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Research Article

EVALUATION OF YIELD AND YIELD COMPONENTS OF WHEAT

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ABSTRACT
Wheat, regardless of its important trading value in the world, is an efficient weapon in global and political relations which its application importance is increasing day by day. While the Iranian population is 1% of world population, it consumes about 2.5% of world's wheat. Wheat is strategic goods like energy and also is one of the important indices of agriculture. To evaluate the yield and yield components of 4 genotypes of wheat an experiment was carried out in randomized complete block design in three replications in the 2014 crop years at Ardebil. The results from ANOVA have indicated the existence of a significant difference among the studied genotypes, regarding all traits of evaluation. Total mean of grain yield of studied genotypes in this experiment was 1340.75 kg per hectare. Genotypes n. 4 with 1528 kg/ha in relation to other studied cultivars and studied genotypes produced the highest and genotypes n.1 the lowest grain yield (1028 kg per hectare).

Keywords: *Wheat, Yield and Yield Components*

INTRODUCTION
Cereals are the most important crops and provide 70% of people's food on earth and constitute the main basis of human nutrition and survival. Wheat and rice provide approximately 60% of energy required for humans and generally, more than 3.4 of energy and 1.2 of protein required for humans are provided from cereals (Imam, 2003).
As Iran, in terms of climate, is situated in an arid and semi-arid region, therefore the risk of drought always threatens wheat. Therefore, in order to achieve a sustainable self-sufficiency, drought resistant cultivars with high yield must be used. In this regard, the identification and production of resistant and high-yielding cultivars is of high value in the investigations.
Grain yield and its related traits have a complex genetic control and multiple loci associated with quantitative traits are responsible for this (Baum *et al.*, 2003). So that Mohammadi *et al.*, (2008) have identified fifteen cases for 1000 barley grain weight and seven, for the grain yield. The grain yield and its stability in many areas of environmental stresses have always been used as an important criterion in selection and introduction of cultivars (Trethowan and Reynolds, 2007). On the other hand, the grain yield is a quantitative trait and is controlled by many genes. Furthermore, due to environmental effects and also genotype-environment interaction, the heritability of this trait is low; thus, selection based on the grain yield for its improvement may be less effective (Richards, 1996).
Morphological traits could be measured easily and with high precision and they have a relatively high heritability, so selection based on these traits may be the safe and rapid way for screening plant communities and improvement of yield (Yap and Harvey, 1972).
The results of researchers' studies have shown that there is a high correlation between the grain yield and the total dry material at the time of maturity in drought stress and stress less conditions. They have stated that the grain yield and total dry material of the plant severely decrease with the emergence of drought stress in the anthesis (Grant *et al.*, 1989). Therefore, in areas where there is a drought risk at the end of the growth season, the use of drought-resistant cultivars adapted to the region that have the potential for high grain yield and low sensitivity to drought stress, is recommended.
DeVita *et al.*, (2007) consider the increase in the number of grains per spike as the main factors of increase in yield. Many scientists believe that increase in grain yield is due to source-repository balance (Richards *et al.*, 2001). But evidence shows that even in one case, the new wheat lines are also the limiting factor repository (Calderini *et al.*, 1999; Reynolds *et al.*, 2000).

The 1000 grains weight is one of the important yields of wheat grain and is determined by the rate and duration of grain filling. Filling rate is controlled by many genes but filling duration is influenced by the environment. Singh and Patel (1996) studied the effects of drought stress at different stages and concluded that grain yield and grain filling period are influenced by drought. The environment is effective in the grain filling rate and also in grain filling duration. Under dry environmental conditions, grain filling duration is reduced. Low temperatures during grain filling period, cause a reduction of grain filling rate and increase of grain filling duration and in general, increases the grain weight. This shows that there is a correlation between the grain filling rate and grain filling duration (Gebeyehou *et al.*, 1982). Thus increasing grain weight is possible by increasing grain filling duration and reducing its rate (Gebeyehou *et al.*, 1982).

MATERIALS AND METHODS

This study was conducted in the crop year 2013 at Ardebil. In the present research, 4 genotypes of wheat were studied in the crop year 2013.Soil tillage operations included plowing, disk and making furrows in the fallow land.

Phosphate fertilizer of the Ammonium Phosphate source, in the primary form, and Nitrogen fertilizer from urea source were consumed in two primary and later results of the laboratory research of soil and water research sections.

Each of the lines was planted in two rows of length and a row-spacing of 25 cm by hand and steadily. Seeding rate was determined based on 300 grains per square meter and the 1000 grain weight In order to prevent from smut the consumed seeds were disinfected by fungicide vitawax before cultivation.

Also operations started to do away with weeds with broad and narrow leaves, using Topic and Granstar pesticides.

The experiment was conducted in the rainfed pattern and in dry land research farm.

After data normality test, the data were used to compare the mean at the 5% possibility level in the form of randomized complete block design of the variance analysis and Duncan's multiple range tests. The computer software EXCEL, SPSS-22 and Minitab 16 were used to analyze the data and draw diagrams.

