THREE-YEAR PERFORMANCE SUMMARY OF NEW SOIL AND SEED APPLIED SYSTEMIC INSECTICIDES ON COTTON

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Abstract

Data from 4 field tests conducted along the Texas Gulf Coast from 1998-2000 were combined for analysis of the effects of seed (Adage and Gaucho) and soil applied (Temik) systemic insecticides on thrips. In this analysis, thrips numbers on 2-5 leaf cotton, plant damage ratings, boll production, lint per boll, lint yield and economic impacts are reported. Statistical differences were not found in thrips numbers between insecticide treatments. Adage and Temik treatments contained significantly fewer thrips than untreated cotton; thrips numbers in Gaucho treated cotton were numerically (not statistically) lower than those in untreated cotton. All insecticide treatments had statistically lower plant damage ratings, greater numbers of harvested bolls and more lint production than untreated cotton. Lint yield increase in insecticide treatments ranged from 72-101 lb/acre.

Introduction

Field studies to evaluate the effects of seed and in-furrow at-planting systemic insecticides on early season insects and subsequent favorable impact on lint production and economic returns have been demonstrated in cotton grown along the Texas Gulf Coast (Parker 2000, Parker and Bethke 1999, Parker and Huffman 1991, Parker and Alaniz 1998). In recent years we have evaluated new systemic insecticides that are now labeled for cotton use. Herein is a summary (in part) of those tests conducted between 1998-2000.

Materials and Methods

Four sets of data from field studies conducted over a 3-year period (1998-2000) were used in this analysis. Tests were planted in March, in 2, 4 or 8 row plots on 38 or 39- inch row spacings. Plot lengths varied from 50-500 ft. and treatments were replicated 4 times (except in one test, 3 times) in a randomized complete block design. Soil types consisted of heavy clays with an average pH of 7.7 and 1-2% organic matter. Cotton varieties utilized in these tests included DPL 20B (one test) and DPL 33B (3 tests). Yield potential was reduced in the 1998 test due to drought conditions; otherwise, moisture was adequate for favorable yields. Insecticide treatments included granular Temik 15G (4.0 oz/1000 row ft) applied in-furrow with two types of applicators (Kinze Company or electric driven Gandy boxes), and seed treated with Adage 5FS (7.6 oz/cwt seed) or Gaucho 480FS (8.0 oz/cwt seed).

Treatment effects were measured in the center two rows of plots by (1) counting the number of thrips and aphids (aphids not reported herein) on 5-10 plants per plot on 2-5 true leaf stage cotton (plants were placed in alcohol, washed and insects collected on filter paper and counted under a microscope), (2) assigning a visual plant damage rating (1=no damage up to 5=severe stunting and leaf curling), (3) harvesting seed cotton by hand from 1/1000 acre lengths of row in each plot, and (4) processing cotton for lint weight on a 10-saw Eagle laboratory gin. Data from the various tests were considered as replicates for statistical analysis.

Results and Discussion

Thrips numbers were statistically lower in Adage and Temik treated plots compared to untreated cotton (Table 1). No statistical difference was found between Gaucho and untreated cotton. Thrips numbers in untreated cotton were generally equal to or slightly above the numbers considered to be economically damaging to cotton according to Texas Agricultural Extension Service guidelines (thrips counted per plant equal to the number of true leaves present for 2-5 leaf cotton).

Visual plant damage was reduced significantly by Adage, Gaucho and Temik. A damage rating above 3 was considered by us to likely result in yield reduction. Untreated cotton was generally easy to identify due to visual plant damage symptoms.

Insecticide treated cotton averaged 26,000 bolls per acre more than untreated cotton and the number of bolls harvested from insecticide treated cotton was statistically greater than the number from untreated cotton. For some unexplained reason, more bolls were required to produce a pound of lint in Temik treated compared with Adage treated cotton.

Adage, Gaucho and Temik treated cotton produced significantly more lint yield than untreated cotton. The increase averaged 85 lb/acre for the three insecticides and ranged from 72-101 lb/acre. Dollar return due to insecticide treatment over the untreated averaged $30.24/acre.

Conclusions

Tests over a period of years provided conclusive evidence of the economic benefit from the use of systemic insecticides applied at-planting on Texas Gulf Coast cotton. Our conclusions are that Adage, Gaucho and Temik (1) reduce early season insect damage to cotton, (2) result in increased cotton production, and (3) provide an economic return.

References

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Table 1. Thrips numbers, plant damage rating, boll production, lint yield and dollar return from use of systemic insecticide seed and granular treatments on Texas Gulf Coast cotton, 1998-2000.

Treatment (rate)	Thrips[a] no./10 plants	Plant da. rating[b]	Bolls (1000's/acre) har-vested	Bolls (1000's/acre) no./ lint lb	Yield lblint /acre	Return $/acre over untreated[c]
Adage 5FS (7.6 oz/cwt seed)	19.7 b	1.28 b	264 a	348 b	807 a	37.72[d]
Gaucho 280FS (8.0 oz/cwt seed)	22.2 ab	1.80 b	258 a	352 ab	789 a	30.73
Temik 15G (4.0 oz/1000 ft)	16.0 b	1.69 b	264 a	366 a	778 a	22.28
Untreated	31.6 a	3.64 a	236 b	358 ab	706 b	
LSD (P=0.05)	11.64	0.63	21.17	16.07	63.0	
P > F	.0275	.0001	.0168	.0560	.0092	

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

[a]Average no. thrips on 2-5 true leaf cotton.

[b]Ratings range from 1 = no damage to 5 = severe stunting and leaf curling.

[c]Cotton value based on $0.60/lb for lint and $0.05/lb for seed; costs include Gaucho 480FS ($0.69/lb seed at 5,800 seed/lb) and Temik 15G ($3.23/lb). Application cost for Temik was calculated at $0.25/acre. Harvesting/hauling/ginning costs for the extra lint produced above the untreated cotton was set at $0.21/lb of lint.

[d]The cost of Adage was estimated at $9.75/acre.