

## ALABAMA COTTON COMMISSION 2006

**TITLE: Evaluation of seed specific fungicide applications for reducing early season cost associated with seedling disease management - research report.**

### INVESTIGATORS:

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**OBJECTIVES:** Our objectives are to evaluate the efficacy and benefit of 1) the seed specific in-furrow fungicide application techniques as compared to the standard in-furrow granular applications; and 2) to compare the new fungicide seed treatments to the recommended in-furrow spray and granule fungicides.

### PROCEDURES:

#### 1. Determine the efficacy of the seed specific in-furrow fungicide application techniques to the standard in-furrow fungicide sprays.

Terraclor Super X, was applied with the seed specific fungicide application technology and compared to the standard in-furrow granular application. This test was conducted in the greenhouse using a modified system developed by Dr. Fulton. Treatments included the standard uniform in-furrow granular application, a site specific 3" band on the seed, a site specific 3" band partially covering the seed, and non treated control application. The test included both high and low disease incidence levels. The high disease incidence test was inoculated with *Rhizoctonia solani* and a low disease test soil was not enhanced. Seedling stand was rated weekly after planting. Site specific and the uniform in-furrow granular treatments ( $P \leq 0.05$ ) significantly increased cotton stand as compared to the control in the high disease level plots (Table 1). Stand was comparable between the site specific and standard uniform spray treatments at 14, 21, and 28 days after planting. The reduction of the amount of fungicide applied in the site specific treatments did not decrease seeding survival under high disease pressure.

**Table 1. Efficacy of the seed specific in-furrow granular fungicide application techniques on cotton stand.**

Treatment	Disease level	% Stand							
		7 DAP	14 DAP	21 DAP	28 DAP				
Standard uniform in-furrow granular	High	70.0	a	77.5	a	75.0	a	75.0	a
Site specific 3" band on the seed	High	72.5	a	75.0	a	72.5	a	72.5	a
Site specific 3" band partially covering the seed	High	50.0	ab	47.5	b	52.5	a	52.5	a
No in-furrow application	High	25.0	b	10.0	c	7.5	b	7.5	b
Standard uniform in-furrow granular	Low	55.0	ab	72.5	ab	67.5	a	67.5	a
Site specific 3" band on the seed	Low	30.0	ab	60.0	ab	60.0	a	60.0	a
Site specific 3" band partially covering the seed	Low	70.0	a	77.5	a	72.5	a	72.5	a
No in-furrow application	Low	67.5	ab	75.0	a	77.5	a	77.5	a
LSD ( $P \leq 0.05$ )		43.4		27		27.7		27.6	

#### 2. Determine the efficacy of the new fungicide seed treatments to cotton seedling disease.

Seedling disease pressure was moderate to high in 2006 in north AL due to cool temperatures and weekly rain events during the last two weeks of April and first two weeks of May. Under natural conditions or low disease pressure, cotton seedling stand was increased by Allegiance/Baytan/Argent/Cruiser (4), Dynasty/Cruiser (8), and Apron/Maxim/Systhane/Dynasty/Cruiser (9) 35 DAP compared to the Cruiser control (1) (Table 2). No significant differences ( $P < 0.05$ ) were found among the different fungicide combinations for skip index. All fungicides produced similar yields compared to the Cruiser control. Under high disease pressure, all seed treatments increased cotton stand as compared to the Cruiser control 21 and 35 DAP. A lower skip index ( $P < 0.05$ ) indicating a more evenly spaced seedling stand was observed in seed treatments Allegiance/Baytan/Argent/Cruiser (4), A14905B (6), A15436C (7), Apron/Maxim/Systhane/Dynasty/Cruiser (9), A15436A (10), A15436B (11), and A15436C (12). Seed cotton yields varied by 1555 kg/ha over all treatments. All seed treatment fungicide combinations resulted in ( $P < 0.05$ ) higher yields compared to the Cruiser control. The addition of Apron produced an average yield increase of 1305 kg/ha. The Avicta variants (5, 6, and 7) produced an average increase of 1011 kg/ha. Cotton seedling disease incidence was moderate in 2006. In the high disease incidence plots (inoculated), differences ( $P \leq 0.05$ ) in seedling stand were observed. At 2, 4 and 6

weeks after planting, all fungicide seed treatments increased stand compared to the control.

