

Alabama Cotton Commission Research Report, Results from 2005 (Final Year of Trial)

Evaluation of Cold Tolerant and Conventional Cotton Varieties and Planting Dates

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OBJECTIVES:

1. Evaluate potential of “cold-tolerant” cotton varieties for Alabama conditions
2. Evaluate potential of expanded planting dates for cold-tolerant and conventional cotton varieties

Seed for cotton cultivars currently grown in Alabama require warm soils in order to germinate and develop properly. Soil temperatures must remain above 60F for a period of several days, which normally occurs after mid-April in much of the state. Recently, “cold-tolerant” cotton varieties have been released that are claimed to germinate and grow well at temperatures well below the optimum for currently grown varieties.

A series of four experiments were conducted across the state with cold-tolerant and conventional cotton varieties to determine if they can offer advantages to Alabama producers.

RESULTS:

Tennessee Valley Research and Education Center

Two varieties each of “cold-tolerant” and “conventional” cotton cultivars were planted at each of three planting dates. One variety of each type was an early maturity and the other full season. Four replications of four 40-inch rows * 25 foot long plots of each variety were planted on April 5, April 15, and April 27, using conventional tillage.

Fertility and pesticide applications were according to ACES recommendations. Cold (two 35F nights) temperatures in late April caused slow growth for emerging cotton. Harvest conditions were generally excellent.

Plots were defoliated, 100 boll-samples were hand-picked, and then plots harvested with a spindle picker on October 04. Seedcotton samples were ginned on a mini-gin for lint quality and turnout, and lint analyzed for quality by HVI at the USDA-AMS lab at Pelham, AL.

RESULTS:

Yield and turnout results are presented in Table 1 below. Lint yields ranged from 741 to 942 lb/A. Lint turnout ranged from 38 to 43%.

Table 1. Lint Yields from Cold Tolerant Varieties * Planting Dates, TVREC, 2005

<u>Planting</u>	<u>Cultivar</u>	<u>Stand plants/50 ft</u>	<u>Lint yield lb/A</u>	<u>Turnout %</u>
Planting Date 1	CT 110 HQ	94	787	38
Planting Date 1	CT 212 HQ	62	794	39
Planting Date 1	FM 958	102	741	41
Planting Date 1	DP 491	72	750	42
Planting Date 2	CT 110 HQ	116	789	40
Planting Date 2	CT 212 HQ	116	876	39
Planting Date 2	FM 958	144	756	41
Planting Date 2	DP 491	102	777	42
Planting Date 3	CT 110 HQ	111	813	37
Planting Date 3	CT 212 HQ	104	928	40
Planting Date 3	FM 958	141	844	41
Planting Date 3	DP 491	104	942	43
LSD (P=.10)		18	136	2

Both Planting Dates and Cultivars had significant effects on stands, with a lower number of plants for the first planting date, and CT 212 HQ, a “cold-tolerant” cultivar, and FM 958 resulting in significantly better stands than the other two cultivars. Stands for FM 958 were also significantly better than the other three varieties at the two later planting dates.

Table 2. Lint Quality, Cold Tolerant Varieties * Planting Dates, TVREC, 2005

<u>Planting</u>	<u>Cultivar</u>	<u>Mic Units</u>	<u>Length inch</u>	<u>Strength g/tex</u>	<u>Uniformity %</u>
Planting Date 1	CT 110 HQ	3.7	1.16	29.4	83.0
Planting Date 1	CT 212 HQ	4.2	1.09	30.1	82.2
Planting Date 1	FM 958	3.9	1.14	30.6	82.6
Planting Date 1	DP 491	4.1	1.14	29.9	81.8
Planting Date 2	CT 110 HQ	3.8	1.13	28.6	82.7
Planting Date 2	CT 212 HQ	3.8	1.11	29.3	83.2
Planting Date 2	FM 958	3.7	1.13	30.9	82.6
Planting Date 2	DP 491	3.9	1.17	31.0	83.1
Planting Date 3	CT 110 HQ	3.9	1.14	29.5	83.2
Planting Date 3	CT 212 HQ	4.6	1.08	29.0	81.5
Planting Date 3	FM 958	3.9	1.12	29.1	83.0
Planting Date 3	DP 491	4.2	1.17	32.9	83.1
LSD (P=.10)		0.3	0.05	1.9	1.4

Better stands and growing conditions for the last planting date resulted in better yields, although there was no significant difference in yields between cultivars planted on the same date. Factorial analysis indicated that there was no significant effect of Planting Date on lint turnout or quality measurements. There were significant differences between cultivars for most lint quality aspects (Table 2).

