# Evaluation of Varying Irrigation Rates on Gossypium hirsutum L. for Growth and Greatest Yield

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Water is a prominent resource used by agricultural farmers. The demand for water, however, has become more than the quantity available, especially in the Texas Southern High Plains. Therefore, new ways of conservation must be investigated to preserve this important resource. The Texas Southern High Plains most valued crop, Gossypium hirsutum L. (upland cotton), requires a substantial amount of water to produce adequate yield. The purpose of this experiment was to test six cultivars of cotton under varying irrigation levels to determine the growth habits as well as the differences among cultivars. The cultivars were irrigated at rates of 0.0, 1.0, 3.0, 4.6, 5.6, 5.8, and 6.4 mm/day to determine the rate could farmers conserve water while sustaining adequate yield. All cultivars were planted in an Amarillo-Acuff sandy loam soil. Cultivars were tested for height (mm), GCF through photo analysis, and nodes above white flower when peak maturity was reached. Yields were compared after harvest. Data was analyzed using SAS, Microsoft Excel, MatLab, Sigma Plot, MACRO, and Photoshop. Results showed that GCF had up to an 85% correlation to the lint yield. Cultivars irrigated at 6.4 mm/day produced the greatest yield. No significant difference noted in yield from varieties irrigated between 4.6 mm/day and 6.4 mm/day. Only a 139.51 Kg/ha difference was noted. Therefore, farmers could conserve 855 gallons of water daily (0.59 gal/acre/min) if irrigating cotton at 5.6 mm/day while maintaining cotton yield. This could allow farmers substantial savings ($88.82 / acre inch.) in electricity during the growing season.

**Awards Won:**