ECONOMIC ANALYSIS OF VARIABLE RATE IRRIGATION AND REMOTE SENSING TECHNOLOGY IN REGULATING COTTON GROWTH

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Abstract

Irrigation and plant growth regulators (PGRs) affect cotton growth, height, and development. Irrigation increases crop height and slows maturity, while the addition of PGRs, such as mepiquat chloride, decreases crop height and increases maturity. Irrigation and PGR application both increase cotton management costs. We examined the effects of varied irrigation and mepiquat chloride application based on remote sensing to test the effects of precision mepiquat chloride application on crop yield, uniformity and quality, and net returns to irrigation and mepiquat chloride application. Cotton was grown under a variable rate irrigation system at the Stripling Irrigation Research Park in Camilla, Georgia with four levels of irrigation and four replicates. Subplots within each irrigation plot had four levels of mepiquat chloride application. One was a full application, the second and third were based on varying levels of oversight based on aerial images during the season, and the fourth was a control treatment with no mepiquat chloride applied. Plant height and maturity were measured prior to each mepiquat chloride application, and crop yield and quality were measured at the end. Results indicate that the non mepiquat chloride plots returned statistically significant higher net returns per hectare or acre (an average of $26/ha or $65/ac across all levels of irrigation) than those treated with the full or standard application of mepiquat chloride. On a yield basis, this translates to a difference of $0.000859/kg or $0.00189/lb higher return for the non mepiquat chloride treated plots than the standard treated plots. There were no significant differences in net returns for the plots where remote sensing technology was utilized to determine mepiquat chloride application amount.