

Date of Planting by Long Staple and Short Staple Variety Trial, Safford Agricultural Center, 1998

L.J. Clark and E.W. Carpenter

Abstract

Four varieties each of Long Staple and Short Staple cotton were tested over four dates of planting in this study. The first date of planting for the Long Staple cotton was delayed to the 3rd of April because of poor weather earlier. The latest planting was May 13th. Cultivars of differing maturities were tested for both long and short staple cotton to determine their optimal planting time. Many agronomic and hvi values were evaluated to determine the effect of different planting dates

Introduction

Each year bring with it a new set of weather conditions that may enhance the stand establishment of cotton or be detrimental to it. With these different weather conditions comes a difference in optimal times to plant and sometimes planting dates are pushed beyond the window when varieties are traditionally planted. This study is the third year of a study involving four varieties each of long and short staple cotton, with the four varieties selected to cover the range from full season to short season varieties that are or could become of importance in the area.

Materials and Methods

The varieties being tested were planted in a replicated small plot design with two rows of each variety being planted in four replicates at each planting date. The crop history is included below to define the cultural practices.

Crop history - Long Staple

Soil type: Grabe clay loam

Previous crop: Cotton

Planting date: 3 Apr, 15 Apr, 30 Apr and 13 May 1998 Rate: 25 lbs/ac

Herbicide: 1.5 pts/ac Treflan preplant incorporated, Prometryne at lay-by

Fertilizer: 100 lbs/ac urea side dressed 6/1, 100 lbs/ac urea side dressed 7/8

Irrigation: Watered up plus 9 irrigations (42 ac in + 3.6" rain) Last date: 14 September

Harvest: 1st pick: 4 November 2nd pick: 25 November

Heat units from plant to harvest (86/55°F): 3764, 3684, 3539 and 3376 for dates 1-4 respectively

Crop history - Short Staple

Soil type: Grabe clay loam/Pima clay loam variant

Previous crop: Cotton

Planting date: 9 Apr, 15 Apr, 30 Apr and 13 May 1998 Rate: 25 lbs/ac

Herbicide: 1.5 pts/ac Treflan preplant incorporated, Prometryne at lay-by

Fertilizer: 100 lbs/ac urea side dressed 6/2, 100 lbs/ac urea side dressed 7/8

Irrigation: Watered up plus 10 irrigations (45 ac in + 3.6" rain) Last date: 18 September

Harvest: 1st pick: 3 November 2nd pick: 1 December

Heat units from plant to harvest (86/55°F): 3745, 3684, 3538, and 3356 for dates 1-4, respectively

Plots were harvested with a modified two-row cotton picker which allowed cotton to be collected from each plot in large cloth bags. Weights were then obtained by weighing the bags on an electronic platform scale.

Results and Discussion

A two-way analysis of the data from the date of planting by long staple varieties is shown in Table 1. The upper part of the table is the response of varieties across all dates of planting. The middle portion of the table is the response of dates of planting across all varieties. General strengths of varieties or appropriateness of planting date are seen from this table, but how individual varieties fared under different planting dates is masked. OA 312, Conquistador, had the highest overall yield and the third date of planting was the best planting time, with the first planting date coming in second. It is obvious that weather plays an important part in the success of a planting. Figure 1 of reference 1 shows that temperatures increased for several days after the first planting and then decreased after the second planting. The temperature was warmer by the third planting and by the fourth date of planting not enough season was left for optimal production. The results had some similarities and some differences to the study in 1997 (2). The 15th of April was the best planting date in 1997 and the worst in 1998, but the principles remain the same. Don't plant until the soil temperature is approaching 60°F and the five day weather forecast favorable, or on an upward trend. Much other information is given in the table which will be left to the perusal of the reader, where there are statistically significant differences in the values of a particular column, that information will be split out to separate the effects of variety and date of planting. That information is contained in Tables 2 through 6 for the long staple cotton.

