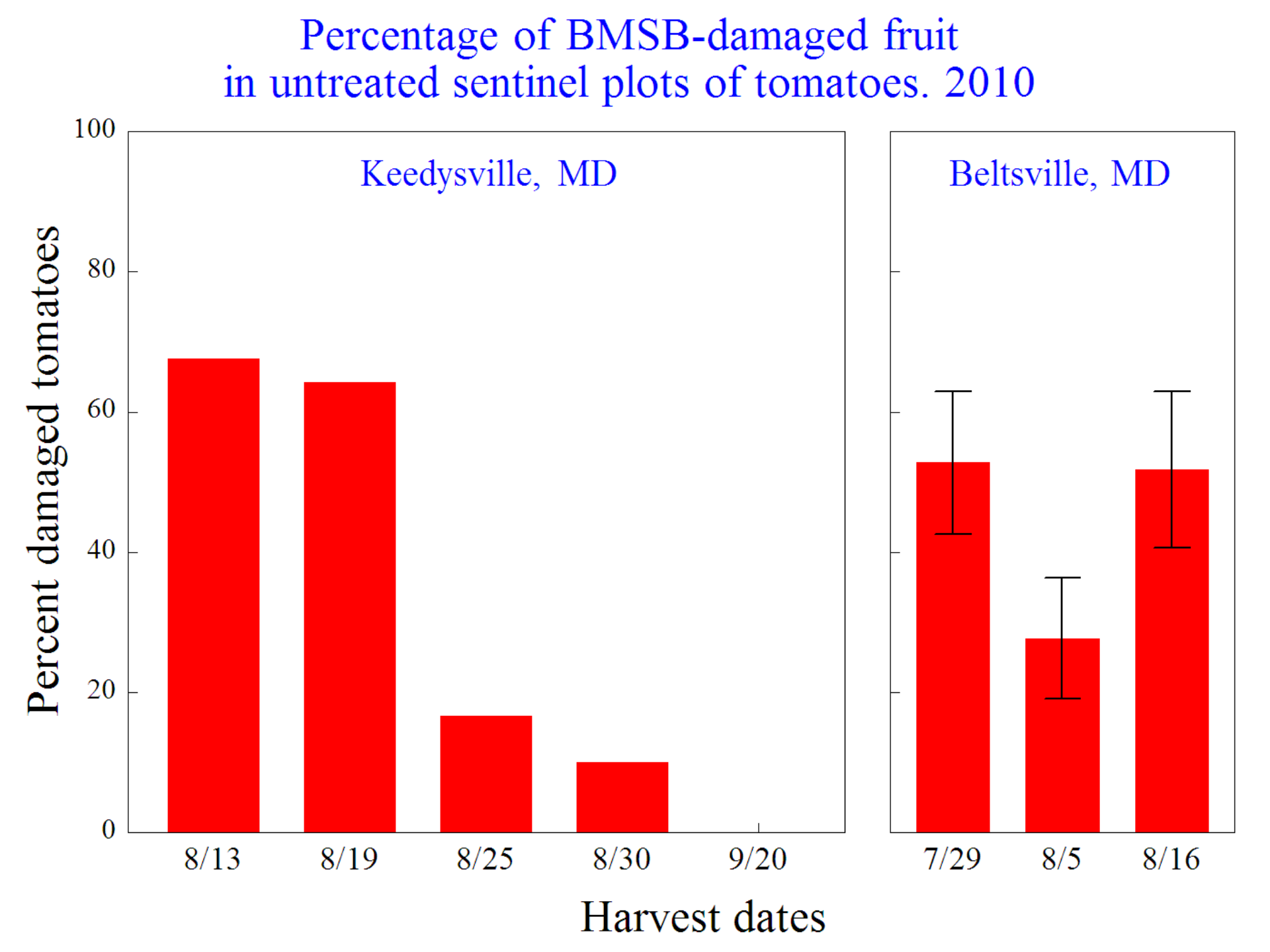
Photos: B. Mulrooney, Un of DE

Lima Bean Cage Study



Okra

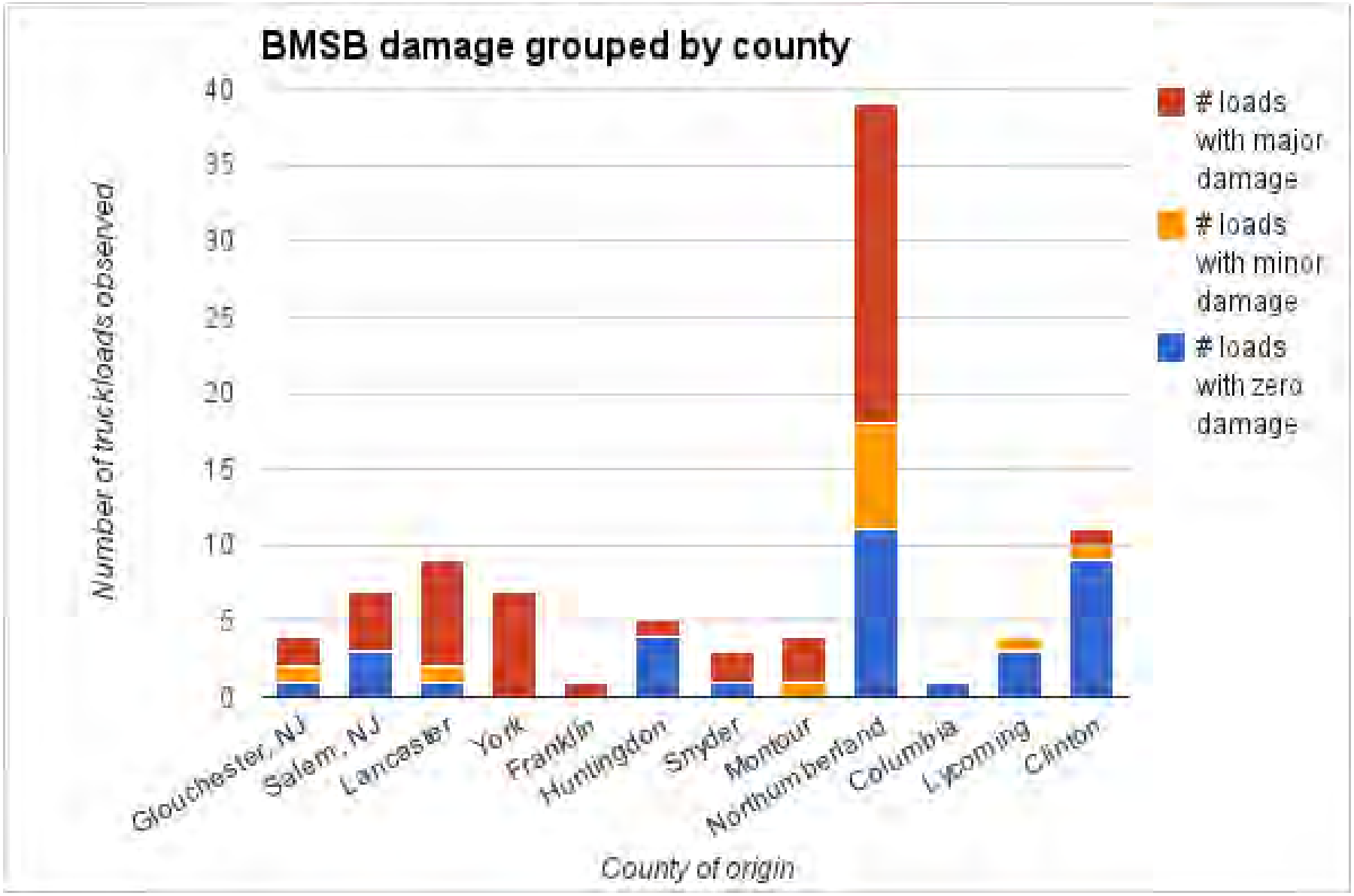
