

Title: Assessment of the Potential Damage and Economic Impact of Stink Bugs on Soybeans in Delaware – 2008

Personnel: Joanne Whalen, Extension IPM Specialist and Bill Cissel, Extension IPM Associate, University of Delaware

Methods:

The soybean variety 'SS RT4440N' was planted on 30 inch centers on June 19 at the University of Delaware's research station located in Newark, Delaware and on June 20 at the University of Delaware's Carvel Research and Education Center located near Georgetown, Delaware. Each plot was divided into three equal blocks (each block 100 ft wide) and treatments were established in each block. Nylon mesh bags were used as cages by placing the bag over the soybean plants, anchoring it to the ground using landscape staples and tying the top of the bags using baler twine immediately after placing cages in the field. The sample unit for each cage was one foot of row and plants were thinned to a final plant population of three plants per foot of row. Cages were placed on all of the treatments once the plants reached the R-2 growth stage (Aug 13) at the Newark location and at the R-3 growth stage (August 15th) at the Georgetown location. The cages remained on the plants for each of the treatments until harvest. Two levels of stinkbug infestation were established: (1) one adult stinkbug per foot of row and (2) no stinkbugs. These infestation levels were established at three different stages of plant growth: R4 (full pod, 3/4" pod in top 4 nodes), R5 (1/8" seed in top 4 nodes), and R6 (full size seed in top 4 nodes). All of the cages were checked twice within the first week following infestation to insure that a stink bug was present and that the uninfested cages remained uncontaminated. The presence of stink bugs was noted for each of the cages and replaced with an adult green stink bug if found dead or missing. After three weeks, the stink bugs were removed and data recorded as alive, dead or missing. Plots were harvested at physiological maturity and the following data was recorded: total number of aborted pods per foot of row; total number of flat pods per foot of row; total number of seeds; and dry weight. All seeds in each sample were also evaluated for the following quality parameters: purple stain, grey mold, pitted seed and shriveled seed. Each data set was analyzed by the mixed model SAS procedure to test for main effects for growth stage and treatment (infested versus uninfested) and their interaction effect. The Tukey option was used to test for significance among multiple mean comparisons.

Infestation and Removal Dates for Each Location and Growth Stage

Plot 1: Newark			Plot 2: Georgetown		
Growth Stage	Infestation Date	Removal Date	Growth Stage	Infestation Date	Removal Date
R-4	8/25	9/15	R4	8/15	9/5
R-5	9/2	9/23	R5	8/22	9/12
R-6	9/10	10/1	R6	9/2	9/23

Results:

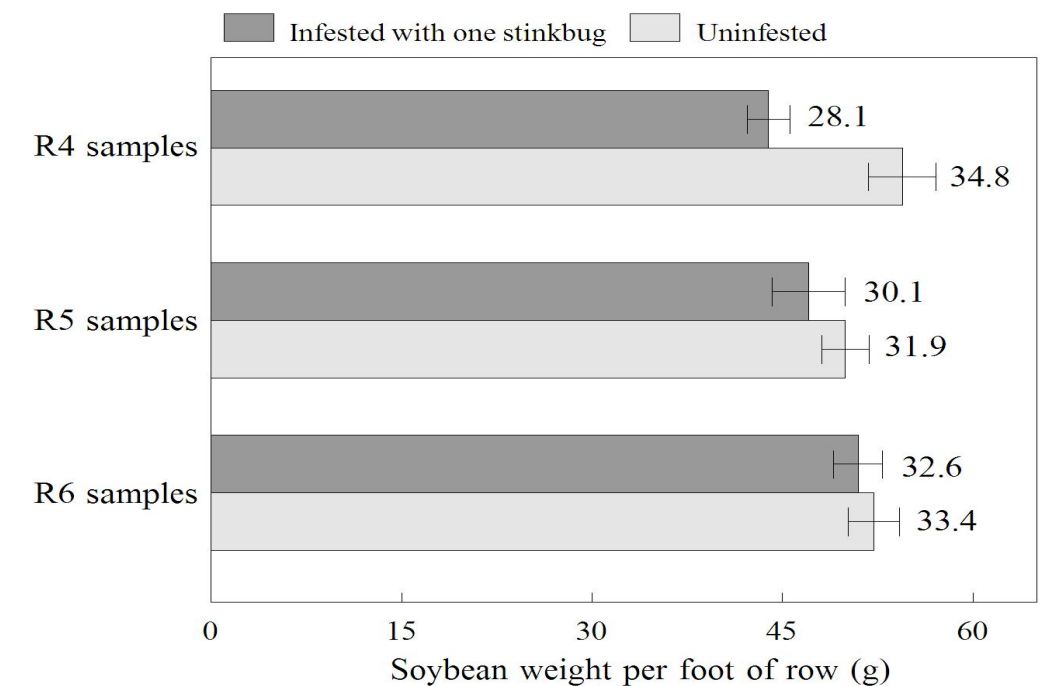


Figure 1. Means (\pm SEM) of soybean seed weight (g) of stink bug infested and uninfested soybean plants. Infestations evaluated at three soybean growth stages. Numbers above bars are mean bushels per acre. Means of 6 replicate cages per growth stage. Newark, Delaware. 2008.

