Evaluation and selection of wheat genotypes under terminal drought stress

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ABSTRACT:
The current investigation was carried out to evaluate the performance of wheat genotypes under terminal drought stress and determination of high yielding genotypes under drought stress and non-stress conditions, during 2013-14 and 2014-15 cropping seasons at Zarghan Agricultural Research Station, Fars province, Iran. About 100 wheat genotypes (98 bread wheat and two durum wheat) were evaluated in alpha lattice experiment with two replications under stress (no irrigation after anthesis) and full irrigation conditions. Fifteen drought tolerance and susceptibility indices were calculated based on grain yield for each of the genotypes. The results of combined analysis of variance showed that the effect of year, drought stress and genotype for grain yield were significant at P value < 0.01. The genotypes 96 (Ofogh), 75 (Roshan) and 95 (WS-90-18) under full irrigation, and 44 (Misr1), 36 and 80 (Dehdasht) under drought stress conditions had the maximum grain yield. With respect to positive and significant correlation of Harmonic Mean Index (HARM), Geometric Mean Productivity (GMP), Stress Tolerance Index (STI), Mean Productivity (MP), Yield Index (YI), Modified Stress Tolerance Index for stress (MSTIs) and Modified Stress Tolerance Index for irrigation condition (MSTIp), with grain yield under both drought stress (Ys) and full irrigation (Yp) conditions, these indices were introduced as the best screening criteria for the evaluation of genotypes in the current experiment. The screening of drought tolerant genotypes was performed using mean rank and rank standard deviation of selected indices, and Biplot analysis was accomplished with the use of Principal Component Analysis (PCA). Finally, the genotypes 44 (Misr1), 96 (Ofogh), 80 (Dehdasht), 70 (Seymareh) and 71 (Azar2) were introduced as the most tolerant genotypes to terminal drought stress.

Keywords:
Drought tolerance after anthesis, grain yield, susceptibility indices, wheat.