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INFLUENCE OF PLANTING DATE AND CULTIVAR ON LYGUS AND COTTON FLEAHOPPER ACTIVITY IN COTTON

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Abstract

The study was conducted at the Texas Agricultural Experiment Station farm near Halfway, Texas, to evaluate the effect of planting date and cotton cultivar on *Lygus* and cotton fleahopper abundance and activity in cotton. The treatments consisted of four commercial cotton cultivars (Stoneville 2454R, Paymaster 2324RR, Paymaster 2145RR, and Paymaster 2167RR) and two planting dates (early May and early June) in a randomized complete block design with four replications for a total of 32 plots. *Lygus* bugs and fleahoppers were sampled in all plots using a beat bucket and whole-plant visual sampling. Seasonal abundance of *Lygus* varied with cotton cultivar as well as planting date. Paymaster 2145RR had the most *Lygus* followed by PM 2167RR, PM 2326 RR, and Stoneville 2454R. Late-planted cotton attracted significantly more *Lygus* when *Lygus* abundance was at its peak in late August. Cotton fleahoppers were more abundant in timely planted cotton compared with that in late planted cotton during the early fruiting stage. Among the four cultivars evaluated, ST 2454R was found to have the lowest fleahopper numbers during cotton squaring.

Introduction

Field infestations and yield losses due to *Lygus* bugs and cotton fleahoppers, *Pseudatomoscelis seriates* (Reuter), have become more of a concern for Texas High Plains cotton producers in recent years. The *Lygus* complex in the Texas High Plains includes *L. hesperus* (Knight), *L. elisus* (van Duzee), and *L. lineolaris* (Palisot de Beauvois). 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 damage developing anthers, abort the growing squares, or cause feeding injury to developing small bolls (Leigh et al. 1988). During the last six years, an average of 0.9 and 3.5 million acres of cotton were infested and 24,000 and 135,000 bales of cotton lint lost annually due to *Lygus* and fleahopper damage in Texas. 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 two sampling methods on *Lygus* and fleahopper population monitoring.

Materials and Methods

The study was conducted at the Texas Agricultural Experimental Station Farm near Halfway, Texas. The treatment consisted of four cotton cultivars (Stoneville 2454R, Paymaster 2326RR, Paymaster 2145RR, and Paymaster 2167RR) and two planting dates (May 11-timely planted and June 9-late planted). The selected cultivars were based upon the plant architecture, leaf pubescence and adaptability in the region. Plots averaged 105 ft × 16 rows on a 30-inch row width. Irrigations were applied through a center pivot system using the LEPA (Low Energy Precision Application) irrigation management system. Temik @ 3.5 lbs/acre was applied at planting for thrips management. Total of 32 plots were arranged in a randomized complete block design with 4 replications. Two sampling methods were used to monitor insects: beat bucket (12 plants/plot) and visual sampling (10 plants/plot). Insect counts were converted to numbers per acre for data analysis. Data were subjected to analysis of variance (ANOVA) with cultivar, planting date, and cultivar × planting date as sources of variation. Treatment means were compared with the least significant difference (LSD) (SAS Institute 2002). Data for sampling method were also subjected to ANOVA and treatment means were compared with LSD.

Results

Beat bucket captured significantly higher numbers (overall 47% more) of *Lygus* than visual sampling (Fig. 1). However, this difference was primarily due to the higher number of nymphs detected by beat bucket than visual sampling. The two methods were similar in detecting *Lygus* adults. Muegge et al. (2003) and Cranmer et al. (2003)

also reported that the beat bucket was more time efficient and detected more *Lygus* compared with several other sampling methods. *Lygus* activity in cotton began in early July and continued through late August in all treatment plots. Although the seasonal average abundance of *Lygus* was similar across cultivars, the abundance during the two weeks of sampling in mid July was significantly higher (3,747 *Lygus*/acre) in PM 2326RR compared with other cultivars (Fig. 2). Also, *Lygus* reproduction in cotton increased in late August as evidenced by increased nymphal abundance. Nymphal abundance was significantly higher (1,731/acre) in PM 2145RR compared with other cultivars. The cultivar PM 2145RR was a pilose type with short dense hairs and it appeared to be more preferred for *Lygus* reproduction. Benedict et al. (1983) also reported that pilose cultivars were more preferred for oviposition as compared to glabrous and hirsute types, but not suitable for growth of the immature insect.

