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Annals of Biological Research

Abstract

[Evaluation of drought tolerance in bread wheat \(*Triticum aestivum*\)](#)

[L.\) using in vivo and in vitro techniques](#)

Author(s): Ezatollah Farshadfar

In order to evaluate the response of 20 genotypes of bread wheat (*Triticum aestivum* L.) to drought stress under in vivo and in vitro conditions, two different experiments were carried out. The results of analysis of variance (ANOVA) showed significant differences between the genotypes for grain yield under irrigated (Yp) and rainfed (Ys) conditions in the field and for percentage of callus induction (POCI), relative fresh weight of growing callus (RFGW), relative growth rate (RGR), callus growth rate (CGR), percentage of callus necrosis (PCN), relative water content (RWC) and in vitro tolerance (INTOL) in the mature embryo culture. These indices indicate the presence of genetic variability, different responses of genotypes to different drought intensities and possible selection of drought-tolerant genotypes under in vivo and in vitro conditions. A three-dimensional plot of Ys, Yp and stress tolerance index (STI) revealed that genotypes 5, 14, 17, 18, and 19 were drought tolerant with high grain yield under stressed and non-stressed conditions. Genotypes 1, 8, 11, 16 and 19 exhibited 100% callus induction in vitro; callus induction was genotype dependant. With regard to INTOL, genotypes 3 and 6 were drought tolerant. Correlation analysis between in vivo (Yp, Ys and STI) and in vitro (RFGW, CGR, RGR, RWC, PCN and INTOL) characters studied. Thus, because of orthogonality and independence, the results of in vitro screening techniques for drought tolerance cannot be generalized at the in vivo level and vice versa. Therefore, the results of in vivo and in vitro studies are not necessarily linked and must be considered separately. Genotype 5 was found to be drought tolerant with high grain yield in both in vivo and in vitro conditions.

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