

# A Study of PIX Rates across CaZn and Triggrr on Long And Short Staple Cotton, Safford Agricultural Center, 1989

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## ABSTRACT

*A four-by-four factorial experiment was performed on the Safford Agricultural Center to determine if CaZn, Foliar Triggrr or Soil Triggrr would cause increases in lint yields on short or long staple cotton. Four levels of PIX were used to see if there would be any interaction between PIX and the other materials. The results in 1989 showed that CaZn and the Triggrr products did not increase yields, the levels of PIX did not increase yields and there was no interaction between them. Very favorable weather conditions and good crop management kept plants from growing vegetative and prevented crop stress, thus reducing the opportunity for the plant growth regulators to increase yields. Yields were excellent with over 1700 and 1600 pounds of lint per acre for short and long staple cotton, respectively.*

## INTRODUCTION

Frequently, questions are asked about the efficacy of different micronutrients and plant growth regulators. Research done recently on zinc at the lower elevations in the state (1,2,3) reported no increases in yield due to foliar nor soil applications of zinc. Part of this test was to see if the same results would be found in our location. Similarly, studies have been done on different cytokinin-containing products; the question being addressed in this experiment is, "Will the Triggrr products increase yields?" Different levels of PIX were applied across the other treatments to see if any interactions would occur.

## MATERIALS AND METHODS

An experiment was established on the Safford Agricultural Center with short and long staple cotton to observe the effects on plant growth and yield with a four-by-four factorial experiment involving three levels of PIX plus a check, and two materials containing cytokinins, a foliar micronutrient and a check. An additional treatment was added to include one level of PIX and each of the cytokinin and micronutrient treatments. The treatments applied are listed in Table 1. Small plots were utilized with four replications in each treatment. Delta Pine 90 and S-6 were the two varieties used in the test. The following crop history indicates how the experiment was implemented.

Soil type: Pima clay loam

Previous crop: Cotton

Planting Date: 4, 17 April 1989 for long and short staple, respectively

Planting Rate: 25 pounds per acre in 36-inch rows

Herbicide: Trillin and Cotton Pro

Fertilizer: 300 lbs/ac 16-20-0 preplant, 90 lb/ac N 16 June

Irrigation: Watered up and furrow irrigated six times

Insecticides: Four applications of pyrethroids

Harvest: First pick: 30 October, 3 November; short, long staple

Second pick: 20 November

Heat units during the season (86°/55°): 3776

Table 1. Treatments and Rates used in the Factorial PIX by Cytokinin plus Micronutrient Experiments at the Safford Agricultural Center, 1989.

Treatment	PIX <sup>a</sup>	Other
1	0	0
2	0	CaZn <sup>b</sup>
3	0	Foliar Triggrr <sup>c</sup>
4	0	Soil Triggrr <sup>d</sup>
5	1/4	0
6	1/4	CaZn
7	1/4	Foliar Triggrr
8	1/4	Soil Triggrr
9	1/2	0
10	1/2	CaZn
11	1/2	Foliar Triggrr
12	1/2	Soil Triggrr
13	1	0
14	1	CaZn
15	1	Foliar Triggrr
16	1	Soil Triggrr
17	1/2	CaZn + Foliar Triggrr + Soil Triggrr

a. PIX in pints per acre applied at early bloom ( July 7th).

b. CaZn was applied at the rate of 2 quarts per acre as a foliar spray in 20 gallons of water on the 6th and 21st of July.

c. Foliar Triggrr was applied at a rate of 8 ounces per acre in 20 gallons of water as a foliar spray on the 6th of July.

d. Soil Triggrr was applied at a rate of 8 ounces per acre in 20 gallons of water, directly on the soil on July 13th, and then tilled into the soil with a rolling cultivator.

Plots were harvested with a two-row cotton picker modified for small plot work. Each plot was caught in a large mesh bag and weighed individually.

## RESULTS AND DISCUSSION

### *Short Staple Cotton*

Table 2. Plant Characteristics of Short Staple Cotton on July 14th, Seven Days after the Second Application of PIX.

