Acala Cotton Variety Trial, Safford Agricultural Center, 2001

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Abstract

Six New Mexico and California Acala cotton varieties were tested along with three upland varieties with good quality and excellent yield potential in a replicated small plot trial on the Safford Agricultural Center in Graham county at an elevation of 2950 feet. The highest yielding variety in this study was DP 655BR with a yield of 1367 pounds of lint per acre. The next highest variety was Fiber Max 989. This latter variety, while not officially classified as an Acala, produced the longest fiber in the study. Yield and other agronomic data as well as fiber quality data are contained in this paper.

Introduction

Southeastern Arizona has a history of growing high quality Upland/Acala cotton. Over the years, only the higher elevation growers were able to economically grow the New Mexico (NM) Acalas as lower quality varieties produced more yield than the premium would compensate for. Our quest continues to find high quality cotton varieties that will competitively yield with the commonly grown varieties.

Materials and Methods

This trial was designed as a replicated small plot trial with four replications. The plots were planted with a cone-type planter which distributes a given weight of seed uniformly over the length of the plot. This year the seeds were planted dry and watered up. The following crop history provides the information on how the crop was managed:

Crop History:

Previous crop: Cotton
Soil type: Pima clay loam variant
Planting date: 26 April 2001 Rate: 25 pound per acre
Herbicide: 1.5 pt/ac Treflan pre-plant, 3.2 pts/ac Caparol at lay-by
Fertilizer: side dressing of 100 lbs/ac of urea on 5/30 and 7/5
Insecticide: 1 application to control pink bollworm
Pix/Prep: None
Defoliation: Ginstar
Irrigation: Furrow, watered up + 7 irrigations (ca. 27.4 inches + 2.3 inches of rain)
Harvest dates: 1st pick: 22 October 2nd pick: not taken
Heat units (86/55EF) from planting to harvest (179 days): - 3613

This is a part of the 2002 Arizona Cotton Report, The University of Arizona College of Agriculture and Life Sciences, index at http://ag.arizona.edu/pubs/crops/az1283

The plots were picked using a modified 2-row cotton picker. The production from each plot was caught in a sack and weighed on an electronic platform scale to determine seed cotton yields. Fifteen boll samples were collected prior to harvest to determine boll weights. These samples were then ginned to determine percent lint turnout.

Results and Discussion

Heat units throughout April and early May were quite variable with many days having less than the 10 HU/day considered minimal for cotton development. This provided some challenges in stand establishment. Fortunately, the heat units per day for this study were greater than 10 for more than a week after planting. Figure 1 shows the maximum and minimum temperatures and the heat units by date throughout the growing season. Figure 2 shows the heat unit deviations from the normal through the growing season. The season was not a particularly warm growing season, but after a low spell in early October the heat units stayed above normal. The first frost date was 24th of November which was 16 days later than normal. The year was very dry with 2.3 inches of rain falling during the growing season and a deficiency of 3.6 inches less than the average yearly rainfall. The number of accumulated heat units were slightly less than seen in 1999 or 2000 (references 1 and 2).

Table 1 contains yield data, plant height, plant populations and boll weights. Yields varied greatly from 1367 to 634 pounds of lint per acre with an average of 993 pounds per acre. The top two varieties were not classified as acala varieties and were included to compare the Acalas with the highest yielding Upland varieties in the area. Fiber quality (HVI) data shown in Table 3, however, indicates that these two varieties have very good lint qualities. This being the case, it is impossible to know the best variety to plant without seeing the values produced per acre. The second column contains these values which are calculated based on CCC loan schedule of discounts and premiums, assuming a base value of 50.40 cents per pound. Premium differences, however, were not significantly great to change the order of the varieties in the table. The varieties that yielded the most lint produced the most money. So, at current premium levels, DP 655BR is the best variety, from this selection of varieties, to grow in this area. On the percent lint column, it is interesting to note that Olvey's variety, OA 263, has the highest lint turnout. This lint turnout advantage brought OA 263 ahead of FM 989BR with respect to lint yield. Plant heights and populations varied a bit with variety, but with the exception of the lower plant populations in the plots with 1517-95, little else seemed noteworthy.

Table 2 contains additional agronomical variables. There were significant differences in values for these variables by variety, but most of these comparisons will be left to the reader.

HVI values of the lint are included in Table 3. All of the varieties in this test were ginned on a saw gin and sent to the classing office as upland varieties. The longest fiber in the study was produced by FM 989, followed by OA 263. It was not surprising to see these varieties with long fiber, but was interesting that they exceeded in length the fiber from the best NM acalas. The strongest fiber was found in the NM varieties which resulted in these varieties having higher premiums than the rest of the varieties in the study.

References

1. Clark, L.J. and E.W. Carpenter. 2000. Short staple variety trials, Graham County, 1999. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-121, pp.107-115.

