SIGNIFICANCE OF THE COTTON FLEAHOPPER AS A PEST OF TEXAS COASTAL BEND COTTON

Roy D. Parker, Emil D. "Trey" Bethke III and Dan D. Fromme
Texas Agricultural Extension Service
Corpus Christi, Robstown and Wharton, TX

Abstract

The paper analyzes combined data from 5 fleahopper control experiments conducted on Texas Coastal Bend cotton in 1993, 1995, 1998 and 1999. Measurements included impact of insecticides on fleahopper and beneficial predator numbers, evaluation of cotton fiber characteristics, effects of fleahopper control on boll numbers, and effect of treatments on lint production. Although numerous insecticides were evaluated in individual experiments, three insecticides (Orthene, Provado, Bidrin) included in all 5 tests were chosen for presentation in this report. These insecticides are commonly used for fleahopper and/or aphid control. Insecticides significantly reduced fleahopper numbers (season averages) during the critical plant growth stage (pinhead square until first bloom). Insecticides had a short term, adverse impact on beneficial predators in the small plots utilized in these studies. No effects were observed on cotton fiber characteristics. Harvested boll numbers were numerically increased in insecticide treated cotton and the number of bolls required to produce a lb of lint were numerically lower in all, and significantly lower in 2 of the 3 insecticide treatments. Lint yields were significantly increased (77.3 lb/acre average) in insecticide treated cotton over the 4-year period. Dollar returns over costs were $17.35 (Orthene), $7.21 (Provado) and $21.14 (Bidrin) when compared to untreated cotton.

Introduction

The cotton fleahopper, *Pseudatomoscelis seriatus* (Reuter), is recognized as a primary pest of Texas cotton. Nymph and adult fleahoppers often cause loss of small squares during the early fruiting period of plant development (first 3 weeks of squaring). Increased damage is observed on smooth leaf varieties which may extend the susceptible period into early bloom. In a field experiment in which 8 insecticides were evaluated, the average yield increase was 80 lb lint/acre (Parker et al. 1993). Parker (1996) evaluated 7 insecticides in which the average increase was 200 lb lint/acre and net returns were increased $105.00/acre. In another field study during the severe drought of 1998 in which 9 insecticides or treatment rates were evaluated, the average lint yield increase was 30 lb/acre; statistical significance was not shown (Parker 1999). However, all but one insecticide treatment in that test produced more lint than the untreated check. Two field studies in Texas coastal counties in 1999 (Fromme 1999, Bethke and Parker 1999) again resulted in numerical lint yield increases in insecticide treated cotton compared to untreated cotton (26.1 and 74.5 lb/acre, respectively). In the latter experiment, the two treatments were applied during early bloom stage of crop development. In these five experiments, fleahopper number during the critical plant stage developmental period averaged 44, 67, 64, 25 and 23 per 100 terminals in the untreated cotton and 14, 13, 12, 9 and 5 in the insecticide treated cotton, respectively.

The objectives of this paper are to summarize the overall impact of insecticides on cotton fleahopper and predator numbers; to determine effects of fleahopper control on cotton fiber characteristics, boll and lint production; and to calculate dollar returns obtained from the 5 fleahopper control studies conducted over a 4-year period.

Materials and Methods

Five sets of data from field studies conducted during 4 years (1993, 1995, 1998 and 1999) were used in the analysis. Four of the tests were conducted on the Texas Agricultural Experiment Station in Nueces County and one test was conducted on a commercial farm in Wharton County. Treatments were replicated 4 times in RCB designs in 4 row x 30-50 ft plots. Cotton varieties included DPL50 (1993, 1995), DPL 33B (1998) and DPL 20B (1999). Insecticides were applied to the center two rows of each plot in two treatments applied at 6-7 day intervals (only one treatment was made in 1993). Treatments were made with either a CO_2 backpack sprayer or a self-propelled Lee Company Spider Spray Trac. Applications were made through hollow cone nozzles and spray volume ranged from 7.5 - 10.9 gpa. Two nozzles were used per row.

Although numerous insecticides were evaluated in the individual experiments, Orthene, Provado and Bidrin were included in all 5 tests; therefore, these materials were chosen for presentation in this report. Treatment effects were measured by (1) comparing fleahopper and predator numbers following treatments, (2) evaluating fiber characteristics, (3) measuring boll and lint production and (4) calculating cost/return based on 1999 prices. Chemical costs in this report for insecticides were $4.51 (Orthene), $12.88 (Provado) and $2.84 (Bidrin).

Results and Discussion

Fleahopper numbers were significantly reduced by all three insecticides (Table 1). Predator numbers were lower in insecticide treated cotton but the reduction was not statistically significant in the Bidrin treated cotton. Rapid movement of predators back into plots probably occurred

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1370-1371 (2000)
National Cotton Council, Memphis TN

because of small plot size. No differences were observed in fiber characteristics (Table 2). Although not statistically significant, numerically more bolls were harvested from insecticide treated cotton and they were significantly heavier (except in one treatment) compared to that in untreated cotton (Table 3). The three insecticides provided significant lint yield improvement and dollar returns when compared to untreated cotton. The lower dollar return for the Provado treatment reflected the increased cost of this insecticide. The average yield increase in insecticide treated cotton in the five experiments was 77.3 lb lint/acre.

