

Summary of 2010 Studies of Brown Marmorated Stink Bug on Soybean in Maryland

Galen Dively and Terry Patton, University of Maryland

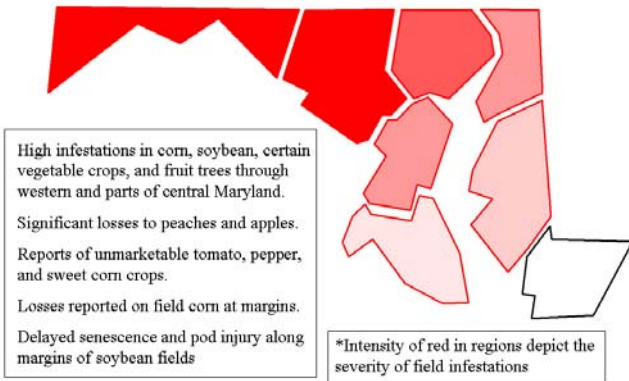


Figure 1. Distribution range of brown marmorated stink bugs in Maryland during 2010. Based on field surveys and reports from extension educators, crop advisors, and growers.

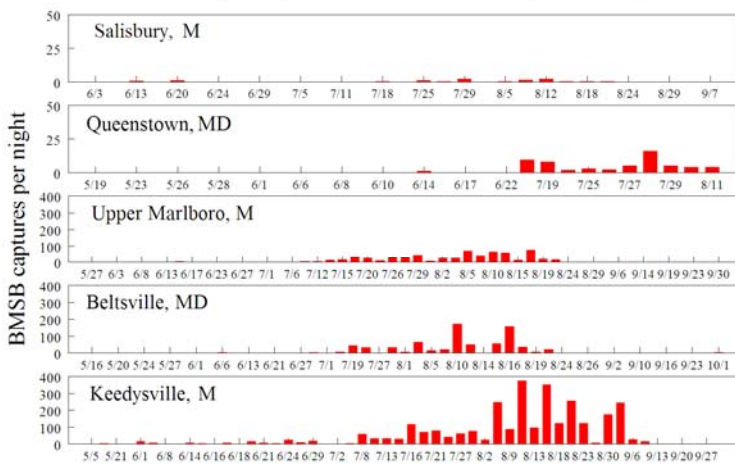


Figure 2. Blacklight trap captures of adult brown marmorated stink bugs, 2010

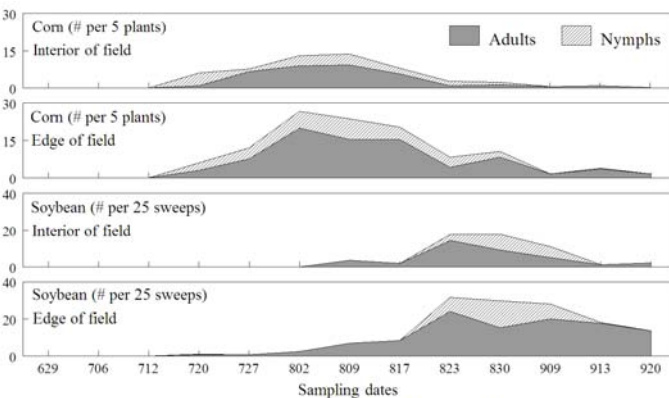


Figure 3. Seasonal abundance of BMSB along the field edge and in the interior of corn and soybean fields, WMREC farm, Keedysville, MD, 2010.

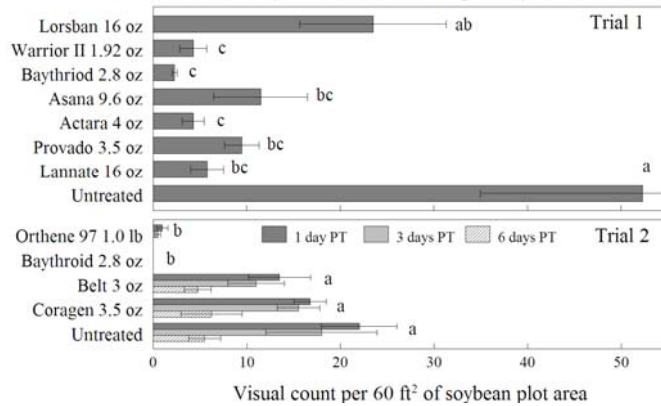
Range of BMSB infestations throughout the state. Populations exploded in 2010 and increased by 5- to 10-fold in many areas of the state. Road surveys and feedback from extension educators and crop advisors reported field infestations in soybeans in all counties, except St. Marys, lower portion of Charles, and the lower three counties on the Eastern Shore (Fig. 1). Highest infestations were found in western and central Maryland, including Ann Arundel and Prince Georges Counties.

Blacklight traps operating at research farms also revealed the highest captures at Keedysville in Washington County, followed by the Beltsville and Upper Marlboro locations. Adult flights peaked around mid August which corresponds to the time when soybeans were colonized. Stink bugs were detected in traps on the Eastern Shore but at much lower numbers. It is clear that vehicles are a main means by which stinkbugs are expanding their range in the state.

