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ABSTRACT BOOK

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Phenotypic assessment of groundnut response to key abiotic stress

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Groundnut is an important oil seed crop, grown under rainfed conditions and often exposed to abiotic stresses including drought and salinity. In the past few years we have screened a large number of germplasm of groundnut, including transgenic groundnut over expressing rd29::DREB1A, and found large variations for traits that are known to be important under drought and for salinity tolerance based on yield under stress conditions. Large differences in TE were observed in the non-transgenic germplasm that was explained by differences in lower transpiration rate (g/cm^2). Moreover, the differences in TE were related to differences in the response of transpiration to higher VPD, i.e. low TE genotypes had sustained transpiration increase above 2.0 kPa, whereas, the high TE genotypes limited their transpiration above that VPD threshold. Several transgenic events had also enhanced water use efficiency across several water regimes which was also explained by lower transpiration rate (g/cm^2) and stomatal conductance. These had enhanced root growth under drought stress that led to increased water uptake when grown in long/large PVC tubes. Under salinity stress, the striking finding was that Na accumulation was not responsible for the large differences in the observed seed yield; rather, higher salt tolerance appeared to be related to a tight control of plant water loss, where the tolerant germplasm had a lower transpiration rate (g/cm^2), likely involving higher ABA content. Therefore, TE differences in groundnut appear to be strongly related to stomata regulation, which also appears to have a strong role under saline stress.