

# Acala/Upland Cotton Variety Trial, Safford Agricultural Center, 2002

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## *Abstract*

*Five New Mexico and three California acala varieties along with twelve upland varieties of interest to the area were tested 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 1552 pounds of lint per acre. It was followed closely by FM 989BR. These same two varieties were also the highest yielding varieties in this study in 2001 (1). Riata, a roundup resistant cultivar from CPCSD, was the highest yielding acala variety in the study. In addition to the yield and other agronomic data traditionally reported, fiber quality data and estimated values per pound of lint and per acre 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 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 yield competitively, 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 silty clay loam variant

Planting date: 26 April 2002

Rate: 25 pound per acre

Herbicide: 1.75 pt/ac Triap pre-plant, 4 pts/ac Caparol at lay-by

Fertilizer: side dressing of 100 lbs/ac of urea on 5/29 and 7/19

Insecticide: 1 application to control Pink bollworm

Pix/Prep: None

Defoliation: Ginstar

Irrigation: Furrow, watered up + 8 irrigations (ca.26.3 inches + 1.6 inches of rain)

Harvest dates: 1st pick: 15 November

2nd pick: not taken

Heat units (86/55EF): to frost (5 Nov) - 3622

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. Ten boll samples were collected prior to harvest to determine boll weights. These samples were then ginned to determine percent lint turnout.

## **Results and Discussion**

Weather conditions were not far from normal for cotton season in 2002. Heat units were quite variable in April with two days dropping below the 10 HU/day considered minimal for cotton development. Heat units were below normal again throughout most of June through the middle of July and then above normal in late August and again in September and October. Perhaps the most unique feature of the weather was the lack of rainfall. The dryness along with the extra warmth at the end of the season provided cotton with ideal conditions for fiber development. Figures 1, 2 and 3 show the temperature and heat unit measurements throughout the growing season. The number of heat units were very slightly higher than 2001 (reference 1).

Table 1 contains yield data, crop values per acre, percent lint turnout, plant height and plant populations. Yields were excellent but varied greatly from 1552 to 900 pounds of lint per acre with an average of 1303 pounds per acre. As in the last year's study, the top two varieties were DP 655BR and FM 989, but with yields more than 200 pounds greater than the previous year. They did not have fiber as long as the acalas, but the lint value per pound for DP 655BR was in the same range as the acalas. Riata, a roundup ready variety from CPCSD, was the highest yielding acala variety with a yield exceeding 1300 pounds per acre and a crop value exceeding \$725 per acre. This put it number four in income earnings. It would require an 8.6¢ per pound premium to equal the income produced by DP 655BR. The percent lint turnout values were obtained by ginning the boll samples picked by hand from each plot and ginned in a 10-saw table gin. Percent lint turnout values were then lowered to be more representative of gin turnouts from a grab sample. Percent lint varied from 37.8% to 30.9%, with the new DP 555BR producing the highest lint turnout value. Plant heights varied less than last year with NM W1218 being the tallest and AG 3601 the shortest. Plant populations varied with seed size, the small seeded DP 555BR having the largest population and the large seeded acalas having the smallest populations.

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. Table 4 shows that Plant Height, Height to Node Ratio (HNR) Plants per Acre and % Lint Turnout all had a direct statistical correlation to lint yield.

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. Neither pre- nor post-ginning cleaners were used and the grades tend to be lower than would be seen with a better quality gin. Micronaire values in this study were higher than normal, with more than half of the varieties falling in the discount range. The high quality acalas had lengths greater than 1.17 inches. These varieties also tended to have the strongest fibers and higher uniformity. Length, strength and uniformity as a whole were excellent, with the California and New Mexico acalas showing the best values. These values along with trash, Rd and +b color values will be left with the reader to follow his/her interests.

## **References**

1. Clark, L.J., E.W. Carpenter and E.R. Norton. 2002. Acala Cotton Variety Trial, Safford Agricultural Center, 2001. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-130, pp.91-96.

