STINK BUG MOVEMENT INTO COTTON FROM ADJACENT CROPS

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Introduction

Cotton production in Georgia has undergone profound changes in the last two decades. Successful eradication of the cotton boll weevil and deployment of *Bt*-transgenic cotton have helped increase Georgia's cotton acreage from 125,000 acres in 1996 to more than 1 million acres recently. In addition, pest management advancements have helped reduce insecticide applications from more than 15 per year in 1996 to less than 3 in 2007. However, the insect pest complex has also changed and previously unimportant insect pests like stink bugs threaten productivity and fiber quality.

A complex of phytophagous stink bugs including the southern green stink bug, *Nezara viridula*, the green stink bug, *Acrosternum hilare*, and the brown stink bug, *Euschistus servus* have become serious pests of Georgia cotton production. These pests pose difficult management challenges because of limited information on basic ecology, distribution within fields and across the farmscape, and a lack of management tactics other than chemical control. The objective of this study was to determine if adjacent crops were likely to increase stink bug damage near the edges of cotton fields.

Materials and Methods

Four to 5.5 acre conventionally tilled fields were planted using the generic plot plan shown in Figure 1. Two fields (replicates) were planted in Tift County and a third field was planted in Decatur County. Corn (DKC 69-72 P26 RR) was planted the week of May 6, while cotton (DPL 143 B2RF), soybeans (DPL 7870 RR), and peanuts (Georganic) were planted during the week of May 20. All crops were irrigated and grown using conventional agronomic practices, but no insecticides that affected stink bugs were used. Corn, peanuts, and soybeans were harvested when they were ready, all prior to the cotton.

At the end of the year the cotton patch was defoliated, alleys were cut to create plots, the plots were harvested, resulting cotton samples were ginned, and a representative fiber sample was sent to the Macon USDA classing office. A single 2-row by 50-foot plot was cut at three distances associated with each adjacent crop: along the border with each adjacent crop, 30-feet from the border with each adjacent crop, and 60-feet from the border with each adjacent crop. The estimated lint value in each plot was calculated from seedcotton yield, gin turnout, and the 2007 upland cotton loan premium and discount values.

Treatments were arranged in a randomized complete block design and analyzed with ANOVA (adjacent crops) or trend analyses (distance from field edge). Linear contrasts were conducted to investigate the change in response variable as a function of distance from adjacent crops.

Results and Discussion

Statistical differences among adjacent crops or distance from field edges were observed with four response variables including seedcotton yield, gin turnout, fiber yellowness, and lint value. Analyses of seedcotton yield suggested an interaction between adjacent crop and distance from the field edge ($F = 2.59$; $df = 4, 11$; $P = 0.09$) (Figure 2A) and we expect this interaction will become more evident with increased replications. Seedcotton yield increased with distance from the field edge ($F = 4.66$; $df = 2, 11$; $P = 0.03$). Gin turnout also increased with distance from field edge ($F = 4.37$; $df = 2, 11$; $P = 0.04$) but was similar among adjacent crops ($P = 0.33$) (Figure 2B). Fiber yellowness, a symptom of stink bug feeding, decreased with distance from the field edge ($F = 4.94$; $df = 2, 10$; $P = 0.03$) (Figure 3A) but was not influenced by adjacent crop ($P = 0.94$). Overall lint value was also affected by distance from the field edge ($F = 5.28$; df = , 10; $P = 0.03$) but not adjacent crop ($P = 0.64$) (Figure 3B). Significant linear trends ($P < 0.05$) for distance from field edge were apparent for seedcotton yield, yellowness, and lint value.

These data strongly suggest that stink bug damage to cotton bolls was more severe near field edges. We suspect that the infestations generally started on the edge and moved toward the center of the field, but temporal analyses of boll damage are needed to confirm this hypothesis. If true, scouting for stink bugs and their associated damage should be targeted to field edges to improve efficiency. Although less clear from the statistical analyses, it appears from the plotted data that stink bug damage may be worse in cotton planted adjacent to soybeans and peanuts than corn. Further work is needed to better understand these temporal changes in host preference.

Acknowledgements

This work was supported by Cotton Incorporated and the USDA/CSREES Special Grants program. We appreciate excellent technical support from David Griffin, Jessica Corbett, Blake Crabtree, and Seth Hamer.

Figure 1. Generalized plot layout for planting cotton with adjacent corn, peanuts, and soybeans. Overall field size (including all four crops) ranged from 4 to 5.5 acres.

