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IMPACT OF ALTERNATE HOST CROPS ON BUG DENSITES IN COTTON

R. D. Bagwell and J. Sharp
LSU Agcenter
Winnsboro, LA

Abstract

The highest densities of bug pests were detected in cotton and in soybeans. More plant bugs were found in cotton than in any other crop, although some plant bugs were detected in all crops sampled (cotton, corn, soybeans, grain sorghum, and rice). Tarnished plant bugs were the most populous insect species in cotton during the entire sampling period. A minor portion of the plant bug population detected in cotton was clouded plant bugs and fleahoppers. The highest densities of tarnished plant bugs were found in cotton adjacent to corn. The lowest tarnished plant bug densities were found in the cotton adjacent to cotton system. All other crop landscapes (soybeans, grain sorghum and rice) had tarnished plant bug densities intermediate to that of the cotton/corn and cotton/cotton landscapes. More stink bugs were found in soybeans than any other crop; again, a few stink bugs were found in all crops. Stink bug species detected in cotton were primarily brown stink bugs and to a lesser extent green, southern green, rice, and red banded stink bugs. Red banded stink bugs, however, were the most frequently detected stink bug (in soybeans). During the two August samples, the average number of stink bugs found in soybeans exceeded 20 stink bugs per 100 sweeps. This number was strongly influenced by a very high density of red banded stink bugs in one of three soybean fields sampled. The mean number of red banded stink bugs found in this field at the 15 August sample was in excess of 60 red banded stink bugs per 100 sweeps. Some red banded stink bugs were found in cotton adjacent to the soybean field with a high density of red banded stink bugs. The number of red banded stink bugs in this field was much lower, 2.1 per 100 sweeps, than in the adjacent soybeans on 15 August. Densities of red banded stink bugs were highest near the soybean field and declined with increasing distance away from the soybean field. These data indicate that crop distribution in an landscape can influence the pest density within cotton. Thus, the distribution of crops in a landscape has an impact on cotton IPM.

Introduction

Recent changes in agricultural policy and commodity prices have resulted in growers increasing the diversity of crops planted. Land that was once devoted to cotton production only is now planted to corn, soybeans, grain sorghum, cotton or possibly rice.

There are many desirable benefits to increased crop diversity. Producers often report increase yields in a corn cotton rotation. The observed benefits are both agronomic and pest management benefits.

Increases in crop diversity can also have a less desirable impact. For example, corn and soybeans are both considered as an excellent host for stink bugs. Increases in crop plantings of either crop near cotton increases the probability of a significant stink bug infestation in cotton.

The following evaluation was initiated to help better understand how insect pest populations in cotton are impacted by the cropping system in a local landscape.

Materials and Methods

All samples were taken in Louisiana production fields. Fields sampled included cotton by corn, soybeans, grain sorghum, rice and cotton. Insects sampled included plant bugs and stink bugs. Samples were taken on a weekly basis and did not consider field treatment for pest management.

Insect densities were determined using either a 15 in. diameter sweep net (cotton, corn, soybeans, grain sorghum, and rice) or by visual examination of 10 row feet (corn). At each field 10 sites were sampled at each date; at each site, 25 sweeps were made or 10 row ft. sampled. All samples were taken within 250 ft. of the adjacent crop. All plant bugs and stink bugs caught were placed in alcohol for later species identification.

Sampling sites were selected based on isolation of crop interaction. No other crops were present within at least 2500 ft. of the sampling site. For example, at a cotton adjacent to soybean sample site, no other crop was planted within 2500 ft. of the sampling sites. Cotton by cotton sites were selected based also on isolation. No other crops were planted within 2500 ft of the cotton by cotton sample sites.

Results and Discussion

The highest densities of bug pests were detected in cotton and in soybeans (Figures 1 and 2). More plant bugs were found in cotton than in any other crop, although some plant bugs were detected in all crops sampled (cotton, corn, soybeans, grain sorghum, and rice). More stink bugs were found in soybeans than any other crop; again, a few stink bugs were found in all crops. Tarnished plant bugs were the most populous insect species in cotton during the entire sampling period (Figure 3). A minor portion of the plant bug population detected in cotton was clouded plant bugs and fleahoppers. The highest densities of tarnished plant bugs were found in cotton adjacent to corn (Figure 4). The lowest tarnished plant bug densities were found in the cotton adjacent to cotton system (Figure 5). All other crop landscapes (soybeans, grain sorghum and rice) had tarnished plant bug densities intermediate to that of the cotton/corn and cotton/cotton landscapes (Figures 6, 7 and 8).

