Short Staple Regional Cotton Variety Trial, Safford Agricultural Center, 1996

L.J. Clark, E.W. Carpenter, G.L. Hart and J.M. Nelson

Abstract

Thirty four short staple varieties were grown in a replicated field trial on the Safford Agricultural Center. Due to a replant in late May, the results are viewed as a late-plant situation. DP 35B was the highest yielding variety with a yield of 1353 pounds of lint per acre with DP 90 in second place but with 80 pounds of lint less per acre. Agronomic values for the plants at harvest and HVI data for lint quality are tabulated in this paper.

Introduction

From time to time, stands are lost and a replant is necessary. The biggest decision to make at that point is, which variety will serve best under the current planting conditions. This experiment will help answer this question. Several varieties are seen in this trial for the first time, one of those of particular interest is DP Nucoton 35B, the Bt cotton most apt to fit in this climatic area.

Materials and Methods

This replicated small plot variety trial is designed to screen a large number of cotton varieties to decide which ones should be tested further in the on-farm testing program. The plots were planted with a cone-type planter which distributes a given weight of seed uniformly over the length of the plot. After planting, the plots were irrigated to produce uniform germination and emergence. The following crop history provides the information on how the crop was managed:

Crop History:

Previous crop: Cotton
Soil type: Pima clay loam variant
Re-Planting date: 22 May 1996 Rate: 25 pounds per acre
Herbicide: Triflurilin pre-plant, Cotton Pro at lay-by
Fertilizer: 200 lbs/ac of NH_4SO_4 30 May, 100 lbs/ac Urea 16 July
Insecticide: 3 applications to control pinkie, aphid and whitefly
Pix/Prep: None
Defoliation: Ginstar
Irrigation: Furrow, watered up + 7 irrigations (ca. 33.1 inches + 3.5 inches of rain)
Harvest dates: 1st pick: 5 October 2nd pick: 25 November
Heat units per growing season: 3562 (86/55)

On October 2nd 25-boll samples were collected by hand to determine boll weights. These samples were then ginned to determine percent lint turnout. The plots were picked using a modified 2-row cotton picker. The production from each plot was caught in a sack and weighed on a hanging scale to determine seed cotton yields. Sub-samples were taken to determine lint quality.

Results and Discussion

The weather is always an important factor in determining how a particular variety performs in a given year. For

this reason, Figures 1 and 2 are included to show how the weather compared with the average. Figure 1 shows individual daily heat units from the first of April to the last of October. A small cold front passed through Safford the first week in April with the 5th being the coldest day, after that only the 11th and 13th were appreciably lower than the recommended 10 heat units per day for optimal planting conditions. May, June and July were very warm with record average temperatures being achieved in May and July. So, cotton growing conditions were ideal for this experiment even though it was replanted a month later than the recommended planting time. Figure 2 shows the departure from average number of heat units throughout the growing season. For most of the growing season, up through the middle of September, the heat units were above normal with only a few excursions below the average line. The last part of September, however, turned cold slowing the maturity of the cotton plants. Indian Summer returned with heat units sufficient to mature and finish all of the varieties before the hard frosts on the 21st and 22nd of October, which ended the cotton growing season. Even though the first fall frost was 11 days ahead of normal, the full growing season ended up with 362 more heat units than normal.

With the growing season being somewhat compressed, interesting things are seen in Table 1. In a late planting situation, the short seasoned varieties normally have the edge and yield better than the long seasoned varieties. Several of these early maturing types are seen near the top, such as, SG 404, SG 125, and DP 5409, but it is interesting to note that the longer maturing varieties, such as, DP 35B, DP 90, DP 5690 and SG 1001 appear above and below them. The extra heat apparently hastened the maturity of these long seasoned, indeterminant varieties.

