

GROWTH AND YIELD DISTRIBUTION HABITS OF COTTON CULTIVARS UNDER MULTIPLE IRRIGATION REGIMES

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Abstract

Water is the most important and limiting factor in plant productivity. Efficient irrigation and cultivar selection can help to produce higher cotton yields when water is limiting. Currently, there are no comprehensive comparisons between cultivars under multiple irrigation levels. Therefore, we propose to test in-season growth characteristics, boll distribution, final yield, and quality among multiple cotton cultivars in response to multiple irrigation levels. The main objectives of this research were to measure in-season crop growth between cotton cultivars under multiple irrigation rates, compare the effects of cultivar and irrigation on cultivar yield and boll distribution, and analyze cotton canopy temperature as an indicator of final yield. Cotton was planted on May 13, 2011 at the TTU Quaker Farm in Lubbock, Texas. The design of the experiment was split plot design, with irrigation as a main plot and cultivar as a split plot. The plots were 13 m * 2 m (2 rows) plots in center of 8-row drip irrigation zones. There were 12 cultivars and 9 irrigation regimes in the study, but some treatments were not presented in the poster, for simplicity. In-season measurements of plant height, total nodes, and nodes above uppermost first-position white flower on 10 random plants in each plot were taken. CropSmart thermal sensors in every plot monitored plant canopy temperature. Prior to harvest; several representative plants in each plot were plant mapped for boll distribution. Bolls per plant per node were calculated by dividing the number of bolls at each fruiting site by the number of plants measured in the plot. Additional bolls increased with irrigation in each cultivar. Increases in boll number due to irrigation were cultivar-specific. The canopy temperature decreased with increased irrigation, but the cultivars with later maturity characteristics (DP1044 and PHY499) had lower canopy temperatures than the earlier maturing cultivars (DP 1032 and PHY375). Crop yield increased with irrigation rate. However, PHY375 and DP1044 performed well at lower irrigation levels, and DP1044 and DP0912 performed well at the higher irrigation levels.