Gulf Coast Research and Education Center

Two varieties each of “cold-tolerant” and “conventional” cotton cultivars were planted at each of three planting dates. One variety of each type was an early maturity and the other full season. Four replications of four 40-inch rows * 25 foot long plots of each variety were planted on April 14, April 28, and May 12, using conventional tillage. Initial land preparation and planting was delayed by persistently saturated soils. Over 5.6 inches of rain in 8 hours on April 30 affected the 1st and 2nd Planting Dates. Several tropical storms, particularly Hurricane Katrina, also adversely affected the trial through excessive rainfall, lodging, and wind damage to open bolls.

Fertility and pesticide applications were according to ACES recommendations. Seedcotton samples were ginned on a mini-gin for lint quality and turnout, and lint analyzed for quality by HVI at the USDA-AMS lab at Pelham, AL (Table 2).

RESULTS:

In contrast to previous years, final plant stands were highest for all varieties for the first planting date, which had more favorable weather immediately after planting. Stands also improved from the 10 Day After Planting (DAP) to the 21 DAP for all planting dates, but was most dramatic for the first planting. CT 110 HQ, a “cold-tolerant” cultivar, and FM 958 had a higher stand count at 10 and 21 DAP than CT 212 HQ and DP 491 for the first planting dates, but results were less consistent for the second and third dates.

Yield and turnout results are presented in Table 1 below. Lint yields were highest for the second planting date, followed by the first and third dates (many open bolls from the first date were lost during Hurricane Katrina), ranging from 555 to 1062 lb/A. There was no significant main effect of variety on yield, but there was a significant interaction between planting dates and varieties.

Table 1. Stand and Lint Yield Data, Cold Tolerant Varieties * Planting Dates, GCREC, 2005

<u>Planting</u>	<u>Cultivar</u>	<u>10 DAP</u> <u>Plants/ 60 ft</u>	<u>21 DAP</u> <u>Plants/ 60 ft</u>	<u>Lint Yield</u> <u>lb/A</u>	<u>Turnout</u> <u>%</u>
Planting Date 1	CT 110 HQ	35	124	749	40
Planting Date 1	CT 212 HQ	16	105	957	40
Planting Date 1	FM 958	43	135	760	36
Planting Date 1	DP 491	10	105	864	41
Planting Date 2	CT 110 HQ	65	88	1062	41
Planting Date 2	CT 212 HQ	47	71	586	37
Planting Date 2	FM 958	69	109	807	41
Planting Date 2	DP 491	56	96	987	41
Planting Date 3	CT 110 HQ	55	71	758	38
Planting Date 3	CT 212 HQ	31	63	908	41
Planting Date 3	FM 958	52	77	954	42
Planting Date 3	DP 491	27	53	555	37
LSD (P=.10)		14	16	135	1

*DAP = Days After Planting

Most lint quality factors were affected primarily by the cultivar, with little effect due to planting date or interactions between Planting Dates and Cultivars (Table 2).

Table 2. Lint Quality, Cold Tolerant Varieties * Planting Dates, GCREC, 2005

<u>Planting</u>	<u>Cultivar</u>	<u>Mic</u> <u>units</u>	<u>Length</u> <u>Inch</u>	<u>Strength</u> <u>g/tex</u>	<u>Uniformity</u> <u>%</u>
Planting Date 1	CT 110 HQ	4.1	1.15	31.8	83
Planting Date 1	CT 212 HQ	3.5	1.18	31.6	84
Planting Date 1	FM 958	3.5	1.16	33.6	82
Planting Date 1	DP 491	4.6	1.14	31.1	83
Planting Date 2	CT 110 HQ	4.0	1.14	31.3	83
Planting Date 2	CT 212 HQ	3.4	1.11	31.3	82
Planting Date 2	FM 958	4.6	1.17	32.9	84
Planting Date 2	DP 491	4.4	1.19	33.9	84
Planting Date 3	CT 110 HQ	4.0	1.12	33.1	82
Planting Date 3	CT 212 HQ	3.9	1.22	33.1	84
Planting Date 3	FM 958	3.9	1.21	32.4	84
Planting Date 3	DP 491	3.7	1.17	33.2	82
LSD (P=.10)		0.4	0.03	1.7	1

Prattville Agricultural Research Unit

Two varieties each of “cold-tolerant” and “conventional” cotton cultivars were planted at each of three planting dates. One variety of each type was an early maturity and the other full season. Four replications of four 36-inch rows * 28 foot long plots of each variety were planted on March 30, April 19, and May 3, using conventional tillage. Fertility and pesticide applications were according to ACES recommendations. Rainfall was plentiful through most of the early season, with cold and wet soils in late April causing damage to germinating cotton. Several three-week periods with little precipitation were experienced from mid-June through early July, mid-July to mid-August, and again in mid-September.