There is too much data in the 3 tables to do justice to a discussion in a few paragraphs, so the reader is encouraged to look at the varieties of interest across the three tables. The % lint turnout numbers are a bit higher than customary because they came from hand picked samples. This elevates these values as well as the lint yields, but, even though the numbers are high, they should be in the same relative yield order. In other words, one variety is not given an advantage over another. The % 1st Pick values are somewhat compressed as previously discussed, but give some indication of the length of time needed for maturity. A higher value indicates that a variety was more rapidly maturing. On plant populations, all varieties fell in the acceptable range except one, BXN 57. It was the lowest yielding variety and that was at least partially due to an inadequate stand. Plant heights and number of nodes seem to be in the normal range and are very comparable to the values of the previous year (1). The Height to Node Ratios (HNR's) were similar to the previous year and within the normal range for productive cotton plants (Silvertooth, et.al., Ref. 2). First fruiting nodes were noted this year to see if, the common knowledge that determinant varieties fruit at an earlier node number than indeterminant varieties, would be true in this circumstance. SG 125, STV 132 and HS 26 fruited at earlier nodes than DP 90 and SG 1001, but there were many exceptions, too. Perhaps the late planting and the extra warm season made the plants behave different than normal.

The HVI values in Table 3 deserve considerable study time. Compared with last year, the average fiber was longer, finer and slightly more uniform, but had lower values of strength and elongation. An interesting comparison can also be made with the advanced strains test (3). The average fiber values of the advances strains were superior to those in this test. This gives a general optimism that fiber qualities in this country will continue to improve.

References

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2. Silvertooth, J.C., E.R. Norton and P.W. Brown. 1996. Cotton growth and development patterns. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-103, pp. 75-96.

