

Pima Cotton Breeding and Genetics

PIMA COTTON IMPROVEMENT

Carl V. Feaster, Research Agronomist and
E. L. Turcotte, Research Geneticist
USDA, Agricultural Research Service

Summary

Recently developed early, short-statured Pima strains may be adapted to 30-inch row culture.

* * *

The Pima Regional Test was grown at five locations in the Pima belt in 1983. The five experimental strains and Pima S-6 were developed at Phoenix under low-elevation conditions. Table 1 includes yield data and Table 2 includes plant-height data from the five locations -- Salome and Maricopa, AZ below 2,500 feet elevation; and Safford, AZ; Anthony, NM; and El Paso, TX above 2,500 feet elevation. As in 1982, P59 averaged highest in yield, Pima S-6 was second, and P53 was third in yield. P51, P58, and P62 were less productive but were much earlier and shorter statured than P59, Pima S-6, or P53. The earliness and short stature of P51, P58, and P62 may allow them to be grown effectively in 30-inch rows. When grown in 38-to-40-inch rows, as they were in the regional test, the plant canopy of these strains seldom closes between rows, thus their maximum yield potential is not obtained. These earlier strains planted in 30-inch rows may have considerable potential under the shorter growing seasons at high elevations. Here, these strains might be planted later when conditions generally are more favorable for germination and emergence, produce acceptable yields, and mature reasonably early.

Advanced and preliminary tests of strains developed at Phoenix were continued at Maricopa and Safford. These strains differed widely in maturity and plant height. Few strains appeared to have significantly greater yield potential than the most productive strains of similar maturity in the regional test.

A program to develop Gossypium barbadense parents for G. hirsutum x G. barbadense interspecific hybrids was initiated by mass-crossing about 50 relatively early, short-statured G. barbadense progenies that have shorter, weaker, and/or coarser fiber than commercial Pima. This mass-cross material should provide basic germplasm for developing improved, early, short-statured, "modal" fiber, G. barbadense genotypes that, when crossed with early, short-statured G. hirsutum, will give adapted interspecific hybrids with "modal" fiber that has wide commercial use.

Two Pima cultivars, two upland cultivars, and four interspecific hybrids involving the four cultivars were evaluated for the second year under two irrigation levels at low and high elevations. The interspecific hybrid from a short Pima x a short upland continued to give an acceptable plant-height response over a range of environments.

Table 1. Yields from Pima Regional Tests, 1983.

	Salome, AZ		Maricopa, AZ		Safford, AZ		Anthony, NM		El Paso, TX		Mean						
	Pounds lint/A	Rank	Pounds lint/A														
P59	1424	a*	1	1324	a	2	840	a	2	841	abc	3	1014	a	2	1089	a
Pima																	
S-6	1283	b	2	1327	a	1	863	a	1	743	bc	5	1069	a	1	1057	ab
P53	1254	b	3	1296	a	3	636	c	6	922	a	1	819	c	6	985	abc
P51	1191	b	4	1264	a	4	820	a	3	783	bc	4	832	c	5	978	abc
P62	1154	b	6	1164	a	5	732	b	4	846	ab	2	928	b	3	965	bc
P58	1186	b	5	1133	a	6	702	bc	5	732	c	6	858	bc	4	922	c

*Yields in a given column followed by the same letter are not significantly different at the 5% level of probability.

Table 2. Plant heights from Pima Regional Tests, 1983.

	Salome, AZ	Maricopa, Az	Safford, AZ	Anthony, NM	El Paso, TX	Mean						
	<u>Inches</u>											
P59	40	b*	48	a	25	b	37	abc	27	ab	35	a
Pima												
S-6	39	b	48	a	28	a	40	a	28	a	37	a
P53	43	a	49	a	29	a	40	ab	29	a	38	a
P51	31	c	40	b	21	c	35	c	22	c	30	b
P62	26	d	35	c	21	c	36	bc	24	bc	28	b
P58	30	c	38	b	22	c	33	c	23	c	29	b

*Heights in a given column followed by the same letter are not significantly different at the 5% level of probability.

PIMA COTTON GENETICS

**E. L. Turcotte, Research Geneticist and Carl V. Feaster
Research Agronomist, USDA, Agricultural Research Service**

Summary

Analyses showed that a dominant male-sterile gene was a new trait in cotton, and that kidney seed found in primitive cottons is recessive.