COMPARISON OF TWO STINK BUG SCOUTING TECHNIQUES UNDER FIELD CONDITIONS

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Abstract

In 2007, lab and field studies were conducted across North Carolina, South Carolina, Georgia, and Virginia. Cotton bolls were collected from fields and examined externally and internally for stink bug feeding signs and damage under both lab and field conditions. The amount of time to examine bolls under each of these conditions was recorded. Results demonstrate that a correlation exists between external stink bug feeding signs and internal stink bug damage. The correlation remains fairly consistent between lab and field conditions. The amount of time to examine cotton bolls was significantly reduced by external examination versus internal examination. Based upon these results, a new scouting procedure may be utilized to improve stink bug sampling.

Introduction

The stink bug complex, which includes the brown stink bug, *Euschistus servus* (Say), and green stink bug, *Acrosternum hilare* (Say), continues to increase in ranking of cotton, *Gossypium hirsutum* L., pests across North Carolina and the Southeastern U.S. The continued adoption of Bt cotton, reduction in broad spectrum insecticide usage, and eradication of the boll weevil, *Anthonomous grandis grandis* Boheman, has lead the stink bugs to become more of a prominent pest (Greene and Herzog 1999, Leonard et al. 1999, Roberts 1999). In 2006, stink bugs infested 6.536 million acres and destroyed 151,347 bales across the U.S., with North Carolina losing 51,607 bales to the stink bugs (Williams 2007).

Current scouting techniques for stink bug damage requires scouts to collect quarter sized bolls, which are then dissected to determine internal damage such as warts and stained lint (Figure 1), which can be time consuming. Stink bug feeding can result in external circular, concaved lesions approximately 1/16 inch in diameter, along with other less obvious symptoms (Figure 2). These external stink bug feeding signs may provide a basis for a new scouting procedure to make damage assessments by visually inspecting the cotton bolls externally. This could reduce the time required by scouts dissecting bolls and allow them to gain more power from their sampling by collecting and examining more bolls, sampling more fields in a given time-period, or gain other efficiencies. In order to determine the feasibility we evaluated the relationships between external stink bug feeding signs and internal stink bug feeding damage symptoms and the time requirement for boll examination based upon each of the two examination methods under lab and field conditions.

Figure 1. Stink bug feeding wart (left) and damaged/stained lint (right).

Figure 2. External stink bug feeding sign.

Materials and Methods

Laboratory Study

In 2007, one hundred bolls were collected from eleven field sites across North Carolina, South Carolina, and Georgia and taken to the laboratory for examination. Bolls were divided into ten bolls per replications for a total of ten replications per field. Bolls were examined for external lesions and the numbers were recorded per replicate. The time required to examine each replication was also recorded. The bolls were then reexamined for internal boll damage symptoms via dissection. Again, the amount of time required per replication was recorded.

Field Study

In 2007, eight field sights with stink bug infestations were selected in northeastern North Carolina and southeastern Virginia. Within each field site, ten sample sites were pre-marked with flagged polls in a pattern that was consistent with a typical scouting pattern (Figure 3). External and internal boll damage examinations were conducted separately. Investigators began by first recording the start time at the field border, and then proceeded through the sampling route. Investigators entered the field and proceeded to the first marked sampling area, where they pulled ten bolls, examined, and recorded the number of bolls with four or more external stink bug feeding signs. The investigators then proceeded to the next sampling area and repeated the procedure. This process was continued until bolls had been collected and examined from all ten sites for a total of 100 bolls per field. As the investigator exited the field, the ending time was recorded. This procedure was repeated in identical fashion but bolls were pulled, dissected on the spot, and the number of bolls with any internal damage was recorded. Again, the starting and ending times were recorded.

Data from both the laboratory study and field study were subjected to Proc GLM and Proc Corr in SAS® for statistical analysis.

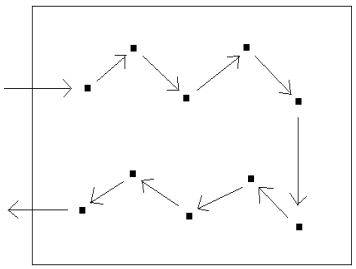

Figure 3. Example of a typical field scouting pattern used in field study.

Results and Discussion

The Pearson Correlation Coefficients (R^2 values) showed positive correlations between external stink bug feeding signs and internal stink bug feeding damage with 0.26 in the lab and 0.27 in the field. It can also be noted that the correlations were consistent under lab and the field conditions. Also, the amount of time was significantly less for the external method as compared to the internal method (Figure 4).

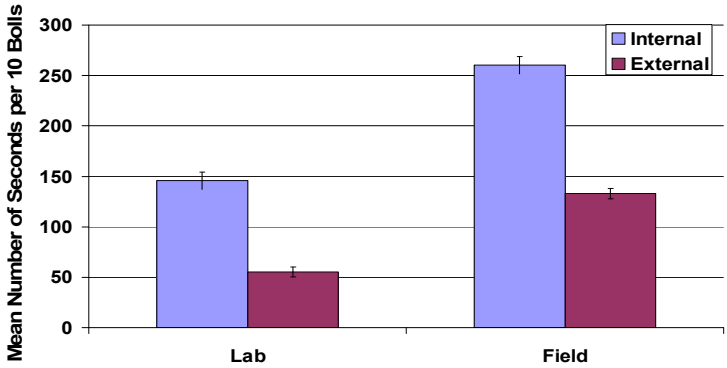

Figure 4. Internal vs. External time under lab and field conditions. Field time includes the amount of time to travel from one sampling area to another.

Conclusions

Data suggest a consistent relationship between external stink bug feeding sign and internal boll damage from stink bug feeding. Given that this relationship remains consistent when attempted on a lager scale, an external boll scouting method may be achievable. Stink bugs populations may not have a random distribution within cotton and other crops and small sample sizes required by time consuming methodology, like internal boll sampling, likely results in poor population estimates. The amount of time saved per sample by implementing an external boll examination scouting procedure may be utilized to improve sampling fidelity by increasing sample size or otherwise be used to improve scouting efficiency.

References Cited

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