

Pima Cotton Regional Variety Trial, Safford Agricultural Center, 1997

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

Abstract

Sixteen 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 1997 was OA 325 with a yield of 746 pounds of lint per acre. It was followed by four other Olvey varieties yielding over 700 pounds per acre. 1997 was not a good Pima cotton year in this valley, weather problems early and insect problems late in the season both took their toll. Yields were more than 300 pounds lower than the previous year and 100 pounds less than in 1995. Yield and other agronomic data as well as fiber quality data are contained in this paper.

Introduction

The burden of developing new long staple cotton varieties has changed from the USDA program to the University and commercial seed companies. 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 and varieties can be evaluated in a high desert environment so varieties 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: 17 April 1997

Rate: 25 pound per acre

Herbicide: 1 pt/ac Triflurilin pre-plant, Cotton Pro at lay-by

Fertilizer: 100 lbs/ac of urea under green manure crop 2/10/97, side dressing of 100 lbs/ac of urea on 6/3 and 7/14

Insecticide: 5 applications to control pinkie, aphids and whitefly

Pix/Prep: None

Defoliation: Ginstar

Irrigation: Furrow, planted to moisture + 6 irrigations (ca. 24 inches + 6 inches of rain)

Harvest dates: 1st pick: 17 October

2nd pick: not taken

Heat units per growing season: 3730 (86/55)

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. 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

April and the first part of May had cold spells that affected the growth of most field of Pima cotton grown in the Safford valley. The crop was short and didn't produce well. In this test yields were down 336 pounds (Table 1). Adequate plant populations were achieved even though the seedling vigor index (higher is better) varied greatly. The ranking of the varieties did not vary greatly over the past two years, even with greatly varying climatic conditions. The Olvey varieties were in the upper third of the test, Pima S-6 and S-7 were in the middle of the test and the New Mexico and Chaney Ranch varieties were in the bottom third of the test. OA 325, also known as HTO (high turn out), had the highest lint yield even though it was listed 4th in seedcotton yield. The high lint turnout brought it to the top of the list. The plant populations were quite consistent across the varieties and all within the optimal range. The seedling vigor index was determined by making stand counts 2 to 3 weeks after planting, then normalizing the resulting stand counts. A value of 1.00 indicates that the stand count was the average of all of the varieties. NM 1601 and OA 312 demonstrated the lowest seedling vigor, whereas OA 337, S-6 and CH 271 had the highest vigor.

Table 2 reports on more agronomic variables. Plant heights and Height to Node Ratios (HNR) were down compared with 1996. First fruiting branches were about the same and boll weights were slightly heavier. NM 1601 was the tallest variety and OA 328 was the shortest variety. The HNRs were closely related to the plant heights. First fruiting branches should be studied together with the physiological characteristics of each variety. This study will be left to the reader. The heaviest bolls were produced by UA 4 and the lightest by CH 972. All of the agronomic variables were correlated with lint yield and the following was found:

Correlations vs lint yield	
Variable	Probability
1st Fruiting Branch	NS
Nodes	NS
Plant Height	NS
HNR	NS
Seedling vigor	0.046 *
Plants per acre	0.008 **
% Lint turnout	2.76X10 ⁴ ***

HVI values of the lint are included in Table 3. The NM 1331 variety, with Sea Island parentage, had the longest fiber, OA 312 had the strongest fiber, and OA 337 and OA 361 (White Pima) had the whitest fiber. Individual fiber quality studies are left to the reader.

References

1. Brown, P., B. Russell and J. Silvertooth.. 1998. 1997 Weather conditions. 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. 1997. Pima cotton regional variety trial, Safford Agricultural Center, 1996. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-108, pp. 177-181.

3. Hart, G.L., J.M. Nelson and L.J. Clark. 1998. Pima regional variety test at the Maricopa Agricultural Center, 1997. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. *In this publication.*

Table 1. Yields and other agronomic data from the Pima cotton variety trial grown on the Safford Agricultural Center, 1997.

