

Evaluation of PIX Multiple Application Treatments on Upland and Pima Cotton in Arizona, 1988

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ABSTRACT

Four field experiments were conducted in Arizona in 1988 to evaluate the effects of various multiple application treatment combinations of PIX on the growth and development, as well as the lint yields of both upland and pima cotton. Plant height was significantly reduced ($P \leq 0.05$) in some PIX treatments in comparison to the checks for short periods of time after the treatment applications. Those effects did not persist, nor did they translate into any significant positive differences among treatments in terms of lint yields for either of the upland or pima experiments.

INTRODUCTION

The use of PIX has been incorporated into the general management of many Arizona cotton production operations. The manner in which it is used varies considerably. In the past 15 years, a large number of experiments have been conducted in a variety of situations and locations across the cotton-growing areas of Arizona. The results have been quite variable and have not indicated a direct consistency in terms of predictable crop management and recommendation guidelines in terms of PIX use.

Four field experiments were conducted in Arizona in 1988 to evaluate a group of PIX treatments consisting of small multiple applications applied at three stages of growth (Table 1).

MATERIALS AND METHODS

Upland and pima cotton experiments were each established in both the Yuma Valley (Yuma County) and the Gila River Valley, north of Gila Bend (Maricopa County).

Treatments used in each experiment, shown in Table 2, were arranged in a randomized complete block design with 4 replications in each case. The dates of actual treatment applications are shown in Table 3; heat units accumulated at the date of each application since date of planting are shown in Table 4. Plots were 20 and 6 rows wide at the Yuma and Gila Bend experiments respectively. Plant measurements in each treatment area for each experiment, were initiated after plant emergence and carried out every 14 days throughout the season, until irrigation termination. Plant measurements consisted of multiple 1-meter samples within each treatment area. Measurements taken in each sample consisted of number of plants m^{-1} , plant heights, number of mainstem nodes per plant, number of flowers m^{-1} , and bolls m^{-1} . Lint yields were measured by harvesting the center 4 rows of each plot with a mechanical picker.

RESULTS

Results from the experiments revealed a reduction in plant height in comparison to check plots at several dates of measurement after PIX application on each experiment. However, no positive results were obtained from either of the experiments in terms of lint yields (Tables 5 and 6). Final plant measurements for each experiment are shown in Tables 7 to 10. As shown, substantial differences with regard to the parameters did not persist to season's end.

It should also be noted that at the Yuma location, both experiments consisted of well-fruited upland (DPL 50) and pima (S-6) as evidenced in the check plots. Also, at the Maricopa County location, both experiments were extended for full-season production by necessity, which may have negated any benefits from PIX. Further work with small, multiple applications will be pursued in 1989 in a similar manner to that of 1988.

Table 1. Locations for PIX multiple application experiments in Arizona, 1988.

<u>Location</u>	<u>Crop</u>	<u>Variety</u>	<u>Soil Type</u>	<u>Planting Date</u>
Yuma Valley	Pima Upland	S-6 DPL-50	Holtville clay	April 1 March 15
Gila Valley (Maricopa Co.)	Pima Upland	S-6 DPL-50	Brios sandy loam	April 15 April 15

Table 2. Treatments and rates used in PIX multiple application experiments conducted in Arizona, 1988.

<u>Treatment</u>	<u>Date of Application</u>		
	<u>1st*</u>	<u>2nd**</u>	<u>3rd***</u>
	-----pts PIX acre ⁻¹ -----		
1	--	--	--
2	1/8	1/8	1/8
3	1/4	1/4	1/4
4	1/8	1/2	--
5	1/4	1/2	--
6	--	1/2	--
7	--	1	--

* 1st = Match-head square

** 2nd = early bloom

*** 3rd = 7 - 10 days post application #2

Table 3. Dates of actual treatment applications for PIX - multiples experiments conducted in Arizona, 1988.

