GROWTH RESPONSES TO RATES AND TIMING OF PLANT GROWTH REGULATORS ON NEW DELTAPINE COTTON VARIETIES

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Introduction

One of the most common methods of controlling excessive vegetative growth in cotton is through the use of plant growth regulators (PGRs). Most PGRs act by reducing the amount of gibberillic acid produced in the plant resulting in a shorter more compact plant (Kerby et all, 1982: Reddy et al., 1990, Hayes, 1993). With the introduction of DP 555 BGRR, growers had to learn to manage cotton with PGRs in a more aggressive manner compared to past varieties. With each year's release of a new class of varieties, there is a need to understand how these new cotton varieties respond to PGRs. Therefore, studies were conducted in 2011 across 3 locations in the Midsouth and Southeast to determine if there were any response differences to PGR rates and timings with regards to plant height of DP 1212 B2RF, DP 1219 B2RF, DP 1252 B2RF, and experimental MON11R159B2RF compared to DP 0912 B2RF.

Materials and Methods

Plant growth regulator studies were conducted at 3 locations across the Midsouth and Southeast in Tchula, MS, Cameron, SC and Maxton, NC. Each location was set up as a one replication mini strip trial. Locations were planted according to the optimum planting dates for that respective region. The plant growth regulator used at each location varied based on local standards. Treatment levels were 1) control 0 oz/A; 2) 4 oz/A early square; 3) 8 oz/A early square; 4) 16 oz/A early square; 5) 4 oz/A early bloom; 6) 8 oz/A early bloom; 7) 16 oz/A early bloom; 8) 8 oz/A early square + 8 oz/A early bloom; 9) 8 oz/A early square + 16 oz/A early bloom; 10) 16 oz/A early square + 16 oz/A early bloom. The cotton varieties used in this study were as follows: DP 0912 B2RF, DP 1212 B2RF, DP 1219 B2RF, DP 1252 B2RF, and experimental MON11R159B2RF. Plant height measurements were recorded from an average of 10 plants per plot at or near cutout for all locations. Analysis was conducted using a strip model design in JMP (SAS Institute Inc., Cary, NC), were as locations were considered as replications. Mean separations were conducted using JMPs LSMeans Differences Student t's at an alpha level 0.05.

Result and Discussion

Variety x Treatment Effects

There was no significant variety x treatment interaction; however, there were numerical differences in plant height among varieties being compared to DP 0912 B2RF. DP 1212 B2RF produced a shorter plant type across all treatments compared to DP 0912 B2RF (Figure 1). DP 1219 B2RF produced a shorter plant across all treatments (similar to DP 1212 B2RF) compared to DP 0912 B2RF with the exception for single early bloom applications of 4 oz/A (Figure 2). DP 0912 B2RF produced a taller plant height compared to DP 1252 B2RF with the untreated and single early square applications of 4 and 8 oz/A and single early bloom applications of 16 oz/A; however, all other treatments were similar (Figure 3). Slightly shorter plants were produced with MON11R159B2RF for all treatments compared to DP 0912 B2RF with exception of a single early bloom application of 4 oz/A and sequential treatments of 8 oz/A early square + 8 oz/A early bloom and 16 oz/A early square + 16 oz/A early bloom (Figure 4).

Treatment Effects

Across all varieties single early bloom applications of 16 oz/A and all sequential treatments significantly decreased plant height compared to early square applications of 4 and 8 oz/A (Figure 5). Plant height numerically decreased from single early square to single early bloom applications for all treatments. Similar effects occurred from single early bloom applications to sequential applications with the exception of 8 oz/A early square followed by 8 oz/A early bloom.

Summary

There were no significant differences between DP 1212 B2RF, DP 1229 B2RF, DP 1252 B2RF, and MON11R159B2RF compared to DP 0912 B2RF across PGR rates and timings. DP 0912 B2RF did produce a numerically taller plant type for most PGR treatments compared to DP 1212 B2RF and DP 1229 B2RF; whereas, small differences were observed for plant height when comparing DP 1252 B2RF and MON11R159B2RF to DP 0912 B2RF. Treatments were significantly different from one another when averaged across varieties. Significant reductions in plant height occurred as PGR rates were delayed until early bloom or when sequential rates were applied at early square followed by early bloom.

