

EVALUATION OF DROUGHT TOLERANCE INDICES OF PHYSIOLOGICAL CHARACTERISTICS IN BARLEY GENOTYPES

Ali Soleymani*¹, Mohamad Hesam Shahrajabian¹, Mehdi Karimi

¹Department of Agronomy and Plant Breeding, Khorasgan (Esfahan) Branch, Islamic Azad University, Esfahan, P.O.BOX:81595-158, Iran.

*Corresponding Author email: a_Soleymani@khuisf.ac.ir

INTRODUCTION: Talebi et al. (2009) reported significant and positive correlation of Y_p with MP, GMP and STI, suggesting that these indices are more effective in identifying high yielding cultivars under moisture conditions. Based on positive and highly significant correlation of grain yield with MP, GMP and STI under both non-stress and stressed conditions, these indices are identified as reliable criteria to select genotypes under terminal drought stress condition (Azizi Chakherchaman et al. 2009, Sharafi et al. 2011). The aim of this research is to study the usefulness of various indices in identifying cultivars adapted to different water stress treatments and select high yielding and drought tolerant crops.

MATERIALS AND METHODS: In order to determine drought tolerance indices according to physiological characteristics for different genotypes of barley in Esfahan region, an experiment was conducted at Esfahan Agriculture Research Station in 2011 (Latitude 32°30' N, longitude 51°49' E, and 1541 m elevation). These two experiments were done separately, by complete block design with 3 replications, in which, 10 genotypes were studied at drought stress condition (Irrigation disruption after emergence of spikes) and normal water irrigation. Soil texture was silty clay (SiCl). In each plot, 6 lines were used, row number 1 and 6 and also 0.5 m from start and end of lines were omitted. The length of each line was 10 m. Seed sowing was done by skillful workers. The distance between plots and between blocks were 1 and 2 m, respectively. Hand weeding was done for control of weeds. The first irrigation was applied just after sowing. The other irrigations were done according to plant requirements in distinct sowing dates. Because of soil richness in P and K, for providing N element, N fertilizer was applied in two split (half of it was used before sowing and half of it was used one week before anthesis stage). In this experiment, seed yield in non-stress condition (Y_p), seed yield in stress condition (Y_s), SSI, TOL, MP, STI and GMP were measured. The total seed yield in both non-stress and stress conditions were measured by harvesting 2.5 m² of the central part of each experimental plot at crop maturity.

RESULTS AND DISCUSSION: Y_p had significant and positive correlation with TOL, SSI, MP and GMP. On the basis of indices, genotypes 3, 6 and 10 are the superior barley genotype with not only drought stress resistance, but also appropriate yield potential under both non-stress and limited irrigation conditions. MP, GMP and STI were the most desirable indices for screening drought tolerant genotypes.

Keywords= Drought tolerance, Barley, Indices.

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