IMPACT OF NITROGEN RATE AND PLANT GROWTH REGULATOR APPLICATION ON DOUBLE-CROPPED COTTON

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Abstract

With the recent rise in wheat prices as well as record cotton prices in early 2011, there has been increased interest in double cropping cotton behind wheat. Given that doublecropped cotton following wheat production will be planted later than usual, managing for earliness is critical. Management factors that can have a direct impact on earliness include nitrogen application rate and plant growth regulator application. Optimizing nitrogen application rates is important in order to maximize yield without promoting excessive vegetative growth. Plant growth regulators are typically used to manage excess vegetative growth. With that in mind, this study was developed to determine the effect of nitrogen application rate and plant growth regulator application on doublecropped cotton growth, development, and yield.

Studies were conducted in 2012 at the R.R. Foil Plant Science Research Center near Starkville, MS and at the Black Belt Branch Experiment Station near Brooksville, MS. Soil type in Starkville was a Leeper silty clay loam whereas the soil type at Brooksville was a Brooksville silty clay. DP 0912 B2RF was planted on May 25, 2012 in Brooksville and June 4, 2012 in Starkville at a seeding rate of 52,000 seeds per acre. Plots consisted of four – 97 cm rows that were 12.2 m in length. Plots were replicated four times at each location. Nitrogen was applied as 32% UAN in a single application at pinhead square. Nitrogen application rates consisted of the following (kg/ha): 0, 34, 67, 101, and 144. Plant growth regulator applications (PGR) strategies were as follows: no PGR, a single application of 49 g ai/ha at first bloom and application of 37 g ai/ha at pinhead square followed by 49 g ai/ha at first bloom. All data were subjected to analysis of variance and means were separated using Fisher's Protected LSD at p = 0.05.

Cotton height and total nodes at first bloom was greatest following nitrogen application rates greater than 67 kg/ha regardless of PGR application. In addition, cotton height and total nodes were significantly reduced at first bloom due to PGR application at pinhead square, regardless of nitrogen application rate. Nodes above white flower were reduced following nitrogen application rates of 34 kg/ha and below, regardless of PGR application. Cotton height reduction following one or two PGR applications at each nitrogen application rate were observed at the end of the season. Height reductions were greater following two PGR applications compared to a single application at each nitrogen application rate at the end of the season. Total nodes and nodes above cracked boll were greatest following nitrogen application rates greater than 67 kg/ha at the end of the season, regardless of PGR application. One or two PGR applications significantly reduced total nodes and nodes above cracked boll compared to no PGR application, regardless of nitrogen application rate at the end of the season. Seedcotton yields at Starkville were maximized (2863 kg/ha) when 144 kg/ha nitrogen was applied, regardless of PGR application. Seedcotton yields were lowest following no nitrogen application or application of 34 kg/ha, regardless of PGR application. Increased nitrogen application rates resulted in increased heights and total nodes as well as maximized yield. Plant growth regulator application reduced end of the season plant height at each nitrogen application rate but had no effect on seedcotton yield. Growers are encouraged to apply 144 kg/ha of nitrogen and manage plant height as they see necessary when doublecropping cotton following wheat production.