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DEVELOPING STRESS TOLERANT TEPARY BEAN THROUGH MUTATION BREEDING

Tepary bean (*Phaseolus acutifolius* A. Gray) is better adapted to heat and drought stress than common bean (*P. vulgaris* L.). Mutant lines of two cultivated tepary accessions (G40068 and G40159) were generated by EMS treatment. The M6 mutated lines: CMT 38, CMT 109, CMT 187 and their original (M0) accessions were evaluated for heat and drought tolerance under greenhouse conditions. Their performance was evaluated for morpho-physiological attributes, seed yield and yield components. Under high temperature and drought conditions, the CMT 38 mutant (M6) line and its original tepary (M0) accession (G40068) showed higher values of pod biomass, pod number and 100-seed biomass. The CMT 109 and CMT 187 mutant lines and their G40159 original accession (M0) also showed the highest value of seed number. Under combined heat and drought conditions: the SPAD readings, seed biomass, 100-seed biomass and seed number parameters could be incorporated into tepary breeding programs, as selection criteria to screen genotypes for tolerance to heat and drought stress. These parameters explain the observed variance in the principal component analysis. The root biomass and the stem diameter were also identified as useful attributes, based on the univariate analysis. This results show that screening of these mutant lines, based on morphological traits like growth habit, is not negatively affected by the yield variables evaluated. The mutation breeding has the potential to generate phenotypic and genotypic variations in tepary that can be exploited by plant breeders in the development of new cultivars more adapted to heat and drought stress.

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