EVALUATION OF A DYNAMIC THRESHOLD FOR MANAGEMENT OF BOLL FEEDING BUGS

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Introduction

Boll feeding bugs have emerged as primary pests of cotton following the successful elimination of the boll weevil as an economic pests and the commercialization of Bt cotton. A complex of bugs exploits the low insecticide use environment and feeds on developing bolls. Stink bugs, primarily the southern green and brown, are the primary boll feeding bugs in this complex. However, tarnished and clouded plant bugs, and leaf-footed bugs may also damage developing bolls. Research has documented losses in both yield and fiber quality to the boll feeding bug complex in Georgia.

Management of stink bugs is accomplished by thorough scouting of medium sized bolls for internal symptoms of feeding. Bolls which have callous growths or warts on the inner surface of the boll wall and/or stained lint are considered damaged. Insecticide treatments are recommended when 20 percent of medium sized bolls (the diameter of a quarter) display internal signs of feeding and stink bugs are observed. Scouts should be observant for bugs when making plant inspections allowing for appropriate insecticide selection if boll damage thresholds are exceeded. Pyrethroid insecticides provide good control of southern green stink bugs but only fair control of brown stink bugs. When brown stink bugs comprise an economic population, organophosphate insecticides are recommended.

The current threshold is static in that the 20 percent internal boll damage level is held constant throughout the season. However, during the growing season the actual number of bolls per plant which are susceptible (less than 25 days of age) to stink bugs varies. The number of bolls per plant which are susceptible to stink bug damage tends to increase in time from the first week of bloom to about the fifth week of bloom and then decreases as plants approach cutout. Intuitively the use of a dynamic or changing threshold which considers the number of susceptible bolls per plant is logical. Potential damage when many bolls per plant are susceptible is much greater than when only a few bolls per plant are susceptible. Thus the objective of these trials was to evaluate a dynamic threshold for management of the boll feeding bug complex.

Methods

Field experiments were established at five locations during 2006 to evaluate the feasibility of a dynamic threshold for management of stink bugs. Three field sites were located in Tift county (RDC Pivot and Lang Farm on the Coastal Plain Experiment Station and at the ABAC Farm), one at the Sunbelt EXPO in Colquitt county, and one at the Southwest GA Research and Education Center near Plains GA in Sumter county. Treatments were arranged in a randomized complete block and replicated four times at each location. Plots varied in size from 6 to 12 rows wide and 40-50 feet in length. Treatments included an untreated check, the current threshold of 20 percent internal boll damage, a dynamic threshold (30 percent internal boll damage during the first and second week of bloom, 10 percent during weeks 3-5 of bloom, and 30 percent after the fifth week of bloom), and an aggressively sprayed (weekly applications). Plots were scouted weekly by examining 10 bolls per plot for internal damage. When thresholds were exceeded in a given treatment, Bidrin at 8 ozs/acre and Baythroid at 3.2 ozs per acre were applied with a self-propelled high clearance sprayer calibrated to deliver 7 gpa with TXVS 8 hollow cone nozzles spaced 18 inches apart. The center two or four rows from each plot were machine harvested and seedcotton samples were submitted to the UGA MicroGin for processing and fiber quality analysis. The mean number of insecticide applications required, lint yield, and net return to management (lint value $0.60/lb and $8.00 per insecticide application) in individual trials were used as replicates and analyzed using an analysis of variance. Treatment means were separated using LSD (P=0.05).

Results

Stink bug populations were generally low at all field sites with the exception of Plains which was planted within a peanut field. The mean number of insecticide applications required in the 20 percent threshold was 0.6 and 1.4 in the dynamic threshold (Table 1). The number of insecticide applications required ranged from 0 to 1 in the 20 percent threshold (two of the five locations never exceeded the 20 percent threshold) and 1 to 2 in the dynamic threshold. The aggressively sprayed plots were sprayed 4 to 7 times depending on location. No significant differences were observed in lint yield; however both threshold treatments and the aggressively sprayed treatment tended to increase yields compared with the untreated. No significant differences were observed in net return to stink bug management above that of the untreated. However, the threshold treatments tended to improve net returns greater than the aggressively sprayed treatment.

Table 1. Number of insecticide applications required, lint yield, and net return to management of boll feeding bugs at five locations, Georgia 2006.

	No. Insecticide Applications	Yield (lbs lint/acre)	Net Return Above Untreated per Acre
Untreated	0.00 a	1302 a	na
20 Percent Threshold	0.60 ab	1345 a	$22.32 a
Dynamic Threshold	1.40 b	1369 a	$29.40 a
Aggressively Sprayed	6.00 c	1385 a	$4.74 a

Means followed by same letter do not significantly differ (P=0.05, LSD)

Boll feeding bug populations were unusually low during 2006; however the data indicates that in the absence of threshold populations, there is no economic advantage to applying insecticides. Thorough stink bug scouting and the use of thresholds is a must to maximize economic returns. Intuitively, consideration should be given to the number of bolls per plant susceptible to stink bugs when making a treatment decision.