

Pima Cotton Regional Variety Trial, Safford Agricultural Center, 1999

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Abstract

Thirty long staple varieties 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 Hazera 83-208 with a yield of 1272 pounds of lint per acre. This interspecific hybrid from Israel yielded nearly 300 pounds per acre more lint than the next closest variety. The average yield in the trial was lower than in the previous year's study. Yield and other agronomic data as well as fiber quality data are contained in this paper.

Introduction

As long staple breeding materials were made available to private breeders, more cultivars are available for cotton farmers to choose from. With this change, newer and better long staple varieties are being developed and tested. Our part in this process is to provide an unbiased testing program where new strains, varieties and hybrids can be evaluated in a high desert environment so cultivars can be selected that will be beneficial to the high desert cotton growers in Arizona, New Mexico and Texas. This is part of an Arizona Regional variety trial as well as a Beltwide Regional variety trial.

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 into moisture where they germinated and produced reasonable stands. 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: 27 April 1999

Rate: 25 pound per acre

Herbicide: 1.5 pt/ac Treflan pre-plant, 3 pts/ac Prometryne at lay-by

Fertilizer: side dressing of 100 lbs/ac of urea on 6/17 and 7/21

Insecticide: 7 applications to control pinkie, aphids and whitefly

Pix/Prep: None

Defoliation: Ginstar

Irrigation: Furrow, planted to moisture + 7 irrigations (ca. 28.7 inches + 3.9 inches of rain)

Harvest dates: 1st pick: 16 November

2nd pick: not taken

Heat units (86/55°F): to harvest - 3727

The plots were picked using a modified 2-row cotton picker. The production from each plot was caught in a sack

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and weighed on an electronic platform scale to determine seed cotton yields. Sub-samples were taken to determine lint quality. Fifty 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 in April and May of 1999 were not ideal for cotton stand establishment. A paragraph on this subject is found in reference 1, which will be found elsewhere in this volume. In spite of a late planting and relatively slow start, some fairly decent yields were observed in the study.

Table 1 contains yield data, plant height, plant populations and boll weights. Yields varied greatly from 1272 to 459 pounds of lint per acre with an average of 788 pounds per acre. This was around 30 pounds per acre less than in the previous year's study (2). Hazera 83-208, an interspecific hybrid from Israel, was in a class by itself in yield, with UA 9, OA 339 and OA 340 (last year's leading variety) falling in line according to yield rank, but around 300 pounds per acre less lint. All varieties were ginned on a small research gin. OA 325, HTO variety, held good to its name producing the highest lint turnout. Plant heights varied by variety with UA 7 and Hazera 116-58 being the tallest and OA 338, the shortest. Plant populations also varied by variety with all but one variety having plant populations at a reasonable number. Pima S-7 had a much lower plant population than the rest of the varieties. Ten boll weights are in grams and as with the previous year OA 325 (HTO) had the heaviest bolls.

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. As seen in the table below the only agronomic variable with a direct statistical correlation to lint yield was Seedling Vigor Index. This value is calculated using stand counts in early May. This stand count is divided by the average stand count from the entire study to provide an index value to compare how quickly early stands are achieved. Cold fronts passing through after planting were very stressing for some varieties. OA 322 had the highest values and OA 312 the lowest.

Correlations vs lint yield			
Variable	Probability	Variable	Probability
1st Fruiting Branch	NS	Seedling vigor	$7.5 \times 10^{-6}***$
Nodes	NS	Plants per acre	NS
Plant Height	NS	% Lint turnout	NS
HNR	NS	10 Boll Weight	NS

HVI values of the lint are included in Table 3. The average fiber length and strength in 1999 was superior to those in 1998, but the uniformity was lower. The longest fiber was found in OA 312, but Hazera 80-58, UA 5, NM 1331, Pima S-7, Hazera 48-86 and OA 322 were the same statistically. UA 7 had the strongest fiber.

References

1. Clark, L.J. and E.W. Carpenter. 1999. Short staple variety trials, Graham county, 1999. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. *In this publication.*
2. Clark, L.J., E.W. Carpenter, G.L. Hart and J.M. Nelson. 1999. Pima cotton regional variety trial, Safford Agricultural Center, 1998. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-116, pp.170-175.

Table 1. Yields and other agronomic data from the Pima cotton variety trial grown on the Safford Agricultural Center, 1999.