**Table 1. Yield and other agronomic variables for Acala variety study, Safford Agricultural Center, 2002.**

Variety	Lint Yield (lb/ac)	Value <sup>2</sup> (\$/acre)	% Lint Turnout	Plant Height (inches)	Plants per Acre
DP 655BR	1552 a <sup>1</sup>	\$840.41	36.6 ab	32.7 abc	58080 ab
FM 989BR	1542 ab	\$752.50	36.4 ab	30.7 abc	54450 ab
FM 991R	1459 ab	\$749.20	35.2 bcd	31.3 abc	61105 ab
ST4793R	1416 ab	\$570.36	37.3 ab	28.7 bc	55660 ab
SG 215BR	1413 ab	\$629.49	36.1 ab	32.3 abc	62315 ab
DP 436R	1408 ab	\$691.33	35.0 bcd	31.7 abc	65340 ab
PM 1560BR	1405 ab	\$613.28	35.0 bcd	29.7 bc	68365 ab
DP 451BR	1401 ab	\$683.69	36.4 ab	30.7 abc	59895 ab
RIATA	1342 ab	\$726.02	36.0 ab	31.7 abc	52635 b
DP 555BR	1339 ab	\$700.97	37.8 a	34.0 ab	69575 a
NM W1218	1310 abc	\$693.65	32.5 ef	37.7 a	61105 ab
BR 9605	1280 abc	\$630.40	33.3 cde	33.3 ab	58080 ab
NOVA	1266 abc	\$632.37	35.4 bc	31.7 abc	53240 b
1517-95	1196 abc	\$618.93	30.9 f	33.0 abc	53240 b
1517-99	1191 abc	\$616.94	33.0 def	33.0 abc	57475 ab
NM B7514	1178 abc	\$654.38	33.2 c-f	31.3 abc	58685 ab
AG 3601	1164 abc	\$565.70	35.0 bcd	25.3 c	64130 ab
NM W4100	1164 abc	\$616.34	33.3 cde	33.7 ab	58685 ab
ST 4892BR	1139 bc	\$432.82	36.6 ab	29.3 bc	60500 ab
DP 5690R	900 c	\$430.20	35.0 bcd	29.3 bc	61710 ab
Average	1303.3	\$642.45	35.0	31.6	59713.5
LSD(05)	410.9		2.3	7.7	16123.1
CV(%)	19.1		4.1	14.8	16.3

1. Values, within a column, followed by the same letter are not significantly different at the 95% level of confidence using Duncan's multiple range test.

2. Values in dollars per acre using the lint values per pound found in Table 3.

**Table 2. Plant mapping data for Acala variety study, Safford Agricultural Center, 2002.**

Variety	1st Fruiting Branch	Total Nodes	HNR	Boll Weight
DP 655BR	9.0 ab <sup>1</sup>	28.3 ab	1.16 abc	5.3 a-e
FM 989BR	10.0 ab	26.3 abc	1.17 abc	5.3 a-d
FM 991R	7.3 b	23.7 c	1.33 a	5.2 a-f
ST4793R	8.7 ab	26.7 abc	1.08 abc	4.8 b-f
SG 215BR	8.0 ab	25.3 abc	1.28 ab	5.2 a-f
DP 436R	8.0 ab	26.7 abc	1.18 abc	4.5 ef
PM 1560BR	10.0 ab	28.3 ab	1.05 bc	4.8 b-f
DP 451BR	7.0 b	25.7 abc	1.21 abc	4.7 c-f
RIATA	8.0 ab	24.3 bc	1.31 a	5.4 abc
DP 555BR	8.7 ab	27.3 abc	1.26 abc	4.5 f
NM W1218	11.0 a	28.7 a	1.31 ab	5.7 a
BR 9605	9.0 ab	25.0 abc	1.33 a	5.3 a-d
NOVA	7.7 ab	28.3 ab	1.12 abc	5.8 a
1517-95	7.7 ab	26.7 abc	1.24 abc	5.5 ab
1517-99	9.7 ab	25.3 abc	1.29 ab	4.7 c-f
NM B7514	7.0 b	24.7 abc	1.27 ab	5.1 a-f
NM W4100	9.0 ab	26.7 abc	1.27 ab	5.4 abc
AG 3601	8.7 ab	25.7 abc	0.99 c	5.5 ab
ST 4892BR	9.7 ab	26.0 abc	1.13 abc	5.5 ab
DP 5690R	9.3 ab	27.0 abc	1.09 abc	4.6 def
Average	8.7	26.3	1.20	51.4
LSD(05)	3.4	4.3	0.27	7.4
CV(%)	24	9.8	13.3	8.8

1. Values, within a column, followed by the same letter are not significantly different at the 95% level of confidence using Duncan's multiple range test.