Variety	SC Yield	% Lint	Lint Yield	Plants/Acre	Seedling Vigor Index
OA 325	1763 a-d ¹	42.4 a	748.0 a	58307 a	0.97 abc
OA 312	1880 a	39.0 efg	733.4 ab	51047 ab	0.85 bc
OA 322	1783 abc	41.1 bc	731.8 ab	58307 a	0.98 abc
OA 337	1847 ab	39.0 efg	720.8 abc	58761 a	1.20 ab
OA 361	1759 a-d	40.7 bcd	716.3 abc	42879 b	0.85 bc
OA 328	1763 a-d	39.2 efg	690.2 a-d	59668 a	1.11 abc
Pima S-7	1714 a-d	40.0 cde	685.0 a-d	48324 ab	0.92 abc
Pima S-6	1609 bcd	41.4 b	666.9 a-d	56719 a	1.2 abc
95-127	1678 a-d	37.9 gh	636.6 b-d	54904 a	0.99 abc
UA 4	1593 bcd	39.5 def	629.9 cd	51047 ab	1.11 abc
NM 1331	1508 de	39.9 cde	601.7 de	42653 b	0.90 abc
CH 271	1617 bcd	37.2 h	601.3 de	56265 a	1.24 a
UA 5	1541 cd	38.4 fg	591.5 def	55584 a	1.16 ab
NM 1601	1291 ef	39.9 cde	515.1 efg	42653 b	0.78 c
CH 972	1521 cde	33.1 i	503.6 fg	56265 a	0.93 abc
PHY 57	1230 f	38.7 efg	476.6 g	47871 ab	1.00 abc
Average	1631.0	39.2	640.5	52578.2	1.00
LSD(05)	222.3	0.9	87.0	10613.5	0.3
CV(%)	9.6	--	9.5	14.2	21.7

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

Table 2. Other agronomic variables measured or calculated from the Pima cotton variety study on the Safford Agricultural Center, 1997.

Variety	Plant Height	HNR	1st Fruiting Branch	Boll Weight (gms)
OA 325	28.3 d-g ¹	1.18 ab	7.1 ab	3.27 abc
OA 312	30.1 b-f	1.27 ab	5.4 bc	2.97 d-g
OA 322	26.6 fg	1.11 b	5.2 bc	2.81 fgh
OA 337	27.3 efg	1.22 ab	7.5 ab	2.75 gh
OA 361	29.0 c-g	1.28 ab	4.1 c	2.91 d-g
OA 328	26.0 g	1.13 b	6.6 ab	3.08 b-e
Pima S-7	29.1 c-g	1.13 b	7.4 ab	3.13 bcd
Pima S-6	30.3 d-e	1.25 ab	6.9 ab	3.09 b-e
95-127	28.6 c-g	1.12 b	6.1 abc	2.83 e-h
UA 4	31.5 a-d	1.33 a	7.0 ab	3.43 a
NM 1331	30.9 a-d	1.35 a	6.0 abc	3.12 bcd
CH 271	33.0 ab	1.33 a	6.1 abc	2.82 e-h
UA 5	32.0 abc	1.21 ab	8.0 a	3.02 c-f
NM 1601	34.1 a	1.34 a	6.8 ab	3.32 ab
CH 972	29.0 c-g	1.26 ab	7.3 ab	2.65 h
PHY 57	29.4 c-g	1.20 ab	5.4 bc	3.07 b-f
Average	29.7	1.23	6.4	3.02
LSD(05)	3.0	0.16	1.9	0.9
CV(%)	7.2	9.4	21.1	--

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

Table 3. HVI Data from the Pima cotton variety trial grown on the Safford Agricultural Center, 1997.

Variety	Length	Uniformity	Strength	Elongation	Micronaire	RD	+b	Grade
OA 325	1.32	89.3	43.2	11.9	4.4	66.6	11.8	2.5
OA 312	1.34	89.6	48.3	11.8	4.3	66.4	12.1	2.5
OA 322	1.31	88.6	41.0	12.1	4.4	69.9	10.8	2
OA 337	1.31	88.1	41.6	11.5	4.3	72.7	8.6	2.5
OA 361	1.32	89.3	45.4	11.6	4.2	72.2	9.5	2
OA 328	1.31	88.1	37.0	11.0	4.3	66.5	11.5	2.5
Pima S-7	1.33	89.9	45.6	11.8	4.5	67.0	11.4	3
Pima S-6	1.33	88.5	44.2	12.1	4.8	63.8	12.8	3
95-127	1.33	89.0	40.5	11.1	4.1	64.8	11.4	3
UA 4	1.33	88.2	41.5	11.3	4.4	68.6	11.4	2
NM 1331	1.36	89.8	39.4	11.5	4.2	66.3	11.8	3
CH 271	1.34	89.1	44.2	11.7	4.2	62.2	12.1	4
UA 5	1.35	89.8	40.5	11.1	4.3	66.9	11.0	3
NM 1601	1.33	89.6	45.2	12.1	4.6	65.9	11.9	3
CH 972	1.31	87.2	34.6	11.2	3.8	68.6	9.5	3
PHY 57	1.34	89.8	42.9	11.7	4.0	67.0	11.3	3
Average	1.33	88.99	42.19	11.59	4.30	67.21	11.18	2.8