Variety	Lint Yield	% Lint	Plants Height	Plants/Acre	10 Boll Wt.
HAZ 83-208	1272 a	38.7 hij	44.8 a	41140 ab	40.0 c-f
UA 9	986 b	39.5 e-i	44.0 a	34182 abc	39.3 c-f
OA 339	957 bc	41.3 b	39.5 a	54753 ab	42.7 a-e
OA 340	953 bc	39.5 e-i	45.3 a	42955 abc	39.0 c-f
HAZ 116-58	951 bc	33.3 l	51.0 a	37813 abc	41.7 a-e
UA 6	929 bc	38.9 hij	38.0 a	34183 abc	37.0 e-h
OA 334	928 bc	39.1 e-j	47.0 a	33880 abc	41.3 b-e
OA 322	898 bcd	38.4 j	37.2 a	44770 abc	37.3 e-h
HAZ 195-86	898 bcd	36.9 k	50.2 a	37510 abc	36.7 e-h
OA 325	896 bcd	42.3 a	45.3 a	44165 abc	48.0 a
OA 338	889 bcd	39.0 g-j	34.8 a	36300 abc	39.7 c-f
OA 350	858 bcd	39.6 e-h	46.0 a	32670 abc	40.0 c-f
OA 337	824 b-e	39.8 d-g	41.0 a	37820 abc	32.3 gh
HAZ 48-86	822 b-e	36.4 k	41.3 a	37813 abc	42.0 a-e
OA 436	817 b-e	38.6 ij	46.0 a	40535 abc	37.0 e-h
UA 8	814 b-e	38.8 hij	45.0 a	42350 abc	40.3 b-f
UA 7	796 b-f	38.3 j	51.8 a	47493 abc	34.0 fgh
OA 361	794 b-f	40.0 cde	46.8 a	35393 abc	34.3 fgh
UA 4	763 b-g	39.9 def	47.7 a	42350 abc	36.3 e-h
UA 5	708 c-h	39.6 e-h	49.5 a	32670 abc	31.7 h
HAZ 362	703 c-h	40.6 bcd	45.7 a	36905 abc	39.7 c-f
Pima S-7	654 d-h	38.8 hij	38.0 a	19058 c	44.7 abc
NM 1601	642 d-h	39.2 e-j	36.7 a	39325 abc	38.0 d-h
OA 328	637 d-h	39.6 e-h	39.5 a	60198 a	34.7 fgh
OA 348	636 d-h	38.7 ij	45.8 a	31460 abc	38.3 c-g
HAZ 57-58	586 e-h	39.0 g-j	46.0 a	38720 abc	42.3 a-e
Pima S-6	535 fgh	40.9 bc	45.5 a	26318 bc	46.7 ab
NM 1331	521 gh	39.1 f-j	47.9 a	28738 bc	44.0 a-d
HAZ 80-58	504 gh	38.7 hij	44.5 a	28435 bc	39.7 c-f
OA 312	459 h	39.4 e-i	47.8 a	37813 abc	41.3 b-e
Average	788	39.1	44.3	37954	39.3
LSD(05)	268	0.89	14.3	23955	6.7
CV(%)	21	1.39	19.7	39	10.4

Table 2. Other agronomic variables measured or calculated from the Pima cotton variety study on the Safford Agricultural Center, 1999.

Variety	1st Fruiting Branch	Total Fruiting Nodes	Nodes	HNR	Seedling Vigor Index
HAZ 83-208	9.0 abc	10.8 a	26.5 b	1.68 abc	114 bcd
UA 9	9.5 abc	11.2 a	28.2 b	1.58 abc	110 b-e
OA 339	8.5 abc	9.8 a	27.3 b	1.45 abc	112 b-e
OA 340	8.5 abc	12.3 a	28.8 b	1.55 abc	119 a-d
HAZ 116-58	7.5 bc	11.3 a	28.7 b	1.77 ab	97 c-g
UA 6	7.5 bc	9.5 a	26.7 b	1.45 abc	105 c-f
OA 334	8.3 abc	10.5 a	29.7 b	1.59 abc	105 c-f
OA 322	9.3 abc	11.2 a	26.7 b	1.40 bc	153 a
HAZ 195-86	9.7 abc	12.7 a	27.8 b	1.80 ab	94 c-g
OA 325	10.3 ab	11.3 a	30.8 b	1.46 abc	114 bcd
OA 338	8.0 abc	10.3 a	40.5 a	1.14 c	115 bcd
OA 350	6.7 c	13.0 a	26.1 b	1.76 ab	82 d-h
OA 337	9.2 abc	8.7 a	27.5 b	1.49 abc	120 a-d
HAZ 48-86	9.3 abc	13.5 a	32.2 b	1.27 bc	100 c-f
OA 436	7.5 bc	11.5 a	26.3 b	1.74 abc	111 b-e
UA 8	8.7 abc	11.3 a	25.0 b	1.83 ab	72 e-i
UA 7	9.3 abc	10.8 a	26.0 b	2.02 a	99 c-g
OA 361	7.7 abc	11.5 a	27.7 b	1.66 abc	97 c-g
UA 4	8.2 abc	11.5 a	31.2 b	1.53 abc	85 d-g
UA 5	11.2 a	11.8 a	29.0 b	1.72 abc	102 cdef
HAZ 362	8.3 abc	11.3 a	32.3 b	1.40 bc	102 cdef
Pima S-7	7.8 abc	12.7 a	28.3 b	1.34 bc	88 d-g
NM 1601	8.5 abc	11.0 a	28.0 b	1.32 bc	103 c-f
OA 328	10.0 abc	9.2 a	29.3 b	1.36 bc	149 ab
OA 348	8.5 abc	11.8 a	25.8 b	1.80 ab	130 abc
HAZ 57-58	9.5 abc	12.3 a	33.0 ab	1.40 bc	109 cde
Pima S-6	7.3 bc	11.7 a	29.2 b	1.61 abc	67 f-i
NM 1331	6.8 bc	13.0 a	28.5 b	1.69 ab	46 hi
HAZ 80-58	6.8 bc	13.3 a	26.8 b	1.65 abc	60 g-i
OA 312	7.8 abc	12.8 a	26.8 b	1.79 ab	44 i
Average	8.5	11.5	28.7	1.58	100.00
LSD(05)	2.9	3.9	7.5	0.5	34
CV(%)	20.9	21.1	16.1	19.3	21

Table 3. HVI Data from the Pima cotton variety trial grown on the Safford Agricultural Center, 1999.

