

## COMPARISONS OF PETIOLE NITROGEN CONTENT FOR PIX TREATMENTS

Joe Townsend and John McKee

Precision Cotton Testing

Coahoma, MS

The test described in this paper was conducted by Joe Townsend of Townsend Ag. Consulting, Inc. and Mr. John McKee of Westside Farms located in Friars Point Mississippi. The test was conducted with funds supplied by BASF Corporation, who also supplied the test protocol and the chemicals used. This is the first paper on the work done by Precision Cotton Testing.

### Abstract

A test was conducted during the 1999 growing season on Westside farms of Friars Point, Mississippi, by Precision Cotton Testing. The test was an attempt to measure the relative efficacy of Pix Plus and BAS 130-01 in relation to plant growth and yield of cotton as compared to a Pix standard treatment. There were 12 replicates of 12 row plots approximately 700 feet long. Pix, Pix Plus, and BAS 130-01 were applied three times to the cotton beginning at the 11<sup>th</sup> main stem node. Equal amounts of each product were applied to reach a combined total of 36.4 ounces per acre. The cotton was measured for plant height three times. The height at the third measurement was Pix 36.94 inches, Pix Plus 36.14 inches, and the BAS 130-01 at 38.72 inches. The results of plant sap nitrate analysis showed an average across 6 sampling dates of 5,753.5 PPM nitrate in the Pix standard, 7,800 PPM in the Pix Plus, and 6,878 PPM in the BAS 130-01 treatment. Pix Plus and BAS 130-01 both showing more stored nitrate than the Pix standard. Yield was taken with a cotton yield monitor, and yield maps made. Although somewhat inconclusive the BAS 130-01, and the Pix Plus both out yielded the Pix standard.

### Introduction

Mepiquat Chloride or Pix has long been used in the Delta area of Mississippi to control cotton plant height and promote an earlier harvest. A test was conducted to compare the efficacy of Pix, Pix Plus, and BAS 130-01 under field conditions during the 1999 growing season. The test was conducted on the Westside Farms of Friars Point, Mississippi. The cotton variety was Stoneville BXN47, planted on May 10. There was 100 lbs. of nitrogen applied pre-plant to the cotton. Seedling emergence was good to excellent. Early Growth was good. Excessive rain was received on the farm early during the growing season. May rain was 11 inches, and June rain was 12 inches. The rains quit after July 3, and

the cotton was furrow irrigated twice, on July 23, and on August 11. The early rains combined with good light and heat caused the plants to grow very vigorously until cut out. This caused the Pix need to be greater than normal. The cotton was planted on a leveled field with a high yield history, as well as a high use rate for Pix.

### Materials and Methods

The field plot design was 12 replicates of 16 rows of 40-inch cotton per treatment as is shown in Table 1. Rows were approximately 700 feet in length. The rates of the Pix, Pix Plus and BAS 130-01 were constant across all treatments. Treatments were applied with a John Deere Hy Cycle applying 10 gallons of spray per acre. No spray additives were used. The first application was made on June 16. The second was on July 3, and the third on July 14. The first application was nine ounces per acre, the second was eight ounces per acre, and the third was 9.4 ounces per acre, giving a total of 26.4 ounces per acre. At the time of the first application the cotton was at 11 main stem nodes, and was approximately 15 inches tall. Plant height measurements were taken on June 24, July 7, and July 23. Ten plants were measured at three locations per plot.

Plant sap nitrate was monitored with a Horiba Cardy Ion Meter in the field on six dates. Petioles were removed from random plants in each treatment from the fourth node down from the terminal, the plant sap removed with a garlic press, and the liquid measured. The dates were July 11, 13 and 25, and August 3, 10, and 13. Due to very rapid nitrate decline in the plant sap 200 pounds per acre of ammonium sulfate was applied on July 26. At this time the cotton plants were at approximately 22 nodes, with fruiting sites on 14 nodes. It was determined that on a farm wide basis the nitrate would be depleted within 10 days, and that much of the remaining squares and blooms would abort and the cotton cut out. Applying this much nitrogen this late was an attempt to make the highest possible yield.

The cotton was defoliated on September 14. At the time of defoliation there were many green bolls in the field, and one pound per acre of Prep was applied with the defoliant. The cotton was picked on October 5. Two John Deere four row cotton pickers were used to harvest the field. One of the pickers was equipped with a Zycom/Agri-plan 700 yield monitor, which picked every other four rows. Yield maps were made of the picking, and were analyzed with Agri-plan 2.1.2 and SS Toolbox software.