Table 2 contains information of the lint yield of long staple varieties over the four dates of planting. Figure 1 also contains that information in a graphical form. It was anticipated that a long season variety like Pima S-6 would have a high yield at the earlier dates of planting and slowly taper off as the later dates of planting didn't leave enough season for maturity of the crop and that short season varieties like Pima S-7 and OA 312 would perhaps start off with less yield potential with the early planting dates and then gain relative strength with the later planting dates, because there was sufficient season for them to mature. This was not the case with this year nor last. OA 312 produced the highest yield on the first date of planting of both years and in 1998 maintained that strength through all the planting dates. All yields went up and down with weather and remaining season. The percent first pick data are in Table 3; this is a measure of relative maturity of the varieties. The percent lint turnouts listed in Table 4 are from our small research gin that produces higher than commercial turnouts. Even though these values are high, they should fall in the same order, relatively. Table 5 contains the first fruiting branch data. Nothing too profound is seen in this data set. The plant population data shown in Table 6 has interesting information. The low plant populations observed for OA 312 in the first two dates of planting tie closely with the low seedling vigor observed in the Pima cotton regional variety trial reported in reference 3.

Table 7 presents the yield data for the date of planting by short staple variety study. As with Table 1, this table gives yields for varieties across all dates of planting and for dates of planting across all varieties. Across all dates of planting Stoneville 474 produced the highest yield and showed a percent first pick even higher than SureGrow 125. Surprisingly, the last date of planting, May 13th, had the highest yield across all varieties. A breakdown of the yield data in Table 8 helps to explain that phenomenon. The yields of both Stoneville 474 and SureGrow 125 were outstanding in the last planting whereas the yields of FM 989 had leveled off and the yield of DP 90 had started to decline by that date. Figure 2 shows these effects graphically. The inference from this data is that for late plantings, one should go to varieties that mature more quickly. The lint turnout percent shown on Table 9 indicate that Stoneville 474 had higher turnout at each of the planting dates than the other varieties. The average percent first pick increased with the date of planting, the reverse of what would be expected. Table 10 shows that this effect is pushed by the quicker maturing varieties and is the opposite of what happened with DP 90. Plant populations (Table 11) varied a bit between varieties and dates of planting. All that can be said is that populations were generally higher with the latter plantings because of better germinating conditions. In Table 12 the plant heights are shown. Nothing more is revealed in this table than in Table 7; that the longer season varieties tended to be taller. No new information was learned from Table 13 which lists plant node data. First fruiting branch (Table 14) values across varieties increased with the planting date, but that was not true for all varieties. DP 90 held steady across all dates of planting. FM 989 and STV 474 were the main varieties that increased their values with the later dates of planting. Table 15 contains the boll weights. Not much more can be learned from this table than from Table 7, that FM 989 had the heaviest bolls and that planting on the third planting date was most conducive to heavy bolls.

The most significant thing shown in this study is that both long and short staple varieties produce best if planted when soil and air temperatures are favorable for physiological growth. This typically occurs in the Safford Valley in the third week in April.

References

1. Clark, L.J., E.W. Carpenter, G.L. Hart and J.M. Nelson. 1999. Short staple regional cotton variety trial, Safford Agricultural Center, 1998. *In this publication.*
2. Clark, L.J. and E.W. Carpenter. 1998. Date of planting by long staple and short staple variety trial, Safford Agricultural Center, 1997. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-112, pp, 13-19.
3. Clark, L.J., E.W. Carpenter, G.L. Hart and J.M. Nelson. 1999. Pima cotton regional variety trial, Safford Agricultural Center, 1998. *In this publication.*

Table 1. Yield and other agronomic data from the date of planting by long staple cotton variety study, Safford Agricultural Center, 1997.

Treatment	Lint Yield	% 1st Pick	% Turnout	HNR	Pl/Ac	Plant Height	Nodes	1st Frt Branch	Boll Weight
Varieties									
Pima S-6	1001 b	77.8 c	41.1 ab	1.66 a	33124 a	38.8 a	23.5 a	7.5 a	3.38 a
OA 325	1086 ab	80.0 b	41.8 a	1.67 a	35279 a	36.8 a	22.1 a	8.0 a	3.66 a
Pima S-7	1025 b	84.0 a	39.4 c	1.70 a	32557 a	37.6 a	22.4 a	7.6 a	3.48 a
OA 312	1181 a	84.2 a	40.3 bc	1.68 a	32670 a	37.2 a	22.1 a	7.5 a	3.53 a
Dates of Planting									
3 Apr	1104 b	83.7 a	40.7 a	1.67 a	31536 bc	37.5 a	22.6 a	7.0 b	3.59 a
15 Apr	945 c	85.6 a	40.8 a	1.62 a	28473 c	37.1 a	22.9 a	8.0 a	3.58 a
30 Apr	1257 a	81.0 b	40.7 a	1.71 a	35733 ab	38.3 a	22.4 a	7.1 b	3.47 a
13 May	985 bc	75.7 c	40.5 a	1.70 a	37888 a	37.6 a	22.1 a	8.6 a	3.41 a
Average	1073.0	3.49	40.6	1.68	33407.3	37.6	22.5	7.65	3.51
LSD(05)	132.6	2.03	1.17	0.13	5201.8	2.93	1.6	0.9	0.32
CV(%)	17.3	3.5	4.05	10.9	21.9	10.9	9.7	116.3	12.6