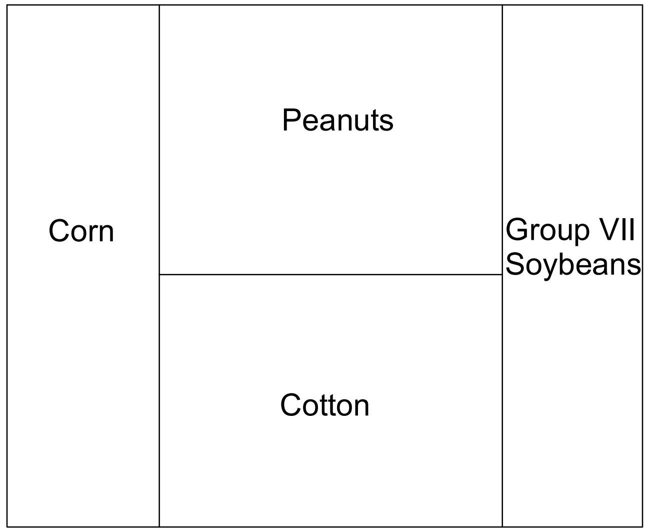

Figure 2. (A) Seedcotton yield and (B) gin turnout as a function of distance from field edge adjacent to corn, peanuts, and soybeans.

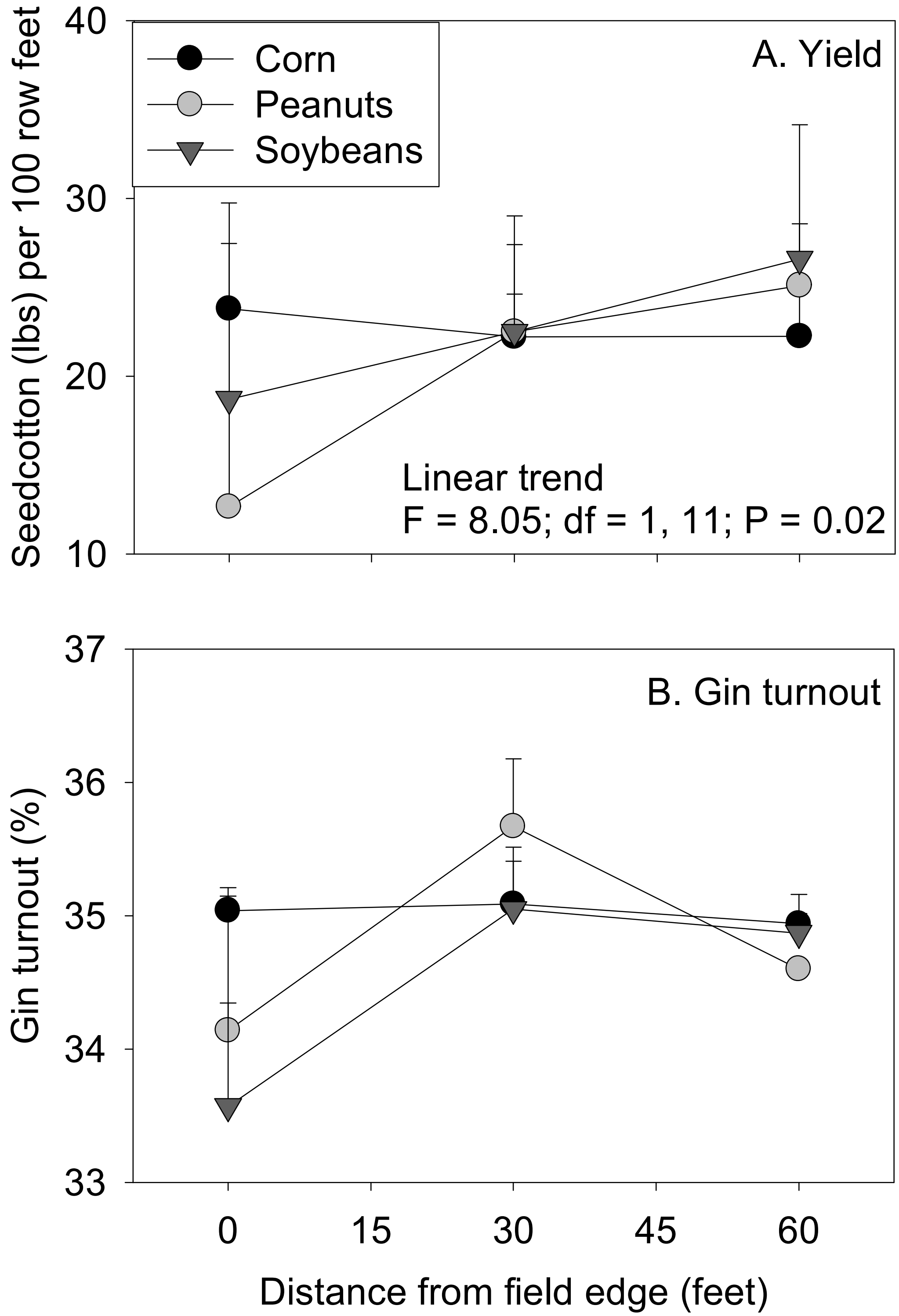

Figure 3. (A) Fiber yellowness and (B) lint value as a function of distance from field edge adjacent to corn, peanuts, and soybeans.