Tomatoes

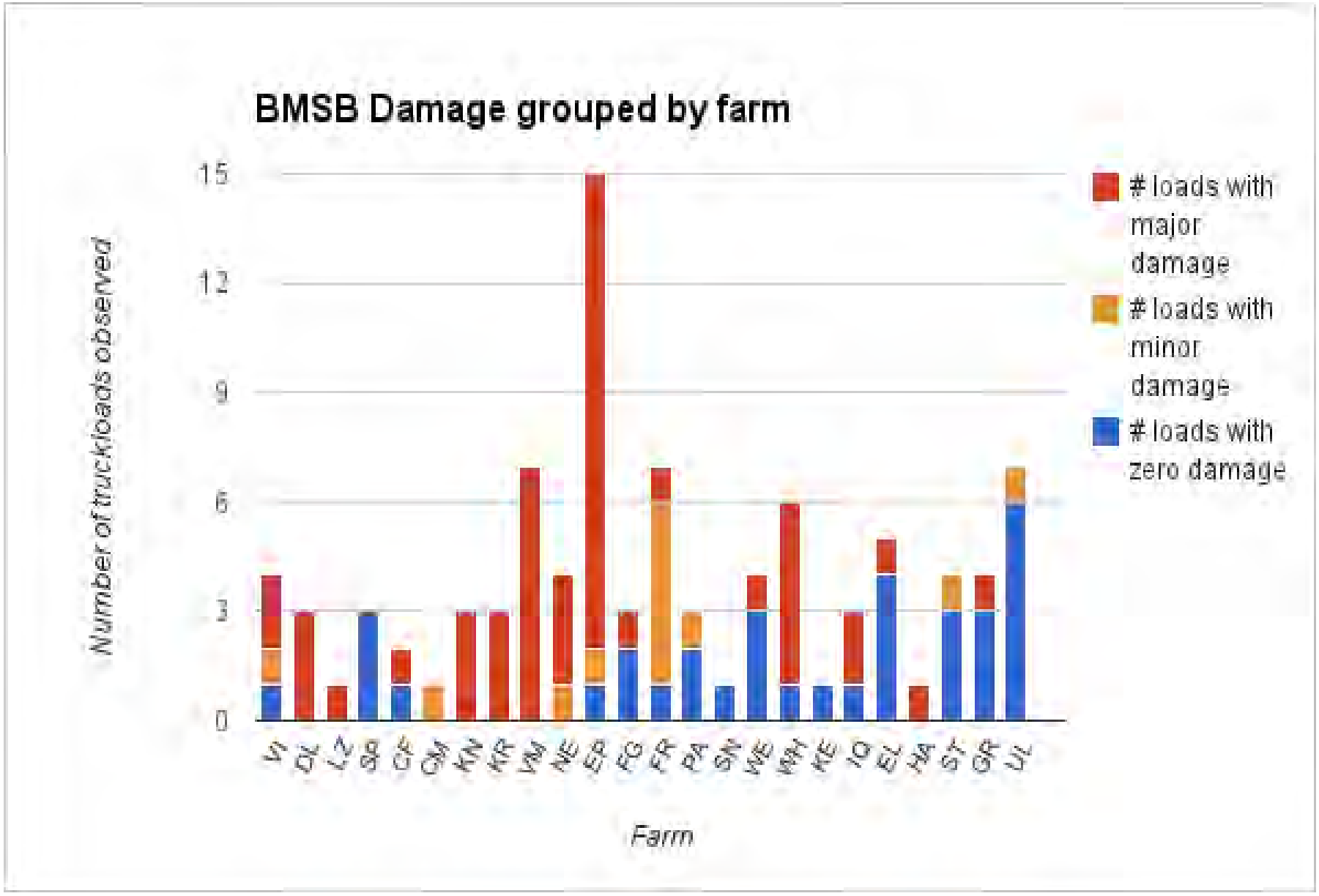

Percentage of BMSB-damaged fruit
in untreated sentinel plots of tomatoes. 2010
Keedysville, MD
Beltsville, MD
Percent damaged tomatoes
100
80
60
40
20
0
8/13
8/19
8/25
8/30
9/20
7/29
8/5
8/16
Harvest dates

