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# Traits Related to Drought Resistance in Tamarind (*Tamarindus indica* L.)

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**Abstract**

Tamarind is a multipurpose tree that belongs to the Fabaceae. Seedling responses of Tamarind to drought were investigated using populations from eight regions of Asia, Africa and America used in agroforestry systems and planted in home gardens. The two drought stress treatments (i.e. low- and medium-watered soil) affected seedling biomass. Water stress reduced the expression of most traits such as leaf area, total plant biomass, leaf mass, root mass, stem diameter, root diameter, leaf mass fraction, root mass fraction, specific leaf area and photosynthesis with the exception of stem and root density which were increased by drought stress. Genotypic variation was observed among provenances for biomass and ecophysiological traits, but was limited for photosynthetic rate. We assume that drought resistance is a genotypic performance that can be based on plant traits such as biomass or other indices. Plant biomass under drought correlated positively (r= 0.481**) with genotypic performance under non-stress (Yp). Drought intensity indices (DII) were 0.26 and 0.30 at the medium-watered and low-watered level, respectively. Plant biomass reduction (Yp-Yd) did not relate to genotypic performance under stress (Yd) for both levels of stress. Geometric mean plant biomass (GM) was weakly correlated to drought susceptibility index (S) (r=0.365*) at the moderate level of drought but it was not significant (r=-0.045) at the low-watered stress. Traits did not tend to correlate with S at both levels of drought stress. On average, provenances with low S value are not desirable as these provenances are often unresponsive to stress-free conditions. Whereas, GM generally correlated with most other traits such as biomass and biomass allocation at moderate and low-watered level of drought stress. The differential correlations between traits and the indices for plant biomass and drought susceptibility would suggest that the most effective approach in breeding for drought resistance in tamarind could be based on selecting for high geometric plant biomass performance (GM) in tamarind.

**Keywords:** Drought index, drought resistance, tamarind

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