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Article

Study the Genetic Performance of Some Faba Bean Genotypes Under Mosul Condition, Iraq.

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ABSTRACT

Throughout the agricultural season fall 2020/2021, research has been carried out in the vegetable research field of the Dept. of Horticulture and Landscaping, Univ. of Mosul, to investigate the genetic performance of several Faba bean genotypes under consideration of Mosul conditions. Seeds of 7 bean cultivars were sown (S2009-175, FBSPN2, Aguadulce, ILD1814, Histal, Favada Orio, and Luzde otono). The genotypes differed considerably in all of the examined variables at a probability threshold of 5%, according to the results of an ANOVA table analysis of sources of variance. The genotype FBSPN2 has been superior in characteristics of plant height and seed yields regarding each of the experimental units. S2009-175 produced the maximum number of dry pods for each plant, Favada Orio in the trait of seed length and pod weight, and Histal produced the maximum diameter of a pod and number of seeds in each one of the pods and diameter of seed for each experimental unit. The genetic and phenotypic variance was high for the weight of the pods for each one of the plants, the weight of 100 seeds, and the height of the plant, according to the results of the genetic parameter analysis, and the percentage of heritability in a broader sense had exceeded 60% for the traits, number of pods, and plant length. For the experimental unit, dry pod weight for each plant, dry pods per plant, seed diameter, pod length and diameter, dry seed yield, and 100-seed weight were all high, and genetic improvement for pod weight, seed weight, and weight of a 100-seeds was high as well.

Keywords: Faba bean, Seed properties, Genetic parameter, Genotypes, Heritability.

INTRODUCTION

The bean plant is known by the names Broad bean and faba bean, and the plant, when producing dry seeds, is known as field bean, horse bean, and all varieties or genotypes thereof, whether planted for the use of green pods for human consumption or dry seeds by Vicia faba L. It represents one of the plants of the legume family[1]; it is believed that its original home is the Mediterranean basin or in central or western Asia, as the ancient Egyptians, Jews, Greeks and Romans knew it [2]. When the faba crop was mixed with soil, bacterial nodules were induced to develop on the plant's roots, which helped keep the soil fertile. It also helped to provide the soil with nitrogen [3 4]. Its green pods or dry seeds are of high nutritional value. Their dry seeds are rich in protein, carbohydrates, niacin, and riboflavin, in addition to calcium, phosphorous, and iron, and their green seeds are very rich in niacin, relatively in carbohydrates and phosphorous, and are medium in their content of protein, calcium, phosphorous, iron, thiamine and acid. Ascorbic. It is one of the main vegetable crops in Iraq, as its green pods are harvested at the beginning of spring and marketed as a green crop, or the pods are left on the plant to dry during the summer and harvested as dry seeds. The predominant pollination in barley is due to the dispersal of pollen grains on the stigma inside the canoe, and the cross-pollination rate is less than 10% [5]. Varieties and genotypes of beans vary in many vegetative, flowering, fruiting, green yield, and nutrient content of dry seeds due to the variation of the genetic factors they carry in addition to the environment in which they are grown and produced [6,7, 8, 9]. Furthermore, [10] indicated that the average yield in the bean for the trait of total seed yield differed significantly. In the first generation of bean cultivars, [11] discovered considerable differences in the number of pods/plant, plant height, weight of 100 seeds, and number of seeds/pod between the average of hybrids and parents. The number of lateral branches per plant, plant height, number of seeds in every pod, number of pods/plant, seed yield per area unit, and weight of 100 seeds have all been significant factors. Knowing how genetic variables are transmitted from parents to succeeding generations and their effect on the external appearance of plants through knowledge of genetic behavior and the nature of the function of genes in traits is critical to estimating genetic parameters and constants.

