THE EFFECT OF IRRIGATION DURING COTTON SQUARING ON LINT YIELD AND PLANT GROWTH CHARACTERISITICS

Seth A. Bvrd John L Snider University of Georgia Tifton. GA Jared R. Whitaker University of Georgia Statesboro, GA **Calvin D. Perry Bobby J. Washington University of Georgia** Camilla, GA Ron B. Sorensen **USDA-ARS National Peanut Research Laboratory** Dawson, GA **Daryl R. Chastain University of Georgia** Athens, GA **Guy D. Collins** University of Georgia Tifton, GA

Abstract

Unpredictable climate patterns, episodic drought, and threat of increasing regulation of agricultural water use have increased the importance of developing efficient irrigation practices to conserve water while optimizing yields, through defining the optimal irrigation rates for various growth stages of cotton. While a majority of research has focused on the effects of irrigation during the flowering period of cotton, irrigation during the squaring stage has been studied to a lesser extent. Increased potential fruiting sites is typically the mechanism by which irrigation leads to increased yields. In this experiment, the effect of irrigation during squaring on lint yield and plant growth characteristics for both early (FM 1944 B2F) and late maturing cultivars (PHY 499 WRF) was investigated during 2012 and 2013 at Stripling Irrigation Research Park, near Camilla GA, to determine if irrigation should be increased or withheld during squaring for cultivars that are likely to either reach a rapid cutout (early cultivar) or avoid cutout (late cultivar). Treatments included both cultivars subjected to the recommended amount of irrigation during squaring (UGA Checkbook; 2.5 cm per week during squaring), twice the recommended amount (5 cm per week during squaring) followed by (fb) normally recommended irrigation (UGA Checkbook) beginning at first bloom, and no irrigation during squaring fb normal UGA Checkbook irrigation beginning at first bloom and thereafter, and a dryland control. In 2012, rainfall provided nearly the targeted 2.5 cm per week during the first (2 cm) and third (2.1cm) week of squaring, however no rainfall occurred during the second week of squaring. Irrigation at twice the recommended rate during squaring (5 cm per week) resulted in plant height and nodes above white flower (NAWF) greater than all other treatments throughout the season. At first bloom, plant height and NAWF was similar between the dryland control and when no irrigation was applied during squaring fb normally recommended irrigation beginning at first bloom, however the latter treatment exhibited signs of stress recovery (taller plants, greater number of NAWF) more similar to that of the normally recommended irrigation (UGA Checkbook; 2.5 cm per week during squaring) towards the end of the season. Despite the signs of recovery, lint yield was reduced when no irrigation was applied during squaring fb normal irrigation beginning at first bloom, compared to the UGA Checkbook (2.5 cm per week during squaring) but was no different than the dryland control, suggesting that normal irrigation during bloom may not compensate for drought stress that occurred during squaring. This effect was observed in both the later and earlier maturing cultivars. Although irrigating at twice the recommended rates (5 cm per week during squaring) resulted in substantially taller plants and greater NAWF, there was no yield advantage when compared to the normal UGA Checkbook (2.5 cm per week during squaring). In 2013, there was one week during squaring without rainfall, however growth remained slow due to cooler temperatures and excessive rainfall during other times throughout the season. There were minimal differences observed in plant growth characteristics throughout the season and no difference in lint yield among treatments, likely due to the 14.3 cm rainfall that occurred during the final week of squaring, and excessive rainfall at other times. It can be concluded from this

experiment that yield reductions may occur if irrigation is withheld during squaring if dry conditions prevail during squaring, despite resuming normal irrigation at first bloom. Irrigating at higher than recommended rates during squaring offered no yield advantage.