Plots were defoliated, and then harvested with a spindle picker on October 18. One-pound grab samples were ginned on a mini-gin for lint quality and turnout, and lint analyzed for quality by HVI at the USDA-AMS lab at Pelham, AL.

RESULTS:

Results from stand counts, yield and lint measurements are presented in Table 1 below. Harvested lint yields ranged from 1108 to 1657 lb/A. Lint turnout ranged from 38 to 42%.

Stands were very low for the first planting date; with only one significant difference between varieties at 7 or 21 Days After Planting (DAP). Stands increased with each Planting Date, but the only other significant difference between varieties was found for the 2nd Planting Date at the 7 Day count. In both cases, FM 958 had a significantly better stand than some other varieties.

Planting Date had a significant effect on yield, with yield increasing with the later planting dates. Variety choice had an effect on yield. Most lint quality measurements were significantly different for varieties, while micronaire was also significantly lower for the 3rd Planting (Table 2).

Table 1. Stands and Yield, Cold Tolerant Varieties*Planting Dates, PARU, 2005

<u>Planting</u>	<u>Variety</u>	7 DAP		21 DAP		Lint Yield Turnout	
		<u>Plants/20'</u>	<u>Plants/20'</u>	<u>Lb/A</u>	<u>%</u>		
Planting Date 1	CT 110 HQ	0.0	37.5	1317	40.0		
Planting Date 1	CT 212 HQ	0.1	34.2	1399	39.0		
Planting Date 1	FM 958	0.0	42.5	1317	41.0		
Planting Date 1	DP 491	0.1	36.5	1108	42.0		
Planting Date 2	CT 110 HQ	51.0	66.5	1521	40.0		
Planting Date 2	CT 212 HQ	55.5	67.0	1481	41.0		
Planting Date 2	FM 958	64.0	66.0	1404	41.0		
Planting Date 2	DP 491	40.0	62.3	1392	38.0		
Planting Date 3	CT 110 HQ	76.0	72.5	1450	39.0		
Planting Date 3	CT 212 HQ	74.3	75.0	1441	39.0		
Planting Date 3	FM 958	73.8	72.0	1513	40.0		
Planting Date 3	DP 491	77.8	76.5	1657	42.0		
LSD (P=.10)		6.3	7.8	213	2.4		

*DAP = Days After Planting

Table 2. Lint Quality, Cold Tolerant Varieties * Planting Dates, PARU, 2005

<u>Planting</u>	<u>Variety</u>	mic	Length	Strength	Unif
		<u>unit</u>	<u>inch</u>	<u>g/tex</u>	<u>%</u>
Planting Date 1	CT 110 HQ	4.1	1.17	31.1	82.9
Planting Date 1	CT 212 HQ	4.1	1.13	29.7	82.5
Planting Date 1	FM 958	4.6	1.16	31.9	83.4
Planting Date 1	DP 491	4.2	1.20	30.9	83.0
Planting Date 2	CT 110 HQ	4.2	1.16	29.7	83.4
Planting Date 2	CT 212 HQ	4.4	1.15	31.4	83.7
Planting Date 2	FM 958	4.4	1.16	30.7	83.6
Planting Date 2	DP 491	4.1	1.21	32.5	83.4
Planting Date 3	CT 110 HQ	3.9	1.17	30.9	83.6
Planting Date 3	CT 212 HQ	3.7	1.14	30.9	83.2
Planting Date 3	FM 958	4.1	1.17	32.2	83.7
Planting Date 3	DP 491	4.0	1.22	32.1	83.9
LSD (P=.10)		0.3	0.02	1.3	0.7

Wiregrass Research and Education Center

Two varieties each of “cold-tolerant” and “conventional” cotton cultivars, as well as two “stacked gene” varieties were planted at each of three planting dates. One variety of each type was designated by the respective seed company as early maturity and the other as mid- to full season. Four replications of four 36-inch rows * 20 foot long plots of each variety were planted on April 15, April 29, and May 16, using conventional tillage.