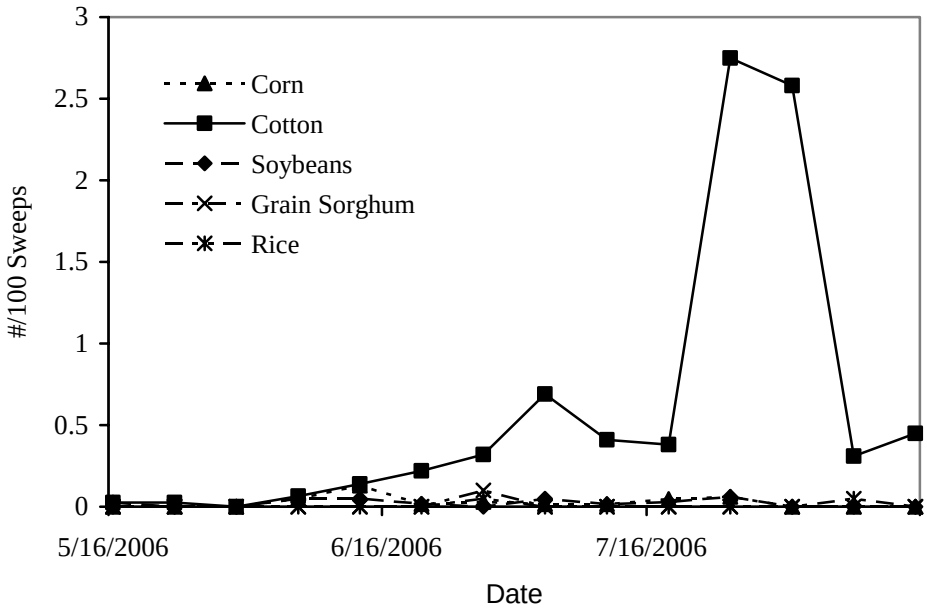

Figure 1. Number of Tarnished Plant Bugs Per 100 Sweeps on Five Row Crops During 2005.

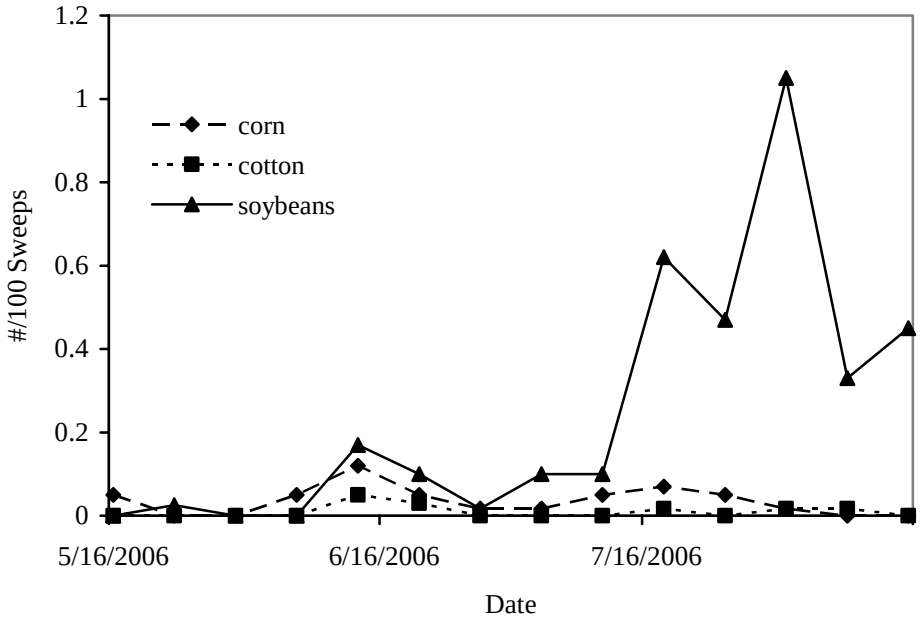

Figure 2. Number of Stink Bugs Per 100 Sweeps on Three Row Crops During 2005.

