TOBACCO AS A TRAP CROP FOR THE TOBACCO BUWORM IN COTTON

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Abstract

The ability of tobacco to serve as a trap for the tobacco budworm in cotton was investigated in Aliceville, AL in 1997. A strip of tobacco, 2 rows by 100 feet, was planted in the center of a 1.1 acre cotton field plot. This field plot was replicated four times. Using whole plant sampling to monitor immature tobacco budworms, it was determined that peak egg laying days occurred in tobacco on 3 June, 23 June, 10 July, and 1 August 1997. Tobacco budworms were present only in tobacco during the first egg-laying period. On 23 June and 4 July, tobacco budworm eggs were found in tobacco and cotton although mean number of eggs per plant was much higher in tobacco than in cotton. No larvae were observed in cotton until the last egg laying period. By 14 August, when sixth instar tobacco budworms were present in tobacco and cotton, the mean number of tobacco budworm larvae per plant was much higher in tobacco than in cotton. These results indicate that the tobacco budworm is more attracted to tobacco than cotton, and thus tobacco could be an effective trap crop for the tobacco budworm in cotton.

Introduction

A trap crop which is highly attractive to a pest can be an effective control measure by becoming a sink for the pest. Stern et al. (1969) reported that strip-planting of alfalfa in cotton was a very effective means of keeping *Lygus* bugs out of cotton by trapping the insects in alfalfa. In this study, tobacco was chosen as a potential trap crop for the tobacco budworm, *Heliothis virescens*, in cotton since the tobacco budworm is the predominate noctuid in tobacco and can be found feeding on tobacco in high numbers (Neunzig 1969, Roach 1976, Bidlack et al. 1991, Manley et al. 1991), and tobacco can be grown to provide an attractive food source for all generations of tobacco budworm immatures.

Materials and Methods

Tobacco (NC 71 variety) was transplanted in a bedded-unplanted cotton field in plots 2 rows wide and 100 feet long on 24 April 1997 in Aliceville, AL. Plants were spaced 4 feet apart for a total of 52 tobacco plants per plot. Four plots were planted as replications in the field. Cotton (DP 90 variety) was planted in 32 rows, 220 feet long on each side of each tobacco plot on 9 May 1997. Whole plant sampling (50 plants per plot) was conducted every 3 to 4 days to monitor immature tobacco budworms on cotton and tobacco throughout the growing season. Student's t-tests were used to compare numbers of eggs and larvae in tobacco and cotton.

Results and Discussion

Four peak egg laying days occurred in tobacco: 3 June, 23 June, 10 July, and 1 August 1997. Tobacco budworms were present only in tobacco during the first egg-laying period (Figure 1). Fourth instars were the oldest instars found on tobacco prior to the second egg laying period (Figure 1). This indicates that adult tobacco budworms did not develop from the larvae feeding on tobacco during this time period. On 23 June and 4 July 1997, tobacco budworm eggs were found in tobacco and cotton although mean number of eggs per plant was much higher in tobacco than in cotton (Figures 2 and 3). Low numbers of fifth and sixth instars (0.03-0.045 larvae per plant) were present on tobacco during these time periods (Figures 2 and 3). Pupation of these larvae was not determined in the field. Even though some of the last instar larvae were parasitized (unpublished data), some probably pupated into adult tobacco budworms in the field. However, the number of adults developing from these last instar larvae would have been low since larval numbers were low. No larvae were observed in cotton until the last egg laying period (Figure 4). Mean numbers of eggs on tobacco and cotton at this time were underestimated due to the difficulty of finding eggs in tobacco flowers and on tall and bushy cotton plants. By 14 August 1997, when sixth instar tobacco budworms were present in tobacco and cotton, the mean number of tobacco budworms per plant was much higher in tobacco than in cotton. Over the season the level of tobacco budworm larval infestation in cotton was relatively low, being nonexistent for the first three peak egg laying periods and never reaching higher than 0.08 larvae per plant after the last egg lay. These results indicate that the tobacco budworm is more attracted to tobacco than cotton, and based on the affinity of this pest to tobacco, interplanting tobacco in cotton could be an effective means minimizing tobacco budworm damage in cotton. An evaluation of the role of the tobacco as a refuge for natural enemies is currently being undertaken.

