2003 BELTWIDE COTTON CONFERENCES, NASHVILLE, TN – JANUARY 6-10

INFLUENCE OF COTTON CULTIVAR AND PLANTING DATE ON FLEAHOPPER AND *LYGUS* POPULATIONS IN THE TEXAS HIGH PLAINS

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Abstract

Seasonal abundance of fleahoppers and *Lygus* varied with cotton cultivar as well as the planting date window. Paymaster 2326RR had the most fleahoppers and *Lygus* compared with Stoneville 2454R, Paymaster 2145RR, and Paymaster 2167RR. Late-planted cotton attracted significantly more of both species compared with the timely planted cotton. Sampling methods varied in their efficiency to capture fleahoppers and *Lygus*. The beat bucket method captured significantly more *Lygus*, while the visual method accounted for the most fleahoppers compared with other sampling methods.

Introduction

Field Infestations and yield loss due to cotton fleahoppers, *Pseudatomoscelis seriates* (Reuter) and *Lygus* sp. have become more of a concern for the Texas High Plains cotton producers over the past years. The *Lygus* sp. complex in the Texas High Plains includes *L. hesperus* (Knight) and *L. elisus* (van Duzee). The cotton plant is most susceptible to square loss during the first three weeks of fruiting and squares up to pinhead size may be damaged by fleahoppers (Muegge et al. 2001). *Lygus* may feed on small squares and damge developing anthers, abort the growing squares, or cause feeding injury to developing small bolls (Leigh 1988). During the last five years, an average of 2 million acres of cotton were infested and 1.4 million bales of cotton lint lost annually due to fleahopper damage in the Texas High Plains (Anonymous 2002). *Lygus* infested an average of 600,000 acres and caused the loss of 27,000 bales of cotton annually during the last five years. The objective of this study was to quantify the influence of planting date window and cotton cultivar on seasonal abundance patterns of cotton fleahoppers and *Lygus* in the Texas High Plains. As part of the study, we also evaluated the efficiency of several different sampling methods on fleahopper and *Lygus* population monitoring.

Materials and Methods

The study was conducted at the Texas Agricultural Experiment Station farm near Halfway, Texas. The treatments consisted of four commercial cotton cultivars and two planting dates in a randomized complete block design with four replications for a total of 32 plots. Cotton cultivars included Stoneville 2454R, Paymaster 2324RR, Paymaster 2145RR, and Paymaster 2167RR. The cultivar selection was based on plant architecture, leaf pubescence, and adaptability of the cultivar to the region. Planting date treatments included a timely planting (within the optimum planting date window recommended for the southern High Plains), and a late planting date that coincided with the replanting cut-off date for the region. Timely planting and late planting dates for this study were May 7 and June 7, respectively. Insect sampling began on June 17 and continued through the growing season on a weekly basis. A vacuum sampler (2-cycle backpack aspirator) was used to monitor populations of both fleahoppers and *Lygus* in all 32 plots. Five different sampling methods were used to sample only the cultivar PM 2326RR to evaluate the comparative efficacy of sampling methods for plant bug monitoring. Sampling methods included the vacuum sampler (30 second vacuum time/plot-100 row feet), sweepnet (100 sweeps/plot-300 row feet), beat bucket (8 plants/plot), drop cloth (48 plants/plot), and visual inspection (10 plants/plot). Sample units for each sampling method varied, but the sample counts were converted to numbers per acre. Data was subjected to analysis of variance (ANOVA) with cultivar, planting date, and cultivar x planting date as sources of variability. Treatment means were then compared with the least significant difference test (LSD) (SAS Institute 2000). Data for sampling method comparison was also subjected to ANOVA with sampling method as source of variability and LSD was used for mean comparison.

Results

The *Lygus* sp. complex included *Lygus hesperus* and *Lygus elisus* in approximately a 2:1 ratio in the Texas High Plains. However, for this report, data are presented as total combined *Lygus* numbers. Seasonal average *Lygus* and fleahopper numbers varied significantly with cotton cultivar. Paymaster 2326RR supported significantly higher number of *Lygus* compared with the other three cultivars evaluated. PM 2326RR, ST 2454R, PM 2145RR, and PM 2167RR supported 588, 282, 314, and 204 *Lygus* per acre per season, respectively. Paymaster 2326RR supported significantly higher number of fleahoppers compared with the other three cultivars evaluated. PM 2326RR, ST 2454R, PM 2145RR, and PM 2167RR supported 2761, 778, 1242, and 946 fleahoppers per acre per season, respectively. Among the four cultivars, PM 2326RR and PM 2167RR are semi-smooth cultivars, whereas PM 2145 RR is a hairy leaf cultivar and ST 2454R is a smooth leaf cultivar. The difference in abundance between PM 2326RR and other cultivars is large, especially when compared with the two semi-smooth leaf cultivars. This data would indicate that the leaf hairiness is not responsible for variation observed in *Lygus*/fleahopper abundance among these cultivars.

Planting date significantly affected total seasonal number, of both *Lygus* and fleahoppers in our study. Late planted cotton had significantly higher numbers of both fleahoppers and *Lygus* compared with timely planted cotton. Average numbers of fleahoppers and *Lygus* in late planted cotton plots were 2169 and 535 per acre, respectively, whereas numbers in timely planted plots were 1420 and 291 per acre, respectively. Significantly higher abundance of these plant bugs in late planted cotton compared with that in timely planted cotton could be attributed to the interaction between plant bugs and plant phenology. Late-planted cotton may have been more attractive to plant bugs then timely planted cotton during the period when plant bugs were moving into cotton fields from other hosts because of the greater abundance of squares present at that time in the late planted cotton.

Sampling methods varied in their efficiency to monitor fleahoppers and *Lygus*. The beat bucket method captured the greatest numbers of *Lygus*. The beat bucket, sweep net, drop cloth, vacuum, and visual methods estimated 2009, 383, 357, 113, and 102 *Lygus* per acre per season, respectively. The visual method accounted for the most fleahoppers compared with other sampling methods. The beat bucket, sweep net, drop cloth, vacuum, and visual methods estimated 4841, 1299, 934, 512, and 6717 fleahoppers per acre per season, respectively.

References

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