Tarnished plant bugs were the most populous insect species in cotton during the entire sampling period (Figure 3). A minor portion of the plant bug population detected in cotton was clouded plant bugs and fleahoppers. The highest densities of tarnished plant bugs were found in cotton adjacent to corn (Figure 4). The lowest tarnished plant bug densities were found in the cotton adjacent to cotton system (Figure 5). All other crop landscapes (soybeans, grain sorghum and rice) had tarnished plant bug densities intermediate to that of the cotton/corn and cotton/cotton landscapes (Figures 6, 7 and 8).

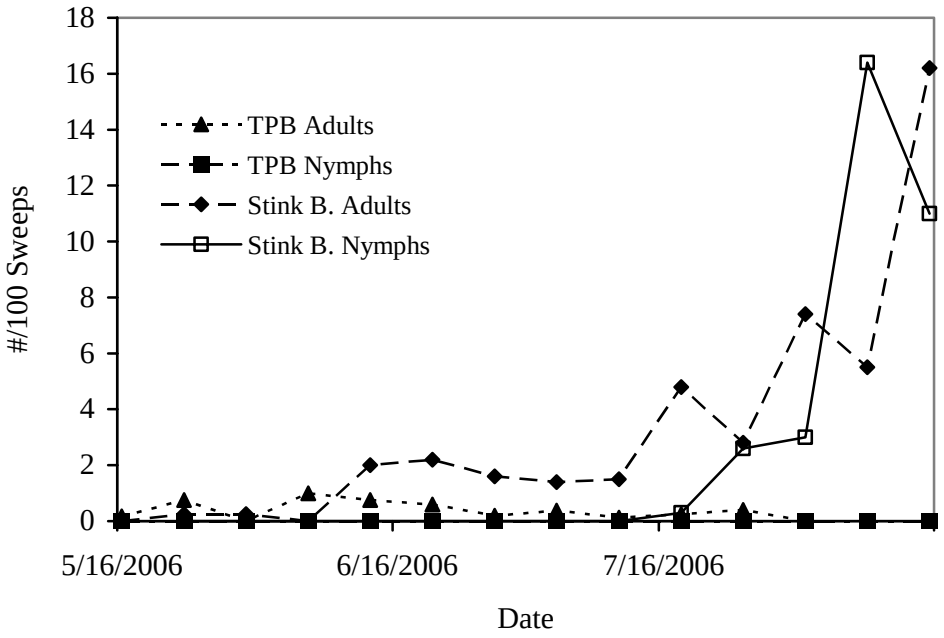

Figure 3. Number of Bug Pests Per 100 Sweeps in Cotton During 2005.