Planting date affected the seasonal activity patterns of *Lygus* (Fig. 3). The timely planted cotton was at peak bloom while late planted cotton was squaring. As a result, during late July to mid-August, *Lygus* activity was higher in timely planted cotton whereas late planted cotton attracted more *Lygus* in late August when timely planted cotton became a less preferred habitat. It appears that *Lygus* from timely planted cotton moved to adjacent late planted cotton plots as timely planted cotton matured and late planted cotton had more squares and young bolls. In late August, nymphal abundance was significantly higher in late planted cotton compared with that in timely planted cotton, whereas adult abundance was similar between the two planting dates.

Cotton fleahopper activity began in early July and continued through August. During the fleahopper susceptible stage of cotton, cotton fleahopper activity was significantly lower in ST 2454R compared to the other three cultivars (Fig. 4). Overall, PM 2145RR had the highest average (5,622/acre) fleahopper activity throughout the sampling period (early July to late August). Planting date significantly affected fleahopper activity in cotton, with significantly higher fleahopper activity in timely planted cotton compared with that in late planted cotton (Fig. 5).

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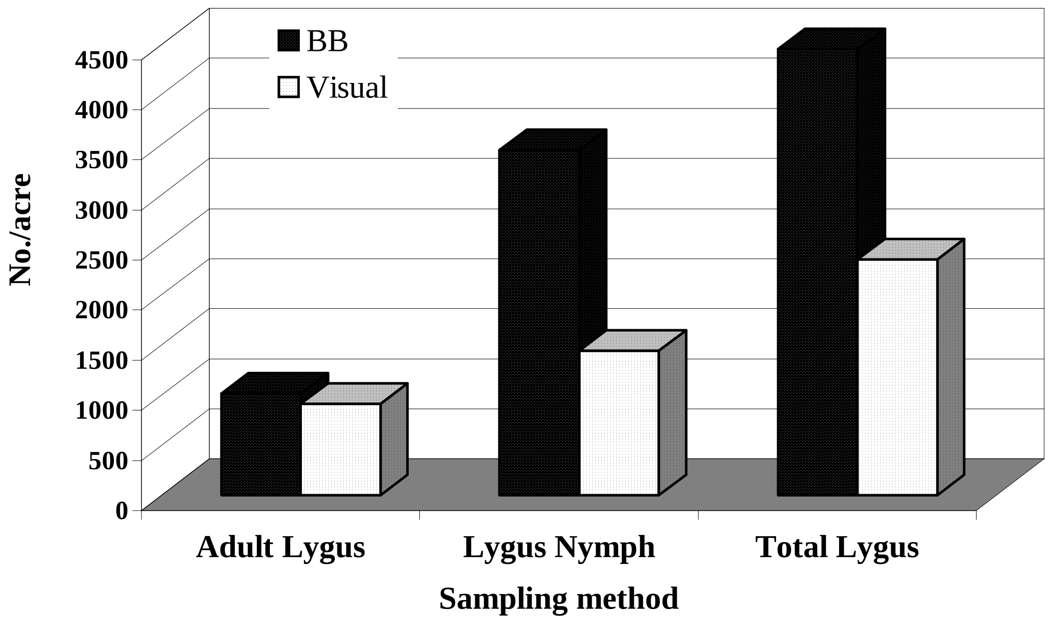

Fig. 1. Comparative catch efficiencies of two sampling methods for *Lygus*, Halfway, Texas, 2004. (BB: Beat Bucket)

