

## **Integrated Agronomy, Physiology, and Plant Breeding Approaches to Improve Drought Tolerance Phenotyping in Peanut**

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Transpiration efficiency (TE) has been considered as an important component for water use efficiency (WUE) and to screen yield variation under drought stress in peanut. A Recombinant Inbred Lines (RIL's) for Valencia breeding were developed for high WUE from two contrasting parents differed in their drought tolerance. A set of 288 RILs derived from drought tolerant JUG3 and drought susceptible Valencia-C were used along with parents to evaluate TE and pod yield. A lysimetric system was used to grow the plants and to screen the RILs for their water use, dry weight, TE, pod yield and haulm weight. One experiment was conducted during the rainy season 2015 using randomized complete block design with 4 replications. Plants were subjected to drought stress treatment, imposed from 40 days after sowing in the form of an intermittent stress, i.e. the plant were subjected to cycles of drying and re-watering similar to treatments applied under field conditions. A 2-fold variation for TE was observed among the RILs, which was typical of a rainy season environment. Other parameters pod yield, water use and haulm weight showed significant variation among the RILs. A significant association was observed between TE and pod yield in this study, although the coefficient of variation was relatively weak ( $R^2 = 0.22$ ), which was also quite typical of mild vapor pressure deficit environment. The distribution of TE among the 288 RILs indicates polygenic character of TE controlled by dominant and additive genes. This study further requires quantitative trait loci (QTL) analysis for marker assisted selection to select and breed efficient genotypes for improved TE.