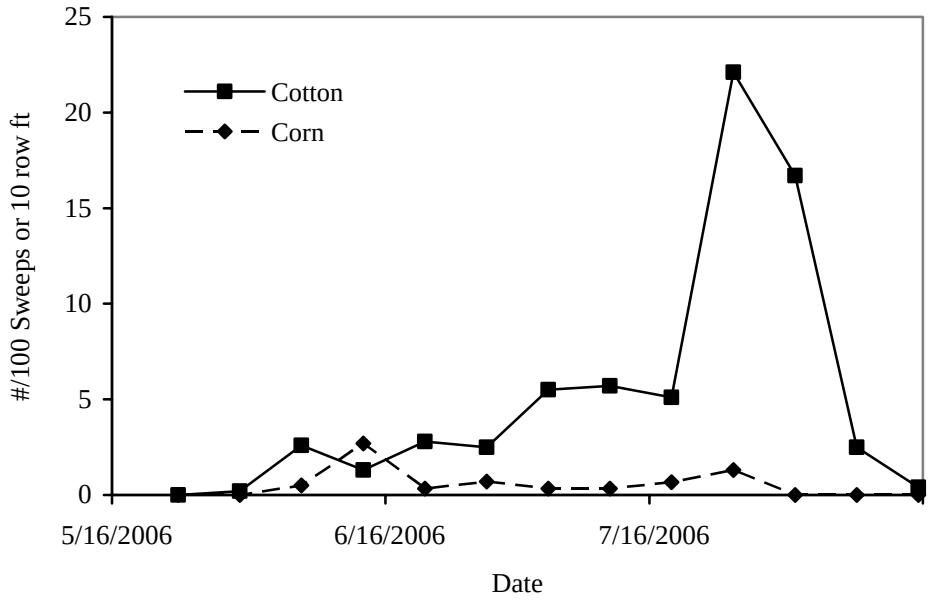

Figure 4. Number of Tarnished Plant Bugs in Cotton and Corn in a Cotton/Corn Landscape.

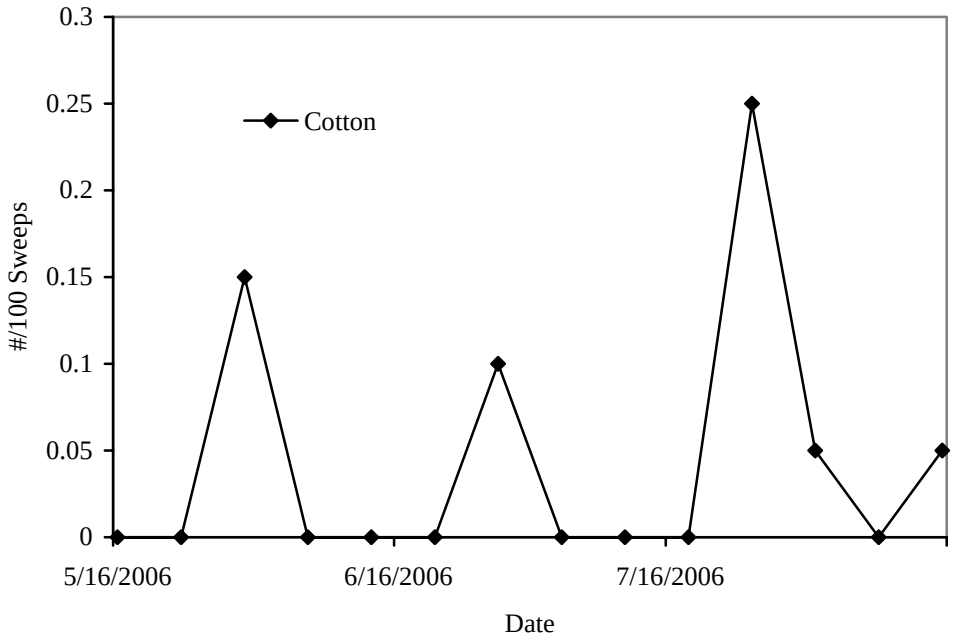

Figure 5. Number of Tarnished Plant Bugs Per 100 Sweeps in a Cotton by Cotton Landscape.