Table 2. Lint yield data for the date of planting by long staple variety study, Safford Agricultural Center, 1998.

Lint Yield				
Variety/ Date	Date 1 (3 Apr)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
Pima S-6	1083	907	1143	869
OA 325	1050	959	1280	1060
Pima S-7	1005	943	1231	919
OA 312	1279	977	1375	1092
Average	1104.3	946.5	1257.3	985.0

Table 3. Percent 1st pick data for the date of planting by long staple variety study, Safford Agricultural Center, 1998.

Percent 1st Pick				
Variety/ Date	Date 1 (3 Apr)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
Pima S-6	79.9	83.9	75.7	71.6
OA 325	82.7	84.0	80.5	72.7
Pima S-7	86.9	86.9	84.7	77.7
OA 312	85.4	87.5	83.2	80.8
Average	83.7	85.6	81.0	75.7

Table 4. Percent lint turnout data for the date of planting by long staple variety study, Safford Agricultural Center, 1997.

Percent Lint Turnout				
Variety/ Date	Date 1 (3 Apr)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
Pima S-6	40.4	41.5	41.8	40.6
OA 325	42.0	42.5	40.6	42.3
Pima S-7	38.7	39.6	40.1	39.4
OA 312	41.7	39.6	40.2	39.6
Average	40.7	40.8	40.7	40.5

Table 5. First fruiting branch data for the date of planting by long staple variety study, Safford Agricultural Center, 1998.

1st Fruiting Branch				
Variety/ Date	Date 1 (3 Apr)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
Pima S-6	7.3	7.3	7.0	8.5
OA 325	6.8	8.5	7.8	9.0
Pima S-7	7.5	8.3	6.5	8.3
OA 312	6.5	8.0	7.0	8.5
Average	7.0	8.0	7.1	8.6

Table 6. Plant population data for the date of planting by long staple variety study, Safford Agricultural Center, 1998.

Plant Population				
Variety/ Date	Date 1 (3 Apr)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
Pima S-6	32216	30855	34485	34939
OA 325	32670	33124	35393	39930
Pima S-7	33124	26771	35846	34485
OA 312	28133	23141	37208	42199
Average	31535.8	28472.8	35733.0	37888.3

Table 7. Yield and other agronomic data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Treatment	Lint Yield	% 1st Pick	% Turnout	HNR	Pl/Ac	Plant Height	Nodes	1st Frt Branch	Boll Weight
Varieties									
DP 90	1307 b	87.1 b	42.6 b	1.72 a	52635 b	37.6 a	21.9 ab	6.4 b	4.58 c
FM 989	1198 c	86.6 b	42.4 bc	1.67 a	53429 ab	37.0 ab	22.3 a	7.9 a	4.93 a
STV 474	1482 a	89.0 a	43.7 a	1.73 a	50593 b	35.4 b	20.7 b	7.0 b	4.72 bc
SG 125	1364 b	88.4 a	41.7 c	1.72 a	59101 a	35.9 ab	21.0 ab	7.0 b	4.85 ab
Dates of Planting									
9 Apr	1214 b	86.4 c	42.3 b	1.69 a	50820 b	36.5 a	21.8 a	6.6 b	4.71 b
15 Apr	1268 b	87.8 b	42.4 b	1.74 a	51501 ab	35.9 a	20.8 a	6.6 b	4.71 b
30 Apr	1411 a	88.0 ab	42.5 b	1.69 a	57513 a	36.7 a	22.0 a	7.4 a	4.93 a
13 May	1458 a	89.0 a	43.4 a	1.73 a	55925 ab	36.8 a	21.4 a	7.7 a	4.72 b
Average	1337.6	87.8	42.6	1.71	53939.5	36.5	21.5	7.1	4.77
LSD(05)	91.7	1.2	0.8	0.12	6207.9	1.7	1.4	0.8	0.2
CV(%)	9.6	1.9	2.7	10.1	16.2	6.5	8.9	15.9	6.0

