

Table 3. Lint yield and water use efficiency (WUE) of 40,000 plants per acre

Lbs. N/ac.	Normal irrigation	
	Yield* lbs/ac	WUE* lbs/in. H ₂ O
0	1213 a	28.5 a
138	1780 c	38.1 b
203	1644 bc	33.7 ab
	2/3 normal irrigation	
0	1283 a	34.9 b
69	1511 b	39.4 b
134	1475 ab	36.8 b

*Entries followed by the same letter are not statistically different at the 5% level.

Use of Growth Regulator PIX[®]

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This material has now been available for several years but test results had failed to pinpoint the best application time, condition or whatever for maximum benefit. Three years experience prior to 1982 had provided economic returns in all tests conducted in Pima County excepting one short staple test. However, there was considerable variance as to appropriate application timing.

The effort in cooperation with BASF in 1982 was designed to add insight into what conditions contributed to the best results. Four different treatments along with a check replicated four times were applied on Pima S-5 cotton. The first treatment was one pint of PIX[®] applied at early bloom (10-12 blooms per foot of row) and a second application of 1 pint at peak bloom (about 25 days after first application). Treatment two was one pint of PIX[®] at early bloom and ½ pint at peak bloom. Treatment three was one pint PIX[®] at early bloom. Treatment four was one pint of PIX[®] at peak bloom and treatment five was the check.

All applications were aeriually applied in 14 row swaths with each swath being one replication of a treatment.

The following results were obtained from this effort.

Long Staple PIX[®] Treatments

Treatment	Apex Farms, Art Pacheco, Marana Pounds Seed Cotton Per Plot				Total Seed Cotton	Lint ^{/1/2} Per Acre
	Rep 1	Rep 2	Rep 3	Rep 4		
1 Pt. PIX [®] Early plus 1 Pt. PIX Late	855	715	740	575	2885	688 a
1 Pt. PIX [®] Early plus ½ Pt. PIX Late	800	785	715	590	2890	689 a
1 Pt. PIX [®] Early	750	750	735	640	2875	685 a
1 Pt. Pix [®] Late	635	805	690	650	2780	663 a
Check	865	760	660	690	2975	709 a

/1 First pick only

/2 Values followed by same letter not significantly different at .05 level by Student - Newman - Keul's test.

The data shown above indicates that there was no benefit by applying PIX[®] in 1982. In fact the check produced slightly more yield per acre. In view of three years previous work which gave an economic yield in every test on long staple one can conclude that 1982 was not the year to use this material.

Weather conditions were quite different in 1982 as compared to the three previous years. Most of the summer rains were late occurring primarily in the latter half of August when a substantial amount fell. Then rains in late September and October kept plants growing vigorously when they should have been slowing down and reaching termination. Most everyone experienced a defoliation problem last fall as a result of the unusual weather.

Stomatal Responses to Nitrogen Fertility in Irrigated Cotton

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Summary

In 1982, field tests were conducted at the Cotton Research Center, Phoenix, to determine the effects of N fertility on stomatal responses to water stress. Experimental details were as outlined in another report by Guinn, Mauney, and Radin (this volume). Stomatal conductances were measured with a LiCor 1600 steady-state porometer on the most recently fully expanded leaves. Crop N status was monitored by petiole nitrate-N analyses. Leaf water potentials were measured with a pressure chamber, with the two-week irrigation cycles providing cyclical imposition of water stress. Plant water relations were characterized by pressure-volume procedures.

As the season progressed, the interaction between N and water status changed greatly. In high N plants, stomata closed at 8 bars lower (more stressed) water potential than in zero-N plants in July, 4 bars lower in August, and at the same water potential in September. The differences early in the fruiting cycle did not result from differences in leaf osmotic pressure, which were very small. The loss of the differential stomatal response to stress corresponded to the decline of petiole nitrate-N to very low values, even in the fertilized plots. Either the increasing fruit load on the plants, or the decline in the leaf N status, could have caused the loss of the differential stomatal response to stress.