

REPORT

Title: Regulated Deficit Irrigation Application and Cotton Production in SW Texas

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Abstract

The urban water demand in Southwest Texas has grown rapidly in recent years due to large population increase. An improved irrigation scheme is in need to support a better water use plan. Regulated deficit irrigation (RDI) is one important measure for saving water for other usage, while maintaining crop yield or farmers' net benefit. An field experiment of deficit irrigation, including five fixed-ratio (100X, 80X, 70X, 60X and 50X) and two RDI (70D and 50D) schemes was conducted at the Texas AgriLIFE Research and Extension Center at Uvalde in the summers of 2008 and 2009 to examine the water saving potential in Southwest Texas. Four varieties were assigned to the experimental field each year as a second factor, to test both deficit irrigation and genotype effects on seed cotton yield, lint yield and fiber quality measurements.

The research showed that the threshold of the replacement ratio for fixed ratio irrigation schemes is between 0.7 and 0.8. Considering the previous study in the same area, 0.7-0.75 is considered to be the practical range to produce non-reduced lint yield and save irrigation water. The newly developed dynamic irrigation scheme demonstrated higher potential to save water, establish deeper cotton plant root system, produce more lint yield per unit water input, and maintain fiber quality. However, further study on optimal deficit ratios of each growth stage is suggested before RDI is applied in cotton production in southwest Texas.