3. Clark, L.J., E.W. Carpenter, G.L. Hart and J.M. Nelson. 1997. Short staple cotton advanced strains trial, Safford Agricultural Center, 1996. *In this publication.*

Acknowledgments

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Table 1. Yields and other agronomic data from the upland cotton variety trial grown on the Safford Agricultural Center, 1996.

Variety	SC Yield	% Lint	Lint Yield	% 1st Pick	Pl/ac
DP 35B	3584 a[1]	37.7 hij	1353 a	94.0 ab	44649 a
DP 90	3168 abc	40.2 b-f	1273 ab	92.7 a-d	40656 abc
HZ 1277	3057 bcd	40.1 b-g	1225 abc	93.9 ab	39204 a-e
SG 404	3191 ab	38.2 e-j	1218 a-d	94.2 ab	38478 a-f
SG 125	2977 b-g	40.6 bcd	1209 a-e	92.0 a-d	35211 a-h
DP 5409	3038 b-e	39.7 b-h	1208 a-e	92.6 a-d	39930 a-d
DP 5690	3022 b-f	38.6 d-I	1179 a-f	93.0 abc	42834 ab
SG 1001	2950 b-g	37.9 g-j	1114 b-g	94.2 ab	37026 a-g
HS 46	2656 d-h	41.2 ab	1092 b-h	90.8 a-e	28677 c-h
DP 50	2973 b-g	36.3 j	1084 b-h	92.9 a-d	40656 abc
STV 132	2552 e-I	41.2 ab	1055 c-I	93.1 abc	31218 b-h
DP 5415	2686 c-h	39.2 b-h	1054 c-I	91.3 a-d	35937 a-g
STV 474	2533 f-I	41.3 ab	1051 c-I	94.6 a	33759 a-h
1517-95	2690 c-h	38.7 d-I	1046 c-I	93.2 abc	38478 a-f
HZ 1244	2671 d-h	38.7 d-I	1038 c-I	92.2 a-d	37389 a-g
BXN 47	2510 ghi	41.2 ab	1036 c-I	90.8 a-e	31218 b-h
HZ 1330	2625 d-h	38.7 d-I	1019 c-I	91.5 a-d	33396 a-h
1517-91	2564 d-I	39.3 b-h	1008 d-I	90.4 b-e	36300 a-g
GC 9005	2625 d-h	38.4 d-j	1007 d-I	92.8 a-d	33033 a-h
SG 501	2442 hi	40.9 bc	999 e-I	94.0 ab	26499 e-I
HZ 1560	2518 ghi	39.4 b-h	994 f-I	90.9 a-e	42834 ab
STV 495	2579 d-I	38.0 f-j	982 f-I	91.4 a-d	28677 c-h
DP 5432	2488 ghi	39.4 b-h	982 f-I	91.9 a-d	29040 c-h
HS 26	2495 ghi	37.9 g-j	946 ghi	92.2 a-d	34485 a-h
PREMA	2438 hi	38.6 d-I	939 ghi	92.3 a-d	25773 f-I
HZ 1215	2358 hi	38.8 c-I	922 ghi	89.7 c-f	33759 a-h
ROYALE	2102 I	43.1 a	908 ghi	89.7 c-f	22869 hi
HZ 1220	2232 hi	40.3 b-e	906 ghi	92.4 a-d	27951 c-I
MAXXA	2094 I	43.0 a	904 ghi	86.8 f	25773 f-I
GC 9010	2407 hi	36.8 ij	885 hi	91.1 a-d	39567 a-d
LA 887	2201 hi	40.0 b-g	881 hi	91.5 a-d	27588 d-I
PM 330	2293 hi	38.3 e-j	880 hi	91.7 a-d	40293 a-d
PM 280	2251 hi	38.0 f-j	857 I	91.3 a-d	39567 a-d
BXN 57	1662 j	40.2 b-f	671 j	87.3 ef	15972 I
Average	2595.3	39.4	1023.1	91.8	33810.9
LSD(05)	409.9	1.79	175.0	3.16	10342.9
CV(%)	12.6	3.6	13.7	2.7	24.5