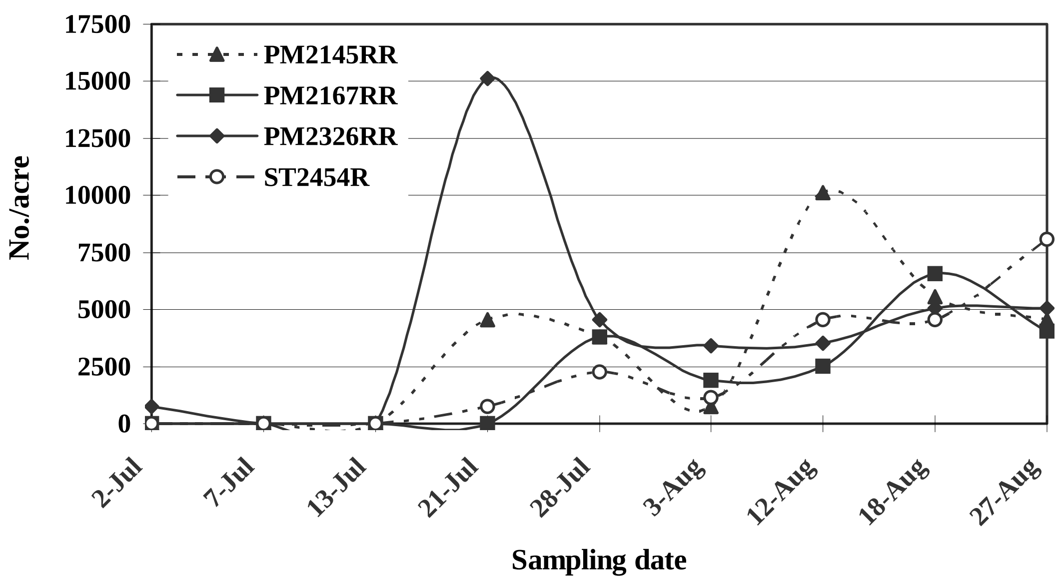

Fig. 2. Effect of cultivar on *Lygus* activity, Halfway, Texas, 2004.

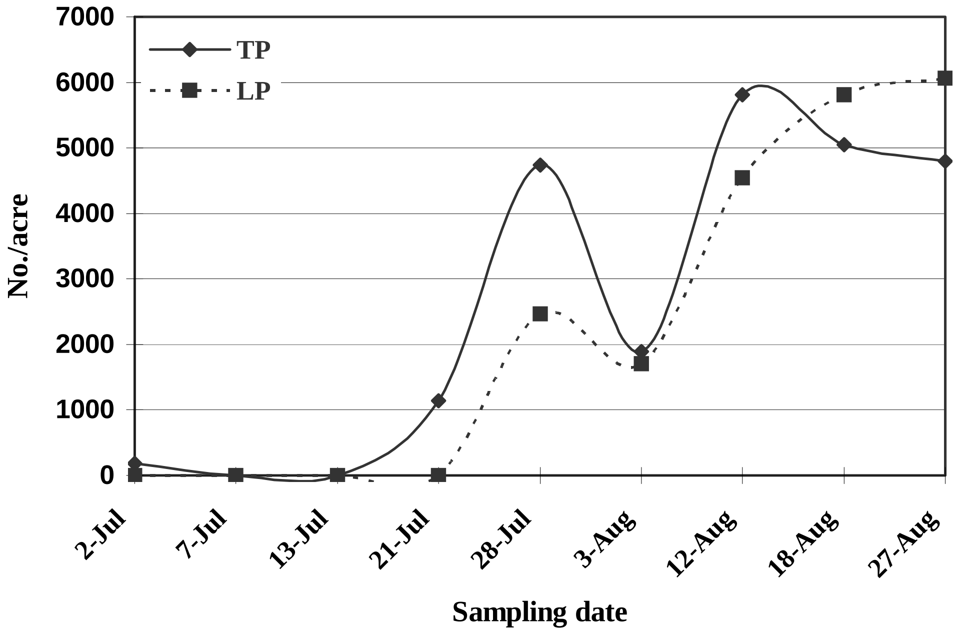

Fig. 3. Effect of planting date on *Lygus* activity, Halfway, Texas, 2004.
(TP: Timely planted; LP: Late planted)