Damage Assessments in Processing Tomatoes

- In 2012, Penn State researchers worked directly with Furmano Farms and placed an evaluator at the grading station as trailer loads were first moving into the processing facility.
- 75 tomato harvest truckloads from multiple counties in PA, NJ and MD were assessed for stink bug injury. Data are being summarized.


EDIBLE


BMSB damage grouped by county
Number of truckloads observed
0
5
10
15
20
25
30
35
40
Gloucester, NJ
Salem, NJ
Lancaster
York
Franklin
Huntingdon
Snyder
Montour
Northumberland
Columbia
Lycoming
Clinton
County of origin
loads with major damage
loads with minor damage
loads with zero damage

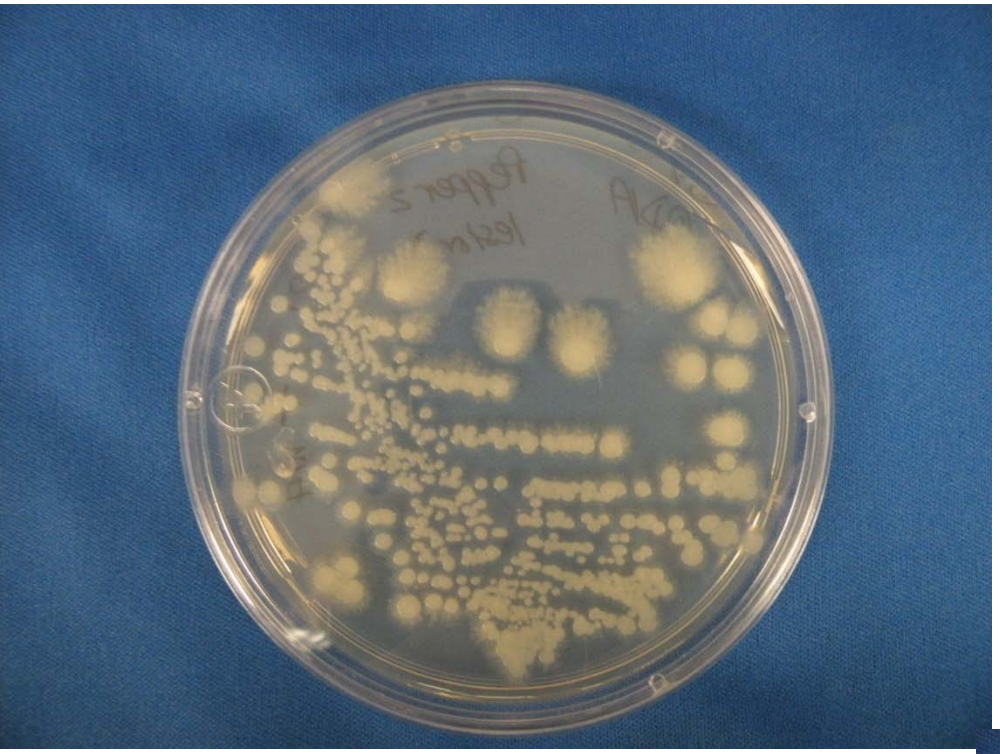

BMSB Damage grouped by farm
Number of truckloads observed
15
12
9
6
3
0
loads with major damage
loads with minor damage
loads with zero damage
Farm

