CHARACTERIZATION OF THE COTTON FRUITING CURVE

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Abstract

An experiment was conducted at Suffolk, Virginia to characterize the cotton fruiting curve as affected by nitrogen (N) fertilization using two cultivars. An early and mid-season cultivars, SG 747 and STV 474, were planted at the earliest possible dates. Both cultivars were grown with 70 lbs. N/acre, the standard recommended rate in Virginia, and 90 lbs. N/acre, a value found to provide higher yields in recent tests. The higher rate was applied as a split application of 35 and 45 lbs. N/acre at phinhead square and at first flower for the 70 lbs N/acre and the 90 lbs N/acre rates, respectively. The growth regulator mepiquat chloride was applied as needed. The physiological progress of the crop was monitored using the COTMAN cotton mapping system and compared to the Target Development Curve (TDC).The growth and development of the early maturing cultivar SG747, was affected by N fertilization. Seventy days after planting, the N treatments tracked the target development curve (TDC) much more closely than the untreated control. The untreated control treatment showed slow nodal development, lower apogee and premature cutout. Although the N treatment rate at which growth and development of the plant was affected slightly differed for SG 747 and STV 474, a similar response to N treatment was observed. The effect of N treatment on the cotton growth curve was more evident for the mid-season cultivar STV 474. The untreated control treatment for STV 474 showed a much lower apogee and a premature cutout more so than SG 747. Cotton lint yield of SG 747 was significantly affected by N fertilization. Nitrogen fertilization of 70 lbs. N/acre yielded 650 lbs of cotton over the untreated control. No yield advantage was found when N application was increased over the recommended 70 lbs. N/acre rate for SG 747. However, for STV 474, 90 lbs. N/acre increased yield significantly over the untreated control and 70 lbs. N/acre rate. No yield difference was observed between the untreated control and the 70 lbs. N/acre treatments. The data generated by the COTMAN program showed the importance of using a standard growth curve to describe the effects of fertilization. The nitrogen rate at which the highest yield was achieved varied for the different cultivars, probably due to the variation in the fruiting growth pattern that resulted in different response time for management inputs such as fertilizer.

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