Mississippi Corn Promotion Board
2019 Progress Report

Project Title: Early Season Management of Stink Bugs in Field Corn

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Project Summary (Issue/Response)

Substantial numbers of commercial corn fields experienced infestations of stink bugs during the vegetative growth stages during 2017 through 2019. The current treatment threshold is 10% infested plants; however, it is unclear how this threshold translates to percent damaged plants which ultimately impacts yield. Also, in many fields visual damage symptomology was observed even when scouting did not detect stink bug infestations. This indicates that current scouting methods may not reliably detect infestations.

Previous research conducted in Kentucky and Indiana demonstrated that stink bugs (primarily brown stink bug and related species) are capable of injuring corn during the vegetative stages. Damage, including plant death (deadheart), reduced plant growth, and tillering, was more severe at earlier growth stages (VE and V2) than at later growth stages. Significant yield reductions were also observed.

During 2018 and 2019, two on-farm experiments were conducted at eleven locations across the Mississippi Delta. Additionally, sixteen small plot experiments were conducted at the Delta Research and Extension Center. The objectives of the on-farm studies were to evaluate the impact of damage from natural stink bug infestations on corn yield. Paired plants and 10 ft sections of row (to allow yield to be converted to a per acre basis) were marked at each location. Plant damage for paired plant experiment was rated on a 0-3 scale with 0 representing no visible damage, 1 representing the characteristic holes in a line across the leaf and/or leaf streaking, 2 representing line(s) of holes across leaves, leaf streaking, with plant stunting, and 3 representing "dead heart" (whorl death and tiller formation) or plant death. Each pair of plants consisted of a damaged plant that was given a damage rating based on visible symptomology and an adjacent non-damaged plant. For the twenty 10' sections damage severity was not determined. Sections representing 0, 10, 20, 30, and 40% damaged plants were established. Scouting and detection of stink bug infestations in vegetative stage corn has been problematic. Several scouting methods were evaluated including visual scouting and sticky card intercept traps. The small plot experiments were to evaluate the effects of simulated stink bug damage during the early vegetative stage (V1, V2, and V3) on field corn yield.

Project Results/Outcomes

For the single plant experiment, plant damage with leaf puncture symptomology resulted in a significant yield reduction compared to the non-damaged control (Figure 1). As damage severity increased, additional significant yield reductions were observed. Some plants with damage symptoms of tillering/dead-heart did not produce any yield. For the 10 ft of row section trials, all levels of damaged plants resulted in significantly lower yields than the non-damaged control (Figure 2). Stink bug damage to 10% or 20% of plants resulted in approximately a 10% yield reduction. Stink bug damage to 30% or 40% damaged plants resulted in approximately a 16% yield reduction. Several scouting methods were evaluated including visual scouting, sticky card intercept traps and flight intercept. None of these methods were effective at reliably detecting stink bugs in or near corn fields. The results of the small plot trials using simulated damage methods were similar those of the on-farm trials with damage from natural stink bug infestations.

Project Results

Figure 1. Impact of brown stink bug damage of varying severity on yield of individual corn plants.

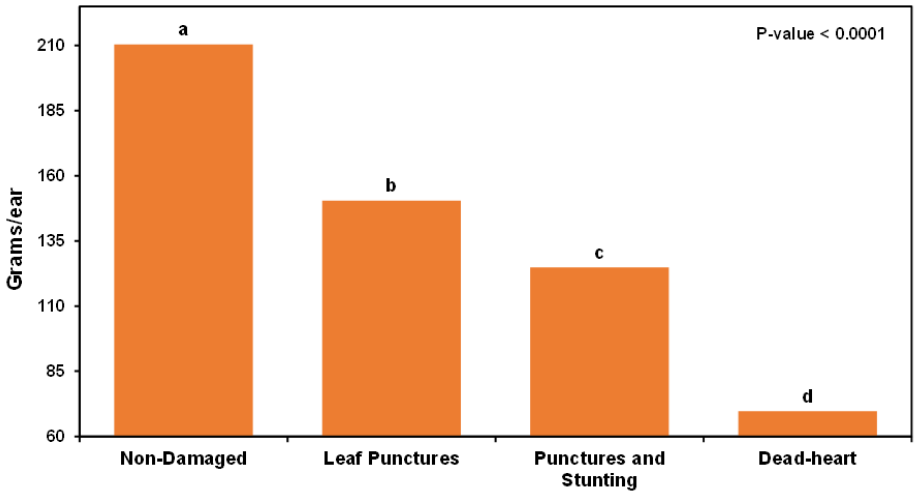
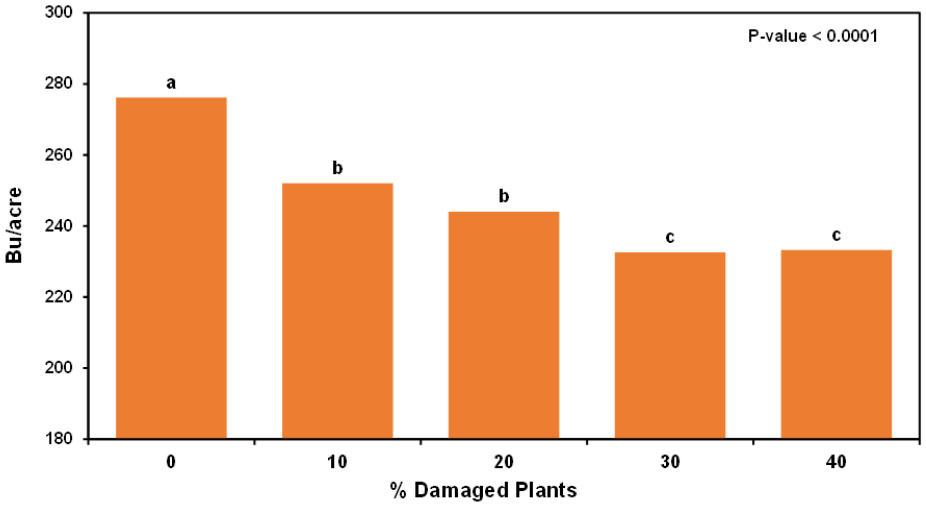


Figure 2. Impact of various levels (percent damaged plants) of brown stink bug damage on corn yield.



Project Impacts/Benefits

These studies demonstrate the impact of stink bug injury on corn yield and give an indication of the amount of yield loss that can occur at varying percentages of stink bug damaged plants. These results also demonstrate the degree or intensity of injury has a dramatic influence on the amount of yield loss that can occur.

Project Deliverables

To date, these results have been presented at numerous meetings including the 2018 MSU Row Crop Short Course and in the graduate student competition at the 2019 and 2020 Beltwide Cotton Conferences, and the 2019 Annual Meeting of the Entomological Society of America.