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2018

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Withers, James and Linford, Loren, "Testing Rearing Diets for A New Invasive Insect Pest in Utah, the Brown Marmorated Stink Bug" (2018). *Research on Capitol Hill*. Paper 91.

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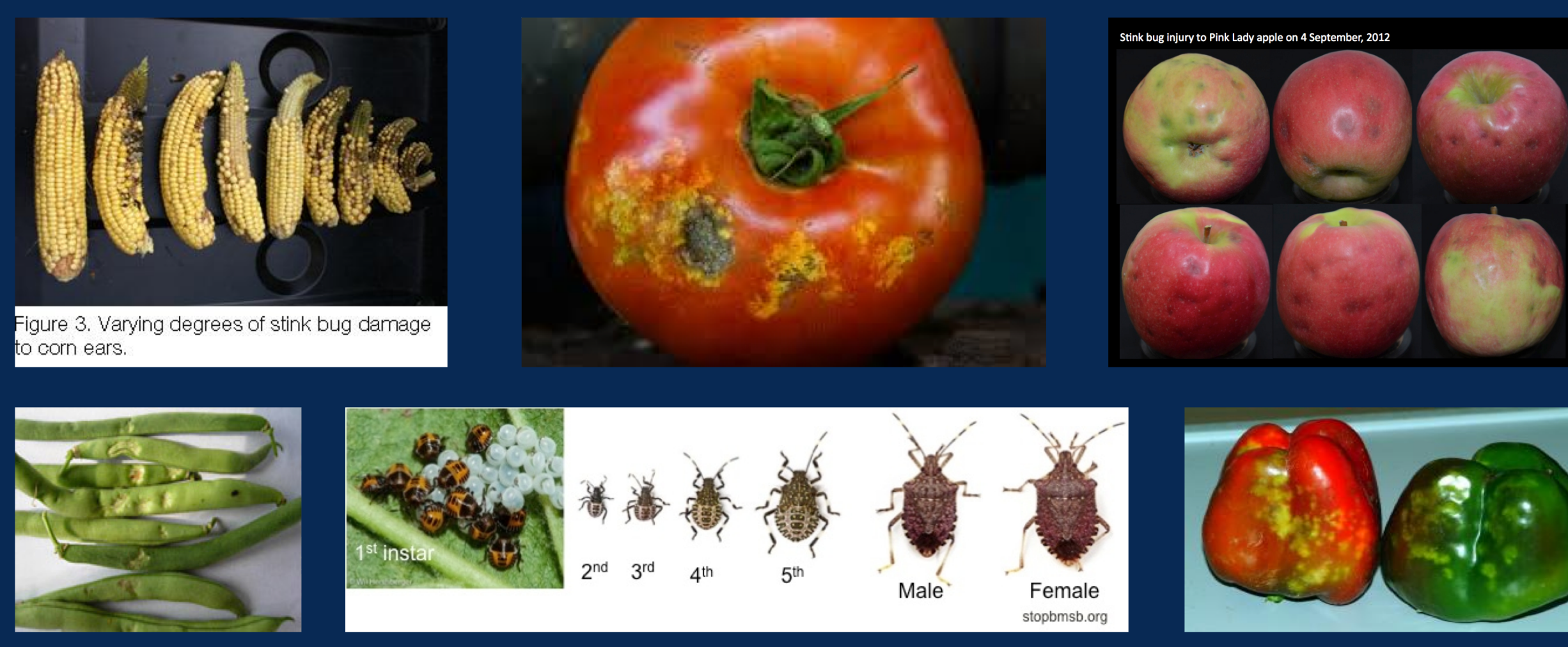




# Testing Rearing Diets for A New Invasive Insect Pest in Utah, the Brown Marmorated Stink Bug

James Withers, *Utah State University* | Loren Linford, *Utah State University*

## Crop damage and developmental stages of BMSB



## I. Introduction

The brown marmorated stink bug (BMSB), *Halyomorpha halys*, is an invasive insect from Asia. It has caused millions of dollars in damage to fruit, vegetable, ornamental, and field crops since its arrival in North America, and can be a severe nuisance pest when it congregates on human structures to overwinter. The BMSB caused \$37 million of apple crop damage in the Mid-Atlantic Region in 2007 to 2010. To study the insect, effective rearing methods are needed. Previous research (Funayama 2004 & 2006; Medal et al. 2012) showed that carrot, raw peanut and soybean increased rearing efficiency. Recent lab experience has found good success with sweet pepper. Our objective was to identify combinations of food sources to increase BMSB survival and reproduction. Carrot was used as a common food source across all treatments. BMSB from the USU colony are used in insect control studies to help combat the pest in Utah.