<u>Location</u>	<u>Crop</u>	<u>Planting</u>	<u>1st</u>	<u>2nd</u>	<u>3rd</u>
Yuma	Upland	March 5	May 9	June 2	June 18
	Pima	April 1	June 2	June 23	July 11
Gila Bend	Upland	April 15	June 8	July 8	July 19
	Pima	April 15	June 8	July 8	July 19

Table 4. Heat units accumulated since planting, for each of the application dates for each PIX - multiple experiment in Arizona, 1988.

<u>Location</u>	<u>Crop</u>	<u>1st</u>	<u>2nd</u>	<u>3rd</u>
Yuma	Upland	883*	1426	1806
	Pima	1079	1596	2104
Gila Bend	Upland	967	1817	2137
	Pima	967	1817	2137

*Integrated heat units calculated with a 86/55 threshold.

Table 5. Cotton lint yields taken from both Upland and Pima PIX experiments at Yuma, AZ, Sept. 28 and Oct. 27, 1988, respectively.

<u>Treatment</u>	<u>Upland</u> -----lbs lint acre ⁻¹ -----	<u>Pima</u>
1	1711 A	1116 A
2	1659 AB	993 BC
3	1641 BC	993 BC
4	1620 BC	984 BC
5	1615 BC	908 C
6	1585 C	1017 ABC
7	1589 C	1026 AB
LSD _{0.05}	68	112

*Means followed by the same letter are not significantly different at the 0.05 probability level according to pairwise comparisons using a Fisher's LSD.

Table 6. Cotton lint yields taken from both Upland and Pima PIX experiments at Gila Bend, AZ Nov. 5, 1988.

<u>Treatment</u>	<u>Upland</u> -----lbs lint acre ⁻¹ -----	<u>Pima</u>
1	1475 A*	917 A
2	1501 A	1017 A
3	1409 B	1010 A
4	1523 A	972 A
5	1513 A	939 A
6	1516 A	955 A
7	1499 A	880 A
LSD _{0.05}	62	NS

*Means followed by the same letter are not significantly different at the 0.05 probability level according to pairwise comparisons using a Fisher's LSD.

Table 7. Mean values from Yuma, AZ Upland experiment taken August 8, 1988.

<u>Treatment</u>	<u>Mainstem Plant Height</u> - inches -	<u>No. of Nodes plant⁻¹</u>	<u>Pre-fruit Nodes</u>
1	40	29	6
2	37	28	6
3	38	31	7
4	35	26	6
5	37	29	6
6	38	32	7
7	39	30	6

Table 8. Mean values from Yuma, AZ Pima experiment taken Sept. 8, 1988.

<u>Treatment</u>	<u>Plant Height</u> - inches -	<u>Mainstem Nodes plant⁻¹</u>	<u>No. of Pre-fruit Nodes</u>
1	43	24	6
2	39	25	6
3	34	22	8
4	37	30	7
5	40	29	7
6	42	25	6
7	41	28	6

Table 9. Mean values from Gila Bend, AZ Pima experiment taken Sept. 19, 1988.

<u>Treatment</u>	<u>Plant Height</u> - inches -	<u>Mainstem</u> <u>Nodes plant⁻¹</u>	<u>No. of</u> <u>Pre-fruit Nodes</u>
1	52	29	8
2	57	30	8
3	56	30	8
4	57	32	9
5	58	29	7
6	61	32	8
7	67	36	8

Table 10. Mean values from Gila Bend, AZ PIX Upland experiment taken Sept. 19, 1988.

<u>Treatment</u>	<u>Plant Height</u> - inches -	<u>Mainstem</u> <u>Nodes plant⁻¹</u>	<u>No. of</u> <u>Pre-fruit Nodes</u>
1	57	32	7
2	49	29	7
3	46	29	7
4	57	29	8
5	54	30	7
6	48	30	8
7	46	30	8
LSD _{0.05}	NS	NS	NS