**Table 2. Effect of experimental seed treatment fungicides on cotton stand, skip index and yield under high and low disease pressure.**

Treatment	Product/AI Rate Unit	Applic. Placement	Stand/8 m row <sup>y</sup> 21dap	Stand/8 m row <sup>y</sup> 35 dap	Skip Index 35 dap	Seed cotton kg/ha	
<b>Low disease pressure</b>							
1	Cruiser 5 FS Apron XL 3LS + Maxim 4FS +	0.34	mg/seed	91.2	79.8 c	2.4 abc	3319.1 ab
2	Systhane 40 WP + Cruiser 5 FS	7.5 + 2.5 +21 0.34	g/100kgseed mg/seed	91.6	89 abc	2.2 abc	3393 a
3	Allegiance-LS + RTU-Baytan- Thiram 1.76 FS	15.0 +41.0	g/100kgseed	86.2	80.6 bc	3.6 a	3240.4 ab
4	Cruiser 5 FS Allegiance-LS + Baytan 30 +Argent 30	0.34 15.0 +10.0 + 21.0	mg/seed g/100kgseed	106.8	98.2 a	0.8 c	3390.6 a
5	Cruiser 5 FS A15436A +	0.34 31	g/ha g/100kgseed	97.2	89.4 abc	1.6 bc	3423.4 a
6	Cruiser 5 FS A14905B	0.34 31	g/ha g/100kgseed	99.4	90.4 abc	1.8 abc	3303.6 ab
7	Cruiser 5 FS A15436C	0.34 31	mg/seed g/100kgseed	93.0	90.8 abc	1.6 bc	3160.5 ab
8	Cruiser 5 FS Dynasty .83 FS	0.03 31	mg/seed g/100kgseed	98.0	93.8 ab	1.8 abc	3137.3 ab
9	Apron XL 3LS + Maxim 4FS + Systhane 40 WP	7.5 + 2.5 +21	g/100kgseed	104.2	93.6 ab	1.2 bc	3070.6 ab
10	Dynasty .83 FS + Cruiser 5 FS Apron XL 3LS + Maxim 4FS + Systhane 40 WP + A15436A +	0.03 + 0.34 7.5 + 2.5 +21 + 26 0.34	mg/seed g/100kgseed mg/seed	90.4	82 bc	2.4 abc	3098 ab
11	Cruiser 5 FS Apron XL 3LS + Maxim 4FS + Systhane 40 WP + A15436B +	0.34 7.5 + 2.5 +21 + 26 0.34	mg/seed g/100kgseed mg/seed	81.0	83.8 bc	2.8 ab	3070.6 ab
12	Cruiser 5 FS Apron XL 3LS + Maxim 4FS + Systhane 40 WP + A15436C +	0.34 7.5 + 2.5 +21 0.34	mg/seed g/100kgseed mg/seed	103.0	83.6 bc	1 c	2898.4 b
LSD P=0.05				27.0	13.6	1.8	474.1
<b>High disease pressure</b>							
1	Cruiser 5 FS Apron XL 3LS + Maxim 4FS +	0.34	mg/seed	11.4 d	9.2 e	20.6 a	1037.6 d
2	Systhane 40 WP + Cruiser 5 FS	7.5 + 2.5 +21 0.34	g/100kgseed mg/seed	48.2 bc	26.8 cd	17.6 ab	1813.0 c
3	Allegiance-LS + RTU-Baytan- Thiram 1.76 FS	15.0 +41.0	g/100kgseed	50.0 abc	31.0 bcd	15.6 abc	1979.9 bc
4	Cruiser 5 FS Allegiance-LS + Baytan 30 +Argent 30	0.34 15.0 +10.0 + 21.0	mg/seed g/100kgseed	52.6 abc	35.4 bcd	14.4 bcd	1997.8 bc
5	Cruiser 5 FS A15436A +	0.34 31	g/ha g/100kgseed	43.4 c	24.8 de	18.2 ab	1891.1 bc
6	Cruiser 5 FS A14905B	0.34 31	g/ha g/100kgseed	57.0 abc	41.6 bc	12.8 bcd	2109.8 bc
7	Cruiser 5 FS A15436C	0.34 31	mg/seed g/100kgseed	66.8 ab	46.2 b	12.0 cd	2147.4 abc

