

Abstract

The objective of this study was to evaluate GxE interactions and yield stability in multi environmental trials across wide ecological locations in Kenya. Thirty-six safflower accessions were evaluated for phenotypic traits at 4 locations namely Katumani, Kinamba, Lanet and Naivasha for two long rain seasons in two years using 7 yield components. The experimental design was a Partially Balanced Lattice design with 3 replications. Analysis of variance (ANOVA) and Principal Component Analysis (PCA) were applied for evaluation of GxE interaction, genotype classifications and stability. The ANOVA showed highly significant differences ($p < 0.01$) among genotypes and locations as well as significant GxL and LxY interactions for all yield components. The first 3 PC accounted for 79% of the total variability in morphological traits. Classification based on the first three principal components showed accessions from Asia (46, 20, 44, 19, 51, 57, 58, 41, 1, 2, 52) tended to group together however a misclassification was found where they also grouped with those of Chinese, Mexican, American and Australian origin. Analysis of GxE interaction could serve in identification of high yielding genotypes with stable performance. Different genotypes reacted differently to varying seasons as indicated by the high significant GxE interaction hence environmental effects are important in understanding plant growth and should be given consideration in safflower breeding programs.