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EVALUATION OF PENTIA™ AS A COTTON PLANT GROWTH REGULATOR ON DP 555 BG/RR

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Abstract

The objective of this experiment was to compare the effects of Mepiquat Chloride (MC), Pix Plus (MC and the bacteria *Bacillus cereus*), and Pentia (mepiquat pentaborate) on a specific cotton (*Gossypium hirsutum* L.) variety – Delta and Pine Land 555 BG/RR (DP 555 BG/RR)- for growth, earliness and yield. Compared with the untreated control, each of the plant growth regulators reduced plant height. Pentia and Pix Plus reached 60% open boll stage earlier and had numerically higher yields compared to the MC treatment or the untreated control.

Introduction

DP 555 BG/RR is a slightly fuller season cotton variety with aggressive growth potential. Consequently, producers are interested in the use of plant growth regulators (PGRs) to control this variety's vegetative growth, enhance its earliness, and possibly increase yields. Mepiquat Chloride (MC) compounds, such as Pix (MC) and Pix Plus have been reported as the most widely used PGR in US cotton production (Zhao et al., 1999), and Pentia (mepiquat pentaborate) has also shown to effectively reduce plant height and earliness (Livingston et al, 1999). Pentia is a relatively new compound formerly tested as BAS130W. Pentia differs from MC in that it has boron on the molecule instead of chloride.

Materials and Methods

Plant Culture

This experiment was conducted on a 38-acre field near Cary, Mississippi in 2002. DP 555BG/RR was planted on April 18, 2002 in a 2X1 narrow-skip pattern. Row spacings were 38 inches with a 64-inch skip. Seed were hill-dropped at a rate of 4 seed per foot of row. All production management decisions were conducted by the grower/cooperator except PGRs. Cotton in this experiment was mechanically harvested on November 18, 2002. The two center rows each of the six-row treatments were harvested. Field was non-irrigated but received 26.44 inches of rainfall from April 18, 2002 through November 18, 2002.

Treatments, Timing, and Rates

The experiment consisted of (1) an untreated control, (2) Mepiquat Choloride (MC), (3) Pix Plus, and (4) Pentia (mepiquat pentaborate) with eight replications of six rows per treatment. The first PGR application was June 24, 2002 at node 11-12 with all the PGRs applied at 8 ounces of product per acre. The first application was washed off by rainfall immediately following the application. (Zhao et al, 1999) PGRs were applied in the second treatment nine days following the initial treatment with all PGRs applied at 8 ounces of product per acre. Two further applications were made at 12 ounces per acre each for all PGRs at intervals of nine and ten days. All applications were applied with a John Deere 6000 Hi-cycle delivering a total volume of 20 gallons per acre.

Evaluation

Each PGR treatment and the untreated control were evaluated for plant height, bolls counts, earliness, total nodes, internode lengths, lint percent, fiber qualities (HVI) and yield.

Results and Discussion

Plant growth regulators benefit cotton by diverting carbohydrates from vegetative to reproductive growth, thereby shortening plant internodes. (Zhao et al., 1999) These products are excellent growth management tools for tall cotton varieties like DP 555 BG/RR. Pentia treated plants were 18.1% shorter than the untreated check, as were Pix Plus and MC treated plants – 13.6% and 13.1% respectively. The untreated cotton plants in this study averaged 55.2 inches in height.

Pentia and MC shortened internode lengths between nodes 11 and 15. Two applications of Pentia provided the greatest amount of internode shortening by 7% and 11% from the preceding internode lengths. MC decreased internode lengths by 2% and 3% at these timings, whereas Pix Plus increased internode lengths by 27% and 7% on these occasions.

All PGRs provided earlier mataurity than the untreated control. At 144 days after planting, Pix Plus and Pentia treated plants had 65.3% and 64.6% open bolls, respectively. MC and the untreated control exhibited 56.9% and 48% open bolls.

PGR treated plants were ready for defoliation by September 18, 2002, however, frequent rains delayed defoliation and subsequent harvest for two months. During this time 16.8 inches of rain fell which was believed to have decreased cotton yield by as much as 20%.

In spite of the delayed harvest, DP 555BG/RR yielded very well. While not statistically significant, Pentia treated plots numerically produced the greatest yield at 1144 pounds lint per acre. Pix Plus, MC and the untreated control yielded 1130, 1086, and 1087 pounds of lint per acre, respectively. No significant differences were indicated in percent lint turnout or other cotton quality or HVI factors.

Conclusion

MC, Pix Plus and Pentia decreased plant height and increased earliness of DP 555 BG/RR compared to the untreated control. Pentia and Pix Plus and treatments averaged 57 lb./acre and 43 lb./acre higher yield than the untreated control, respectively. Lint yields for the MC treatments averaged no different than the untreated control in this experiment. Neither boll counts, percent gin turnout nor HVI data indicated significant differences. Future trails should be conducted to further examine the benefits of Pentia on cotton plant management and earliness. More trials should be conducted to include in a summary across areas and years.

References

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