Genotypic stability and adaptability in tropical maize based on AMMI and GGE biplot analysis

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ABSTRACT. We evaluated the phenotypic and genotypic stability and adaptability of hybrids using the additive main effect and multiplicative interaction (AMMI) and genotype x genotype-environment interaction (GGE) biplot models. Starting with 10 single-cross hybrids, a complete diallel was done, resulting in 45 double-cross hybrids that were appraised in 15 locations in Southeast, Center-West and Northeast Brazil. In most cases, when the effects were considered as random (only G effects or G and GE simultaneously) in AMMI and GGE analysis, the distances between predicted values and observed values were smaller than for AMMI and GGE biplot phenotypic means; the best linear unbiased predictors of G and GE generally showed more accurate predictions in AMMI and GGE analysis. We found the GGE biplot method to be superior to the AMMI 1 graph, due to more retention of GE and G + GE in the graph analysis. However, based on cross-validation results, the GGE biplot was less accurate than the AMMI 1 graph, inferring that the quantity of GE or G + GE retained in the graph analysis alone is not a good parameter for choice of stabilities and adaptabilities when comparing AMMI and GGE analyses.

Key words: AMMI; GGE biplot; BLUP; Cross-validation