What causes the browning and extensive damage to various fruits and vegetables from BMSB feeding?
Jerry Brust and Karen Rane (U. MD)

Yeast found

Eremothecium coryli (aka *Nematospora coryli*)

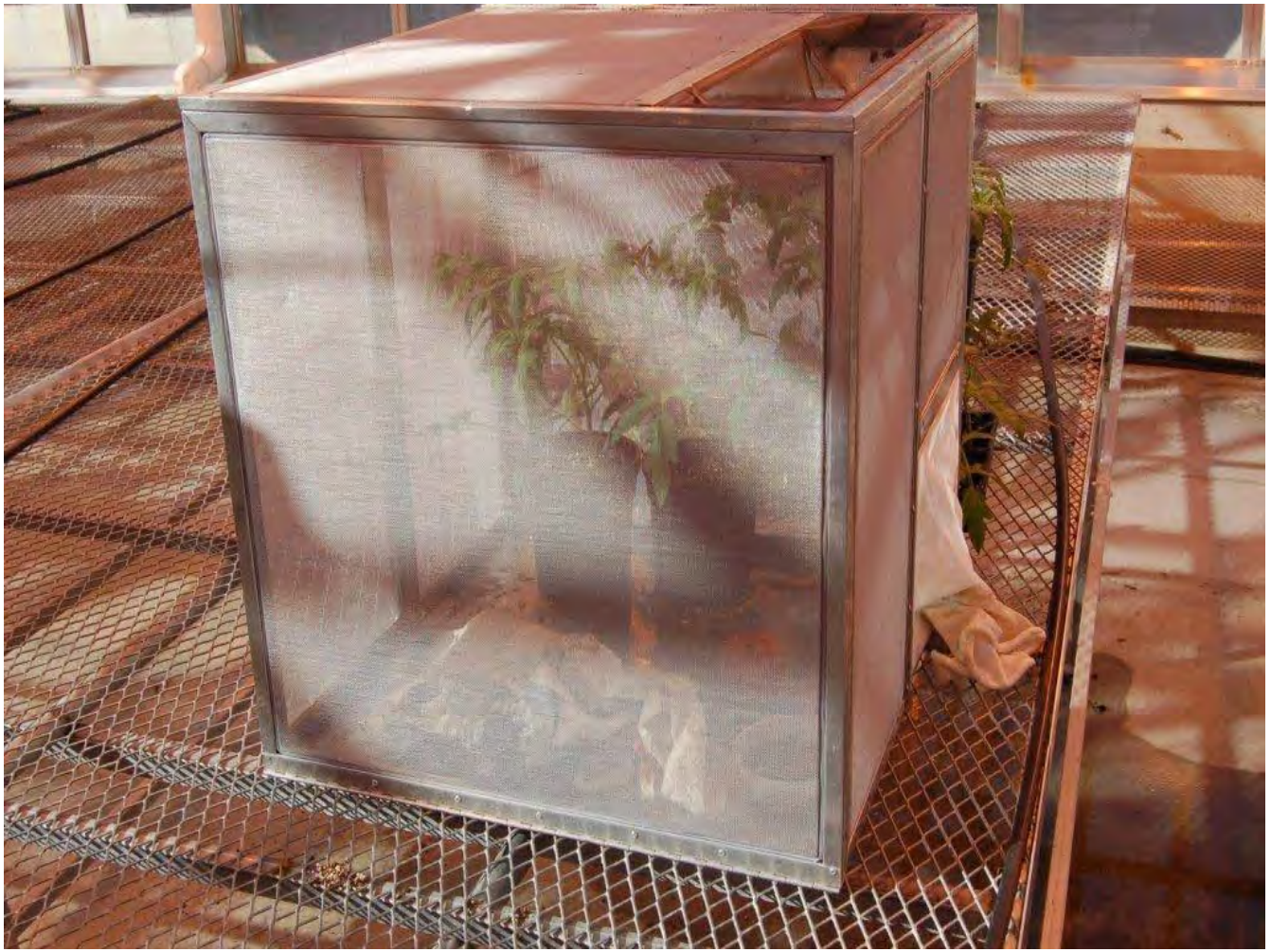
Causal organism of Stigmatomycosis of tree nuts, which is known to be transmitted by hemipterans (especially stink bugs)