Fertility and pesticide applications were according to ACES recommendations. Rainfall was plentiful through most of the early season. Planting was delayed and germinating cotton damaged, particularly for the first two Planting dates, due to often saturated soil conditions.

Plots were defoliated, and then harvested with a spindle picker on October 14. One-pound grab samples were ginned on a mini-gin for lint quality and turnout, and lint analyzed for quality by HVI at the USDA-AMS lab at Pelham, AL.

RESULTS:

Due to wet field conditions in early spring, there was considerable variability in stand and yield measurements. The 7 Day After Planting (DAP) count decreased from the first to the last planting date, but the 21 DAP count increased with the last planting. (Table 1), There were some statistical differences in plant stands between varieties at the same planting date. Yields were statistically higher for the last Planting Date than the first two dates, likely due to less saturated soil after planting.

Table 1. Stands and Yield, Cold Tolerant Varieties*Planting Dates, WGREC, 2005

<u>Planting Date</u>	<u>Variety</u>	<u>7 DAP</u>	<u>21 DAP</u>	<u>Lint Yield</u>	<u>Turnout</u>
		<u>plants/40'</u>	<u>plants/40'</u>	<u>lb/A</u>	<u>%</u>
Planting Date 1	CT 110 HQ	77	79	886	42.3
Planting Date 1	CT 212 HQ	82	84	873	42.5
Planting Date 1	FM 958	83	92	610	42.3
Planting Date 1	DP 449 BG/RR	93	81	944	41.5
Planting Date 1	DP 444 BG/RR	88	83	763	42.3
Planting Date 1	DP 491	83	76	819	47.0
Planting Date 2	CT 110 HQ	84	88	910	41.8
Planting Date 2	CT 212 HQ	77	81	1094	42.0
Planting Date 2	FM 958	72	81	905	42.3
Planting Date 2	DP 449 BG/RR	81	96	928	39.8
Planting Date 2	DP 444 BG/RR	71	85	1081	42.5
Planting Date 2	DP 491	65	74	1037	43.8
Planting Date 3	CT 110 HQ	71	100	770	41.5
Planting Date 3	CT 212 HQ	68	102	934	42.5
Planting Date 3	FM 958	78	116	1080	41.5
Planting Date 3	DP 449 BG/RR	71	102	1004	41.8
Planting Date 3	DP 444 BG/RR	83	119	970	42.8
Planting Date 3	DP 491	66	99	956	44.5
	LSD (P=.10)	13	15	274	1.9

*DAP = Days After Planting

Lint quality was primarily affected by the cultivar, with no interactions between planting date and the cultivar. Micronaire was statistically higher with for the first two plantings, compared to the last planting (Table 2).

Table 2. Lint Quality, Cold Tolerant Varieties*Planting Dates, WGREC, 2005

<u>Planting</u>	<u>Cultivar</u>	<u>Mic</u> <u>units</u>	<u>Length</u> <u>inches</u>	<u>Strength</u> <u>g/tex</u>	<u>Unif.</u> <u>%</u>
Planting Date 1	CT 110 HQ	4.63	1.10	29.1	82.7
Planting Date 1	CT 212 HQ	5.07	1.03	28.9	81.9
Planting Date 1	FM 958	4.75	1.12	31.4	83.0
Planting Date 1	DP 449 BG/RR	4.65	1.06	31.1	83.2
Planting Date 1	DP 444 BG/RR	4.55	1.06	29.5	82.1
Planting Date 1	DP 491	4.85	1.15	31.4	83.0
Planting Date 2	CT 110 HQ	4.66	1.10	28.8	82.8
Planting Date 2	CT 212 HQ	5.03	1.06	29.6	83.0
Planting Date 2	FM 958	4.80	1.12	32.3	83.8
Planting Date 2	DP 449 BG/RR	4.82	1.08	31.2	83.2
Planting Date 2	DP 444 BG/RR	4.45	1.08	29.5	83.5
Planting Date 2	DP 491	4.75	1.15	31.7	83.0
Planting Date 3	CT 110 HQ	4.75	1.09	28.8	82.7
Planting Date 3	CT 212 HQ	4.68	1.05	29.8	81.6
Planting Date 3	FM 958	4.63	1.13	32.0	83.6
Planting Date 3	DP 449 BG/RR	4.48	1.05	29.7	82.6
Planting Date 3	DP 444 BG/RR	4.33	1.07	30.2	83.0
Planting Date 3	DP 491	4.45	1.15	31.2	83.2
	LSD (P=.10)	0.23	0.03	1.4	1.0