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THRIPS CONTROL ON BOLLGARD AND NON-BT COTTON VARIETIES

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Abstract

Three studies were conducted in 2001 and 2002 to evaluate seed treatment insecticides for thrips control on BollGard and non-BT cotton varieties. In-furrow insecticide treatments of aldicarb (Temik 15G) and phorate (Thimet 20G), foliar sprays of acephate (Orthene 97AG) and lambda cyhalothrin (Karate Z), and hopper box seed treatments of acephate (Orthene 75S) were compared to commercial seed treatments of thiamethoxam(Adage in 2001,Cruiser 5FS in 2002) and imidicloprid (Gaucho 600 F). The tobacco thrips, *Frankliniella fusca* (Hinds), was identified as the primary species in these studies. In 2001 thiamethoxam treated seed gave three weeks of thrips control comparable to the aldicarb in-furrow treated cotton, but residual control declined by 5 weeks after planting. Foliar applications of either acephate or lambda cyhalothrin to the thiamethoxam treatments provided thrips control comparable to the aldicarb treated cotton. All insecticide treated cotton had significantly higher lint cotton yields compared to the untreated cotton. In the 2002 studies, thrips control with the seed treatments suppressed thrips for 3-4 weeks which was equal to the in-furrow treatments of aldicarb. The seed treatments needed one foliar spray of either acephate or lambda cyhalothrin to extend control for an additional three weeks which equaled the control of the in-furrow aldicarb. Because of excessive fall rain and poor harvest conditions, cotton yields in the 2002 studies did not reflect the effects of thrips control.

Introduction

The availability of commercial seed treatments for thrips control on cotton is seen by many southeast Alabama growers as a time and labor saving management tool that fits well with the transgenic cotton varieties and other new production technologies. Although the damaging effect of thrips feeding on cotton can be easily seen during the first few weeks of the season, research data has not always been able to show improved cotton yields as a result of thrips control. (Cook 1998, Hopkins et. al. 2002). Others have seen yield benefits from thrips control (Herbert 2002, Faircloth et. al. 2002). Thrips control is recommended in Alabama by the Extension System (Smith and Freeman 2002) to improve early season vigor and growth of cotton seedlings. Most southeast Alabama cotton producers use some method of thrips control either at planting or during early season. The purpose of these studies was to evaluate the new seed treatment insecticides in order to advise cotton growers on their use.

Methods and Materials

All studies were conducted on the Wiregrass Research & Extension Center in Headland, AL. Commercial planters were used to plant seed and apply in-furrow insecticides. Seed treatments were applied to the designated cotton seed in all studies by the insecticide manufacturer. All studies were planted in a randomized complete block design with four replicates. Plots in all studies were four, thirty-six inch spaced rows thirty feet in length. Foliar sprays were applied with a four row pto-driven row crop sprayer calibrated to 10 GPA. Plant stand counts were taken in each study by counting the number of cotton seedlings in one middle row of each plot. Thrips damage ratings were made by visually assessing the thrips damage to the whole four row plot using a subjective damage rating scale. Cotton yields were taken from the middle two rows of each plot using a one row mechanized harvester. Lint yields were estimated at forty percent of total seed cotton yield based upon previous results of cotton variety trials. Data was subjected to analysis of variance ANOVA and Fisher's LSD separation (P=0.05).

All other production practices for optimum cotton production were followed as recommended by the Alabama Cooperative Extension System.

2001 Study

SureGrow 125 BR cotton variety was planted on May 2, 2001. Foliar sprays were applied at the two true leaf stage (May 21) or four true leaf stage (June 5). Thrips damage ratings were made on May 5th and a second rating on June 19th. A five point rating scale was used where 1= no damage and 5= dead plants. Plots were harvested on October 15th.

2002 Study I

DP458 BR cotton variety was planted on April 25, 2002. Foliar sprays were applied on May 3rd to treatments designated at first true leaf stage and on May 10th for those treatments designated at two-three true leaf stage. Stand counts were made on

May 3rd and thrips damage ratings were made on May 14th and the second on May 22nd using a 10 point rating scale where 1=no damage and 10= dead plants. Plots were harvested on November 1st.