Table 8. Lint yield data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Lint Yield				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	1266	1310	1417	1233
FM 989	1057	1140	1350	1243
STV 474	1391	1302	1485	1752
SG 125	1143	1319	1390	1603
Average	1214.3	1267.8	1410.5	1457.8

Table 9. Percent lint turnout data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Percent Lint Turnout				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	42.5	42.4	42.5	43.2
FM 989	42.0	42.5	42.2	43.0
STV 474	43.8	42.7	43.7	44.8
SG 125	41.1	41.8	41.6	42.6
Average	42.4	42.4	42.5	43.4

Table 10. Percent 1st pick data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Percent 1st Pick				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	87.6	87.4	87.1	86.5
FM 989	84.7	86.5	87.7	87.7
STV 474	87.4	88.4	88.9	91.2
SG 125	85.7	88.8	88.5	90.5
Average	86.4	87.8	88.1	89.0

Table 11. Plant population data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Plant Population				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	47190	53543	54450	55358
FM 989	56719	45375	59895	51728
STV 474	46283	46283	55811	53996
SG 125	53089	60803	59895	62618
Average	50820.25	51501.00	57512.75	55925.00

Table 12. Plant height data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Plant Height				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	37.5	37.3	38.0	37.5
FM 989	37.3	35.5	37.5	37.8
STV 474	35.0	36.3	34.8	35.8
SG 125	36.3	34.8	36.5	36.0
Average	36.5	36.0	36.7	36.8

Table 13. Nodes data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Nodes				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	21.8	21.8	23.0	21.3
FM 989	22.8	21.3	23.0	22.3
STV 474	21.3	20.0	21.0	20.5
SG 125	21.3	20.3	21.0	21.5
Average	21.8	20.9	22.0	21.4

Table 14. First fruiting branch data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

First Fruiting Branch				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	6.5	6.5	6.3	6.5
FM 989	6.8	7.3	8.5	9.0
STV 474	6.8	5.8	7.5	8.0
SG 125	6.3	7.0	7.5	7.3
Average	6.6	6.7	7.5	7.7

Table 15. Boll weight data for the date of planting by short staple variety study, Safford Agricultural Center, 1998.

Boll Weight				
Variety/ Date	Date 1 (9 APR)	Date 2 (15 Apr)	Date 3 (30 Apr)	Date 4 (13 May)
DP 90	4.47	4.62	4.90	4.33
FM 989	5.10	4.78	4.99	4.84
STV 474	4.55	4.61	4.90	4.80
SG 125	4.72	4.84	4.93	4.92
Average	4.7	4.7	4.9	4.7

