# HIGH THROUGHPUT PHENOTYPING OF DROUGHT TOLERANCE IN CONVERTED *GOSSYPIUM* SPP. RACESTOCKS

**Dustin Wilkerson**
**Steve Hague**
**Department of Soil and Crop Sciences, Texas A&M University**
**College Station, Texas**

## Abstract

Cotton breeders seek to develop methods to efficiently screen for drought tolerant traits in converted racestocks so that they can be introgressed into higher yielding varieties. High throughput phenotyping (HTP) enables breeders to screen large amounts of material but it is still unclear at which growth period these techniques are the most efficient. The primary objective of this study is to use HTP techniques to identify growth stages during the season that confer significant correlations between each sensor and lint yield, lint % and the fiber quality traits, micronaire, length, and strength. Eleven racestocks, two released cultivars, and two experimental elite lines were randomly chosen and planted in four locations during 2015 in a randomized complete block design. NDVI, leaf surface temperature, stomatal conductance, and chlorophyll content measurements were collected between 60 and 114 days after planting (DAP). Spearman's correlations were constructed and analyzed for each collection date. NDVI showed significant positive correlations with lint yield on 27 out of 31 total measurements at points between 60 and 114 DAP. Leaf surface temperature showed significant negative correlations with lint yield on 15 out of 30 measurements at points between 60 and 114 DAP. Stomatal conductance and chlorophyll content also showed significant positive correlations on 3 out of 14 and 2 out of 10 correlations respectively, focused solely around flowering. The results showed that NDVI and leaf surface temperature can be used 60 to 114 DAP while stomatal conductance and chlorophyll content measurements perform more efficiently during flowering.