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Thrips Control Response to Temik and Gaucho in UNR Cotton

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INTRODUCTION

The benefits of soil-applied systemic insecticides and seed treatments for thrips control have been demonstrated in wide-row (36- to 40-inch) cotton production (Cooke et al. 1994; Parker and Huffman 1991; Christian and Supak 1994; Carter et al. 1989; Reed and Jackson 2002). Wright et al. (2000) reported that thrips control was essential in Ultra-Narrow Row (UNR) cotton production (7.5- to 15-inch rows) to maintain adequate plant populations. The product label rate of Temik® 15G (aldicarb) for thrips control in all cotton producing states except for Texas, Oklahoma, and New Mexico, is 3.5 to 5 pounds per acre (0.53 to 0.75 pound of active ingredient per acre) or 4.5 to 6 ounces per 1,000 row feet in 40-inch rows. If 4.5 to 6 ounces per 1,000 row feet is converted to pounds per acre for a 9.5-inch row, the rate would be 15.5 to 20.6 pounds per acre (2.3 to 3.1 pounds of active ingredient per acre), which is within the maximum label rate of 33 pounds per acre (4.95 pounds of active ingredient per acre) per year. Bacheler (2000) noted that in 7.5-inch rows versus 38-inch rows, the number of row-feet is increased by approximately five times, resulting in a fivefold increase in the amount of Temik required based on the label. Bacheler's data (1999), indicated that 8 pounds per acre (1.2 pounds of active ingredient per acre) produced lint yield equal to 16 pounds per acre (2.4 pounds of active ingredient per acre) and higher than the untreated check.

Wright et al. (2000) reported that some growers were successful using 6 to 9 pounds per acre (0.9 to 1.35 pounds of active ingredient per acre) for thrips control. He noted that most people who eliminated in-furrow insecticide application for UNR cotton did so due to the expense required based on the number of row feet. Wright also stated that on a per-row-foot basis, thrips control becomes more expensive for UNR than for wide-row cotton. Therefore, a field study was conducted in 2000 and 2001 to evaluate thrips control with selected seed or soil applied (in-furrow) insecticides in UNR cotton.

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Materials and Methods

The study was conducted on a Catalpa silty clay loam soil in 2000 and 2001 near Verona, Mississippi. The experimental design was a randomized complete block design with four replications. Plot size was 14x50 feet. There were several treatments: (1) a check (no insecticide); (2) Gaucho (imidacloprid) seed treatment applied alone; (3) Gaucho seed treatment combined with Temik at 0.53 pound of active ingredient per acre applied in-furrow; and (4) four rates of Temik ranging from 0.53 to 2.1 pounds of active ingredient per acre applied in-furrow (Table 1). All Gaucho treatments were applied to the seed at 0.25 pound of active ingredient per 100 pounds of seed and mixed in a seed treater until thoroughly coated.

Potash and phosphate fertilizers were applied in the fall according to soil test recommendations prior to tillage. Ammonium nitrate (34% N) was applied broadcast at 90 pounds of nitrogen per acre 3 weeks after planting.

Plots were chiseled and disked in the fall and field-cultivated in the spring, approximately 2 months before planting. Burndown herbicides were applied approximately 1 month before planting. Sure-Grow 501BR at 150,000 seeds per acre was planted on May 30, 2000, and June 11, 2001, with a vacuum planter in 9.5-inch rows on spring-prepared flat seedbeds. Plots were rolled following planting to conserve soil moisture.

Weeds and mid- and late-season insect pests were controlled with appropriate pesticides. Gramoxone (paraquat) at 0.5 pound of active ingredient per acre plus Meturon 4L (fluometuron) at 1 pound of active ingredient per acre was applied after planting in 2000. Gramoxone Max (paraquat) at 1 pound of active ingredient per acre was applied after planting in 2001. Roundup Ultra (glyphosate) at 1 pound of active ingredient per acre was applied to four-leaf cotton for postemergence weed control in 2000. In 2001, Roundup Ultra Max (glyphosate) was applied at 1 pound of active ingredient per acre to four-leaf cotton, followed by Staple (pyrithiobac) at 1.28 ounces of active ingredient per acre and Select (clethodim) at 0.125 pound of active ingredient per acre to maintain weed-free plots. Pix (mepiquat chloride) in 2000, and Pix Plus (mepiquat chloride + Bacillis cereus) in 2001, were applied as needed for plant growth control. Cotton was scouted twice a week for mid- and late-season insect pests. Recommended pesticides were applied when insect pests were at or above threshold levels.