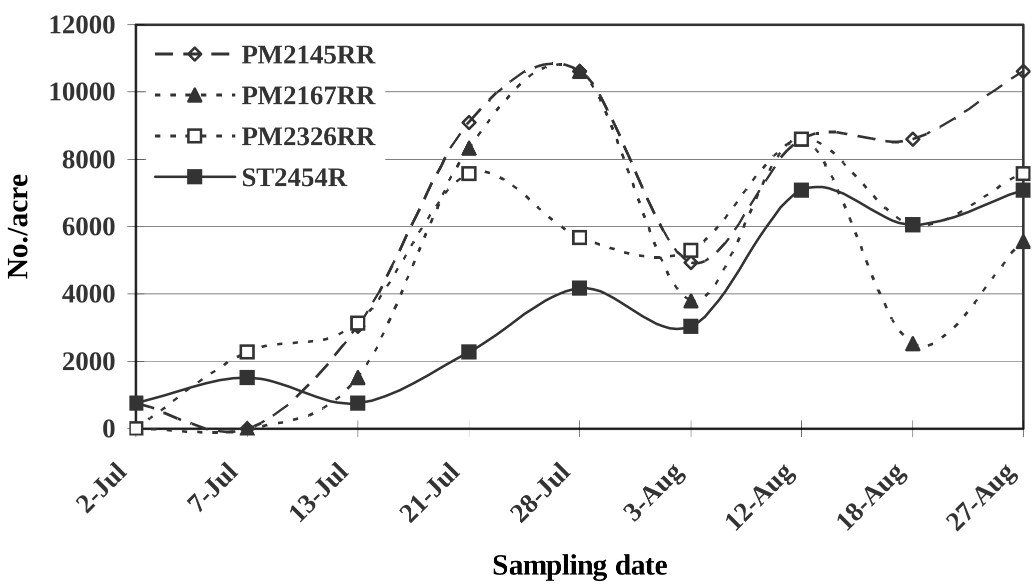

Fig. 4. Effect of cultivar on cotton fleahopper activity, Halfway, Texas, 2004.

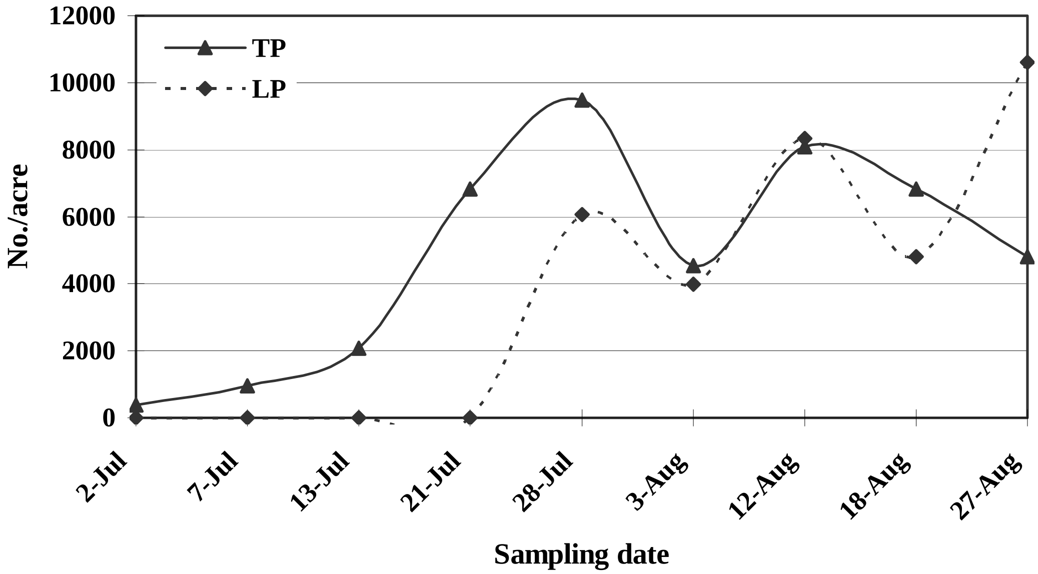

Fig. 5. Effect of planting date on cotton fleahopper activity, Halfway, Texas, 2004.