Treatment	Blossoms per 8'	Bolls per 8'	Plant Height
1	21.5 abc*	22.3 abc	15.3 a
2	20.5 abcd	24.7 a	15.3 a
3	19.3 abcd	21.7 abc	15.7 a
4	22.5 ab	23.7 a	16.3 a
5	20.5 abcd	2.0 abc	17.0 a
6	17.0 d	19.7 c	16.0 a
7	20.0 abcd	22.5 abc	15.8 a
8	21.5 abc	24.7 a	16.5 a
9	21.0 abcd	22.3 abc	15.8 a
10	17.0 cd	20.0 bc	15.5 a
11	18.5 bcd	23.3 a	16.0 a
12	24.0 a	23.7 a	16.3 a
13	20.5 abcd	22.7 abc	16.3 a
14	20.7 abcd	23.0 ab	16.8 a
15	20.5 abcd	21.7 abc	16.5 a
16	23.0 ab	24.7 a	15.3 a
17	20.0 abcd	22.3 abc	16.3 a
Mean	20.4	22.6	16.0
LSD (05)	2.68	2.81	1.36
All PIX, 0 Other	20.9	22.3	16.1
All PIX, CaZn	18.8	21.9	15.9
All PIX, Trig F	19.6	22.3	16.0
All PIX, Trig S	22.8	24.2	16.1
0 PIX, All other	21.0	23.1	15.7
1/4 PIX, All other	19.8	22.2	16.3
1/2 PIX, All other	20.1	22.3	15.9
1 PIX, All other	21.1	23.0	16.2

\* Values followed by the same letter are not significantly different at the 5% level using the Student-Newman-Keuls test.

A correlation analysis on this data indicated a highly significant correlation between the number of bolls and the number of blossoms, but no such relationship between either of these variables and the plant height. Treatments 6 and 10 had the lowest number of bolls and blossoms of all the treatments and the CaZn treatment across all PIX treatments had the lowest values of all three variables. Triggrr applied to the soil had the highest values of the variables measured.

Table 3. Yield and Plant Characteristics of Short Staple Cotton Treated with Applications of PIX across CaZn, Foliar Triggrr and Soil Triggrr on the Safford Agricultural Center, 1989.

Treatment		Lint <sup>a</sup> Yield	Percent 1st Pick	Plant Height <sup>b</sup>
PIX	Other			
0	0	1726.6 a <sup>c</sup>	91.2 a	32.6 a
0	CaZn	1663.1 a	91.5 a	31.4 a
0	Trig F	1697.4 a	90.9 a	32.5 a
0	Trig S	1758.4 a	91.6 a	35.3 a
1/4	0	1716.5 a	88.4 a	34.4 a
1/4	CaZn	1599.6 a	91.6 a	31.3 a
1/4	Trig F	1541.1 a	89.2 a	33.2 a
1/4	Trig S	1663.1 a	91.7 a	33.3 a
1/2	0	1630.1 a	90.3 a	33.8 a
1/2	CaZn	1766.0 a	90.8 a	35.0 a
1/2	Trig F	1630.1 a	91.1 a	32.3 a
1/2	Trig S	1702.5 a	91.1 a	32.3 a
1	0	1739.3 a	90.6 a	33.0 a
1	CaZn	1693.6 a	91.1 a	30.7 a
1	Trig F	1760.9 a	91.0 a	34.6 a
1	Trig S	1719.0 a	89.6 a	31.4 a
1/2	All	1767.3 a	91.8 a	32.6 a
Average		1692.6	90.8	32.9
LSD 05		148.4	2.2	3.1
All PIX, 0 other		1703.1	90.1	33.4
All PIX, CaZn		1680.6	91.3	32.1
All PIX, Trig F		1657.4	90.5	33.1
All PIX, Trig S		1710.7	91.0	33.1
0 PIX, All other		1711.4	91.3	32.9
1/4 PIX, All other		1630.1	90.2	33.1
1/2 PIX, All other		1682.2	90.8	33.3
1 PIX, All other		1728.2	90.6	32.4

a. Lint yields are in pounds per acre

b. Plant heights are in inches

c. Values within a column followed by the same letter are not significantly different at the 5% level using the Student-Newman-Keuls test.

There were no significant differences among any of the treatments, but the highest yield was achieved by Treatment 17, which had the 1/2-pint rate of PIX and CaZn and both Foliar Triggrr formulations. Within the PIX treatments, the check and the 1-pint rate seemed to have an advantage that would go along with the research done previously in Graham County (5). Within the other treatments, the check and the Soil Triggrr seemed to have an advantage. This seemed to tie in with the data shown in Table 2.

## Long Staple Cotton

Table 4. Plant Characteristics of Long Staple Cotton on July 14th, Seven Days after the Second Application of PIX.