Thrips (Fankliniella sp.) population counts were made 26 and 24 days after planting in 2000 and 2001, respectively. Five plants were cut from each plot, placed in plastic bags, and taken to the laboratory where insects were washed from the plants into micro sieves, placed on filter paper, and counted under a microscope.

The cotton was defoliated and desiccated before stripper harvest each year. The stripper-harvested seed cotton was ginned with a mini-gin (state-of-art, full-scale gin) to determine gin turnout and lint yield. All data were analyzed with SAS Mixed Procedure program, in the Statistical Analysis System (SAS) software (Little et al. 1996). When no interactions were detected, the data were pooled over years. Treatment means were separated with Fisher's Protected LSD calculated at the 10% significance level.

Results and Discussion

Since there was no year-by-treatment interaction, the data were pooled over years. Thrips populations ranged from 0 to 5.13 thrips per five plants with differences among treatments (Table 1). Thrips populations were significantly lower for all Temik treatments and Gaucho + Temik than the check and Gaucho seed treatment. These results indicated that the Gaucho seed treatment was not as effective as Temik applied in-furrow. However, the Gaucho seed treatment thrips population of 3.63 per five plants was below the 1-thrips-per-plant threshold for insecticide application as reported by the Mississippi Cotton Insect Control Guide (2004).

Lint yield ranged from 1,072 pounds per acre for the check to 1,217 pounds per acre for Temik at 0.53 pounds of active ingredient per acre applied in-furrow (Table 1). Gaucho seed treatments and in-furrow Temik treatments produced significantly higher lint yield than the check. Although the Gaucho seed treatment had higher thrips populations than Gaucho + Temik and Temik rates of 0.53 to 2.1 pounds of active ingredient per acre, the lint yields were not significantly different. These results indicated that increasing rates of Temik above 0.53 pound of active ingredient per acre for UNR cotton did not significantly increase thrips control or yield. As others have reported in wide-row cotton (Cooke et al. 1994; Parker and Huffman 1991; Christian and Supak 1994; Carter et al. 1989; Reed and Jackson 2002.), our results indicated that soil insecticides significantly reduced thrips populations compared with the untreated check in the UNR system, similar to what others have found in wide-row systems. However, under low populations of thrips infestations, higher rates of Temik did not perform significantly better than lower rates for UNR cotton as has been suggested by Bacheler (2000) and Wright et al. (2000).

Table 1. Cotton lint yield and thrips population response to in-furrow and seed treatment insecticides, averaged over years (2000 and 2001).

Insecticide	Rate	Insecticide application method	Lint yield[1] (lb/A)	Thrips per five plants[1]
Untreated check	—	—	1,072b	5.13b
Gaucho 4FS	0.25 lb ai/100 lb	Seed	1,183a	3.63b
Gaucho 4FS + Temik 15G	0.25 lb ai/100 lb + 1.05 lb ai/A	Seed In-furrow	1,195a	0.00a
Temik 15G	0.53 lb ai/A	In-furrow	1,217a	1.13a
Temik 15G	1.05 lb ai/A	In-furrow	1,176a	0.13a
Temik 15G	1.50 lb ai/A	In-furrow	1,194a	0.50a
Temik 15G	2.10 lb ai/A	In-furrow	1,201a	0.38a
Treatment LSD (P=0.10)			61	2.18

[1]Means followed by the same letter are not significantly different.

Conclusions

The Gaucho seed treatment and the check had higher thrips populations than Gaucho + Temik, as well as the Temik rates of 0.53 to 2.1 pounds of active ingredient per acre. However, lint yields indicated no difference between the Gaucho seed treatment, Gaucho + Temik, and Temik rates of 0.53 to 2.1 pounds of active ingredient per acre; all produced greater yield than the check. The benefits of an in-furrow insecticide in UNR cotton were similar to wide-row rates. Temik at 0.53 pound of active ingredient per acre, a commonly used rate in wide-row cotton, provided equivalent thrips control and lint yield in UNR cotton.

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