## II. Methods

We tested four food combination treatments, replicated four times each, for both Nymphs and adults

- Treatment 1: bell pepper and carrot
- Treatment 2: soybean, peanut and carrot
- Treatment 3: green bean and carrot
- Treatment 4: apple and carrot

Measurements were collected weekly for eight weeks. Foods were replaced weekly. We measured:

- Number of dead and living adults by gender (male and female).
- Number of egg masses produced.
- Number of live and dead Nymphs, and their development stage (1st - 5th instar).
- Weight of adults and Nymphs



BMSB food treatments (right) and experiment Alcon gainers enclosed in mesh cages (left).

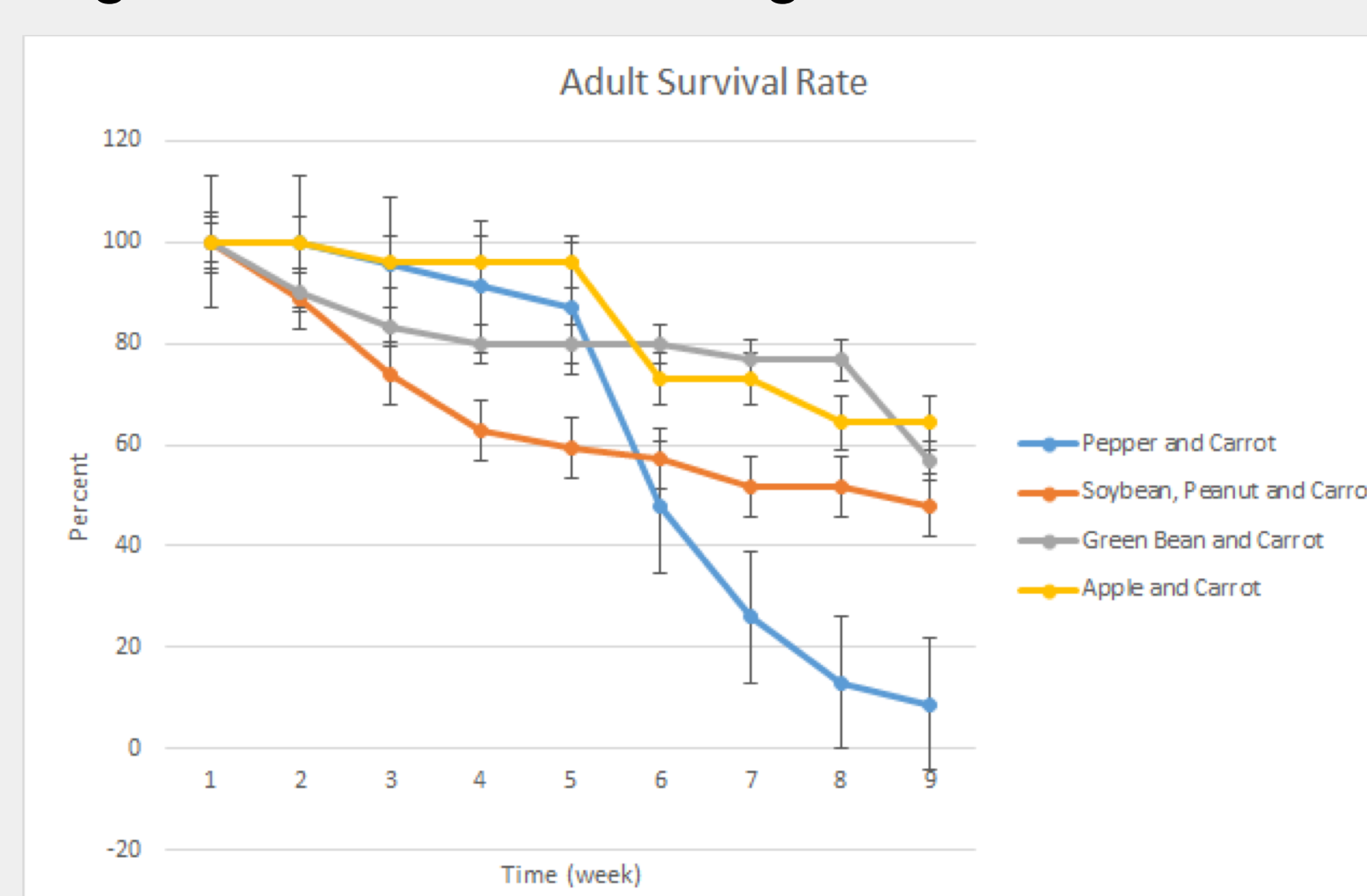


## III. Results

### Adults

- Adult survival was much lower when fed pepper (Trt. 1)(see Fig. 1).
- Only adults fed soybean/peanut or green bean (Trts. 2 and 3) produced egg masses.

Figure 1: Treatments including high protein or high moisture had the highest survival rate



## III. Results continued

### Nymphs

- In the early developmental stages (instars 1-3), a diet with apple produced high survival rates; however, it was not advantageous to later developmental stages.
- A diet including green beans allowed for a nymph to reach adulthood.

Figure 2: All treatments had a high mortality rate.

