

# Long Staple Cotton Variety Trial, Safford Agricultural Center, 1993

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

## **Abstract**

*Sixteen long staple cotton varieties (including 4 Pima experimental lines) were tested in a replicated small plot trial on the Safford Agricultural Center. Plots were machine harvested twice to determine yield and percent first pick. Small hand samples were taken to determine boll size, percent lint turnout and fiber qualities. Pima S-6 was the highest yielding variety with 1110 pounds per acre of lint. Five of the sixteen varieties yielded over 2 bales per acre. A new variety OA 312 looks particularly promising with yield very close to S-6, fiber quality better than S-6 and an earliness that approaches that of S-7.*

## **Introduction**

As more cotton breeders become involved in the production of long staple varieties that are outside of the USDA program, it becomes more important for us to test the varieties throughout the state. This test is part of a regional test being carried out in two locations in the state of Arizona. This test will also serve as a screening test to evaluate long staple varieties before they are placed in on-farm trials in the counties.

## **Materials and Methods**

This experiment was a replicated, small plot trial planted with a cone planter. A given volume of seed was placed uniformly throughout the plot, so final plant populations varied with seed size and germination percent. After planting, the plots were irrigated to bring about a uniform stand. The following crop history provides the details of how the plots were managed.

### Crop History:

Previous crop: Durum wheat

Soil type: Pima silty clay loam

Planting date: 13 April, 1993                      Rate: 25 lbs/ac

Herbicide: 1.25 pints/ac triflurilin, preplant

Fertilizer: 50 lbs/ac side-dressed 10 June, 50 lbs/ac side-dressed 16 August

Insecticide: Pyrethroid 2X, organophosphate 1X

Irrigation: Furrow, watered up + 6X (approximately 20 inches + 6 inches of rain)

Harvest dates: 2 November and 24 November

Heat units per growing season: 3819 (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 percent lint turnout and lint quality.

## Results and Discussion

The number of long staple varieties available for testing continues to increase as is evidenced by the number of entries tested this year compared to the previous year (reference 1). Yields were also improved with 5 of the 16 varieties tested yielding over 2 bales per acre compared to 1 out of 10 in the 1992 trial. The increased yields were probably weather related, even though 1993 was not an easy year to get cotton out of the ground. Figures 1 and 2 in reference 2 show how the heat units came during the year. It can be noted that there were two events during early April when 5 heat units or less were received per day. Cotton comes out of the ground much easier with 10 or greater heat units per day than with 5. This, however, was not the only difficulty. The heavy rains of the winter made ground preparation difficult and some fields were poorly prepared. Poorly prepared soils coupled with more windy days than normal lead to spotty stands and more replanting than usual. On the positive side, however, more heat units were received in the 1993 growing season than during the previous year, which made possible increased yields in some cases.

Table 1 shows the yields and other agronomic values from the varieties tested in this experiment. Pima S-6 led the trial followed closely by OA 312. S-6 yielded approximately 20% more than S-7, which corresponds to what Percy and Turcotte (1993) found at their Safford Agricultural Center site in 1992. Their study also shows an 8% advantage to S-6 over S-7 at all of their locations over 2500 feet elevation. The % first pick column, however, shows a considerable increase in maturity of S-7 compared to S-6. In cases where adverse conditions exist, S-7 has been shown to out-perform S-6 at our elevation. (See Percy and Turcotte's (1993) study on Safford (Palmer) and the study by Clark, et.al. (1993).) New material such as OA 312 look particularly promising. OA 312 yielded with S-6 but matured nearly as fast as S-7. P 75 also yielded well as it did in Percy and Turcotte's 1992 study at our location. It appears to need more time to mature, however.

In order for a long staple variety to succeed, it must yield well under the prevailing climatic conditions and also have a quality equivalent to or better than S-6. Data on fiber characteristics determined by HVI analysis are shown in Table 2. Look first at the top 3 entries. OA 312 compares well with S-6 and P 75 and exceeds them both in strength and micronaire. The micronaire increase might be a plus at the higher elevations. Looking at other values in Table 2; OA 304 and OA 303 have exceptionally long fiber, OA 313, OA 303, P 76 and OA 323 have exceptionally strong fiber, and the average values of all the varieties are equal to or better than that of S-6.