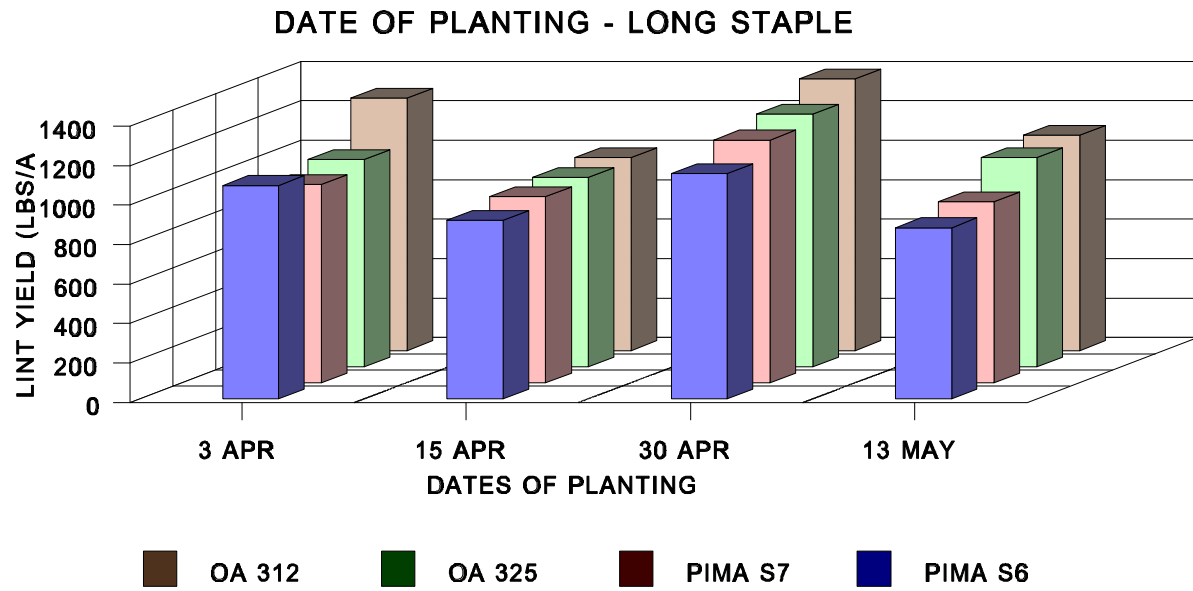


Figure 1. Lint yields for the long staple date of planting study on the Safford Agricultural Center, 1998.

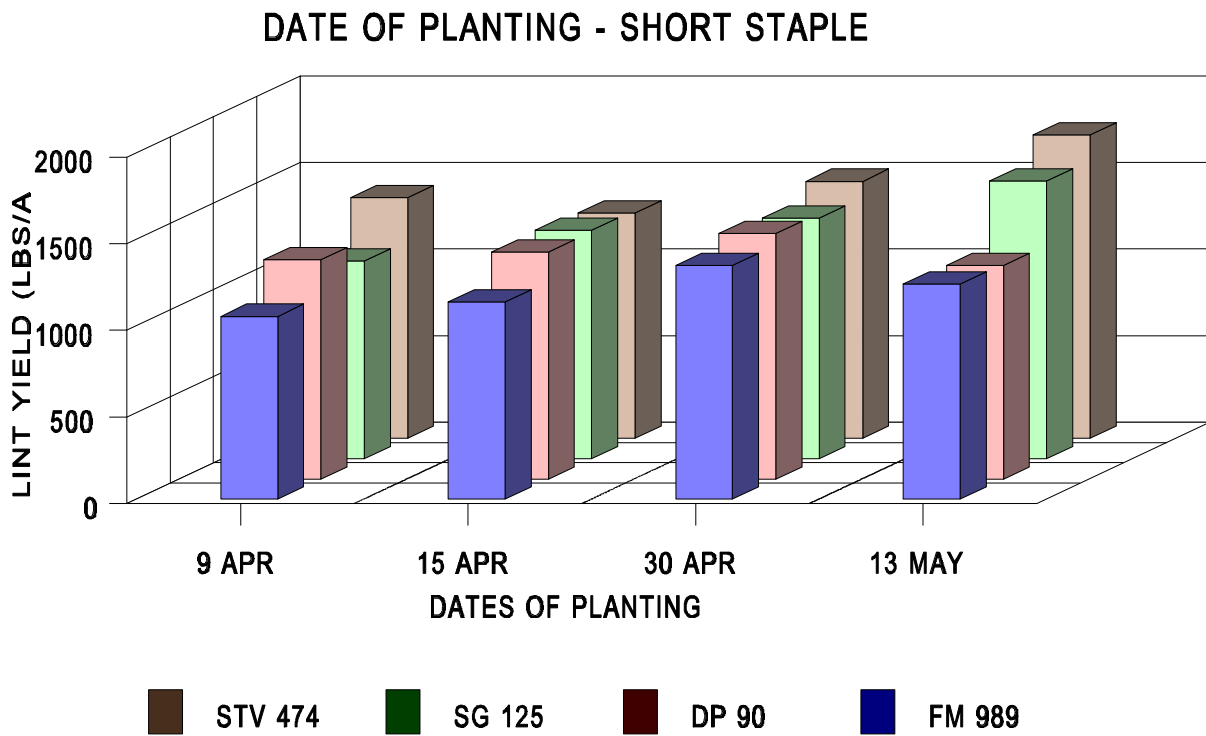


Figure 2. Lint yields for the short staple date of planting study on the Safford Agricultural Center, 1998.