

# Report on project “The influence of planting dates on water use and yield in peanut: A field-scale evaluation”

Monique Leclerc, University of Georgia

Peanut is typically planted from late April to middle June in the southeastern US, but the degree to which the planting date of peanut impacts water-use efficiency still remains a subject of controversy. This research has importance concerning about the increasing global issues, particularly on matters related to water conservation.

The primary objective of this research was to determine the water-use efficiency and yield of peanut associated with different planting dates. The experiment was done in Southwest Research and Education Center in Plains, GA over a three-year period 2017-2019. Peanut cultivar Georgia-06G was planted in three fields adjacent to one another on three different planting dates: early planting date in late April, mid planting date in middle May and late planting date in early June. The eddy-covariance system was installed in each of the fields. This system consists of fast response sonic anemometer (CSAT3, Campbell Scientific, Logan, UT) and a CO<sub>2</sub>/H<sub>2</sub>O gas analyzer (LI-7500, LI-COR Inc., Lincoln, NE) and a data logger, powered by deep cycle batteries charged with a solar panel. The CSAT3 anemometer was installed towards the prevalent wind direction. The 10 Hz data was collected and processed for average 30 min interval. Data analysis was done by using the EddyPro software and MATLAB.



The results suggest that the peanut ecosystem with the last planting date presents the highest carbon assimilation rate and water-use efficiency during the early growth stage and the lowest carbon assimilation rate during the late growth stage. However, evapotranspiration does not give consistent results among different planting dates. Their differences among different planting dates are generally small during the middle growth stages. These results are also verified by further analysis of daily variation of carbon assimilation rate, evapotranspiration and water-use efficiency, as well as carbon assimilation rate under similar conditions of photosynthetically active radiation. In comparison with the earlier planted peanuts, the last planted peanuts have faster growth rate with larger biomass during the early growth stage but a lower biomass at late growth stage. Peanut yield with the last planting date was significantly higher in 2018 and 2019. However, there is no significant difference in peanut yield between different planting dates in 2017 possibly because the last planted peanuts experienced air temperature drop at the late growth stage. These results are partly induced by different air temperatures, photosynthetically active radiation, vapor pressure deficit, and other weather conditions experienced due to different planting dates. The preliminary results suggest that unless the air temperature during late growth season is low, the late planting date may be better to get higher yield.