2. Clark, L.J. and E.W. Carpenter. 2001. Acala cotton variety trial, Safford Agricultural Center, 2000. Cotton, A College of Agriculture and Life Sciences Report, The University of Arizona, Tucson, AZ. Series P-125, pp. 97-103.

Table 1. Yield and other agronomic variables for Acala variety study, Safford Agricultural Center, 2001.

Variety	Lint Yield[1]	Value[2]	% Lint	Plant Height	Plants per Acre
DP 655BR	1367.2 a	$730.78 a	37.8 bc	34.4 bc	32216 abc
FM 989	1189.2 b	$642.76 b	38.7 b	36.1 ab	27679 bc
OA 263	1074.6 bc	$574.36 c	40.2 a	35.4 abc	34485 ab
FM 989BR	1054.0 bc	$557.57c	37.8 bc	35.1 abc	27452 bc
BR 9605	1022.5 c	$527.60 d	37.2 c d	35.6 abc	38115 a
BR EXP 303	973.7 cd	$527.73 d	34.8 fg	36.3 ab	36527 ab
1517-99	927.1 cde	$504.56 e	35.4 fg	35.5 abc	32216 abc
NM W4100	869.0 de	$473.18 f	36.6 de	37.6 a	34712 ab
NM B7514	822.6 e	$444.19 g	36.0 e f	35.0 abc	33124 abc
1517-95	634.4 f	$344.77 h	34.6 g	33.0 c	24729 c
Average	993.4	532.80	36.9	35.4	32126
LSD(05)	147.9	22.1	1.14	3.1	9182.4
CV(%)	10.3	1.8	2.13	6.1	19.7

1. Values followed by the same letter are not separable statistically at the 95% level of confidence.
2. Value of lint per acre based on CCC loan schedule of discounts and premiums, assuming a base value of 50.40 cents per pound.

Table 2. Plant mapping and gin trash for Acala variety study, Safford Agricultural Center, 2001.

Variety	1st Fruiting Branch	Total Nodes	HNR	Boll Weight	% Trash
DP 655BR	4.13 b	21.1 b	1.63 cde	5.43 bcd	11.2 abc
FM 989	4.38 ab	20.3 b	1.79 abc	6.05 a	10.7 bc
OA 263	5.50 ab	21.1 b	1.68 a -e	5.15 cd	12.0 abc
FM 989BR	6.00 a	21.5 ab	1.64 cde	5.67 abc	12.4 a
BR 9605	5.38 ab	21.5 ab	1.67 b-e	5.77 ab	12.1 abc
BR EXP 303	5.63 ab	19.6 b	1.86 ab	4.95 d	12.3 ab
1517-99	5.63 ab	21.3 b	1.69 a-d	5.77 ab	12.3 ab
NM W4100	5.13 ab	20.3 b	1.87 a	5.28 bcd	11.4 abc
NM B7514	5.38 ab	23.6 a	1.49 e	5.42 bcd	10.6 c
1517-95	5.26 ab	21.0 b	1.58 d e	5.39 bcd	11.4 abc
Average	5.24	21.1	1.69	5.49	11.6
LSD(05)	1.83	2.33	0.19	0.59	1.6
CV(%)	24.1	7.61	7.88	7.41	9.6

1. Values followed by the same letter are not separable statistically at the 95% level of confidence.

Table 3. HVI data for Acala variety study, Safford Agricultural Center, 2001.

Variety	Length	Mike	Strength	Uniformity	RD	+b	Premium
DP 655BR	1.12 bcd	4.40 e	29.2 def	81.0 c	83 a	92 def	3.05 ab
FM 989	1.17 a	4.55cde	29.8cde	82.0 b	81 bc	96 ab	3.65 a
OA 263	1.15 ab	4.85 ab	28.8 ef	82.0 b	80 cd	95 abc	3.05 ab
FM 989BR	1.10 cde	4.55cde	28.7 f	82.0 b	82 ab	94 bcd	2.50 ab
BR 9605	1.12 bcd	4.90 a	30.0 bcd	82.0 b	81 bc	91 ef	1.20 b
BR EXP 303	1.06 e	4.70 bc	30.8 bc	81.0 c	80 cd	97 a	3.80 a
1517-99	1.14 abc	4.50 de	32.3 a	82.0 b	81 bc	93 cde	4.03 a
NM W4100	1.09 de	4.40 e	30.8 bcd	83.0 a	81 bc	90 f	4.05 a
NM B7514	1.06 e	4.55cde	30.9 b	81.0 c	79 d	93 cde	3.60 a
1517-95	1.07 e	4.60 cd	31.9 a	82.5 ab	81 bc	92 def	3.95 a
Average	1.11	4.6	30.3	81.9	81.0	92.9	3.3
LSD(05)	0.04	0.2	1.0	0.97	1.9	2.7	2.1
CV(%)	2.59	2.9	2.4	0.82	1.6	2.0	28.8

1. Values followed by the same letter are not separable statistically at the 95% level of confidence.
2. Average premium of discount applied to the lint based on CCC loan schedule.