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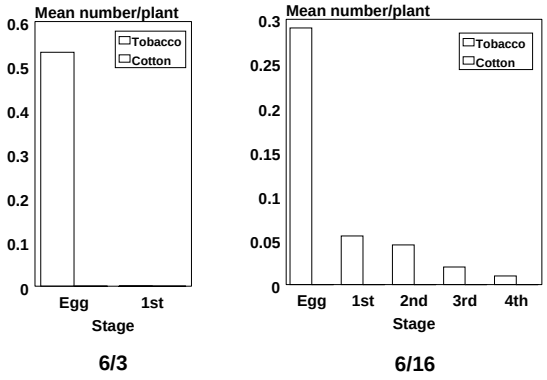

Figure 1. Mean number of tobacco budworm eggs and larvae in tobacco and cotton for the first peak egg lay in Aliceville, AL in 1997.

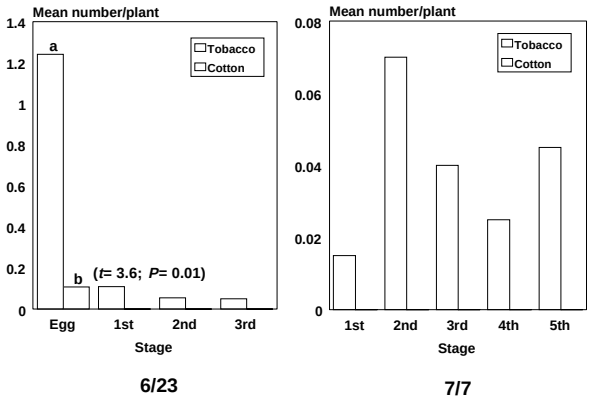

Figure 2. Mean number of tobacco budworm eggs and larvae in tobacco and cotton for the second peak egg lay in Aliceville, AL in 1997.

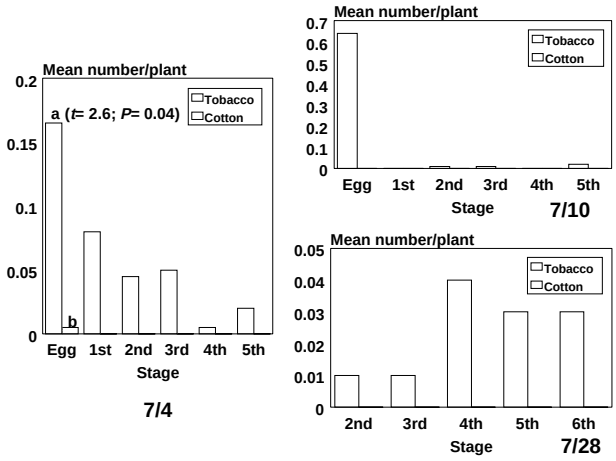

Figure 3. Mean number of tobacco budworm eggs and larvae in tobacco and cotton for the third peak egg lay in Aliceville, AL in 1997.

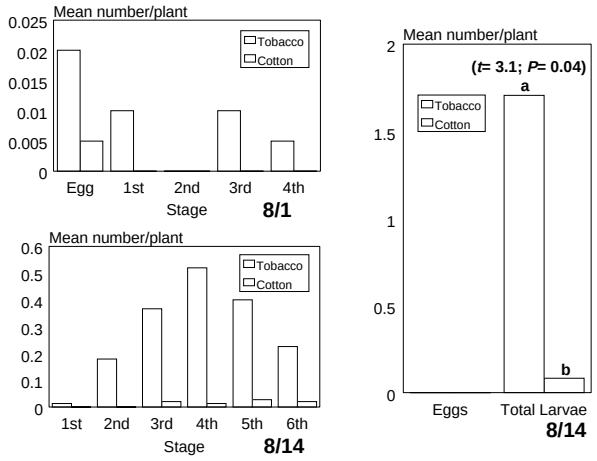

Figure 4. Mean number of tobacco budworm eggs and larvae in tobacco and cotton for the last egg laying period in Aliceville, AL in 1997.