**Table 3. HVI data for Acala variety study, Safford Agricultural Center, 2002.**

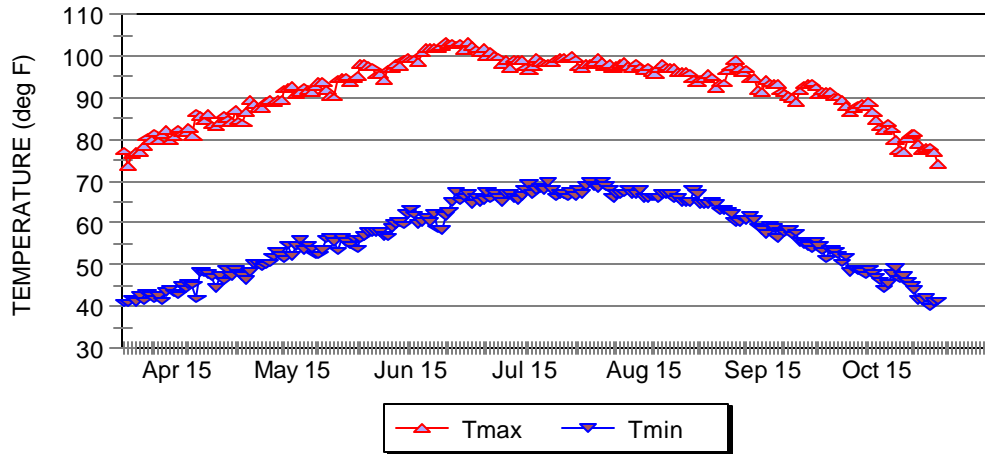
Variety	Color Grade	Leaf Grade	Mike	Length	Staple	Strength	Uniformity	HVI Trash	HVI Color	Color		Lint Value ¢/lb <sup>1</sup>
										RD	+B	
DP 655BR	11	1	49	111	36	31.0	83	1	11-2	82	85	54.15
FM 989BR	11	3	51	109	35	28.8	83	1	11-2	83	81	48.80
FM 991R	21	2	51	114	37	30.7	84	1	21-1	83	77	51.35
ST4793R	41	4	56	106	34	26.9	82	5	41-1	75	82	40.28
SG 215BR	11	2	54	105	34	27.3	83	2	11-1	81	94	44.55
DP 436R	21	3	51	112	36	27.2	82	2	21-2	81	79	49.10
PM 1560BR	31	4	55	113	36	27.7	83	3	31-1	79	79	43.65
DP 451BR	21	3	51	109	35	27.5	83	3	21-2	81	79	48.80
RIATA	21	3	44	117	37	31.7	84	3	21-1	81	83	54.10
DP 555BR	11	3	45	113	36	27.6	81	3	11-2	82	84	52.35
NM W1218	31	3	49	120	38	30.7	84	5	31-1	79	84	52.95
BR 9605	31	2	50	117	37	34.1	83	3	31-1	79	81	49.25
NOVA	31	4	49	114	37	30.6	82	4	31-1	80	80	49.95
1517-95	21	3	50	121	39	33.7	86	3	21-2	79	88	51.75
1517-99	21	4	48	123	39	31.9	84	3	21-2	79	85	51.80
NM B7514	21	3	47	124	40	32.8	85	4	21-2	80	83	55.55
AG 3601	21	2	55	113	36	32.2	82	2	21-1	81	85	48.60
NM W4100	31	3	48	119	38	31.7	84	1	31-1	77	85	52.95
ST 4892BR	21	4	59	103	33	28.5	82	4	21-4	78	92	38.00
DP 5690R	11	3	54	108	35	30.5	83	2	11-1	82	87	47.8
Average	--	3.0	50.8	113.6	36.4	30.2	83.2	2.8	--	80	84	49.29

1. Estimated lint value per pound using 45¢ per pound as an average upland cotton lint value then applying premiums and discounts listed for the Desert Southwest on the USDA AMS website on March 3<sup>rd</sup>, 2003.

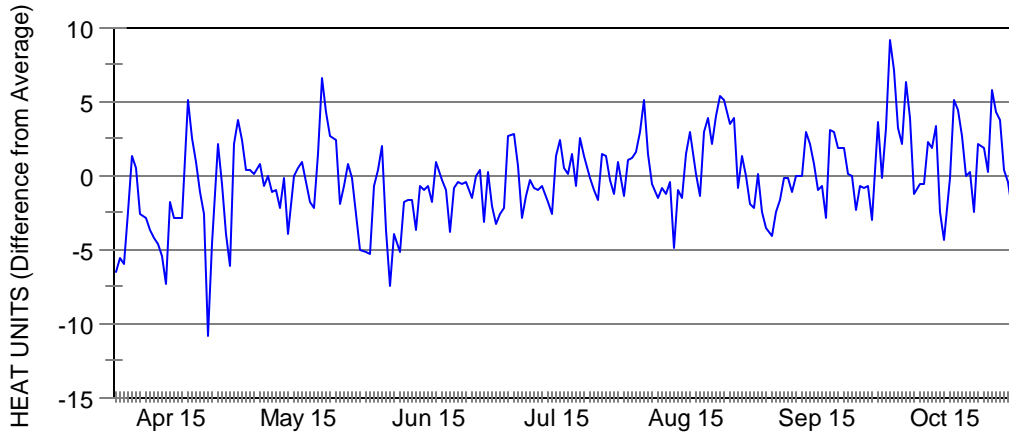
**Table 4. Correlations versus Lint Yields for the Acala variety study, Safford Ag Center, 2002.**

Variable	Probability	Variable	Probability
1st Fruiting Branch	NS	Plants per Acre	0.0016 **
Total Nodes	NS	% Lint Turnout	0.0098 **
Plant Height	0.001 **	Boll Weight	NS
HNR	0.049 *		

**Figure 1. Maximum and minimum temperatures during the cotton growing season, 2002.**



**Figure 2. Heat units (86/55EF) during the 2002 cotton growing season and average data.**



**Figure 3. Heat unit differences from normal during the 2002 cotton growing season.**

