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Survey, Correlation of Yield and Yield Components in 40 Lines Barley (*Hordeum vulgare* L.) in Region Tabriz

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Abstract: In order to assess 40 morphological and agronomic lines of barley, an experiment in a randomized complete block design with three replications was done. Between the lines of all traits except harvest index. Lines 10, 13, 21, 22, 23, 25, 27 and 31 were better than the other lines from the Yield and most of the evaluated characteristics Biomass, tiller number in fertile and infertile, harvest index, plant height and spike length were significantly positively correlated with grain yield. In multiple regression analysis, spike length, awn length, seed weight, number of fertile tillers biomass remained in the final model.

Key words: Yield components · Barely lines · Correlation

INTRODUCTION

Barely with its scientific name; *Hordeum Vulgare* is one of the oldest cereals cultivating in the Moderate areas of the world [1].

Grain yield in barley, like other crops, is very complex trait that is a function of genetic and environmental factors are. In different environmental conditions, different characteristics effect on increasing the seed Yield, the affect rate of these characteristics can be different depending on the Barely kind [2].

Attempting for producing Cultivars with high Yield through the compilation of high tillering power, long spike, large seeds in one genotype has not been successful, because the compensation effect of Yield components cause the affects to be Mediocrity, [3]. The number of spike or fertile tillers is due the bushes density, power of tillering, survival of tiller and whilst the number of spike is also affected by genotype and cultivating Yield. The number of seed in every spike and the 1000 Seed weight is also due to physiological process of plant growth and development [3].

The correlation between the characteristics and the seed Yield in Barely showed that seed Yield has a Significant and positive correlation with the length of spike, the number of seed per spike, the 1000 Seed weight and Biological Yield. Also, the number of fertile tillers per plant, grain weight per spike and grain yield has a direct effect is positive and significant. Tomer *et al*. [4] Showed that the direct effect of high grain yield, grain number per spike and grain weight were followed.A lot of views/opinions have been presented about the relations between, the herbs height and the seed Yield. Brigges, [5] Sammare *et al*. [6]. Informed that the correlation between the herbs height and seed Yield is positive, while Sheng *et al.* [7] said that there is a negative relation between the herbs height and seed Yield.

The purpose of this research is identifying the high Yield potential lines and making decision about the importance of the effective characteristics on the seed Yield.

MATERIALS AND METHODS

The experiment was done in the cultivating year 2009-2010 in the Agricultural research station of Islamic Azad University of Tabriz, Situated in 15 kilometers East of Tabriz with 46° longitude and 17 Eastern minutes and 38° Latitude and 5 Northern minutes and with 1360m height from the sea level. In this study, 40 barley lines using a randomized complete block design with three replications were examined. Each line cultivated in three, 2meters rows placed in 20centimeter from each other. In the tillering stage, the Urea fertilizer diffused on the experimental units up to 100 kg/hec. Characteristics like; seed Yield, biomass Harvest index, seed numbers per spike, the 1000 Seed weight, Plant height, spike length, awn length, number of fertile tiller of infertile tiller, was measured. For Significant

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Table 1: Characteristics lines used in the experiment of barley

No	Line	Pedigree
1	EC79-10	Walfajre/Miraj 1
2	EC79-13	Kmk/Wa2196-63/EBC(A)
3	EC79-18	Lignee 131 //4341 N/Ortolan
4	EC80-7	YEA389.3/YEA475.4
5	EC80-11	Alger/(CI10117/CHOYO.
6	EC80-13	Ceres/W12192/Emir/3/Karoon
7	EC81-11	Coss/OWB 71080-44-1H
8	EC81-13	Comp 89-9 Cr-79027/Atem//(Alpha/HC1905//ROBUR)/3/…
9	EC82-5	Alger/(CI10117/Choyo.
10	EC82-10	Arar/Productive
11	EC82-11	Np106/Minn 14133-Gvaxduois//Gi0143
12	EC83-4	L.131/Gerbe//Ager-Ceres/3/(Sotia/Wa…)
13	EC83-5	Arar/L.1242
14	EC83-10	GkOmega
15	EC83-12	K-096M3
16	EC83-15	Schuyler//(M.RNB89.80/NB1905//L.527)
17	EC83-17	Makouee//Zarjow/80-5151
18	A1C84-7	Star/Dundy
19	A1C84-9	F2//Radical/Karat/3/Radical/4/Xemus
20	A1C84-12	Kozir/330
21	A1C84-14	Astrix©/3/Mal/OWB753328-5H//Perga/Boyer
22	A1C84-15	Monolit/Plaisant
23	A2C84-5	CWB117-77-9-7/Teran78
24	A2C84-6	CWB117-77-9/Teran78
25	A2C84-8	Legia/3/Arizon5908/ATHS//L.640
26	A2C84-11	Roho/Mazurka//Dyton
27	A2C84-12	Boyer(F356)126//Cem1413/Kt2085
28	A2C84-14	Cyclone/ Arar
29	A2C84-18	Mal/OWB753328-5H//11840-76/3/Radical
30	A2C84-17	Monolit/Plaisant
31	makuie	makuie
32	CB74-2	CB74-2
33	Reyhan	Reyhan
34	kavir	kavir
35	73M4-C	73M4-30
36	Schulyer	Schulyer
37	L.1242	L.1242
38	Aths	Aths
39	EM80-7	Rihane//Aths/Bc
40	EM80-9	L.B.Iran/Una 8271//Gloria "S"/Come"s"-11M/3/Kavir

on characteristics, except the seed Yield and biomass, 10/ten plants of any plots were used and for measuring the seed and biomass Yield, all plants of any experimental unit were used. Considering details the variance analysis evaluated and confirmed in all of the characteristics. It was used of multivariate analysis, for fixing (confirming) the first kind of error. Then it univariate analysis of variance for all traits were measured as a randomized complete block design. SPSS and MSTAT-C Softwares were used for statistic analysis.