1. Values followed by the same letter within a column are not significantly different at the 5% level of probability.

Table 2. Other agronomic variables measured or calculated from the cotton variety study on the Safford Agricultural Center, 1996.

Variety	Pl Ht (in)	Nodes	HNR	1st Fruiting Node	Boll Weight (g)
DP 35B	39.0 ab[1]	25.2 a	1.55 a-e	7.0 abc	5.2 f-k
DP 90	36.0 a-f	22.2 b-f	1.62 a-e	7.4 ab	4.9 I-m
Hartz 1277	31.2 d-g	21.8 b-f	1.43 def	6.2 bc	4.8 j-m
SG 404	33.2 b-g	21.6 c-f	1.54 a-e	6.0 bc	5.3 e-j
SG 125	37.8 abc	21.4 c-f	1.78 ab	6.0 bc	5.0 h-l
DP 5409	34.0 a-g	23.2 a-e	1.48 c-f	6.0 bc	4.6 klm
DP 5690	39.6 a	23.0 a-f	1.73 abc	6.6 bc	5.0 h-l
SG 1001	38.0 ab	23.0 a-f	1.66 a-e	7.2 abc	4.8 klm
HS 46	38.8 ab	24.4 ab	1.60 a-e	7.4 ab	4.9 I-m
DP 50	29.0 gh	20.8 ef	1.40 ef	7.2 abc	5.1 f-k
STV 132	25.2 h	20.4 f	1.23 f	6.4 bc	5.6 d-h
DP 5415	33.2 b-g	21.6 c-f	1.54 a-e	6.6 bc	4.4 m
STV 474	34.6 a-g	23.0 a-f	1.52 a-e	7.2 abc	5.1 g-l
1517-95	36.6 a-e	22.0 b-f	1.69 a-d	6.4 bc	5.6 d-g
Hartz 1244	36.8 a-d	23.6 a-d	1.59 a-e	6.8 abc	5.4 e-I
BXN 47	35.2 a-f	21.2 c-f	1.66 a-e	7.2 abc	4.6 lm
Hartz 1330	32.0 c-g	20.6 ef	1.57 a-e	7.4 ab	5.5 d-h
1517-91	34.0 a-g	21.4 c-f	1.59 a-e	6.4 bc	5.7 d-g
GC 9005	31.6 d-g	22.0 b-f	1.44 def	7.4 ab	6.8 a
SG 501	38.4 ab	22.0 b-f	1.75 abc	6.6 bc	4.8 I-m
Hartz 1560	39.6 a	22.4 b-f	1.78 a	8.6 a	5.0 h-l
STV 495	33.8 a-g	22.4 b-f	1.51 a-e	7.4 ab	5.2 f-k
DP 5432	37.0 a-d	23.2 a-e	1.60 a-e	7.6 ab	5.0 h-l
HS 26	32.0 c-g	21.0 def	1.54 a-e	6.4 bc	5.8 cde
PREMA	33.4 b-g	22.6 b-f	1.49 c-f	7.4 ab	6.6 ab
Hartz 1215	36.6 a-e	23.8 abc	1.54 a-e	6.6 bc	5.0 h-l
ROYALE	30.4 fg	21.6 c-f	1.41 def	6.4 bc	5.7 cde
Hartz 1220	35.2 a-f	23.6 a-d	1.50 b-f	6.0 bc	5.0 h-l
MAXXA	30.8 efg	22.0 b-f	1.42 def	5.4 c	5.8 cde
GC 9010	34.8 a-g	23.0 a-f	1.51 a-e	6.2 bc	6.2 cd
LA 887	36.8 a-d	22.0 b-f	1.68 a-e	6.0 bc	6.0 cde
PM 220	33.4 b-g	22.4 b-f	1.49 c-f	6.8 abc	5.3 e-I
PM 280	33.2 b-g	21.6 c-f	1.56 a-e	6.4 bc	5.4 e-I
BXN 57	33.6 b-g	22.2 b-f	1.52 a-e	6.2 bc	5.1 g-k
Average	34.6	22.3	1.56	6.72	5.3
LSD(05)	4.7	2.12	0.23	1.52	0.46
CV(%)	10.9	7.6	11.7	18	7