Conclusions

The cotton fleahopper is a key pest of Texas Coastal Bend cotton. Generally, two insecticide treatments are required for their control during the squaring to early bloom period. Insecticides reduce fleahopper and predator numbers. No effects were observed on cotton fiber characteristics. In these studies fleahopper numbers were maintained below 11/100 plant terminals compared with numbers averaging about 45/100 plant terminals in untreated cotton (on average). Treatment for fleahoppers when they exceed established economic threshold should result in significant yield improvement and increased net return.

References

Bethke, Emil D. III and Roy D. Parker. 1999. Comparison of insecticides for control of cotton fleahopper. pp. 18-24. *in* Results of Insect Control Evaluations on Corn, Sorghum and Cotton in Texas Coastal Bend Counties, Texas Agricultural Extension Service, Corpus Christi, TX.

Fromme, Dan D. 1999. Comparison of insecticides for control of fleahopper and their impact on cotton production (in press). *in* Upper Coast IPM Annual Report, Texas Agricultural Extension Service, Wharton, TX.

Parker, Roy D. 1996. Comparison of insecticides for control of fleahoppers on Texas Coastal Bend cotton. pp. 769-771. *in* Proc. Beltwide Cotton Prod. Conf., National Cotton Council of America, Memphis, TN.

Parker, Roy D. 1999. New insecticides for control of cotton fleahopper and impact of drought on production. pp. 1055-1056. *in* Proc. Beltwide Cotton Prod. Conf., National Cotton Council of America, Memphis, TN.

Parker, Roy D., Stephen D. Livingston and Raymond L. Huffman. 1993. Evaluation of insecticides for control of fleahopper on cotton. pp. 57-64. *in* Results of Insect Control Evaluations on Corn, Sorghum, Cotton and Pecans in Texas Coastal Bend Counties, Texas Agricultural Extension Service, Corpus Christi, TX.

Table 1. Average effect of insecticides on cotton fleahopper and beneficial predator numbers, five test summary, Texas Coastal Bend.

		Number per 100 terminals	
Treatment	Rate[a] oz/acre	fleahoppers	predators
Orthene 90S	4.1	7.6 b	20.8 b
Provado 1.6F	2.1	9.4 b	17.1 b
Bidrin 8E	2.4	13.2 b	29.7 ab
Untreated		44.7 a	35.3 a
LSD (P=0.05)		12	13
P > F		0.0001	0.016

Means in a column followed by the same letter are not significantly different by ANOVA (P = 0.05; LSD).

[a] Average rate used in 5 tests conducted in 1993, 1995, 1998 and 1999.

Table 2. Effect of foliar insecticides applied for fleahopper control on cotton fiber characteristics, five test summary, Texas Coastal Bend.

		Fiber characteristics[b]				
Treatment	Rate[a] oz/acre	Mic	Lgth	Ur	St	Elong
Orthene 90S	4.1	4.1 a	1.07 a	82.3 a	26.2 a	7.3 a
Provado 1.6F	2.1	4.0 a	1.07 a	82.4 a	25.4 a	7.5 a
Bidrin 8E	2.4	4.1 a	1.06 a	82.6 a	25.5 a	7.3 a
Untreated		4.1 a	1.07 a	82.9 a	25.7 a	7.3 a
LSD (P=0.05)		NS	NS	NS	NS	NS
P > F		0.2506	0.4018	0.5449	0.156	0.3578

Means in a column followed by the same letter are not significantly different by ANOVA (P = 0.05; LSD).

[a] Average rate used in 5 tests conducted in 1993, 1995, 1998 and 1999.

[b] Mic = micronaire, Lgth = length, Ur = uniformity ratio, St = strength, Elong = % elongation.

Table 3. Average effect of insecticides applied for fleahopper control on production and economic return, five test summary, Texas Coastal Bend.

Treatment	Rate[a] oz/acre	Harvested bolls 1000's/a	No. bolls per lint lb	Yield lb lint/a	Return $/acre over untreated[b]
Orthene 90S	4.1	251 a	347 ab	778 a	17.35
Provado 1.6F[c]	2.1	249 a	338 b	773 a	7.21
Bidrin 8E	2.4	244 a	338 b	784 a	21.14
Untreated		233 a	359 a	701 b	
LSD (P=0.05)		NS	17.2	63.9	
P > F		0.2381	0.0649	0.0493	

Means in a column followed by the same letter are not significantly different by ANOVA (P = 0.05; LSD).

[a] Average rate used in 5 tests conducted in 1993, 1995, 1998 and 1999.

[b] Cotton value based on $0.50/lb lint and $0.04/lb for seed; costs include Orthene 90S ($9.78/lb), Provado 1.6F ($436.00/gal) and Bidrin 8E ($84.00/gal). Application cost for two foliar treatments was ($3.00/acre x 1.8 treatments = $5.40/acre). Harvesting, hauling and ginning costs for the extra lint produced over the untreated cotton was figured at $0.21/lb lint.

[c] Provado is generally not used for fleahopper control unless aphids are also being considered for control.