The characteristics of used lines are shown in Table 1.

CONCLUSIONS AND DISCUSSION

First, considering data, the variance analysis evaluated and confirmed. Then the variance on variance analysis was done based on randomized complete blocks and the results showed that the studied lines have a Significant difference in all evaluated characteristics, except the number of infertile tillers and Harvest index (Table 2) this shows that there is genetically variety between the studied lines, we can utilize from this variety, for selecting better lines Breeding programs. The least variation coefficient among the studied characteristics

Table 2: Analysis of Variance For traits studied

S.O.V	df	Mean of Square: Plant height	Spike Length	Awn length	Peduncle length	Number of grains	1000 Seed weight
Block	2	961.689**	1.570**	1.835	31.903*	260.73**	4.29
Line	39	150.250**	1.364**	1.407*	25.457**	55.18*	33.31**
Error	78	59.436	.331	.856	10.130	32.97	4.35
C.V (%)		13.14	11.39	9.28	11.89	21.91	4.97

S.O.V	df	Mean of Square: Biomass	Grain Yield	HI	Flag leaf	Number of fertile tiller	Number of infertile tiller
Block	2	90.395114**	36042.63**	42.4882	6.364**	4.496**	2.192
line	39	64882.993*	10998.69*	31.138	3.393**	2.209**	0.410
Error	78	49.39095	6371.973	20.809	0.532	0.797	0.520
C.V (%)		56.21	25.56	13.68	28.67	22.42	34.11

Table 3: Correlation coefficients between traits in barley lines

	Grain main spike	1000 Seed weight	Grain yield	Biomass	Number of fertile tillers	Number of infertile tillers	HI	Plant height	Peduncle length	Spike length
1000 Seed weight	-.390*									
Grain yield	.090	.014								
Biomass	.128	.211	.874**							
Number of fertile tillers	-.162	.331*	.684**	.712**						
Number of infertile tillers	.069	-.047	.491**	.534**	.586**					
HI	-.024	-.329*	.603**	.152	.236	.131				
Flag leaf	.406**	-.0.85	-.218	-.274	-.408**	-.330*	-.025			
Plant height	.244	.363*	.426**	.651**	.331*	.036	-.243			
Peduncle length	.185	.428**	.238	.460**	.182	-.174	-.293	-.837**		
Spike length	.023	.056	.331*	.512**	.468**	.245	-.156	-.382*	-.276	
Grain main spike	-.403*	.135	.109	.128	.231	.046	-.004	-.027	--.044	.563**

belonged to the 1000 Seed weight and the length of awn (4.97% and 9.28% respectively). The numbers of infertile tiller, with the most variation coefficient (34.11), were more influenced by environment. the variation coefficient is a standardized criteria and shows the characteristics value repetition rate, but less number of this criteria, repetition, indicates, less influence of the environment on these characteristics.

The variation coefficients between the studied characteristics based on data mean, has been inserted in Table 3. the seed Yield has a positive and Significant correlation with biomass,plant height, spike length, Harvest index and the number of fertile and infertile tillers. Biomass has the highest correlation coefficient with the seed Yield. Jafarzadeh, [8] observed a Significant, positive and simple correlation between the seed Yield and Harvest index, by evaluating 25 Cultivars and the promising line of Barely. The Significant and positive correlation of the seed Yield with the plant height is rational, since height increase is possible through providing growth best conditions and the more green level resulting in increase of CO2 absorption and producing high "Photo Osmilate Production and accumulation of materials, fertilization, seed formation and filling and Result it possible to greatly increase the yield [9]. 1000 Seed weight had a Significant and positive correlation with the number of fertile tiller, plant height and Peduncle length; that is, increasing of fertile tiller numbers, plant height and Peduncle length causes to increase the 1000 Seed weight.

The correlation between the 1000 Seed weight and Harvest index was negative and significant. It was gained negative and significant correlation between the seed numbers per spike and the 1000 Seed weight. Since the maximum Yield is limited in a given condition, thus the 1000 Seed weight decrease by increasing the seed numbers. The length of awn had also a Significant and negative correlation with the seed numbers. Biomass in addition to having a significant positive correlation with the number of fertile tillers, plant height, spike length, peduncle length and number of fertile tillers was also positive and significant correlation. Correlation between number of fertile tillers with fertile tillers, plant height and spike length, flag leaf area with positive and negative, were significant. The number of fertile tillers, Low significant negative correlation with the flag leaf.

Table 4: Regression of grain yield With traits

S.O.V	df	Mean of/square	F
Regression	5	.024	41.227**
Diversion of the regression	34	.001	

Table 5: Regression coefficients of traits related yield

Respectively traits of the model	Regression coefficient
Spike Length	-.310*
Awn length	.147
1000 Seed weight	-.258**
Biomass	.895**
Number of fertile tiller	.243*

Correlation with plant height, peduncle length and spike length were positive and significant. Spike length, awn length relationship was also positive and significant. Amini [10] With different varieties of barley, the highest correlation between grain yield and grain number per spike was observed. Amer, [11] reported a Significant correlation between the seed Yield and the number of seed per spike, but no correlation between the seed Yield and the 1000 Seed weight. According to the same reports and contradictory results, it is obvious that determining the correlation rate of Yield components and Yield it, depends to some extent on the evaluating lines and on environmental conditions [12].

In multiple regression analysis, Five trait (spike length, awn length, 1000 Seed weight, biomass and the number of fertile tillers) remained in the last regression model and they also considered as influencing components on the seed Yield. The explanation coefficient (R^2=0.84) Showed that more than 80 % yield variation are expressed by these variables (Ttables 4 and 5).

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