EFFECTS OF VARIOUS RATES AND APPLICATION TIMINGS OF PENTIA® (PGR) ON MULTIPLE COTTON VARIETIES

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Abstract

A trial was conducted to compare the effects of several cotton varieties to multiple rates and application timings of Pentia® (plant growth regulator) in the south-central Brazos River bottom region of Texas. Pentia® is one of many commercial plant growth regulators that have been commercially available for many years. In this day and age, when new varieties are introduced every year and in general, only have a short life span, it is relatively easy to mis-manage PGRs due to lack of experience in using the PGRs on the specific varieties under a giving set of environmental conditions. Some varieties respond greater to PGRs than others and thus improper PGR application rates can have detrimental effects on individual varieties from applying too little or too much giving the variety and growing conditions. So direct comparisons of responses of individual varieties to PGRs, such as Pentia®, can generate valuable information for growers, thus allowing them to make more intelligent management decisions such as proper use rates and application timings of PGRs. This study looks at a set of relatively new commercial and some pre-commercial varieties of cotton and the effects PGR management can have on them.

Introduction

A trial was established to evaluate the effects of various PGR management strategies have upon four newer commercial verities grown in the lower Brazos river bottom of Texas.

Materials and Methods

Four commercial/pre-commercial cotton varieties from BASF, BX 1972 GLTP, BX 1974 GLTP, FM 1953 GLTP, and ST 5471 GLTP, were planted on Apr 26, 2018. Plots were 4 rows (40 inch spacing) x 40 ft in a RCBD. The field received 13.5 in of rainfall during the growing season and supplemental irrigation was applied 5 times with approx. 1 in of irrigation via a linear sprinkler system, at each watering during the fruiting period as needed. Soil type consisted of Weswood silty clay loam.

Three PGR management treatments were compared, (1) no PGR, (2) 3 sequential application of Pentia® at 6 oz each or (3) 6 oz fb 2, 12 oz treatments, respectively. The application timing were at MHSQ, first bloom and mid bloom, May 25, June 11 and June 25, respectively. NAWF were collected from 10 plants per plot with first position white blooms on July 13 and July 27. Plant height and total nodes were obtained on Aug 24, prior to application of any harvest aids. On August 30, Dropp @ 3oz + Folex @ 6 oz + Ethephon @ 21 oz was applied fb a Sept 12 app of Folex @ 6 oz + Sharpen @ 1 zo + MSO @ 1% v/v + AMS @ 15 lbs/100 gal. The plots were harvested on Sept 20, 2018.

Results and Discussion

There were differences in mean NAWF on the July 13 observation date but not on July 27. In general, NAWF were greatest on July 13 on the plots that did not receive any applications of PGRs (Table 1). The difference in NAWF occurred amongst individual varieties between the non-PGR treated plots and the treated plots. In addition, as expected, plant height was significantly affected by PGR treatments, with the treatments that received a greater amounts of PGR general having shorter plant heights.

Mean yield was significantly affected by PRG treatments within individual varieties (Table 2). In general, the higher PGR-treated plots yielded less than the non-treated PGR plots. BX 1972 GLTP responded the greatest between the treated and non-treated PGR plots. Percent turnout was affected by PGR treatments amongst two of the varieties, BX 1974 GLTP and ST 5471 GLTP. Loan value was not affected by the PRG treatments. The PGR treatments did affect mean lint value/Acre on two varieties. BX 1972 GLTP and BX 1974 GLTP both were negatively affected by the PGR treatments compared to the non-treated PGR plots.

Table 1. Mean NAWF, Plant Height and Total Nodes.

Variety	Pentia® Rates	NAWF Jul 13		NAWF Jul 27		Plant Height (in)		Total Nodes	
BX 1972 GLTP	none	4.6	a	2.6	a	36.2	abc	18.5	de
BX 1972 GLTP	6 oz (3X)	3.5	d	2.7	a	34.5	bcd	22.2	a
BX 1972 GLTP	6 oz, 12 oz (2X)	4.0	a-d	2.6	a	31.3	de	19.7	b
BX 1974 GLTP	none	4.4	ab	2.8	a	39.6	a	18.9	cd
BX 1974 GLTP	6 oz (3X)	3.6	d	2.4	a	33.8	cd	19.9	b
BX 1974 GLTP	6 oz, 12 oz (2X)	3.5	d	2.7	a	30.0	e	19.5	bc
FM 1953 GLTP	none	4.3	abc	2.9	a	31.0	de	19.7	b
FM 1953 GLTP	6 oz (3X)	3.7	cd	2.5	a	30.1	e	18.0	e
FM 1953 GLTP	6 oz, 12 oz (2X)	3.5	d	2.5	a	29.7	e	19.8	b
ST 5471 GLTP	none	4.5	ab	2.9	a	37.8	ab	22.3	a
ST 5471 GLTP	6 oz (3X)	3.7	cd	2.3	a	33.0	cde	19.5	bc
ST 5471 GLTP	6 oz, 12 oz (2X)	3.8	bcd	2.5	a	29.7	e	18.9	cd
Mean		3.9		2.6		33.1		19.7	
Treatment Prob(F)		0.0365		0.4518		0.0002		0.0001	
LSD P=.10		0.68		0.44		3.66		0.68	
Standard Deviation		0.56		0.37		3.06		0.57	
CV		14.39		14.05		9.26		2.89	