Variety	Length	Strength	Uniformity	Micronaire	RD	+B	Grade
HAZ 83-208	1.35 hi	30.3 jk	85.5 efg	36.0 j-m	66.0 de	110.0 ij	4/5 cd
UA 9	1.39 c-f	39.2 bc	86.0 def	36.5 i-m	64.0 fgh	122.5 a-d	4 de
OA 339	1.35 hi	34.3 f-i	85.0 fgh	35.0 lm	68.5 c	101.0 l	5 bc
OA 340	1.37 e-i	38.6 bcd	87.0 bcd	40.0 c-g	66.0 de	119.5 d-g	3/4 ef
HAZ 116-58	1.32 j	31.4 h-k	84.0 h	38.5 e-j	67.0 d	102.5 kl	4/5 cd
UA 6	1.39 d-g	39.6 bc	85.0 fgh	39.5 d-h	65.0 ef	122.5 a-d	4 de
OA 334	1.35 h-i	38.0 b-e	86.5 cde	41.5 cd	67.0 d	113.0 hij	4/5 cd
OA 322	1.41 a-d	35.2 e-g	86.5 cde	38.5 e-j	67.0 d	114.0 ghi	4/5 cd
HAZ 195-86	1.38 e-h	31.0 ijk	84.5 gh	31.5 no	62.3 ij	124.0 a-d	6 a
OA 325	1.38 e-h	38.2 b-e	87.5 abc	45.5 a	70.5 ab	120.5 c-f	2 g
OA 338	1.37 f-i	37.0 c-f	85.5 efg	42.5 bc	63.0 hij	126.5 ab	4/5 cd
OA 350	1.39 c-f	38.3 b-e	85.5 efg	39.0 d-i	64.0 fgh	121.5 b-e	5 bc
OA 337	1.35 hi	38.5 b-e	86.0 def	40.0 c-g	67.0 d	108.0 jk	5/6 ab
HAZ 48-86	1.41 a-d	30.2 k	84.5 gh	31.0 o	65.0 ef	116.2 e-h	5/5 ab
OA 436	1.40 b-e	35.4 d-g	85.5 efg	38.3 e-k	64.0 fgh	124.5 a-d	5 bc
UA 8	1.40 b-e	37.2 c-f	86.0 def	39.0 d-i	63.0 hij	122.5 a-d	4/5 cd
UA 7	1.39 c-f	44.6 a	87.0 bcd	37.0 h-l	65.0 ef	119.7 d-g	4/5 cd
OA 361	1.35 i	38.2 b-e	85.5 e-g	37.5 g-l	66.5 d	111.0 hij	5 bc
UA 4	1.39 c-f	38.9 bc	87.0 bcd	42.5 bc	66.5 d	119.0 d-g	4/5 cd
UA 5	1.42 abc	39.8 bc	87.0 bcd	40.5 c-f	63.0 hij	128.0 a	4 de
HAZ 362	1.36 ghi	35.3 d-g	84.5 gh	40.5 c-f	62.0 j	121.5 b-e	5/5 ab
Pima S-7	1.41 a-d	40.9 b	87.5 abc	38.5 e-j	71.5 a	115.5 f-i	2 g
NM 1601	1.39 c-f	36.5 c-g	86.0 def	35.5 klm	63.5 ghi	123.2 a-d	4/5 cd
OA 328	1.35 i	34.7 f-h	86.0 def	41.5 cd	67.0 d	121.5 b-e	3 f
OA 348	1.39 d-g	39.2 bc	85.5 efg	34.0 mn	64.5 fg	126.0 abc	4/5 cd
HAZ 57-58	1.39 c-f	33.2 g-k	85.0 fgh	35.5 klm	65.0 ef	115.5 f-i	5 bc
Pima S-6	1.36 ghi	39.1 bc	88.0 ab	44.5 ab	70.5 ab	119.5 d-g	2 g
NM 1331	1.41 a-d	34.5 fgh	85.5 efg	38.0 f-k	63.5 ghi	126.5 ab	4/5 cd
HAZ 80-58	1.42 ab	33.6 g-j	86.0 def	34.0 mn	64.5 fg	116.5 e-h	5 bc
OA 312	1.43 a	41.0 b	88.5 a	41.0 cde	70.0 b	120.5 c-f	2 g
Average	1.38	36.7	86.0	38.4	65.7	118.4	4.0
LSD(05)	0.03	3.3	1.1	2.9	1.5	5.8	0.6
CV(%)	1.20	5.5	0.8	4.6	1.4	3.0	7.9