SYSTEMIC INSECTICIDE USE ON COTTON FOR THRIPS AND APHID CONTROL

Texas Agricultural Experiment Station, Nueces County, 2000

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SUMMARY: Systemic insecticides provided statistically significant control of aphids through the matchhead square stage (55 days after planting). Additionally, plant damage ratings at the matchhead square stage were significantly lower in all insecticide treated plots compared to untreated cotton. Insecticide treated cotton produced from 100-165 lb/acre more lint than untreated cotton.

OJECTIVES: The experiment was established to evaluate the effects of systemic insecticides applied as seed, granular or liquid treatments for control of thrips and aphids, and to measure subsequent impact on yield.

MATERIALS/METHODS: The experiment was planted 10 Mar, 2000, on the Meaney Annex of the Texas Agricultural Experiment Station at Corpus Christi, Texas. DPL 33B variety cotton was planted at 70,000 seed/acre in a sandy clay loam soil (52% sand, 16% silt, 32% clay) with 8.1 pH and 1.1% organic matter. Sorghum had been planted on the site in the previous season. The soil profile contained excellent moisture at-planting and at the 3-inch depth was 77.1°F. A 4-row research cone planter was used to plant cotton seed in 4 row (38-inch centers) by 50 ft long plots. The experiment was arranged in a randomized complete block with 4 replications. Electric driven Gandy boxes were used to deliver granular Temik into the seed furrow and the liquid Admire was applied into the seed furrow through single 8002E nozzles oriented with the row in a total volume of 7.88 gpa at 40 psi and a speed of 3.25 mph. Pressure was provided by CO_2. Herbicide consisted of Treflan 4 HFP (1 qt/acre) incorporated on 9 Nov 1999. Dual II Magnum (7.64 lb ai/gal) at 1.0 pt/acre Plus Cotoran 4L at 2.0 pt/acre was applied on 11 Mar. Fertilizer consisted of 100-14-0 + 0.6 Zn/acre. A total of 7.64 inches of rain was received during the growing season. Adage and Gaucho were applied as seed treatments.

Treatment effects were assessed by (1) counting the number of aphids and thrips on 5 plants on 2 true leaf stage cotton, 27 days after planting (DAP); plants were placed in alcohol, washed and insects collected on filter paper and counted under a microscope, (2) estimating the number of cotton aphids by examination of 5 leaves in each plot at 41 and 55 DAP, (3) assigning a visual plant damage rating (1 = no damage up to 5 = severe stunting and leaf curling), (3) counting plants on 13.75 ft row on one of the two center rows in each plot on 19 Jul and (4) harvesting by hand 13.75 ft row in each plot on 26 Jul. Seed cotton was processed on a 10-saw Eagle Laboratory gin.

RESULTS/DISCUSSION: No differences were found in thrips and aphid numbers at the 2 true leaf stage (27 DAP) but by 41 DAP, aphid numbers were significantly greater in untreated compared to insecticide treated cotton (Table 1). By 55 DAP aphid differences did not exist but significantly more visual damage was observed in untreated compared to treated cotton. No differences were found in plant stand or the number of bolls required to produce one lb of lint (Table 2). Significantly more bolls and lint were harvested from the insecticide treated cotton compared with untreated cotton except in the Gaucho treatment. Lint yield increases in insecticide treated cotton ranged from a low of 100 lb/acre in the Gaucho treatment to a

high of 165 lb/acre in the Adage treatment. All insecticide treatments produced more lint than untreated cotton, with an average yield increase of 136.2 lb/acre compared to untreated cotton.

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Table 1. Thrips, aphids and insect plant damage rating in cotton treated with various seed and in-furrow applied systemic insecticides, Texas Agricultural Experiment Station, Nueces County, TX, 2000.

Treatment (rate)	Thrips/5 plants[a]	Aphids/5 plants[a]	No. aphids per leaf[b] 41 DAP	No. aphids per leaf[b] 55 DAP	Plant damage rating[c]
Adage 5FS (7.6 oz/cwt seed)	4.0 a	0.3 a	1.15 b	15.0 a	1.25 c
Gaucho 480FS (8.0 oz/cwt seed)	3.8 a	8.0 a	2.03 b	21.3 a	1.50 bc
Temik 15G (4.0 oz/1000 ft row)	3.0 a	8.0 a	10.98 b	27.3 a	1.50 bc
Admire 2F (6.4 oz/acre)	1.8 a	4.0 a	3.20 b	19.8 a	2.25 ab
Admire 2F (3.2 oz/acre)	3.5 a	5.5 a	4.75 b	14.5 a	1.25 c
Untreated	2.0 a	11.3 a	28.38 a	26.3 a	3.00 a
LSD (P = 0.05)	NS	NS	11.15	NS	.881
P > F	.2975	.0720	.0002	.3264	.0009

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

[a] Cotton growth stage = 2 true leaves on 6 Apr or 27 days after planting.

[b] Cotton growth stage = 5-6 true leaves on 20 Apr and matchhead square on 4 May (41 and 55 days after planting, respectively).

[c] Plant damage ratings range from 1 = no damage to 5 = severe stunting and leaf curling. Observations were made on 4 May.

Table 2. Cotton plant density, boll production and lint yield with various seed and in-furrow applied systemic insecticides, Texas Agricultural Experiment Station, Nueces County, TX, 2000.

Treatment (rate)	Plants 1000's/acre	Number bolls (1000's/acre) harvested	Number bolls (1000's/acre) per lint lb	Yield lb lint/acre	Return $/acre over untreated[a]
Adage 5FS (7.6 oz/cwt seed)	52.5 a	299 ab	356 a	839 a	[b]
Gaucho 480FS (8.0 oz/cwt seed)	59.0 a	276 bc	358 a	774 ab	38.43
Temik 15G (4.0 oz/1000 ft row)	61.8 a	298 ab	376 a	799 a	47.39
Admire 2F (6.4 oz/acre)	69.0 a	315 a	384 a	822 a	42.06
Admire 2F (3.2 oz/acre)	64.5 a	295 ab	364 a	817 a	53.33
Untreated	51.8 a	245 c	365 a	674 b	
LSD (P = 0.05)	NS	37.9	NS	122.4	
P > F	.1088	.0051	.2337	.0270	

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

[a] 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), Temik 15G ($3.23/lb) and Admire 2F ($545.00/gallon). Application cost for Temik and Admire was calculated at $0.25/acre. Harvesting/hauling/ginning fees for the extra lint produced above the untreated cotton was set at $0.21/lb of lint.

[b] Adage is an experimental insecticide for which a cost has not been established.