Various researchers, including [13,14], found that the genetic variance has been considerably different for each of the number of lateral branches for every plant, plant height, pod length, number of pods/plant, the dry yield of fruits (pods), the weight of a 100 seeds, and total seed yield in various genotypes of bean. The number of lateral branches in every plant, plant height, pod length, number of pods in every one of plants, total seed yield per unit area, and weight of 100 seeds all had a high percentage of heritability in the broad sense. There are considerable differences between genotypes understudy for properties of plant height, number of seeds/pod, number of branches per plant, date of flowering and maturity, total seed yields, and 100 seed weight, based on the results of the analysis of variance regarding the examined traits [15, 16, 17, 18]. [19] indicated in their study that the mineral element concentration was significantly varied among the genotypes. The genotype (S 2009, 140) gave a high value in the number of seeds per pod, while the genotype (S 2008, 096) was supervised in seed diameter. Genotype gave a high value in seed length. On the other hand, the genotype (S 2009, 175) was supervised compared with the other genotypes under the study. The genotype (S 2008, 034) gave a high value in the seed weight per plant; the genotype (S 2009, 140) supervised in Fe concentration which was given a high value (5.275%) compared with the other genotypes, while the genotype (Aguadulce) gave high value in K concentration (4.1%), the genotype (S2009,40) supervised in Ca concentration (1.75%) comparative with the other genotypes under the study. On the other hand, the genotypes (S 2009, 116, S 2009, 81, S 2008, 034) gave a zero (0.0%) concentration in Mn., while the genotype (S 2008, 096) gave a high value in Pb concentration (8.710%). The genotype (ILB 1814) was supervised in N concentration and protein (4.9% and 30.625%), respectively. In their study, 19 discovered that the 15 Vicia genotypes were significantly different based on the size, plant height, flowering days, number of pods for each one of plants, the diameter of the pod, number of branches/plant, seed length, pod length and diameter, number of seeds in each of the pods, seed weight /plant, 100 Seeds weight, and total seed yields /unit area.

This research aims at studying the genetic performers for some of the genotypes of the faba beans under the Mosul government condition, Iraq.

MATERIALS AND METHODS

This research was performed in vegetable research of the Department of Horticulture and Landscape Engineering / Univ. of Mosul over the growing season, fall 20/21, to study genetic performers for some faba bean genotypes under Mosul conditions. The land allocated for this was prepared in the form of lines, then the seeds were planted for the genotypes of the barley used in the study, Table 1, at a distance of 15 cm between a hole and a second, with 10 plants for each genetic composition.

No.	codes	Entries	Pedigrees	Origins
1	P1	FBSPN-2	WBR 2-7x WRB 1-4x local	**Icarda**
2	P2	S2009, 175	ILB1266-L 28/05x sel.99 latt10418	**Icarda**
3	P3	ILD 1814	Syrian Local Large	**Icarda**
4	P4	Aguadulce	ILB 1266	**Spain, Icarda**
5	P 5	Favada Orio	France	**Local markets**
6	P6	Hostal	Spain	**Local markets**
7	**P 7**	**Luzde otono**	**Spain**	**Local markets**

Table 1. Genotypes that have been utilized in this research, as well as their symbols.

The distance between the line and the last was 75 cm. For each experimental unit (genotype), all experimental units were fertilized at (30, 60 kg K/ha as K_2So_4, and 60 kg P/ha as P_2O_5, and all of the agriculture service operations were conducted in terms of the hoeing, weeding, and controlling disease and insect infestations as soon as they appeared, as is the case in the productive fields in the production area [20]. The data have been recorded on 5 plants from every experimental unit (i.e., genotype) and included the number of lateral branches for every plant, the height of the plant (cm), the number of dry pods for each plant, the weight of dry pods for each plant (grams) at the stage of seed extraction, pod length and diameter (Fruit) at the stage of seed extraction (cm), the weight of dry pods per plant (gm), number of dry seeds for each fruit (pod) length and diameter of seed (mm), the weight of a 100 seeds (gm), dry seed yield in each one of the experimental units (kg) Dry seed yield (tons/dunam). The genetic parameters of the characteristics of genotypes under study, including the components of phenotypic and genotypic variation, have been analyzed based on the following equation: $\delta 2P = \delta 2G + \delta 2E$. The coefficient of phenotypic and genetic variance was estimated according to the following equation, which was adopted by [23] from the following equations:

$PCV\% = (\delta 2\ P/\tilde{Y})\ x\ 100.$

$GCV\% = (\delta 2\ G/\tilde{Y})\ x100$

where $\tilde{Y}$ = arithmetic average value of adjective. The percentages of the heritability in broad understanding were also calculated based on the findings by (Falconer and Mackay, 1996). The limits of the values of heritability in the broad sense were adopted by [21], which are H2(b.s) Less than 40% Low, 40-605 Medium, More than 60% High.