z	Cruiser 5 FS	31	mg/seed			15.2	
8	Dynasty .83 FS	0.03	g/100kgseed	43.4 c	30.2 bcd	abc	1876.2 bc
	Cruiser 5 FS	31	mg/seed				
9	Apron XL 3LS + Maxim 4FS + Systhane 40 WP	7.5 + 2.5 +21	g/100kgseed	69.8 a	64.0 a	9.4 d	2592.6 a
	Dynasty .83 FS + Cruiser 5 FS	0.03 + 0.34	mg/seed				
10	Apron XL 3LS + Maxim 4FS + Systhane 40 WP + A15436A +	7.5 + 2.5 +21 + 26	g/100kgseed	61.0 abc	39.2 bcd	12.0 cd	2338.7ab
	Cruiser 5 FS	0.34	mg/seed				
11	Apron XL 3LS + Maxim 4FS + Systhane 40 WP + A15436B +	7.5 + 2.5 +21 + 26	g/100kgseed	52.6 abc	43.2 b	13 bcd	2278.5 abc
	Cruiser 5 FS	0.34	mg/seed				
12	Apron XL 3LS + Maxim 4FS + Systhane 40 WP + A15436C +	7.5 + 2.5 +21	g/100kgseed	61.0 abc	44.6 b	11.2 cd	2165.2 abc
	Cruiser 5 FS	0.34	mg/seed				
	LSD P=0.05			21.0	16.2	5.6	465.6

Column numbers followed by the same letter are not significantly different according to Fishers least significant difference test at P=(0.05)

Trilex is the new fungicide which is expected to replace PCNB in the cotton production system. Cotton seedling stand was increased ( $P \leq 0.05$ ) by the RTU Baytan Thiram/Allegiance + Trilex/ Vortex/Allegiance/Baytan as compared to the black seed control at 14 DAP (Table 3). By 28 DAP all fungicide seed treatments increased stand ( $P \leq 0.05$ ) over the black seed control. The additional seed treatments Trilex/ Vortex/Allegiance/Baytan, Trilex/Allegiance/Baytan, and Dynasty CST increased ( $P \leq 0.05$ ) stand by as compared to the seed treatment standard RTU Baytan Thiram/ Allegiance at 28 DAP. The uniformity of the seedling stand as measured by the skip index was better in the RTU Baytan Thiram/ Allegiance alone or with Trilex/ Vortex/Allegiance/Baytan, or Trilex/Allegiance/Baytan. Seed cotton yields varied by 430 lb/a over all treatments. The seed treatments increased yield by an average of 267 lb/a while the addition of TSX increased yield by 227.6lb/a.

**Table 3. Effect of Trilex seed treatment fungicide on cotton stand, skip index and yield.**

Treatment	Rate	Appl	Stand/25 ft row <sup>z</sup>		Skip index <sup>y</sup>	Seed cotton
			14DAP	28DAP	28DAP	lb/a
1. RTU Baytan Thiram/ Allegiance	3.0 + 0.75 oz/cwt	seed	97.2 ab	80.0 b	1.6 bc	2968.9 bc
2. TRT 1 + Trilex/ Vortex/Allegiance/Baytan	0.64+0.08+0.75+0.25 oz/cwt	seed	110.8 a	101.0 a	0.2 c	3255.6 a
3. TRT 1 + Trilex/Allegiance/Baytan	0.64+0.75+0.25 oz/cwt	seed	100.8 ab	103.6 a	1.0 bc	3041.2 abc
4. TRT 1 + Dynasty CST	3.95 oz/cwt	seed	105.6 ab	96.4 a	2.0 ab	3104.5 ab
5. Untreated black seed			91.4 b	66.0 c	3.2 a	2825.5 c
6. TRT 1 + TSX 18.8G	5.5 lb/A	Infurrow	98.2 ab	90.2 ab	1.8 ab	3053.1 abc
LSD (0.05)			16.4	13.8	1.6	257.3