1. Values followed by the same letter within a column are not significantly different at the 5% level of probability.

Table 3. HVI data from the upland cotton variety trial grown on the Safford Ag. Center, 1995.

Variety	Length	Uniformity	Strength	Elongation	Micronaire	C Grade	L Grade
DP 35B	1.22 ab[1]	83.0 c-I	31.5 b-f	9.9 abc	4.1 c-f	31/32	2.0 abc
DP 90	1.17 a-g	82.5 ghi	31.6 b-e	9.8 bcd	4.4 a-e	32	1.0 c
Hartz 1277	1.15 e-I	82.8 f-I	26.0 no	10.0 a	4.1 b-f	21/31	3.5 ab
SG 404	1.17 a-g	85.4 ab	30.0 e-j	10.0 a	4.5 abc	21/31	2.5 abc
SG 125	1.20 a-f	85.4 ab	25.4 o	10.0 a	4.1 c-f	21/22	3.0 abc
DP 5409	1.15 e-I	81.6 hi	27.6 j-o	10.0 a	4.1 b-f	21	3.5 ab
DP 5690	1.16 c-I	82.7 f-I	30.8 c-h	9.8 bcd	4.2 b-f	31/32	2.0 abc
SG 1001	1.21 abc	84.5 a-g	29.4 e-k	9.7 cd	4.0 c-f	31/32	2.0 abc
HS 46	1.20 a-e	84.3 a-g	31.1 b-f	9.9 abc	3.9 def	21/31	3.0 abc
DP 50	1.18 a-g	84.1 a-g	26.2 no	10.0 a	4.2 b-f	21/31	2.0 abc
STV 132	1.10 I	83.6 a-h	27.6 k-o	10.0 a	4.2 b-f	22/32	1.5 bc
DP 5415	1.22 a	84.5 a-g	29.7 e-k	10.0 a	3.7 f	21/22	3.0 abc
STV 474	1.16 b-h	84.7 a-g	28.3 I-n	10.0 a	4.3 a-e	22/32	1.5 bc
1517-95	1.19 a-f	84.8 a-g	33.1 abc	10.0 a	4.3 a-e	31/32	2.5 abc
Hartz 1244	1.18 a-g	83.0 d-I	32.7 a-d	10.0 a	4.8 a	32	1.5 bc
BXN 47	1.16 c-I	84.0 a-h	27.5 k-o	10.0 ab	4.1 b-f	22	2.0 abc
Hartz 1330	1.20 a-e	85.9 a	28.6 g-m	9.9 abc	4.2 b-f	21	3.5 ab
1517-91	1.21 a-d	85.2 a-e	31.6 b-e	9.6 de	4.4 a-d	22/32	1.5 bc
GC 9005	1.20 a-f	86.0 a	34.9 a	10.0 ab	4.2 b-f	31	3.5 ab
SG 501	1.15 d-I	82.7 f-I	30.5 d-I	10.0 a	4.1 b-f	32	1.5 bc
Hartz 1560	1.18 a-g	82.7 f-I	29.1 j-l	10.0 a	3.7 f	21/31	2.0 abc
STV 495	1.19 a-f	82.9 e-I	27.7 j-o	9.7 bcd	3.8 ef	21/31	3.5 ab
DP 5432	1.18 a-g	81.1 I	31.0 c-g	9.4 e	3.9 def	21/22	3.0 abc
HS 26	1.11 hi	84.0 a-h	30.3 e-I	10.0 a	4.7 ab	31	3.5 ab
PREMA	1.20 a-f	85.3 a-d	34.6 a	9.9 abc	4.1 c-f	32/42	1.5 bc
Hartz 1215	1.16 c-I	85.4 abc	27.0 l-o	10.0 a	4.0 c-f	21/32	2.5 abc
ROYALE	1.20 a-f	85.4 ab	34.0 a	9.8 bcd	4.2 b-f	21/31	4.0 a
Hartz 1220	1.15 e-I	85.7 ab	26.7 mno	10.0 a	4.3 a-e	21	3.5 ab
MAXXA	1.18 a-g	85.0 a-f	33.3 ab	9.8 abc	4.3 a-e	31/32	2.5 abc
GC 9010	1.14 f-I	83.9 a-h	34.0 a	9.6 de	4.1 c-f	31	2.0 abc
LA 887	1.18 a-g	82.6 ghi	30.5 d-I	10.0 a	4.4 a-e	21/22	1.0 c
PM 220	1.05 j	83.0 c-I	28.6 h-m	10.0 a	4.4 a-d	32	1.5 bc
PM 280	1.13 ghi	83.6 a-h	29.6 e-k	9.8 abc	4.4 a-d	32	1.0 c
BXN 57	1.17 a-g	83.3 b-I	30.8 c-h	10.0 a	3.9 def	22/32	1.5 bc
Average	1.17	83.9	29.9	9.9	4.2	--	2.34
LSD(05)	0.05	2.0	2.0	0.2	0.5	--	1.9
CV(%)	2	1.2	3.3	1.0	5.8	--	41