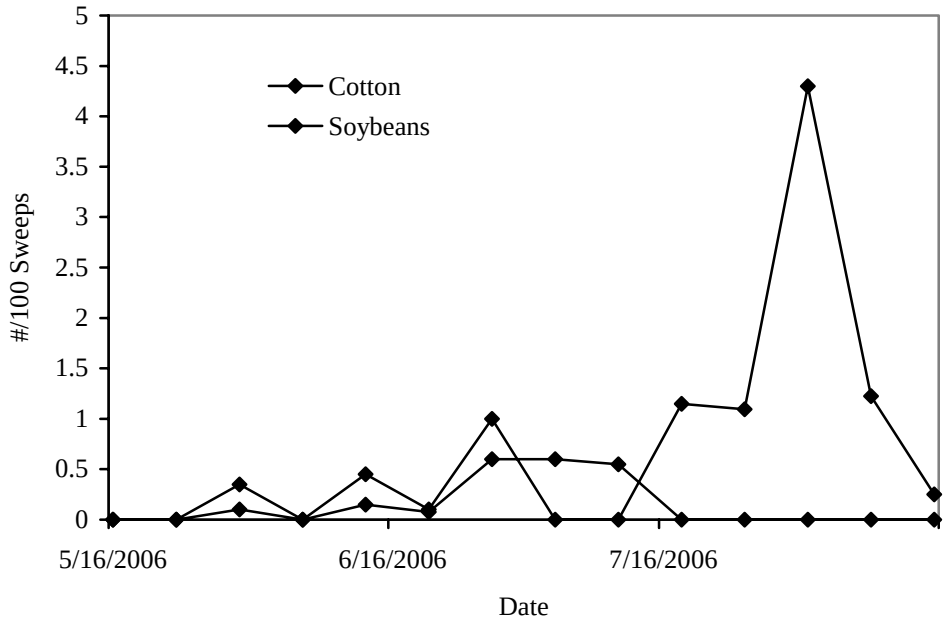

Figure 6. Number of Tarnished Plant Bugs in Cotton and Soybeans in a Cotton/Soybean Landscape.

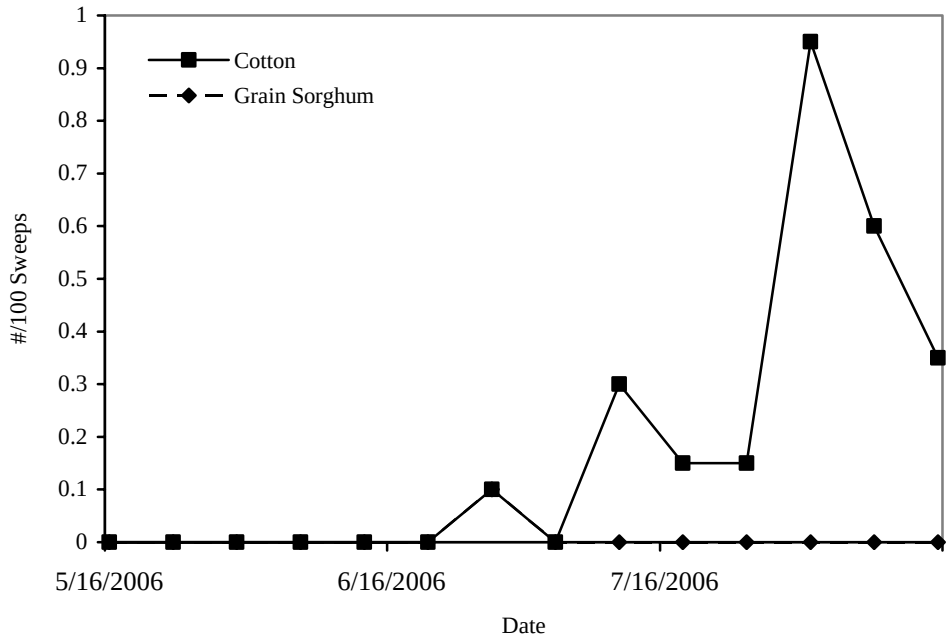

Figure 7. Number of Tarnished Plant Bugs in Cotton and Grain Sorghum in a Cotton/Grain Sorghum Landscape.