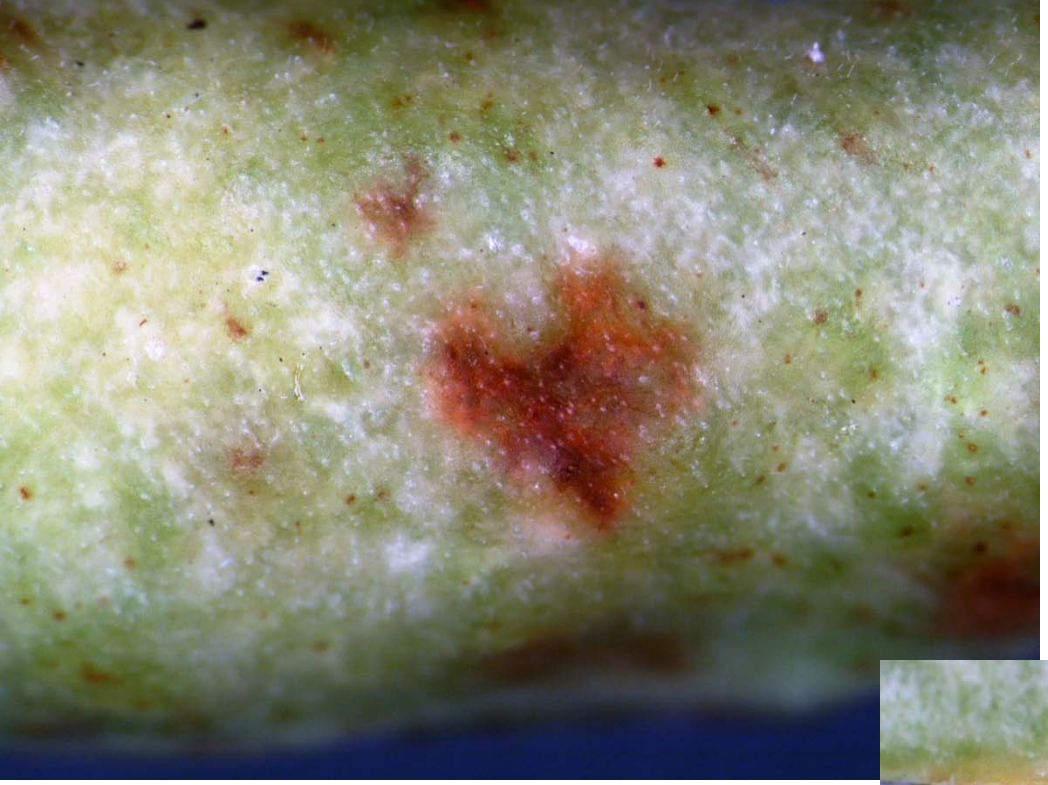
The yeast is taken up and becomes lodged in the stylet pouch when the insect feeds on infected host plants.