2002 Study II
Fiber Max 989 RR and 989 BR varieties were planted on April 22nd. The foliar sprays were applied to two true leaf cotton in the designated plots on May 3rd. Stand counts were made on May 3rd. Thrips damage ratings were made on May 14th and the second on May 30th using a 10 point scale where 1= no damage and 10= dead plants. Plots were scouted weekly for other insect pests to determine if the non-BT plots needed treatment. An overspray of Karate at 0.02 lb. ai/A was applied to all treatments on Aug. 8th for stinkbug control. Cotton was harvested on September 19th.

Results and Discussion

Weather conditions during planting, emergence and early-season usually have an affect on cotton seedling vigor, efficacy of insecticides and thrips populations (Faircloth et. al. 2002). Cotton in each of these three studies conducted in 2001 and 2002 was affected differently by these various environmental factors and as a result responses to thrips control in each were somewhat different. In 2002 late season rainfall and storms caused significant regrowth and boll rot problems which impacted yields and the usefulness of yield data in terms of response to early season thrips control.

2001 Study
All insecticide treatments provided significant suppression of thrips damage up to the first thrips damage rating (Table 1) on May 25th and continued through the second thrips damage rating on June19th. Low soil moisture and cool temperatures caused very slow seedling growth as indicated by the time between foliar sprays which were targeted at second true leaf for spray number one and four true leaf for the second spray. The dates for these sprays were May 21st and June 5th, respectively (Table 1). The second thrips damage rating also indicates that insecticides improved their performance by the second rating which was due to improved soil moisture.

Adage seed treatments and Temik treated cotton provided significantly better thrips damage suppression up to the first thrips damage rating than the other insecticides (Table 1). The first foliar sprays of either Karate or Orthene applied to the Temik and Adage seed treatment cotton provided superior suppression of thrips damage compared to all other treatments. This level of thrips damage protection resulted in significantly improved cotton yields (Table 1).

2002 Study I
Cruiser and Gaucho seed treatments were as effective early as the Temik in-furrow treatments in suppressing thrips damage (Table 2), but by the second thrips damage rating the seed treatments were showing significantly more thrips damage. The first foliar insecticide sprays of either Orthene or Karate at the one true leaf stage were the most effective in providing additional thrips damage suppression to the seed treatments (Table 2). In this study soil moisture at planting was adequate but became dry within weeks after cotton emergence. This appears to have affected the residual of the insecticides. Yields of insecticide treated cotton were not significantly different from the untreated cotton. Although yields are good, there was considerable regrowth and boll rot of the early set bolls. This may have negated any benefit from early season thrips control.

2002 Study II
All insecticide treatments provided significant suppression of thrips damage through the second rating (Table 3). There were considerable differences among insecticide treatments. The Cruiser and Gaucho seed treatments had significantly more thrips damage than did either rate of Temik in-furrow (Table 3). The 5 lb/A rate of Temik provided significantly better thrips damage suppression than all other insecticide treatments. The foliar sprays of Karate or Orthene applied at the two true leaf stage to the seed treatment plots improved thrips damage suppression comparable to the lower rate of Temik.

Thrips damage or efficacy of insecticide treatments did not differ between the two cotton varieties (Table 4). Cotton yields of FM 989 BR averaged across all thrips control treatments were significantly higher by 231 lbs. of lint (Table 4). No additional treatments for Heliothine or other lepidopterous insect pests were applied to the FM 989 RR plots based upon weekly scouting and utilizing established Alabama Cooperative Extension insect control recommendations (Smith and Freeman 2002). Season-long suppression of sub-threshold levels of these pests may explain the yield increase for the BT variety (FM 989 BR) compared to the non-BT variety (FM 989 RR).