Weekly sampling was conducted in several corn and soybean fields on the Western MD REC farm at Keedysville. Results in Fig. 3 show peak densities of about 6 stink bugs per corn plant or per 25 sweeps in soybeans at the field edges. Adults exited senescing corn fields during mid August and began colonizing soybeans. Field infestations exhibited strong edge effects in which numbers of bugs are highest within 10 feet from the field margins, especially abundant next to woodlots; and then numbers quickly drop off toward the field interior. BMSB

caused a delay in soybean senescence along the field edges, known as green stem syndrome. Infested plants stayed green longer because the salivary fluids injected during feeding affected the plant maturation process.

Figure 4. Results of insecticide trials to evaluate the efficacy against BMSB. Means within trials followed by same letter are not significantly different. 2010.

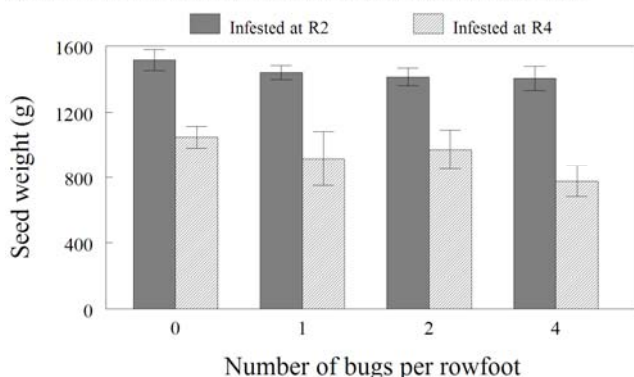


Efficacy of registered insecticides for BMSB control. Two insecticide trials (Fig. 4) were conducted at the Beltsville research farm at different times. Trial 1 was evaluated 4 days after treatment and results showed that 80-90% control was achieved by a single application of several pyrethroids (Baythroid, Warrior II, Asana), Lannate, and two foliar neonicotinoids (Actara, Provado). Lorsban was the least effective. Trial 2 tested additional systemic products including Orthene, Belt, and Coragen.

Orthene and Baythroid provided effective residual control up to 6 days post treatment, while Belt and Coragen were relatively ineffective. Though these results are promising, additional tests are needed to evaluate other products, variable rates, and application strategies. In particular, perimeter treatments may be the most economical and effective strategy, given the behavior of this insect along the field margins.

Extent and nature of BMSB feeding injury. We monitored BMSB populations at two research farms (Keedysville and Beltsville) and determined that this insect probably goes through two generations per year. It was first recorded as overwintered adults on trees in mid May; then adults colonized vegetable crops, mainly tomato, pepper, and cucurbit crops, followed by infestations on developing ears of field corn and sweet corn; and finally it began to colonize soybean fields in mid to late August. In each crop, adults laid eggs and produce immatures (nymphs), so it is clear that many crops are at risk throughout most of the growing season. We also manually infested plots of soybean plants (2 rows 10 ft. long) covered by screened cages with densities of 0, 1, 2, and 4 late to mid stage nymphs per foot of row. The double-crop soybeans ('Asgrow') were planted on July 1. Replicated infestations were introduced at R2 and R4 stages of soybean growth. Introduced populations were allowed to develop and feed for 2

Figure 5. Seed weight per 20 rowfeet of double-crop soybean plants enclosed in cages infested with BMSB nymphs at the R2 and R4 growth stages. 2010.



weeks after which cages were removed and plots were treated with Warrior to prevent further injury. On November 3, all plots were harvested with small motorized thresher.

Fig. 5 shows the average seed weight (\pm SEM) from cages infested with different numbers of nymphs at the two plant growth stages. Main effects of density or its interaction with stage were not significantly different. However, the trend in the data showed a slight decline in seed weight with higher infestations at R2 and an even greater

decline at R4. The cages placed over plants at R4 significantly affected yields compared to the overall yields in the R2 cages. The data on seed quality and the composition of pod types were not ready for analysis as of the writing of this proposal. One conclusion is that the stink bug densities tested was not high enough to represent the levels that were observed in many soybean fields in Western MD. A similar cage study was conducted by Dr. Ames Herbert and his graduate student in Virginia. These studies are part of a larger project by the BMSB Working Group including USDA and University scientists from the Mid-Atlantic area.

To assess the effects of the delayed growth along field edges, we removed ten consecutive plants at multiple paired edge and interior sites in two soybean fields at the Beltsville research farm. These fields were heavily infested along the field margins next to woodlots and remained green, while the interior of the fields was fully senesced. Mature and

immature pods were recorded on each plant samples and the seeds were removed by a small motorized thresher. Infested plants along the field edges had 57-68% less seed yield and 26-38% fewer mature pods (Fig. 6). In addition to the obvious yield loss, the moisture level of beans in the delayed growth at the edge of fields was significantly higher and this created a harvesting problem as well as storage and drying issues after harvest.

Figure 6. Seed weight and percentage of mature pods on 10 plants sampled at paired edge and interior sites of two soybean fields, Beltsville, MD, 2010.