References

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Reddy, V. R., O. N. Baker, and H. F. Hodges. 1990. Temperature and mepiquat chloride effects on cotton canopy architecture. Agron. J. 82:190-195.

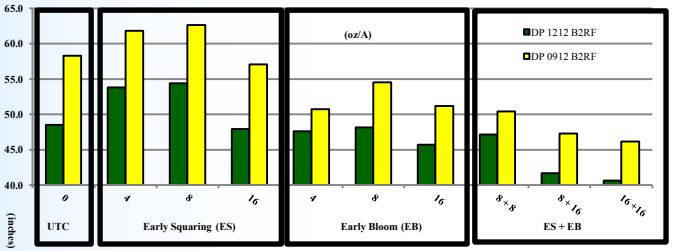

Figure 1. Plant height measurements taken at or near cutout for plant growth regulator treatments comparing DP 1212 B2RF and DP 0912 B2RF.

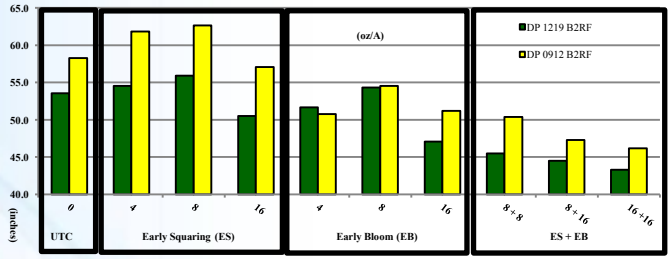

Figure 2. Plant height measurements taken at or near cutout for plant growth regulator treatments comparing DP 1219 B2RF and DP 0912 B2RF.

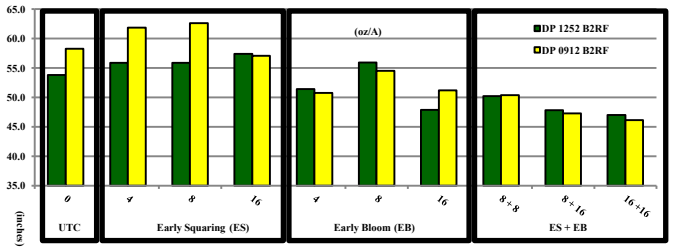

Figure 3. Plant height measurements taken at or near cutout for plant growth regulator treatments comparing DP 1252 B2RF and DP 0912 B2RF.

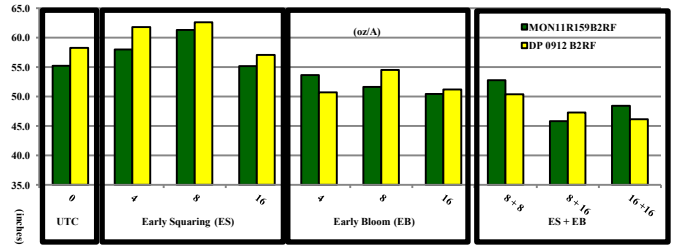

Figure 4. Plant height measurements taken at or near cutout for plant growth regulator treatments comparing MON11R159B2RF and DP 0912 B2RF.

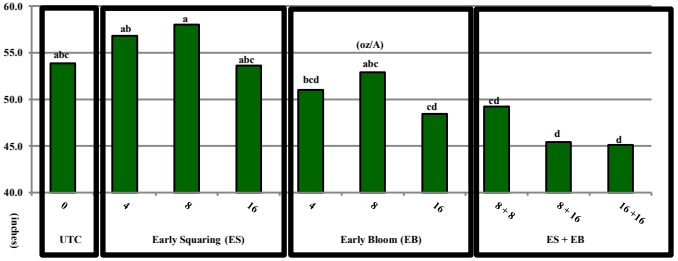

Figure 5. Plant height measurements taken at or near cutout for plant growth regulator treatments averaged across all varieties and locations in 2011.

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