### Results and Discussion

Plant height measurements are given in Table 1. On June 24 the cotton averaged 14.6 inches tall. By July 7 the Pix treatment averaged 32.25 inches, the Pix Plus 34.45 inches,

and the BAS 130-01 was 37.48 inches. On this date the Pix Plus plants were 7% taller than the Pix treatment and the BAS 130-01 plants were 14% taller than the Pix plants. On July 23 the Pix treated cotton was 36.94 inches tall, the Pix Plus 36.14, and the Mepiquat bromide was 38.72 inches tall. By this time the Pix Plus cotton was three per cent shorter than the Pix treated cotton, and the BAS 130-01 treated cotton was 5% taller than the Pix standard.

Plant sap nitrate or petiole testing results are shown in Table 2. The data showed the Pix Plus having significantly more stored nitrate at almost every site tested, regardless of date. The numbers shown in Table 2 are somewhat misleading in that the test kit will only measures to 10,000 PPM nitrate, and on several dates the Pix Plus readings were greater than 10,000 PPM. A figure of 10,000 PPM was used in the instances when this occurred which tended to reduce the differences between treatments somewhat.

The nitrate testing shows that the Pix Plus and the BAS130-01 both had more stored nitrate than did the Pix standard. The means for all the tests run shows Pix with a mean nitrate of 5,753.5 PPM, the Pix Plus at 7,800 PPM, and the BAS 130-01 at 6,878 PPM. The Pix standard showed 26% less nitrate than did the Pix Plus, and the BAS 130-01 had 12% less nitrate. Apparently the Bacillus cerus portion of Pix Plus in some way allowed the cotton to store more nitrate. This might be part of the reason for the increased yields reported for Pix Plus in the past. As cotton growth was less affected by the BAS 130-01 treatment early in the season it could have allowed the leaves to store more nitrate. It is my belief that leaf size should have been measured in this test to determine whether nitrate storage could have been a function of leaf size. Visual observation did not show a significant leaf size difference. However, At time of defoliation it was noted that the Pix Plus and the BAS 130-01 treatments had more green bolls at the top of the plants. Also, there does seem to be a relationship between nitrate and yield in this test.

Yield maps were drawn with the appropriate software, and yields determined. Yield was determined for the entire test, and for approximately 90% of the test field. The rows were shortened on both ends to take out variation due to water standing on the low side of the field from the two irrigations. This was done in an attempt to take out variations in yield which were not influenced by the treatments. Yields are expressed as bales per acre. This was done by taking the farm average gin turn-out for all the BXN 47 cotton. The figure used was 1,400 lbs. of seed cotton equaled a 500 lb. bale of cotton. Yield is given by the yield monitor as flow per 2 seconds, with the distance and location determined by the GPS unit. The corrected yield was 1.899552 bales per acre or 2,659.37 lbs. of seed cotton per acre for the Pix standard, 1.909931 bales per acre or 2,673.90 lbs. seed cotton for the Pix Plus treatment, and 1.903936 bales per acre or

2,665.51 lbs. seed cotton per acre for the BAS 130-01 treatment. This is a 1.8% lower yield for the Pix standard than for the Pix standard, and 0.1% more yield for the Pix Plus than for the BAS 130-01 treatment. The number of yield points having various yields, and the subsequent per cent of the total yield is given in Table 3. The uncorrected yield data was 1.78 bales per acre for the Pix standard, 1.84 bales per acre for the Pix Plus, and 1.86 bales per acre for the BAS 130-01. In this case the Pix standard was 7% less in yield than the BAS130-01. Yield from the Pix Plus was 3.3% less than the BAS 130-01.

The advantages of harvesting with a yield monitor are many, but it often poses more questions which should be addressed and tend to cloud the data somewhat. However, the Pix Plus and the BAS 130-01 both showed a yield advantage over the Pix standard.

In conclusion it appears that in the not too distant future BAS 130-01 will hopefully be available for cotton producers. Rates and timing will probably need to be changed from current trends to make this product perform as needed. Also, Pix Plus shows promise as a product to enhance plant growth, and allow cotton plants to store more nitrogen than a program using only Pix.

Table 1. Summary of Plant Height (inches)

	Pix	Pix Plus	Pix Ultra
24 June	14.67	14.45	14.85
7 July	32.25	34.45	37.48
23 July	36.94	36.14	38.72

Table 2. Petiole Nitrate (PPM)

	Pix	Pix Plus	BAS 130-01
11 July	6967	9834	7200
18 July	3767	6567	5167
25 July	2700	4900	5000
4 Aug	8367	10000	9300
10 Aug	7500	9700	9000
13 Aug	5220	5800	5600

Table 3. Number of Yield Points at Various Yields from the Yield Monitor Maps.

Bales/ac	Pix		Pix Plus		BAS 130-01	
	No.	% of	No.	% of	No.	% of
1-1.49	105	8	108	8	105	8
1.5-1.99	669	53	666	52	726	56
2-2.49	468	37	491	39	438	34
2.5 plus	15	1.2	10	.08	18	1.4
Totals	1257		1275		1287	