

Evaluation of the US Mini-core Collection to Identify Drought Tolerant Genotypes Utilizing Environmental Control Rainout Shelters

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Breeding for drought tolerance in peanut has been challenging due to strong genotype by environment interaction. This complex trait is controlled by many major and minor quantitative trait loci (QTLs). Introgression of exotic genetic sources may facilitate the introduction of novel drought tolerant genes in cultivated peanuts. The goal of this research was to characterize physiological, agronomic, and molecular traits utilizing environmental control rainout shelters to identify drought tolerant genotypes from 162 peanut accessions, including the U.S. mini core collection. A mid-season drought was applied for 30 days, followed by full irrigation for the rest of the growing season. Physiological measurements, such as specific leaf area (SLA), relative water content (RWC), and leaf dry matter content (LDMC) were taken every week during drought and one week following irrigation. Drought was rated on a color scale of 1 (no wilting) to 10 (complete wilting) taken just before irrigation. Pod yield was measured at the end of the growing season. Correlation of all measured traits was utilized to identify drought tolerant peanut genotypes. Multiple growing seasons will confirm findings and drought tolerant genotypes may be utilized in breeding programs.