

Nuanmanee Phromnil 2010: Heritability of Drought and Heat Tolerance in Mungbean (*Vigna radiata* (L.) Wilczek). Master of Science (Agriculture), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Mr. Vititr Chairaree, Dr.rer.agr. 83 pages.

Drought and heat stresses are two major factors limiting mungbean yield in Thailand. Therefore, breeding new mungbean genotypes, which are able tolerance drought and heat is important. The objectives of this study were to estimate heritability and proper screening method using some physiological traits in relate to droutht and heat tolerance of drought and heat tolerance in a cross of mungbean derived from a tolerance mungbean line (V1595, P₂) and a susceptible mungbean line (V3131, P₁) and also evaluated the homogeneity of variances from two parents. P₁, P₂, F₁, F₂, BC₁P₁ and BC₁P₂ were evaluated at the reproductive stage under field and laboratory conditions during flowering period. Assay of drought and heat tolerance were light quantum yield (Φ_{PSII}), maximum quantum yield (Fv/Fm), cell membrane thermostability (CMT), triphenyl tetrazolium chloride (TTC), relative water content (RWC), height, seed dry weight, pod number per plant, 100 seed weight and seed number per plant. Homogeneity of variances of parents was homogeneous of populations were *in situ* Φ_{PSII} , *in situ* Fv/Fm, *in vivo* Φ_{PSII} , PEG- Φ_{PSII} , Heat- Φ_{PSII} , *in vivo* Fv/Fm, PEG-Fv/Fm, Heat-Fv/Fm, PEG, CMT, PEG-TTC, Heat-TTC, TTC, RWC, height dry weight per plant, pods per plant and seed numbers per pod which can to combine of seasons were the same heritability. Heritability ranged from 0.02-0.99 under stress conditions. The hight heritabilities were observed for PEG-TTC_{Stressed} (0.99) *in situ* Fv/Fm_{Stressed} (0.90). TTC_{Stressed} (0.89) PEG_{Stressed} (0.76) and CMT_{Stressed} (0.74). Heritabilities of the control ranged from 0.01-0.88 of which high heritabilities were obtained from PEG-TTC_{Control} (0.88) *in vivo* Fv/Fm_{Control} (0.85) PEG_{Control} (0.82) CMT_{Control} (0.82) and Heat-Fv/Fm_{Control} (0.71). The results of the study state that the parameters which have high heritability and appropriate could be used for selection for drought and heat tolerance in mungbean.

Student's signature

Thesis Advisor's signature