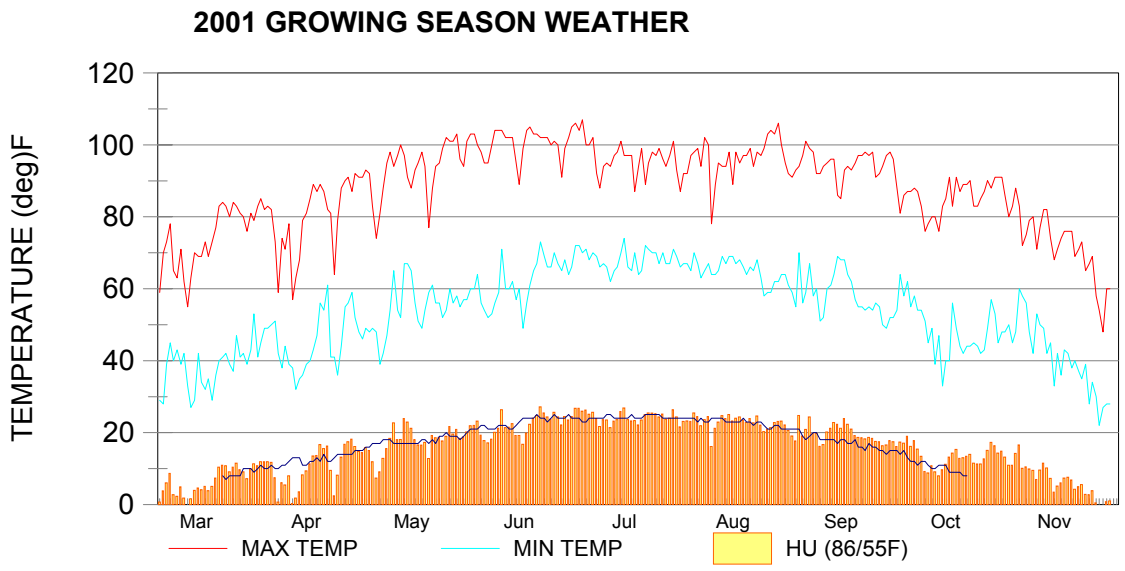

Figure 1. Maximum and minimum temperatures and Heat Units during the 2001 **cotton growing season.**

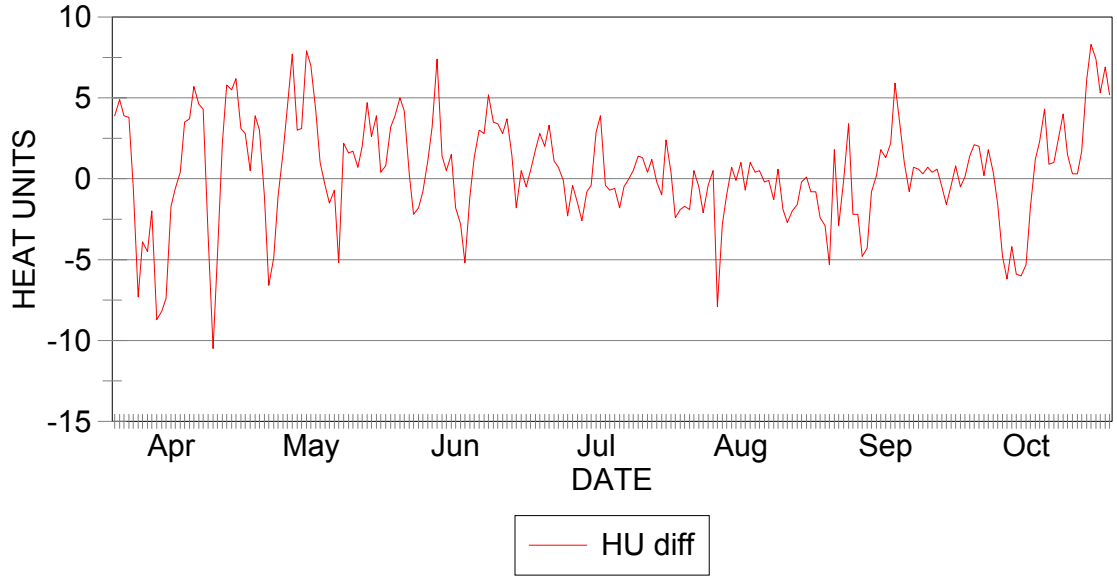

Figure 2. Heat unit differences from normal during the 2001 cotton growing season.