References

Cook, D. R., E. Burris, B. R. Leonard and J. B. Graves. 1998. Residual efficacy of selected at-planting soil applied insecticides on seedling thrips populations in northeast Louisiana. Pp. 1180-1183. I*n* Proc. Beltwide Cotton Conf. San Diego, CA. 5-9 Jan. Natl. Cotton Counc. Am., Memphis, TN.

Faircloth, J. C., J. R. Bradley, Jr. and J. W. Van Duyn. 2002. Effect of insecticide treatments and environmental factors on thrips populations, plant growth and yield of cotton. J. Entomol. Sci. 37(4): 308-316.

Herbert, D. A. Jr. 2002. Evaluation of selected in-furrow and seed applied insecticides with and without additional foliar band or broadcast application, for control of thrips on cotton, 2001. Arthrop. Manage. Tests 27: F48. 2pp.

Hopkins, J. D., D. R. Johnson, G. M. Lorenz, III and M. W. Fairbanks. 2002. Evaluation of soil applied insecticides and seed treatments for the control of thrips on cotton. Arthrop. Manage. Tests 27: F50. 4 pp.

Smith, R. H. and B. Freeman. 2002. Cotton Insect Control. *In* Cotton Insect, Disease and Weed Control Recommendations for 2002. Alabama Cooperative Extension System Circular ANR-415. pp. 1-11.

Table 1. Plant Stand, Thrips Damage Ratings and Yields in 2001 Cotton Thrips Control Study.

Treatment/Rate	Stand	TDR 1	TDR 2	Lint Yield
Untreated Control	88.50 AB	4.38 A	4.65 A	1055.1 CD
Temik 15g 3.5 lb/A (InF)	78.75 AB	3.35 DEF	2.10 EFGH	1229.4 ABC
Temik 15g 5 lb/A (InF)	84.00 AB	3.25 EF	1.90 EFGHI	1272.9 ABC
Thimet 20g 5 lb/A (InF)	88.25 AB	3.48 CDE	3.23 C	1282.6 AB
Temik 15g 3.5 lb/A + Orthene 97 0.25 lb/A	91.75 A	3.23 EF	1.38 K	1326.2 AB
Orthene 75 4 oz/A (HB)	78.75 AB	3.95 B	4.03 B	1156.8 BCD
Orthene 75 4 oz/A (HB)+ Karate 1 oz/A)	78.75 AB	3.60 CD	2.35 DE	1287.4 AB
Adage Seed Treat + Orthene 97 0.25 lb ai/A)	77.50 AB	3.30 EF	1.73 GHIJK	1393.9 A
Adage Seed Treatment + Karate z 1 oz/A	80.00 AB	3.15 F	1.53 IJK	1389.1 A
Adage Seed Treatment	76.00 B	3.13 F	2.63 D	1185.8 ABCD
Temik 15g 5 lb/A + Orthene 97 0.25 lb ai/A	86.50 AB	3.18 F	1.40 JK	1331.0 AB
Temik 15g 3.5 lb/A + Karate z 1 oz/A	86.25 AB	3.08 F	1.53 IJK	1403.6 A

Table 2. Plant Stand, Thrips Damage Ratings and Yields in 2002 Study I Cotton Thrips Control Study.

Treatment	Stand[1]	TDR 1[2]	TDR 2	Lint Yield
Untreated Control	86.0 A[3]	8.6 A	9.5 A	905.08 A
Cruiser 5 FS Seed Treatment	80.8 AB	4.5 BCD	5.4 B	929.28 A
Cruiser 5 FS Seed Treatment +Karate Z 1 oz/A (FSP @ 1 TL)	76.5 ABC	3.8E	4.8 C	987.36 A
Cruiser 5 FS Seed Treatment +Karate Z 1 oz/A (FSP @ 2-3 TL)	56.3 BC	4.3 D	4.8 C	970.42 A
Cruiser 5 FS Seed Treat. + Orthene 97SP 0.25 lb/A (FSP @ 1 TL)	71.8 ABC	3.9 E	4.7 C	943.8 A
Cruiser 5 FS Seed Treat + Orthene 97SP0.25 lb/A (FSP @ 2-3TL)	81.0 AB	4.3 CD	4.8 C	972.84 A
Temik 15g 3.5 lb/A	48.5 C	4.6 BC	4.9 C	938.96 A
Temik 15g 5 lb/A	73.8 ABC	4.4 BCD	4.8 C	951.06 A
Gaucho 600 FS	86.5 A	4.7 B	5.5 B	975.26 A

Table 3. Stand Counts, Thrips Damage Ratings and Yields in 2002 Study II in Cotton Thrips Control Study.