From a fiber quality standpoint, mean micronaire was not significantly affected by PGR rates within a variety, although for some varieties, there was a trend for higher micronaire values amongst treatments that received amounts of Pentia® (Table 3). PGR rates did affect mean staple length of two varieties, BX 1972 GLTP where the higher PGR treatments led to greater staple lengths and FM 1953 GLTP in which higher PGR rates led to lower staple length. There were no differences in mean strength or uniformity between treatments.

Table 2. Mean Yield, Turnout, Loan and Lint Value.

Variety	Pentia® Rates	Yield (lbs/A)		Turnout %		Loan Value (Cents/lb)		Lint Value ($/Ac)	
BX 1972 GLTP	none	1659	ab	39.7	ef	54.33	a	901	ab
BX 1972 GLTP	6 oz (3X)	1424	f	38.5	g	54.45	a	775	f
BX 1972 GLTP	6 oz, 12 oz (2X)	1415	f	39.2	fg	54.46	a	770	f
BX 1974 GLTP	none	1709	a	46.6	a	54.26	a	927	a
BX 1974 GLTP	6 oz (3X)	1498	de	44.8	b	54.40	a	815	de
BX 1974 GLTP	6 oz, 12 oz (2X)	1497	de	43.9	b	54.40	a	814	de
FM 1953 GLTP	none	1489	e	39.8	ef	54.51	a	812	de
FM 1953 GLTP	6 oz (3X)	1458	ef	39.9	ef	54.41	a	794	ef
FM 1953 GLTP	6 oz, 12 oz (2X)	1452	ef	39.7	ef	54.49	a	791	ef
ST 5471 GLTP	none	1602	bc	41.6	c	54.53	a	873	bc
ST 5471 GLTP	6 oz (3X)	1551	cd	41.1	cd	54.40	a	844	cd
ST 5471 GLTP	6 oz, 12 oz (2X)	1596	c	40.5	de	54.35	a	868	bc
Mean		1529		41.3		54.42		832	
Treatment Prob(F)		0.0001		0.0001		0.6265		0.0001	
LSD P=.10		62.22		0.952		0.2064		33.54	
Standard Deviation		51.99		0.795		0.1725		28.03	
CV		3.4		1.93		0.32		3.37	

Table 3. Mean Yield, Turnout, Loan and Lint Value.

Variety	Pentia® Rates	Mike		Length		Strength		Uniformity	
BX 1972 GLTP	none	4.0	e	1.21	d	30.1	a	83.2	a
BX 1972 GLTP	6 oz (3X)	4.0	e	1.23	bc	30.9	a	84.0	a
BX 1972 GLTP	6 oz, 12 oz (2X)	4.2	cde	1.23	bc	30.3	a	84.2	a
BX 1974 GLTP	none	4.5	ab	1.20	de	30.1	a	83.1	a
BX 1974 GLTP	6 oz (3X)	4.5	ab	1.21	cd	30.7	a	84.1	a
BX 1974 GLTP	6 oz, 12 oz (2X)	4.5	ab	1.21	cd	30.8	a	84.3	a
FM 1953 GLTP	none	4.1	de	1.26	a	30.8	a	84.1	a
FM 1953 GLTP	6 oz (3X)	4.3	bcd	1.24	b	30.9	a	84.0	a
FM 1953 GLTP	6 oz, 12 oz (2X)	4.2	cde	1.23	bc	31.2	a	83.9	a
ST 5471 GLTP	none	4.4	bc	1.20	de	31.9	a	84.3	a
ST 5471 GLTP	6 oz (3X)	4.5	ab	1.20	de	31.2	a	83.3	a
ST 5471 GLTP	6 oz, 12 oz (2X)	4.7	a	1.18	e	31.6	a	83.1	a
Mean		4.3		1.22		30.9		83.8	
Treatment Prob(F)		0.0001		0.0001		0.1376		0.253	
LSD P=.10		0.2418		0.0214		1.063		0.971	
Standard Deviation		0.202		0.0179		0.889		0.811	
CV		4.68		1.47		2.88		0.97	

Summary

As expected, three of the four varieties showed a significant response to Pentia®, the one exception was FM 1953 GLTP. It should also be noted that FM 1953 GLTP was generally the lowest yielding variety in this trial. Mean lint yield and mean lint value per acer was affected in two of the varieties, BX 1972GLTP and BX 1974 GLTP. There was no consistent trend from the Pentia® treatments amongst each variety in relation to main fiber characteristics that were compared.

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