

Yield test data for 1966 at Marana are incomplete and are listed for seed cotton harvested on Nov. 15, 1966.

Pima S-2	2020 lbs of seed cotton/acre
#126-1	1840 " " " " "
63-17-1-16	1910 " " " " "

The slightly lower yield of #126-1 was due to the extension of harvest. #126-1 was ready for final picking approximately 2 weeks prior to actual harvest.

Storm proof 63-17-1-16 is a relatively late maturing strain.

Experimental #126-1, planted at the Casa Grande Overpass Farm gave the following yield on 3-1/2 acres.

<u>Total Seed Cotton Harvested</u>		
Oct. 6, 1966	4,620 lbs	3 bales
Dec. 1, 1966	<u>3,750 "</u>	<u>2-1/2 bales</u>
Total	8,370 lbs	5-1/2 bales

It is interesting to note that October 6 is an unusually early date to harvest long-staple cotton. This is an indication of an early maturing strain of cotton.

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#### PIMA PHYSIOLOGY

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Previous work of the Pima improvement program has shown marked differences between varieties S-3 and S-4 in height and yield when grown at different altitudes. S-3 is best adapted to the higher altitudes where it is productive and has a desirable height. At low altitudes, S-3 fruits late in the season, and is rank and unproductive. On the other hand, S-4 yields well and has a desirable plant type at low elevations. At high altitudes, S-4 sets fruit too low for most efficient harvesting.

The objective of the Pima physiology program is to gain basic information about the physiology of the cotton plant and the ways in which the environment influences the internal chemical reactions which control plant height and the many factors which make up yield--namely, squaring, square shed, pollination, seed set, and boll abscission. Knowledge of the relationships between various environmental factors (light, temperature, water, nutrients) and specific chemical reactions in the plant will help the cotton-improvement program by allowing relatively simple, precise, and rapid tests to be used to identify a plant's adaptability to a given environment. This will greatly reduce the time needed to determine the environment to which a plant is best adapted. It will also improve the precision of this determination.

Through an analysis of the early- and mid-season growth of Pima varieties S-3 and S-4 at Phoenix (low altitude) and at Safford (high altitude), evidence has been gained concerning the identity of the physiological processes involved in differences between these two varieties in height and yield at these two locations.

Height measurements and node counts of Pima S-3 and S-4 plants at Phoenix and Safford indicate that varietal and locational differences in height are due to differences in internode length.

Weekly square and boll counts suggest that the lower yield of S-3 as compared to S-4 at Phoenix is related to differences between the varieties in pollination, seed set, and boll abscission. Square production and square abscission do not appear to be important factors in the varietal difference in yield at Phoenix. At Safford, on the other hand, yield differences between these two varieties are apparently associated with differences in square production and square abscission.

A statistical analysis of the daily maximum (day) and minimum (night) temperatures at Phoenix and at Safford and of the square loads and boll loads on varieties S-3 and S-4 at these locations suggests that the square load is related to daily maximum temperature and the boll load is related to daily minimum temperature. These relationships may explain why the differences between these two varieties are not relatively the same at the two locations.

At Phoenix, where night temperatures are high during July and August yield is influenced not only by daily maximum temperature, through its effects on squaring and square shed, but also by daily minimum temperature, through its effects on pollination, seed set, and boll shed. The latter effect appears to be the factor most limiting to yield at Phoenix. At Safford, however, summer night temperatures are not as high as at Phoenix, and therefore yield is influenced primarily by daily maximum temperature through its effects on the square load.

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#### PIMA COTTON IMPROVEMENT

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Two Pima varieties were released for commercial production in June, 1966. These two varieties, Pima S-3 and Pima S-4, appear adapted to a two-variety system. Pima S-3 is recommended for the high altitudes, and Pima S-4 is recommended for the low altitudes and for high altitudes where conditions of high productivity cause Pima S-3 to be late and rank.

Yield and percentage lint data from the 1966 Regional Pima Tests are included in Table 1. The test includes Pima S-1, Pima S-2, Pima S-3, Pima S-4, and experimental strain P17. The locations where these tests were grown vary in altitude from approximately 1200 to 3000 feet.