Treatment	Variety	Stand	TDR 1	TDR 2	Lint Yield
Untreated Control	FM 989 RR	77.75 AB[3]	8.62 A	9.15 A	985 abcd
Untreated Control	FM 989 BR	63.75 CDEF	8.78 A	8.88 A	1169 ab
Cruiser Seed Treatment	FM 989 RR	61.50 DEFG	5.05 DE	5.95 CD	1137 ab
Cruiser Seed Treatment	FM 989 BR	53.25 GHI	5.18 CDE	5.33 DEF	1123 abc
Cruiser Seed Treatment + Karate 1 oz/A (FSP @ 1-2 TL)	FM 989 RR	71.75 BC	4.07 I	4.18 GH	1038 abcd
Cruiser Seed Treatment + Karate 1 oz/A (FSP @ 1-2 TL)	FM 989 BR	47.75 I	4.65 EFGH	4.75 FGH	1113 abc
Temik 15g 3.5 lb/A (InF)	FM 989 RR	77.50 AB	4.15 HI	3.98 H	1169 ab
Temik 15g 3.5 lb/A (InF)	FM 989 BR	55.50 FGHI	4.22 GHI	4.38 GH	953 cd
Temik 15g 5 lb/A (InF)	FM 989 RR	81.75 A	2.75 J	2.80 I	1062 abc
Temik 15g 5 lb/A (InF)	FM 989 BR	70.00 BCD	2.55 J	2.78 I	1116 abc
Gaucho Seed Treatment	FM 989 RR	56.25 FGHI	5.68 C	6.05 BCD	818 d
Gaucho Seed Treatment	FM 989 BR	51.00 HI	5.33 CD	5.88 CDE	1096 abc
Gaucho Seed Treatment + Karate 1 oz/A (FSP @ 1-2 TL)	FM 989 RR	63.00 CDEF	4.78 EF	4.58 FGH	1043 abcd
Gaucho Seed Treatment + Karate 1 oz/A (FSP @ 1-2 TL)	FM 989 BR	58.25 EFGHI	4.83 DEF	4.98 EFG	1084 abc
Cruiser Seed Treatment + Orthene 97AG 4 oz/A (FSP @ 1-2 TL)	FM 989 RR	66.50 CDE	4.43 FGHI	4.53 FGH	1002 abcd
Cruiser Seed Treatment + Orthene 97AG 4 oz/A (FSP @ 1-2 TL)	FM 989 BR	50.50 HI	4.78 EF	5.35 DEF	1062 abc
Gaucho Seed Treatment + Orthene 97AG 4 oz/A (FSP @ 1-2 TL)	FM 989 RR	56.00FGHI	4.70 EFG	4.53 FGH	1014 abcd
Gaucho Seed Treatment + Orthene 97AG 4 oz/A (FSP @ 1-2 TL)	FM 989 BR	59.75 EFGHI	4.65 EFGH	4.13 GH	1164 ab
Thimet 20g 5 lb/A (InF)	FM 989 RR	70.00 BCD	7.00 B	6.35 BC	898 cd
Thimet 20g 5 lb/A (InF)	FM 989 BR	64.00 CDEF	6.78 B	6.90 B	1212 a

Table 4. Plant stand, thrips damage ratings and yield between BT and non-BT cotton varieties in 2002 Study II .

Variety	Stand	TDR 1	TDR 2	Lint Yield
FM 989 RR	68.20 A	5.12 A	5.21 A	1016.64 B
FM 989 BR	57.38 B	5.17 A	5.33 A	1109.33 A