Also estimated is the expected genetic improvement according to [24] from the following equation.

EGA. % = [(K H2(b.s) $\sqrt{\delta 2 P}$) / Ỹ] x 100

According to [22], these values were determined and are E.G.A Less than 10% Low, 10-30% Medium, and above 30% High. All agronomic data have been recorded and subjected to and compared to a level 5% probability [25]. Level analyses with the use of the SAS statistical program [26, 27]. The genotypic, as well as phenotypic correlations between the seed yield and yield-associated features have been calculated with the use of the approach that has been explained by [46]. For the analyses of indirect as well as direct impacts over seed yields, path analyses have been conducted among traits, with estimates being obtained with the use of equations of the regression, where properties had been standardized previously, using an approach that had been explained by [47].

RESULTS

Analyses of the Variance

Table 1 lists analyses of the sources of difference for twelve traits in genotypes of the bean, which shows the average sum of squares. The table shows that genotypes were significantly different in all studied features at a 5% probability level.

The general average of the traits studied

Table 2 shows average values of the vegetative growth traits, yield traits, and elements in 7 of the cultivars and genotypes of beans. It has been seen from this table that the FBSPN-2 genotype has been considerably superior to plant height (97.333) cm with compositions genotypes Favado Orio, Histal, and Luzde option. However, it did not differ significantly with the genotypes S2009,175, ILD1814, and Aguadulce, and did not reach the significance limit for this trait among genotypes Favado Orio, Histal and Luzde otono. As for the trait of the number of lateral branches for every one of plants, genotype Histal (7.33) was significantly superior to genotype S2009,175 and Aguadulce, which produced the least number of 4.66 and 4.66, respectively, and did not reach the significant level between genotypes (FBSPN2, S2009,175, ILD1814 and Aguadulce, Favada Orio and Luzde otono.

As the same table shows, the genotypes differed significantly in the characteristics of the number of dry pods for each plant, genotype S2009,175 produced the highest number of 48.00. It differed significantly with all genotypes, while genotype 6 produced the lowest number of 24,667. Also, genotype Favada Orio was significantly superior to the weight of pods for each plant (754.67 g) with the other genotypes, and genotype 6 produced the lowest weight, which amounted to 420.00 g. As for the pod length trait, genotype Favada Orio (23.333) cm outperformed genotype FBSPN2, S2009,175, ILD1814, Aguadulce, and genotype Aguadulce produced the lowest value in that, amounting to 16.33. However, this trait did not reach the significance level among genotypes Favada Orio, Histal, Luzde ontono. Genotype Histal produced the highest pod diameter of 2.433 cm and has been considerably better than the rest of genotypes FBSPN2, S2009,175, and ILD1814.

S.O.V	df	Mean square											
		X 1	X2	X3	X 4	X5	X6	X 7	X 8	X9	X 10	X11	X 12
Block	2	27.1905	1.2857	9.3333	76.7619	0.1633	0.0129	0.619	0.1668	0.0075	53.0366	0.0510	0.1718
Genotypes	6	772.079 **	2.9365 **	227.825 **	4303752.18 **	25.6556 **	0.1400 **	2.4444 **	0.8112 **	0.1107 **	2200.98 **	0.0630 **	0.227 **
Error	12	63.579	1.1746	4.6111	189.2619	0.3039	0.0095	0.2302	0.1588	0.0162	70.0182	0.0101	0.0638
Total	20												

Table 1. Anova analysis

X1=plant length (cm), x2=Number of branches /plant, x3=Number of the dry pods/plant, x4=weight of pods in each plant(gm), x5=pod length(cm), x6= diameter of the pod (cm), x7=seed/pod, x8= length of the seed (m.m), x9=seed diameter (mm), x10=100seeds weight (gm), x11=seeds yield /plot (gm), x12=total yield seed (ton/donum).