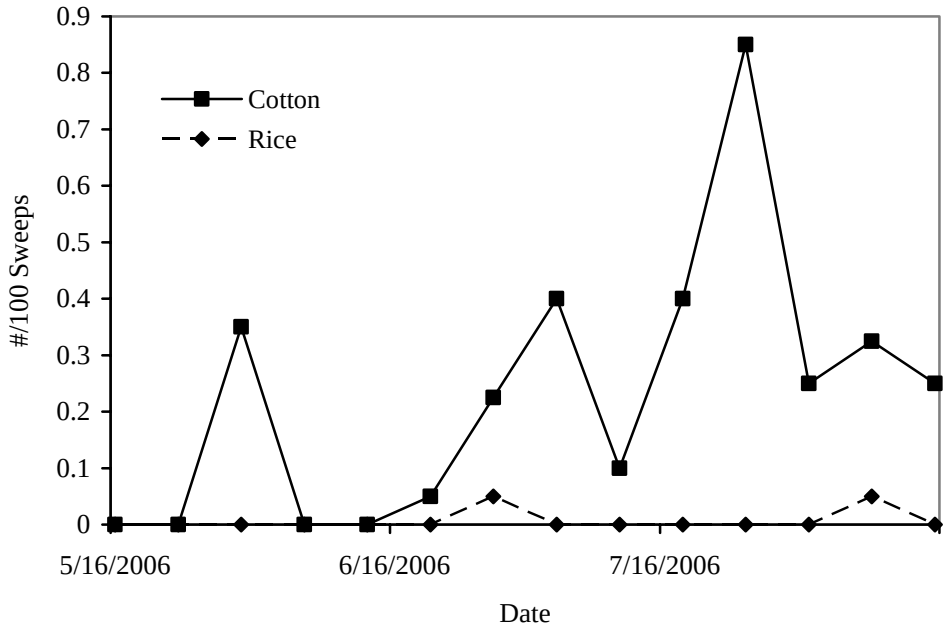

Figure 8. Number of Tarnished Plant Bugs in Cotton and Rice in a Cotton/Rice Landscape.

Stink bug species detected in cotton were primarily brown stink bugs and to a lesser extent green, southern green, rice, and red banded stink bugs. Red banded stink bugs, however, were the most frequently detected stink bug (in soybeans). During the two August samples, the average number of stink bugs found in soybeans exceeded 20 stink bugs per 100 sweeps (Figure 9). This number was strongly influenced by a very high density of red banded stink bugs in one of three soybean fields sampled. The mean number of red banded stink bugs found in this field at the 15 August sample was in excess of 60 red banded stink bugs per 100 sweeps.

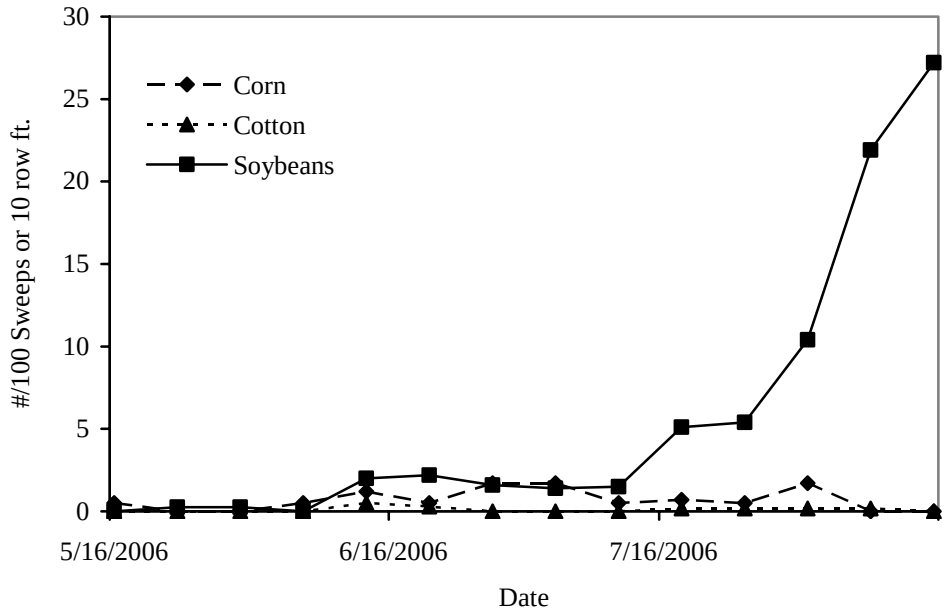

Figure 9. Number of Stink Bugs in Three Row Crops During 2005.

Some red banded stink bugs were found in cotton adjacent to the soybean field with a high density of red banded stink bugs. The number of red banded stink bugs in this field was much lower, 2.1 per 100 sweeps, than in the adjacent soybeans on 15 August. Densities of red banded stink bugs were highest near the soybean field and declined with increasing distance away from the soybean field.

These data indicate that crop distribution in an landscape can influence the pest density within cotton. Thus, the distribution of crops in a landscape has an impact on cotton IPM. Tarnished plant bug control is more likely needed in cotton near corn, to a lesser extent in cotton adjacent to other crops and less likely to be needed in a large cotton monoculture. Stink bug control is more likely need in cotton adjacent to soybeans.

The findings of this study indicate that from an IPM standpoint, different crops should be isolated as much as possible to help reduce the amount of pesticide sprays needed for insect control.

Acknowledgement

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