RESULTS AND DISCUSSION

Based on the results of the Variance analysis of evaluated traits (table 1) of genotypes under study, regarding all traits there was a significant difference. This is a result of high genetic variety among studied genotypes regarding the studied trait.

Table 1: Variance analysis of studied traits in 4 cultivars of wheat in dry conditions

S.O.V	df	Mean of squares		
		yield in hectares	1000 grain weight	Seed number per spike
Rep	3	55256.6ns	5.89ns	2.03ns
Genotype	18	257321.06**	23.258**	4.325ns
Error	54	21584.03	1.563	3.01
C.V%		2.48	2.629	3.913

andstand respectively for significant differences at the 5% and 1% levels*

The total mean of the 1000 rain weight of 4 genotypes was equal to 36.4 gr. Genotypes n. 3 devoted the most thousand grain weight to themselves and were placed in class a (Figure 1).

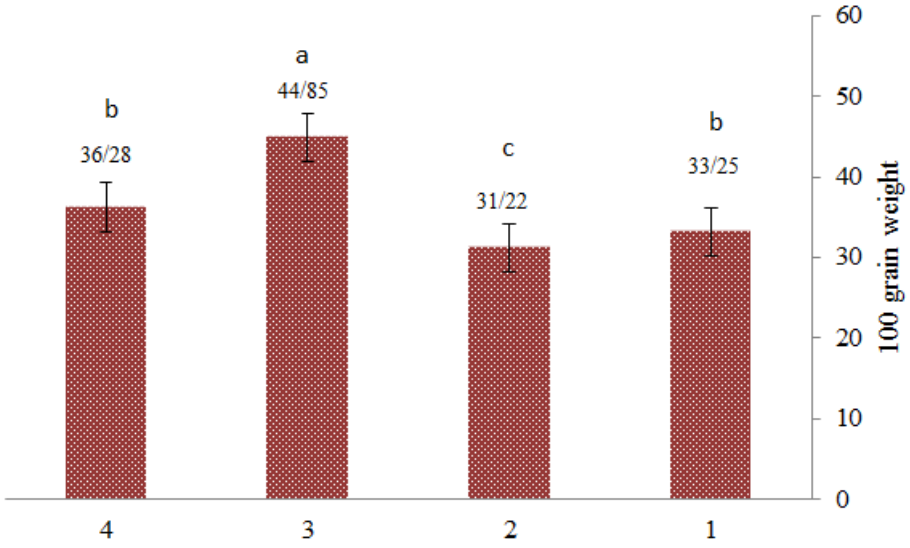

Figure 1: Average genotypes evaluated for 1000 grain weight

Statistical analysis of data related to the grain yield trait showed that there is a significant difference at the 1% level among studied genotypes regarding the grain yield (table 2). The significance of difference between genotypes and cultivars for the grain yield is indicative of the massive genetic variety between cultivars and studied genotypes. So, in breeding programs there exists the possibility of using the present variety to create high-yielding cultivars. Total mean of grain yield of studied genotypes in this experiment was 1340.75 kg per hectare. Genotypes n. 4 with 1528 kg/ha in relation to other studied cultivars and studied genotypes produced the highest and genotypes n.1 the lowest grain yield (1028 kg per hectare) (figure 2).

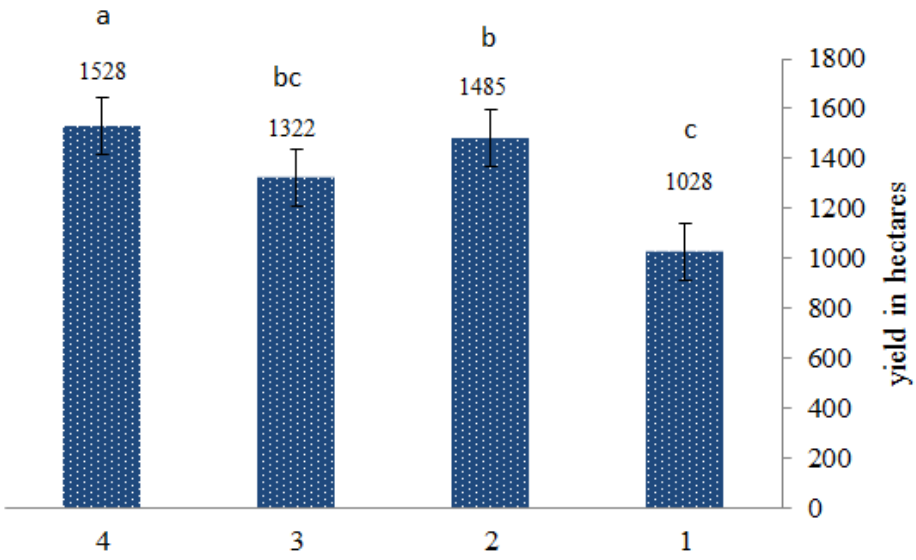

Figure 1: Average genotypes evaluated for yield in hectares

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