Treatment	Blossoms per 8'	Bolls per 8'	Plant Height
1	21.5	22.8	25.8
2	21.5	22.0	25.3
3	22.0	24.5	26.0
4	21.3	23.5	24.8
5	21.5	23.5	26.3
6	23.5	25.3	25.8
7	21.3	24.0	26.8
8	22.0	24.8	25.0
9	18.5	20.3	25.5
10	22.8	26.0	
11	23.8	25.5	
12	22.8	24.0	23.3
13	21.5	25.0	
14	21.5	24.3	
15	23.0	25.5	
16	24.3	26.3	
17	23.3	25.0	
Mean	22.1	23.9	25.4
LSD (05)	3.31ns	3.39ns	2.11ns
All PIX, 0 other	20.8	2.7	25.7
All PIX, CaZn	22.3	23.8	25.4
All PIX, Trig F	23.1	24.4	26.0
All PIX, Trig S	22.6	24.3	24.9
0 PIX, All other	21.6	23.2	25.5
1/4 PIX, All other	22.1	24.4	26.0
1/2 PIX, All other	22.0	23.5	25.1
1 PIX, All other	22.6	24.1	25.3

There were no significant differences between any of the variables measured. A correlation analysis done on the data indicated a highly significant positive correlation between the number of bolls and the number of blossoms, and a weak negative relationship between both of these variables and the plant height. Isolating the treatments, there was a correlation ( $r^2 = -.92$ ) between plant height and both bolls and blossoms on Treatment 1 at the 8% level of confidence.

Table 5. Yield and Plant Characteristics of Long Staple Cotton Treated with Applications of PIX across CaZn, Foliar Triggrr and Soil Triggrr on the Safford Agricultural Center, 1989.

Treatment	Lint <sup>a</sup> Yield	Percent 1st Pick	Plant Height <sup>b</sup>
PIX			
0	Other		
0	0	1533.3 ab <sup>c</sup>	86.6 a
0	CaZn	1633.2 ab	88.3 a
0	Trig F	1582.1 ab	87.5 a
0	Trig S	1445.0 ab	88.1 a
1/4	0	1593.7 ab	85.4 a
1/4	CaZn	1485.7 ab	85.9 a
1/4	Trig F	1522.9 ab	87.8 a
1/4	Trig S	1541.5 ab	86.8 a
1/2	0	1599.5 ab	87.6 a
1/2	CaZn	1617.0 ab	87.5 a
1/2	Trig F	1549.6 ab	86.5 a
1/2	Trig S	1485.7 ab	87.8 a
1	0	1723.8 a	86.4 a
1	CaZn	1582.1 ab	87.2 a
1	Trig F	1506.6 ab	88.8 a
1	Trig S	1421.8 b	86.4 a
1/2	All	1551.9 ab	86.5 a
	Average	1551.5	87.2
	LSD 05	162.8	3.3
	All PIX, 0 other	1612.6 a	86.5 a
	All PIX, CaZn	1579.5 a	87.2 a
	All PIX, Trig F	1540.3 ab	87.7 a
	All PIX, Trig S	1473.5 b	87.3 a
	0 PIX, All other	1548.4 a	87.6 a
	1/4 PIX, All other	1535.9 a	86.5 a
	1/2 PIX, All other	1562.9 a	87.4 a
	1 PIX, All other	1558.6 a	87.2 a

a. Lint yields are in pounds per acre

b. Plant heights are in inches

c. Values within a column followed by the same letter are not significantly different at the 5% level using the Student-Newman-Keuls test.

In the case of long staple cotton, the highest yielding treatment was Treatment 13 with 1 pint of PIX and nothing else, but this treatment was only significantly higher than Treatment 16 with 1 pint of PIX and Soil Triggrr. There were no differences between PIX treatments and across the other treatments, however, there were differences between the other treatments and across PIX treatments. Soil Triggrr across PIX yielded significantly less than the check and CaZn treatments. This went against the trend seen in the short staple plots, where Soil Triggrr looked like it may have helped the yield. The difference here may be more because of the stage of growth of the cotton than the type of cotton. At the application time the long staple cotton was much taller than the short staple and probably in a different stage of physiological growth.

## CONCLUSIONS

No positive increases in yield were seen by the use of PIX, CaZn nor the Triggrr products in this experiment, or was there any interaction between the treatments. The high number of heat units early in the season and over all favorable climatic conditions caused both short and long staple cotton to set fruit loads early, limiting their vegetative growth, so PIX was not needed. Also, the crop was managed in a manner to minimize plant stress, limiting the need for cytokinins. Apparently, Zn was not a limiting factor in the production either.

## REFERENCES

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