Genotype × environment interaction by AMMI and GGE biplot analysis in three consecutive generations of wheat (Triticum aestivum) under normal and drought stress conditions

ABSTRACT

Thirty six wheat genotypes derived from diallel crosses from F1 to F3 and their parents were evaluated in six different environments for the stability of performance. Performance was measured by seed yield per plant under drought and non-drought stress conditions. The experiment was conducted as a randomised complete block design with three replications in over one year. Additive main effects and multiplicative interaction (AMMI) and Genotype main effect and genotype x environment interaction (GGE) were employed in the evaluation of genotypes; AMMI analyses showed significant (P< 0.01) G × E, (genotype × environment interaction) with respect to plant seed yield. The AMMI stability value (ASV) revealed that cross number 14 (Irena × Veery) is stable. GGE-biplot models showed that the six environments used for the study belonged to two mega-environments. The GGE results also confirmed crosses number 11 (Irena × Chamran) and 17 (S-78-11 × Chamran) as the most stable, and recommended for the creation of hybrids. Based on environment 3 (F3 population, drought) with an inbreeding depression effect, hybrid number 17 (S-78-11 × Chamran) was identified as the best line due to its stability and high yield.

Keyword: Stability; GGE biplot; Wheat yield; AMMI analysis