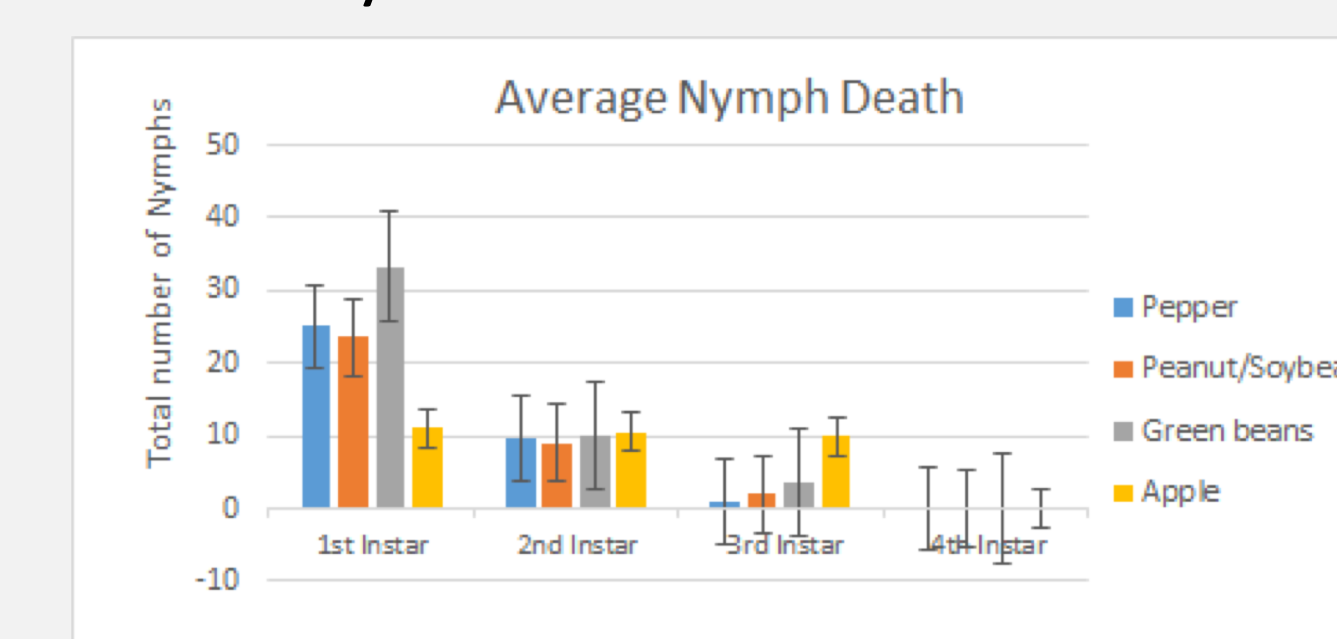
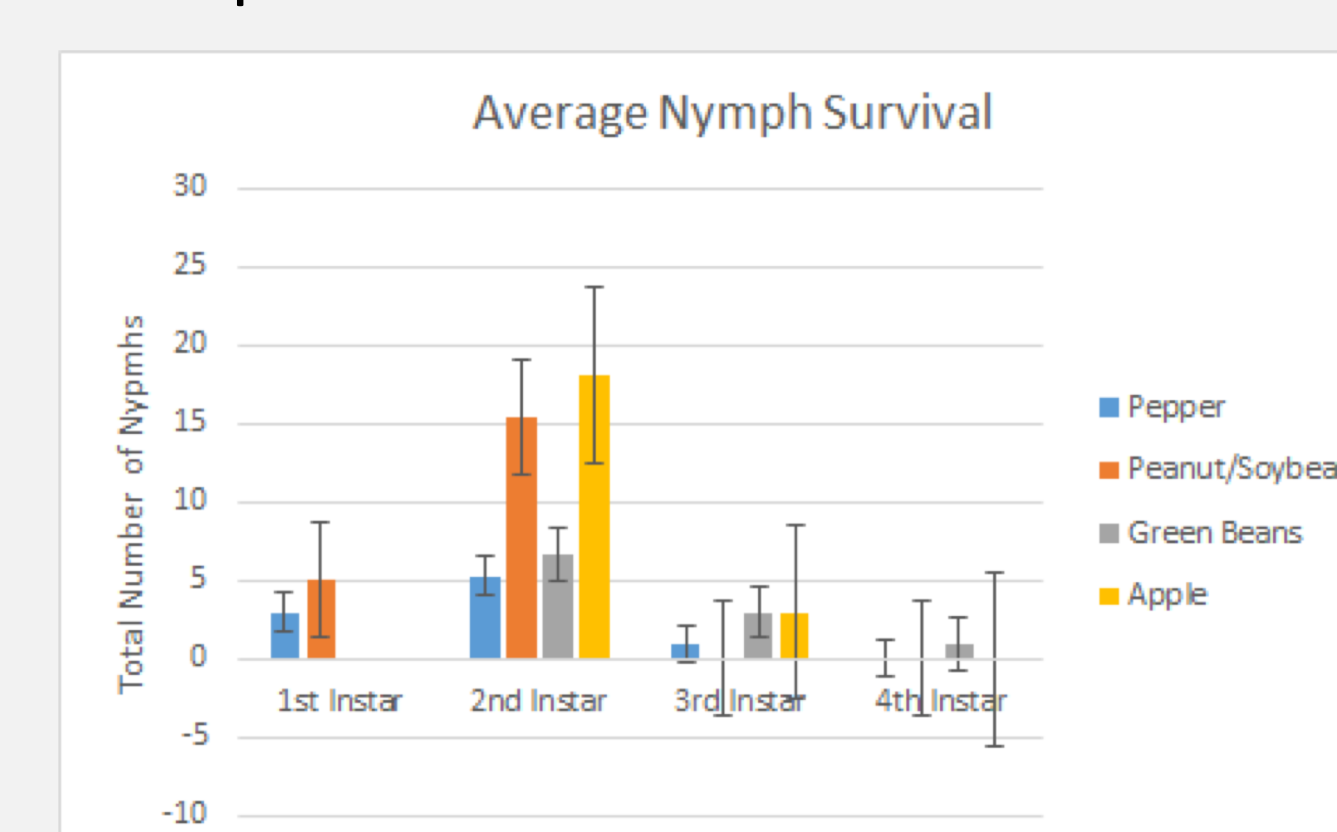


Figure 3: Treatments with moisture and protein were more successful.



## IV. Conclusions

Foods with protein (e.g., soybean, peanut and green bean) were necessary for egg production by adults. Additionally, protein intake was important for later nymph (instar 4) to complete development to an adult.

Humidity, created by foods high in water content (e.g., apple), were important to development and survival of nymphs and adults.

Multiple factors may have influenced BMSB mortality and egg production rates, such as conducting the experiment in the fall at the end of their development cycle, fluctuating temperature and humidity in the rearing room, and mold growing on foods, especially apple.

We thank Dr. Alston, Cody Holthouse, Zach Schumm and the Department of Biology, Utah State University, for supporting this research project.