

## EVALUATION OF DIVERSITY AND HERITABILITY BREAD WHEAT LINES UNDER LATE MOISTURE STRESS CONDITION

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### INTRODUCTION

Drought stress is a pervasive feature of wheat production in world's major cereal growing regions. To improve the productivity in these areas, the importance of traits associated with tolerance to drought needs to be quantified (McDonald et al., 2008). Wheat (*Triticum aestivum* L.) is the world most cultivated food crop known as the king of all cereal crops as its cultivation is easier, ecologically suitable and contain high amount of nutrients. Stepwise regression was calculated to detect the most effective traits on economic yield Regression estimates a functional relationship between variables or the relationship between independent and dependent variables (Kian Ersi *et al*, 2013). In the study current the objectives were: (i) detection of the most important effective traits on wheat economic yield under terminal moisture stress, (ii) evaluate the genetic diversity for drought adaptation among the studied lines under drought stress in terms of yield, (iii) detection of the best important effective traits on economic yield under terminal moisture stress condition.

### MATERIALS AND METHODS

Seeds of 20 winter wheat lines (*Triticum aestivum* L.), including, 18 promising lines and 2 control lines were prepared from the Natural Resources and Agriculture Research Center of Isfahan, Iran. The land for the tests was prepared by deep plowing, two disks and furrowing. Then, nitrogen, phosphor and potassium fertilizers were added according to results of the soil nutrient test. This experiment was conducted in 2011-2012 in a research field, located in the station of Kabotarabad (Isfahan, Iran). Seeds were sown in plots of 5.5 m×1.2 m with six rows in each plot. The distance between rows was 20 cm and seed density was established at 400 seeds per square meter. The experiment was arranged as a randomized complete block design with three replications under terminal moisture stress conditions. Moisture stress condition was applied by cutting after initiation of wheat heading. The following traits were evaluated during the growth season from 10 randomly selected plants; days to 50 percent heading, days to 50 percent anthesis, flag leaf area, flag leaf length, relative water content (RWC) and excised leaf water retention (ELWR) and traits of peduncle weight, spike weight, grain weight per spike, straw weight of spike, harvest index of spike, number of tillers per m<sup>2</sup>, number of spikes per m<sup>2</sup>, number of spikelets per spike were calculated after harvesting also from 10 randomly selected plants. In addition, biological and economic yields were measured from planted shrubs per meter square in each plot and recorded as based on gr.m<sup>-2</sup>; and finally, percentages of harvest index were calculated by calculating evaluations for grain yield to biological yield. After testing "the normality residual exam", data were analyzed using SAS (version 6.12) and Minitab software. Analysis of results was made by stepwise regression to detect the most effective agro-morphological traits on economic yield.

### RESULTS AND DISCUSSION

The results of ANOVA showed significant difference ( $p < 0.01$ ) among lines for the majority of traits including, days to 50 percent heading, days to 50 percent anthesis, RWC, ELWR, number of tillers per m<sup>2</sup>, number of spikes per m<sup>2</sup>, number of spikelets per spike, peduncle weight, spike weight, grain weight per spike, straw weight of spike, flag leaf length, flag leaf area and harvest index of spike. These results indicated that lines had high diversity for the above-mentioned traits. Information presented indicates that the traits of days to 50 percent anthesis, days to 50 percent heading and number of tillers per m<sup>2</sup> had the maximum effect on heritability and the traits of harvest index per m<sup>2</sup> and grain yield had the minimum. It can therefore be determined that the above-mentioned traits with high broad sense heritability are controlled by genetic factors, and as such have a good response to selection. Results shows that the

magnitude of Phenotypic Coefficient of Variation (PCV) was higher than that for Genotypic Coefficient of Variation (GCV) for all characters studied and that ELWR and number of tillers per m<sup>2</sup> had the maximum genetic variance and traits of days to 50 percent heading and days to 50 percent anthesis had the minimum.

**Keywords:** Genetic Diversity, Yield, Phenotypic Coefficient of Variation, Genotypic Coefficient of Variation

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