PIE-3575: Evaluation of mulberry genetic resources for functional traits for resilience to climate change *(CSGRC Hosur with RSRS Ananthpur & CSR&TI Mysuru)*

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Introduction: CSGRC, Hosur which is a National Active Germplasm Site for Mulberry is maintaining more than 1200 mulberry genetic resources in its field gene bank collected from different agro-climatic regions. In order to evaluate them for their utility as potential parents in crop improvement, a project was taken up to evaluate 39 short-listed mulberry genetic resources at RSRS, Ananthapur (high temperature and low rainfall), CSGRC, Hosur and CSR&TI, Mysuru (favorable climate) and identify top performers with adaptive traits that make them resilient to climate change. The identified top performing accessions can function as potential parental material for developing climate resilient mulberry varieties.

Objectives:

1. To estimate variability in different functional traits associated with drought tolerance in mulberry germplasm
2. To identify donor parents for specific traits having adaptive significance
3. To standardize the assessment method for different functional traits to identify desired mulberry genotypes

Outcome:

In the mixed culture system of the heterogeneous environment, the three trials across different seasons revealed high divergence in functional morphological traits. In CSGRC Hosur, 09 accessions viz. MI-0400, MI-0376, MI-0214, ME-0007, MI-0762, MI-0686, MI-0763, ME-0251 and MI-0568 were top performers compared to check varieties S-13 and Anantha. In CSR&TI Mysore, 08 accessions viz. MI-0437, MI-0310, MI-0683, ME-0173, MI-0246, MI-0685, MI-0762 and ME-0256 were top performers compared to check varieties S-13 and Anantha. In RSRS Ananthpur, 11 accessions viz. MI-0439, MI-0437, MI-0400, ME-0107, MI-0332, MI-0686, ME-0253, ME-0251, MI-0458, MI-0139 and ME-0256 were top performers compared to check variety S-13. Among the check varieties, S13 and Anantha performed well compared to V1 and Vishala.

Considering all morphological parameters, MI-0568, MI-0762, and Anantha performed better in CSGRC, Hosur, CSR&TI, Mysuru and RSRS, Anantapur, respectively. Comparative results revealed five accessions *viz*. MI-0437 (Female), MI-0400 (Female), MI-0686 (Male), MI-0762

(Female) and ME-0251 (Female) to be highly adaptive in all the three experimental locations proving their utility as donor parents by institutes implementing breeding programs.
The biochemical traits *viz.* Glutamate synthase activity and ascorbic acid content known to be correlated to drought tolerance were positively correlated to biomass, shoot weight and leaf weight. Hence, these parameters can function as screening tools for identifying desired genotypes for the said functional traits.

Recommendations/Utilization:
The five accessions viz. MI-0437 (F), MI-0400 (F), MI-0686 (M), MI-0762 (F) and ME-0251 (F) that revealed to be highly adaptive could serve as donor parents in breeding programs taken up by the institutes implementing mulberry breeding. The biochemical traits *viz.* Glutamate synthase activity and ascorbic acid content known to be correlated to drought tolerance with positive correlation to biomass, shoot weight and leaf weight can function as screening tools for identifying desired genotypes for the said functional traits. The morphological and biochemical data generated in this study can be utilized for identifying additional mulberry genotypes tolerant or sensitive to drought with resilience to climate change. The result of this study provides a foundation for further investigation of molecular mechanism underlying response to drought stress.