1. Values followed by the same letter within a column are not significantly different at the 5% level of probability.

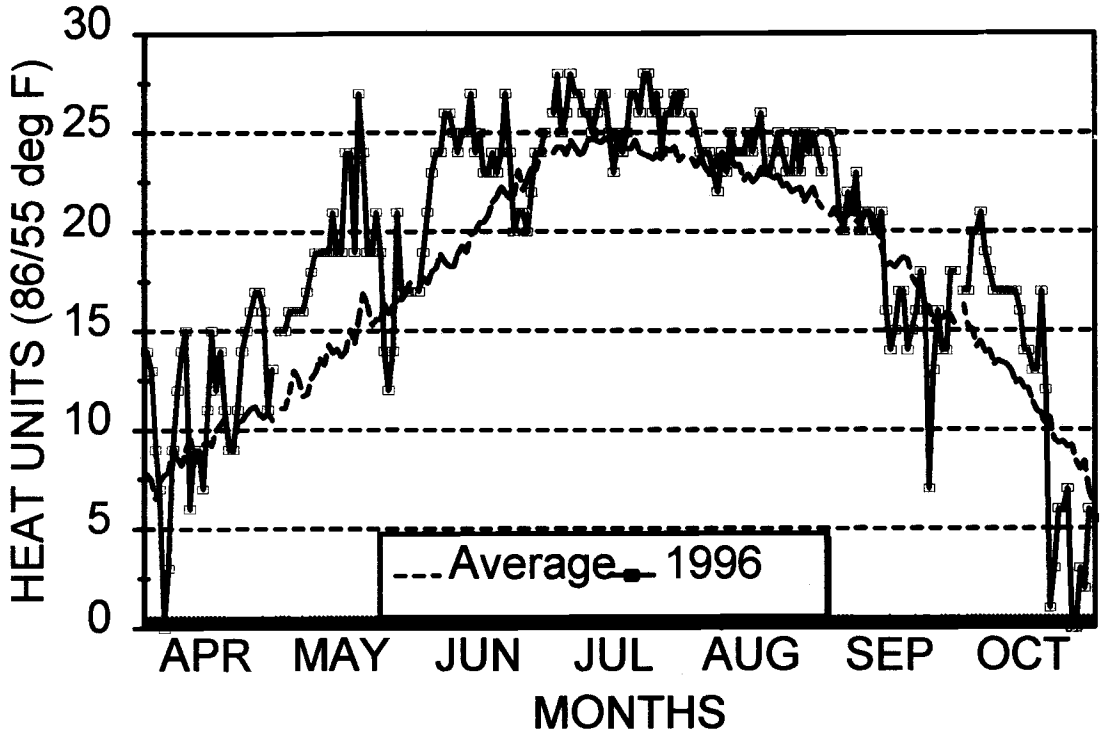

Figure 1. Daily heat units for 1996 and the average, plotted across the growing season.

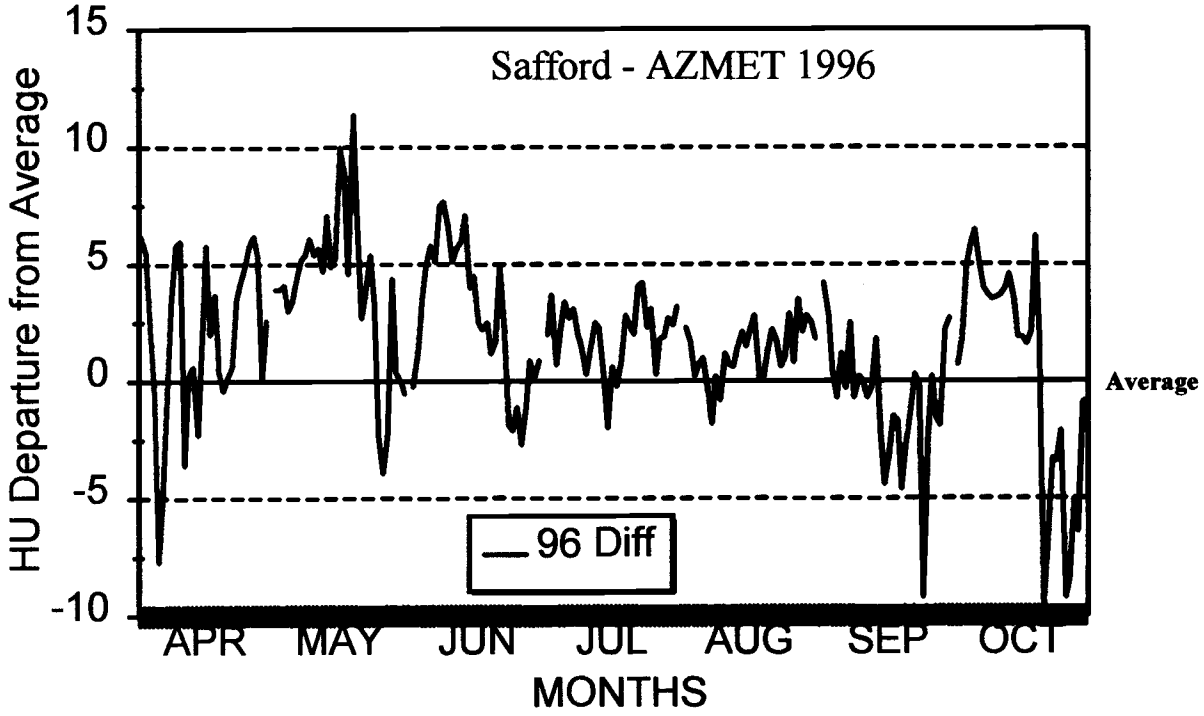

Figure 2. Heat unit differences from the average for 1996, across the growing season.