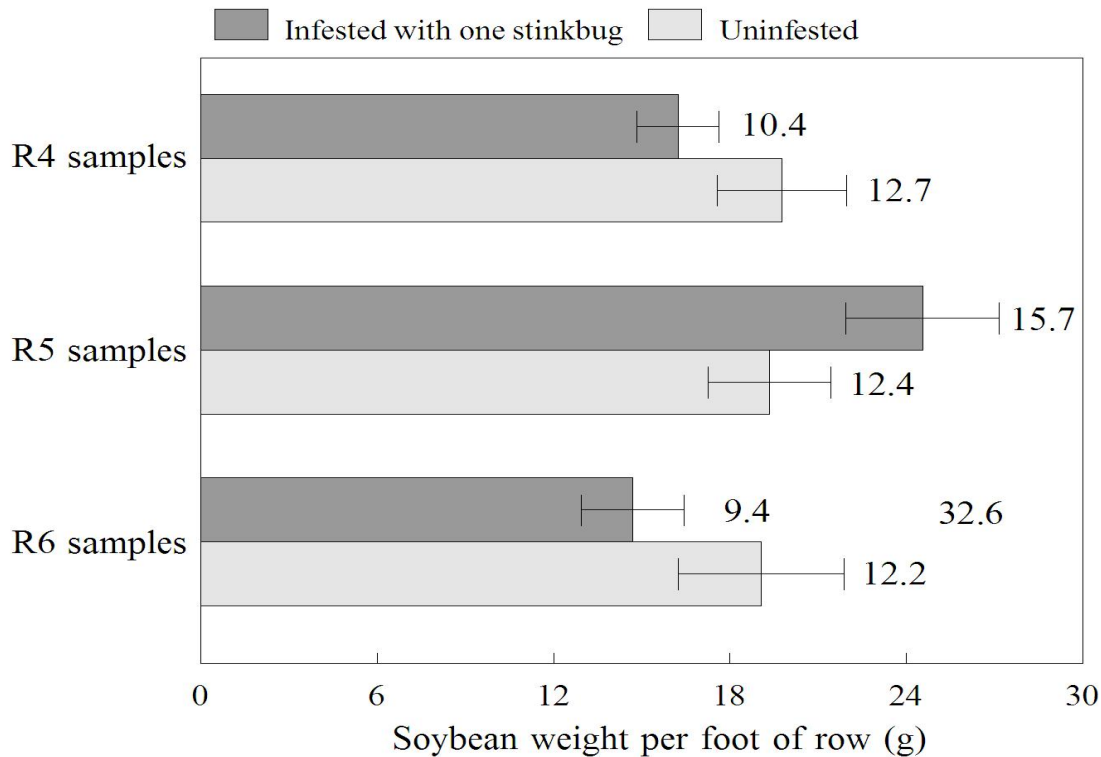


Figure 2. Means (\pm SEM) of soybean seed weight (g) of stink bug infested and uninfested soybean plants. Infestations evaluated at three soybean growth stages. Numbers above bars are mean bushels per acre. Means of 6 replicate cages per growth stage. Georgetown, Delaware. 2008.

Conclusions: In the Newark location, yields were significantly reduced by stinkbug infestations at the R-4 growth stage of development (6.7 bu/acre). These results are similar to reports from the Virginia study in 2007. Although the trend was similar at the R-5 and R-6 growth stages, the differences were not significantly different. Due to drought stress, we did not see a consistent effect at the Georgetown location. Although not included in the analysis, we also saw a trend for higher levels of shriveled seeds in the stink bug infested cages at the Newark location, especially at the R-6 stage of development. Overall, it appears that an infestation level of one stink bug per foot of row at the R-4 stage of plant development can have an effect on yield in some years and at some locations. In general, populations of one stink bug per foot of row are generally only seen in hot spots in fields and rarely occur field wide. The impact of stink bug feeding on soybean yield appears to be minimal during the R5-6 stages. The preliminary results of pooled data analysis from the 3 states indicates that further studies are needed to evaluate the impact of stinkbug feeding on seed quality at the R-6 stage of development.