EFFICACY AND AGRONOMIC IMPACTS OF COMMERCIALLY AVAILABLE PLANT GROWTH REGULATORS ACROSS THE COTTON BELT

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Abstract

Cotton is a subtropical, perennial plant with an indeterminate growth habit. Vegetative and reproduction growth occur simultaneously; however, excessive vegetative growth can have detrimental effects on cotton. Excessive vegetative growth can lead to problems such as increased fruit abortion, delayed crop maturity, and yield reductions. Excessive vegetative growth in cotton is controlled through applications of plant growth regulators (PGR). Agricultural research with PGRs began in the 1930s; however, the introduction of Pix® in 1980 brought PGRs into cotton production. Extensive previous research exists on the effects of PGR application on cotton. Previous research regarding PGR effects on fiber quality indicate that no differences in fiber quality were observed after application of several commercially PGR products. Yield responses have been very inconsistent. Research is available showing increased, decreased, and no yield effects due to PGR applications. Generally speaking, PGR applications are likely to be beneficial when fruit retention is reduced and excessive vegetative growth is present. However, PGR applications can be detrimental when applied in excess amounts or when applied to stressed cotton. This study was initiated to quantify the effect of PGR application on cotton plant height, lint yield, and fiber quality in eleven states across the Cotton Belt.

Experiments were conducted in Alabama, Arkansas, Arizona, Georgia, Louisiana, North Carolina, Oklahoma, South Carolina, Tennessee, Texas (2 locations), and Virginia. With the exception of one location in Texas, all experiments were conducted as small plot research. The following PGRs were evaluated: Mepex®, Mepex Gin Out®, Pentia™ and Stance™. Application rates and timings are given in Table 1. 'FiberMax 9063 B2RF' was planted at both locations in Texas; 'Delta and Pineland 117 B2RF' was planted in North Carolina, Tennessee, and Virginia; 'Delta and Pineland 555 BGRR' was planted in Alabama, Georgia, and South Carolina, and 'Phytogen 485 WRF' was planted in Arkansas and Louisiana. Seeding rates, planting date, fertility, insect management, weed management, and harvest-aid applications were state-specific and were based on extension recommendations for each state. Data collected included: plant height prior to PGR application, plant height two weeks after initial application and prior to second PGR application, plant height two weeks after second PGR application, and plant height at the end of the growing season. Total mainstem nodes, nodes above cracked boll, lint yield, and fiber quality data were also collected. Data from each state were grouped into regions: the upper southeast region was North Carolina, Tennessee, and Virginia; the lower southeast region was Alabama, Georgia, and South Carolina, the mid-south region was Arkansas and Louisiana, and the southwest region was both Texas locations. No region by PGR treatment interactions were detected; therefore, data were pooled over all regions and will be discussed collectively.

Application of Mepex®, Mepex Gin Out®, Stance™, and Pentia™ resulted in significant plant height reductions two weeks after the matchhead square (MHS) application. Plants treated with PGRs were approximately 27- to 28-inches in height compared to 31-inch plant heights for untreated plants or those treated with Induce®. Similarly, significant plant height reductions due to PGR application were also observed two weeks after the second application as well as at the end of the season. No significant differences in lint yield were observed due to application of PGRs. Fiber quality was also unaffected by application of PGRs. Micronaire, staple, strength, and uniformity were similar for all PGR treatments as well as Induce treatments and the untreated check. Application of PGRs provided no apparent benefit in terms of lint yield or fiber quality in 2007; however, PGR application decisions should be made on a field-by-field basis each growing season.

Table 1. Application rates and timings of plant growth regulators (PGR).

Product[a]	Rate	Application Timing
Mepex fb[b]	8 oz/A	MHS[c]
Mepex	10 oz/A	2 WAIT[d]
Mepex Gin Out fb	8 oz/A	MHS
Mepex Gin Out	10 oz/A	2 WAIT
Stance fb	1.5 oz/A	MHS
Stance	2 oz/A	2 WAIT
Stance fb	2 oz/A	MHS
Stance	3 oz/A	2 WAIT
Pentia fb	8 oz/A	MHS
Pentia	10 oz/A	2 WAIT
Stance fb	2 oz/A	MHS
Stance fb	3 oz/A	2 WAIT
Stance	3 oz/A	NAWF = 5[e]
Induce fb	0.25 % v/v	MHS
Induce	0.25 % v/v	2 WAIT
Untreated		

[a] All PGR treatments included Induce at 0.25% v/v
[b] fb: followed by
[c] MHS: Matchhead square
[d] 2 WAIT: 2 Weeks after initial treatment
[e] NAWF = 5: Nodes above white flower equals five