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Genotypic and Differential Responses of Growth and Yield of Some Maize (*Zea mays* L.) Genotypes to Drought Stress

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Abstract

Fifteen genotypes of maize (*Zea mays* L.) were evaluated at two locations in Sudan (Khartoum and Wad Medani) during the season 2003/04, to estimate the genetic variability and performance for yield and some vegetative characters under drought at vegetative and reproductive growth stages. Three water treatments were applied, namely; well-watering, drought during vegetative stage only, and drought during reproductive stage only. Phenotypic and genotypic variances, genotypic coefficient of variation, heritability, genetic advance and phenotypic correlation between yield and some vegetative traits were estimated. Significant differences among genotypes were found for most of the traits studied, except days to 95 % anthesis, stem diameter (45 days), leaf area index (30 and 60 days), and number of leaves/plant (45 days). The genotypes showed differential yield response to drought stress. High yield (kg ha⁻¹) was exhibited by genotype PR-2 when drought stress was during vegetative stage, and by genotype Z-2 when it was during reproductive stage. However, the genotype M-45 exhibited considerable high yield when it exposed to drought at both vegetative and reproductive stage. The effect of drought on genotypes was significant for days to 25 % silking, plant height and grain yield (kg ha⁻¹) at Wad Medani. High genotypic coefficient of variation, heritability and genetic advance were exhibited by plant height. Grain yield (kg ha⁻¹) was significantly and positively correlated with plant height, stem diameter (45 days), leaf area index and number of leaves/plant (60 days), however, significant and negative association with days to 50 % and 95 % silking was observed. It could be concluded that, genotypes have differential yield response to drought and accordingly the genotype M-45 could be used for further improvement of drought tolerance in maize. Based on their positive association with yield, the characters plant height, stem diameter and number of leaves/plant would be the best selection criteria for maize improvement.

Keywords: Correlation, drought, genotypic variance, heritability, reproductive stage, selection criteria, vegetative stage, *Zea mays*