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## Evaluation and characterization of transgenic groundnuts expressing the *At DREB1A* gene for various drought tolerance traits

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Breeding groundnut for enhanced drought tolerance traits like transpiration efficiency (TE) and stomatal conductance have not been very successful. Considering the immense potentials of biotechnological applications, their integration with plant physiology and breeding could provide a holistic approach for addressing a complex trait like drought tolerance. In our efforts to use transgenic technology for the development of drought tolerant groundnuts, we have developed over 50 transgenic events through *Agrobacterium*-mediated transformation using the *DREB1A* gene driven by the stress-responsive rd29A promoter. The T3 to T6 generation of these events were screened in dry-down experiments in the greenhouse to study various important component traits including transpiration (T) and TE that are associated with better performance under intermittent drought conditions. Our observations so far clearly indicate that some transgenic events clearly had higher TE than the wild type under water stress that appears to be related to a lower stomatal conductance and an overall lower rate of water loss per unit of leaf area. These transgenic events have also been tested in a lysimetric system (long and large PVC cylinders that mimic a soil profile) where the root growth was dramatically enhanced under water stress, and the differences in rooting related well with a higher water uptake. The resulting modification in the TE and other yield architecture components in these transgenics might help unravel some of the unanswered questions about the mechanisms and pathways involved in stress-induced gene expression as well as whole plant responses under drought. The current status of this work and future plans on engineering drought tolerance in groundnut will be discussed.