Genotype x Environment Interactions for a Diverse Set of Sweetpotato Clones Evaluated across Drought Prone Environments of Mozambique

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Abstract

Sweetpotato is grown during the rainyand during the dry season in Mozambique (the rainy season is very unstable). In total 58 clones were evaluated across three years during the dry season and with two treatments (with and without irrigation during the initial growing stages). Three check clones were used (Jonathan, Resisto, and Tanzania). The G x E analysis was conducted by ANOVA, regression, and AMMI analysis. Ratios of variance components due to genotypes, genotype x year, genotype x treatment, genotype x year x treatment, and the plot error were 1: 2.90:0.52:1.27: 3.98 for storage root yield and 1:0.45:0.13:0.29: 1.45 for upper biomass yield – corresponding heritabilities were 37.6 and 74.5, respectively. The stability of harvest index was significantly correlated with the PCA1 and PCA2 values obtained from AMMII analysis with storage root yields. Fifteen clones were found to have higher storage root yields compared to the best check (Resisto) with initial irrigation, whereas only four clones were found to have higher storage root yields compared to the best check (Tanzania) without initial irrigation. AMMI analysis revealed a group of genotypes with high additive main effects and PCA1 values close to zero for storage root yield. Moreover, a multiplicative index was tested to facilitate selection. In conclusion, storage root yield genotype by year; it can be extreme under drought prone growing conditions of sweetpotato. This makes right selection decisions and breeding progress difficult. Harvest index stability might be a key trait to identify clones with yield stability under drought prone growing conditions. At least two environments should be used at early breeding stages to consider this trait early in the breeding process.

Key words: Genotypes, heritabilities& stability of harvest index