

Determining the Impact of Planting Pattern on Water-use Efficiency of Peanut.

N. SINGH*, M.Y. LECLERC, G. ZHANG, Crop and Soil Sciences Department, University of Georgia, Griffin, GA 30223; R.S. TUBBS and W.S. MONFORT, Crop and Soil Sciences Department, University of Georgia, Tifton, GA 31793.

Peanut is a major crop in the southeast USA with Georgia producing more than 49% of all U.S. peanut in recent years. Drought is common in the Southeast and with rapid urban development in Georgia competing for water resources. It is vital to study the water-use efficiency of peanut. Peanut is generally grown in single-row and twin-row planting patterns. Yield, disease resistance and market grade advantages of twin-row over single-row has been well documented, yet little information is available regarding water-use efficiency differences between single- and twin-row peanut production. The main objective of this study is to compare the water-use efficiency for single- and twin-row planted peanut using the eddy-covariance method. The other objectives are to compare yield, number of pods per plant, and weight of pods per plant. Data were collected in 2016 and 2018 and analyzed for different growth stages of peanut. The eddy-covariance data were analyzed for different growth stages of peanut. In 2016, no significant difference was observed in yield, the number of pods per plant, or weight of pods per plant between single- and twin-row planting. Conversely, in 2018, twin-row had significantly greater yield by 20%, number of pods per plant by 11.9 %, and weight of pods per plant by 12.2%. The difference between both years lies in the far greater precipitation during 2018 compared to 2016. For analysis and comparison of eddy-covariance data, peanut growing period was divided into the vegetative stage, the stage beginning bloom to full seed, and the stage after beginning maturity. In 2016, water-use efficiency of twin-row was higher than single-row in the vegetative stage and beginning bloom to full seed stage by 30.97% and 12.9% respectively. However, after beginning maturity stage, the water-use efficiency of single-row was significantly higher than twin-row by 10.7%. This may have caused by the reported minimal precipitation during this period. In 2018, water-use efficiency was reported to be significantly higher in the beginning bloom to full seed stage and after beginning maturity stage by 9.1% and 8.8% respectively. The results of both years indicate that the water-use efficiency of twin-row is greater than single-row for the beginning bloom to full seed stage. This period includes flowering and pod filling stages which are very critical to the yield of peanut. This study points out that water-use efficiency could be one of the factors supporting the known advantages of growing twin-row over single-row over yield, disease resistance and market grade.