INTERACTION OF WATER AND NITROGEN ON SIMULATED COTTON YIELD

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The Texas High Plains region is characterized as semi-arid and has variable growing conditions. Due to the weather unpredictability, economic productivity has trended below the US average level. Excessive water extraction and limited aquifer recharge is the main cause for decline in the Ogallala Aquifer, which is the only source of irrigation water in THP. Farmers in this region are facing problems with limited irrigation and high nitrogen prices which result in reduced cotton lint production. Irrigation and nitrogen are the two most important factors for maximizing cotton production. Cotton yield response to various combinations of nitrogen and irrigation in center pivot irrigated cotton field was estimated. A cotton crop model Cotton2k was selected for simulating cotton yields for this study. Daily weather data observed for 30 years (1975-2004) at four different stations (Plainview, Seminole, Crosbyton, and Muleshoe) were used for the simulations. Simulations of cotton yield were made with various combinations of nitrogen and water. The yield results were analyzed and the result showed that, for rain fed condition, best yield result with the application of 60lbs/acre N. For center pivot irrigated field, maximum cotton yield was occurred with the dose of 175lbs/ac of nitrogen and 86 cm of total applied water.