E. coryli is transmitted as fragments of mycelia and as small buds, after the insect has fed on infected host plants

Greenhouse feeding trials - Keedysville, MD



BMSB feeding on green bean

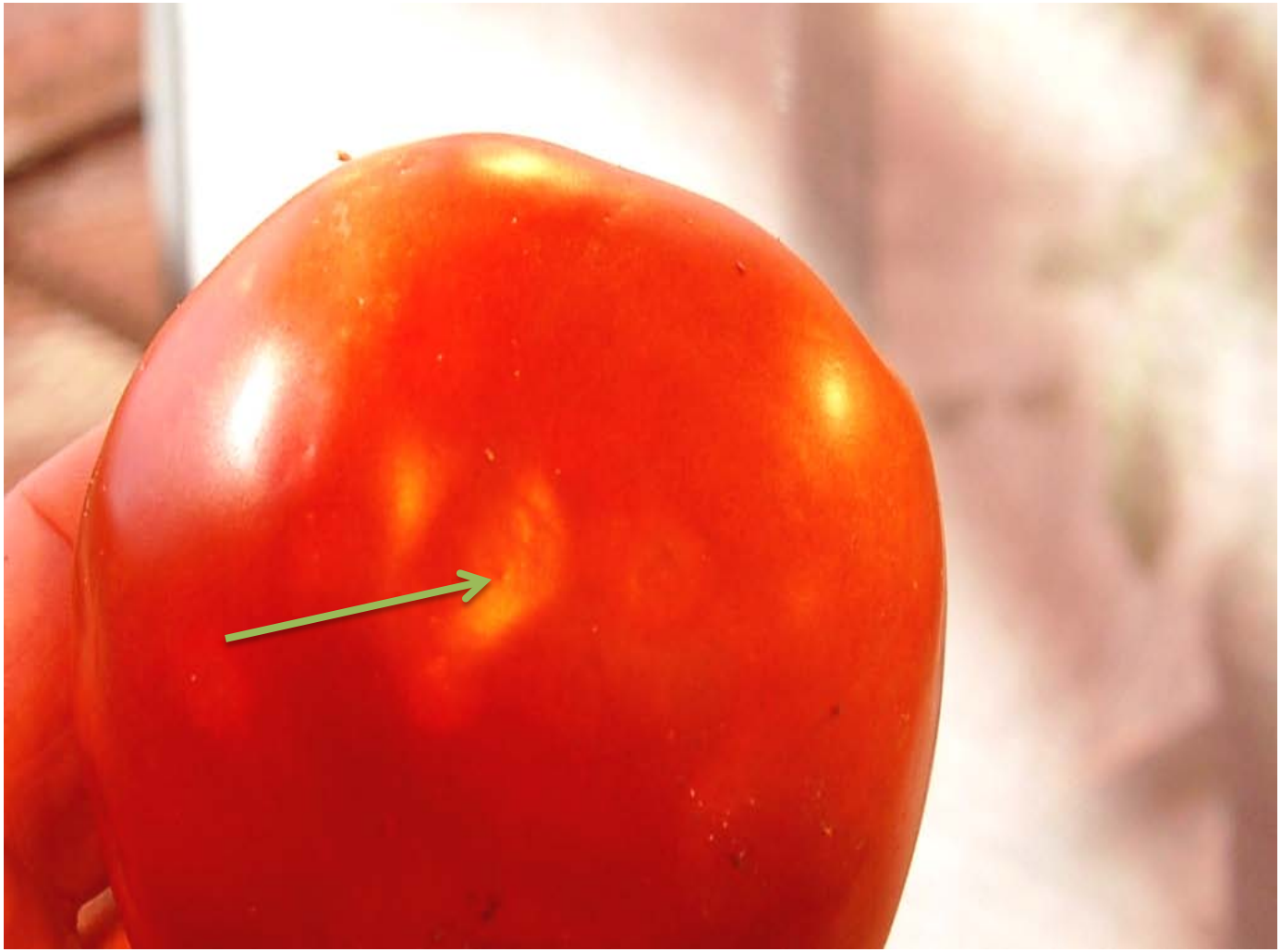


Yeast recovered

Eremothecium coryli

When yeast is present in BMSB feeding site it causes a collapse of the feeding area resulting in a ‘crater’ appearance.

Arrow shows BMSB feeding site on tomato, causing collapse of tissue. Tomato from cage-feeding trials



Expected Outcomes

- **We will characterize the different types of damage that BMSB can cause to vegetables.**

We will estimate the overall impact of BMSB on specific vegetable crops.