With more breeders concentrating on the long staple cotton, changes are coming fast, especially in the fiber quality. This is our first look at many of these varieties so we must temper our optimism with a bit of caution. Our tests will continue to verify the results of this study.

## References

1. Clark, L.J., E.W. Carpenter and J.M. Nelson. 1993. Long and Short Staple Cotton Variety Trial, Safford Agricultural Center, 1992. Cotton, A College of Agriculture Report, The University of Arizona, Tucson. Series P-94, pp.138-144.
2. Clark, L.J., E.W. Carpenter, G.L. Hart and J.M. Nelson. 1994. Short Staple Cotton Variety Trial, Safford Agricultural Center, 1993. Cotton, A College of Agriculture Report, The University of Arizona, Tucson. In this volume.
3. Percy, R.G. and E.L. Turcotte. 1993. Pima Cotton Improvement. Cotton, A College of Agriculture Report, The University of Arizona, Tucson. Series P-94, pp.157-162.

## Acknowledgments

Each of the companies supplying seed for this study contributed financially to aid our research effort. For this we are grateful.

**Table 1. Yields and other agronomic values for long staple varieties grown at the Safford Agricultural Center, 1993.**

Variety	Lint Yield lbs/ac	% Lint Turnout	% First Pick	Boll Size gms/boll	Plant Height inches	Plant Population
Pima S-6	1109.6	38.02	69.4	3.03	35.5	30401
OA 312	1096.7	37.86	78.8	2.65	34.5	40384
P 75	1020.8	38.00	63.9	2.80	38.0	32670
OA 304	1011.1	36.65	69.7	2.81	38.5	39023
P 77	1006.3	36.67	79.2	2.74	33.5	33124
OA 305	988.5	36.31	77.0	2.84	33.5	34485
P 73	951.7	35.62	67.5	2.34	35.0	36754
DP 9911	933.3	37.81	58.4	2.88	41.0	29948
Pima S-7	924.6	38.71	82.1	3.00	31.0	38115
Oro Blanco	923.2	38.30	62.8	2.92	39.0	32670
P 76	907.1	37.86	59.2	2.85	38.5	37208
Phy 417	898.9	38.45	72.7	2.98	37.5	35846
OA 323	895.3	36.70	81.6	3.36	33.5	28586
OA 303	873.4	36.91	69.0	2.71	32.5	32216
H-2	857.1	37.36	46.1	2.53	42.5	33578
OA 313	741.7	35.72	75.9	2.42	34.0	26771
Average	946.21	34.96	69.08	2.804	35.94	33871.1
LSD(05)	265.69	--	23.62	--	7.698	8336.89
CV(%)	13.3	--	18.0	--	11.7	14.6

**Table 2. HVI fiber characteristics for long staple varieties grown at the Safford Agricultural Center, 1993.**

Variety	Length	Uniformity	Strength	Elongation	Micronaire	Grade
S-6	1.38	88.9	42.5	12.0	4.3	2/3
OA 312	1.38	88.2	44.8	12.0	4.4	3
P 75	1.36	87.1	41.2	12.0	4.2	2/3
OA 304	1.41	89.6	42.0	12.0	4.3	3
P 77	1.34	88.0	43.3	13.0	4.4	3
OA 305	1.37	88.8	41.6	12.0	4.3	3
P 73	1.36	88.6	46.8	12.0	4.2	1/2
DPL 9911	1.39	87.8	47.7	12.5	4.4	2/3
S-7	1.37	87.6	44.3	12.0	4.4	2/3
Oro Blanco	1.40	89.0	44.0	13.0	4.6	2/3
P 76	1.40	89.1	49.9	13.0	4.1	2/3
Phy 417	1.38	88.7	43.0	13.0	4.7	2/3
OA 323	1.38	86.9	49.7	11.5	4.5	2
OA 303	1.41	88.2	52.6	12.0	4.2	3
H-2	1.36	87.9	39.5	11.5	4.3	2/3
OA 313	1.38	87.0	53.1	12.0	4.2	1/2
Average	1.38	88.19	45.35	12.22	4.32	2/3
LSD(05)	0.033	1.43	3.14	0.64	0.3	1.13
CV(%)	14.7	1.1	9.3	4.5	4.6	24.9