Understanding and Enhancing Drought Tolerance in Virginia Type Peanut

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Peanut (*Arachis hypogea* L.) is a high value crop ranking second most important legume in production after soybean, generally grown as a rain-fed crop in the world. Drought is among one of the major limiting factors for peanut yield and quality. Over 90% of peanut production in Virginia-Carolina growing region is under rainfed condition (no supplemental irrigation). Drought poses major challenges to peanut growers under rainfed conditions for yield and quality to maintain their competitiveness in the market. The most reliable solution for peanut growers to mitigate drought in rainfed conditions is to adopt drought tolerant cultivars. To achieve this objective, our research focuses on phenotyping and genotyping of established three populations (consisting of 722 lines) of recombinant inbred lines (RILs) for drought tolerance. Five parents for these populations were selected on the basis of previous studies which showed contrasting traits for drought tolerance. Phenotype these large populations (RILs) at field by taking ground measurement for plant height, canopy width, Normalized Difference vegetation index (NDVI), canopy temperature (CT), wilting, disease rating and pod yield. Based on 2018-19 phenotypic data, we have selected about 15% of lines from each population. These selected sub-set of lines will be further studied for physiological traits for drought tolerance in controlled field conditions using rainout shelters, with and without irrigation. Genotyping of the RILs is done by using standard Genotyping-by-sequencing approach. This will facilitate the identification of genomic markers associated with drought tolerance in these RIL populations and allow generation of reliable markers to enable marker-assisted selection for drought tolerance in peanut breeding.