Genotype	Mean value											
	X 1	X2	X 3	X 4	X 5	X6	X7	X8	X9	X10	X 11	X 12
FBSPN-2	97.333a	5.333ab	41.667b	745.00a	17.300cd	1.833d	5.667b	20.307a	10.563ab	163.450b	1.180a	1.967a
S2009, 175	92.333a	4.667b	48.000a	706.33b	17.767bc	2.000cd	4.333c	20.230a	10.433bc	154.520bc	1.044a-c	1.740ab
ILD 1814	88.333a	6.333ab	40.667b	640.67c	18.400b	2.133bc	5.333b	19.033b	10.313c	139.947c	1.119ab	2.032a
Aguadulce	86.667	4.667b	36.667c	664.00c	16.333d	1.867d	5.333b	20.130a	10.467bc	143.103c	0.977bc	1.661a-c
Favada Orio	61.667b	5.333ab	29.333d	754.67a	23.2333a	2.267ab	6.000b	20.600a	10.753a	192.207a	0.887cd	1.478bc
Hostal	57.000b	7.333a	24.667e	420.00e	22.733a	2.433a	7.333a	20.433a	10.803a	102.600d	0.920bc	1.511bc
Luzde otono	69.00b	6.333ab	26.667de	547.67d	22.367a	2.167bc	5.667b	20.400a	10.770a	143.867c	0.756d	1.260c

Table 2. The average value for characteristics of faba genotypes at the growing seasons 2020/2021.

X1=plant length (cm), x2=Number of branches /plant, x3=Number of the dry pods/plant, x4=weight of pods in each plant(gm), x5=pod length(cm), x6= diameter of the pod (cm), x7=seed/pod, x8= length of the seed (m.m), x9=seed diameter (mm), x10=100seeds weight (gm), x11=seeds yield /plot (gm), x12=total yield seed (ton/donum).

Aguadulce and Luzde, otono and genotype FBSPN2 produced the lowest diameter in this trait of 1.833 cm. As for the characteristic of the number of seeds in each one of the pods, the table data shows that genotype Histal produced the highest number of 7.33 seeds. Besides, it considerably differed from all studied genotypes, and genotype S2009,175 produced the lowest number of 4.333 seeds. At the same time, there were no significant differences between genotypes FBSPN2, ILD1814, Aguadulce, and Luzde otono for this trait. It also appears from the same table for the character of seed length that genotype Favada Orio gave the highest length, which was 20,600 mm. It differed significantly from the remaining genotypes, while genotype ILD1814 showed the lowest length (19,033) mm, there were no significant differences between the genotypes FBSPN2, S2009,175, Aguadulce, Favada Orio, Histal, Luzde otono for this adjective.

The superiority of genotype Histal has been considerably superior in property of the diameter of the fruit, as it gave the highest diameter, which amounted to (10,803 mm), and the lowest diameter resulted from genotype ILD1814, which was 10.313 mm. There were no significant differences between the genotypes FBSPN2, Favada Orio, Histal, and Luzde otono. Also among the genotypes, FBSPN2, S2009,175, ILD1814, and Aguadulce in this trait. As for the 100-seed weight trait, genotype Favada Orio outperformed the remaining genotypes, as it resulted in the production of the maximum value of 192.207gm, and the lowest weight resulted from genotype Histal, which amounted to 102.600 gm. There have been significant differences between genotypes for the trait of seed yield for each experimental unit, as genotype FBSPN2 produced the highest yield of 1,180 kg, and this was superior to genotypes Aguadulce, Favada Orio, Histal, and Luzde otono. The lowest yield resulted from genotype Luzde otono, which amounted to 0.756, and it did not reach the significant limit for this trait among genotypes S2009, 175, Aguadulce, Favada Orio, Histal. As for the seed yield trait per unit area, genotype FBSPN2 produced a maximum total seed yield of 1.967 tons per dunum and a minimal total yield produced by genotype ILD1814, which produced 1.132 tons per dunum. Through these results obtained, the genotypes of the bean have varied among themselves in the traits studied under conditions of Mosul city. For the conditions of the city of Mosul, from the results of Table 3, it was found that the genotypes and cultivars of the bean have varied among themselves in most of the studied characteristics, which have been represented in properties of vegetative growth, yields, and its elements, and seed traits.

Genetic constants

The table shows the genetic constants for the studied traits in seven genotypes of the bean, represented by genetic and phenotypic variance, the genetic and phenotypic variance coefficient, the heritability percentage in the broad sense, the projected genetic enhancement, and the general average of the expected genetic improvements for twelve traits in the genotypes. It appears that genetic variances have been high. For the characteristic of the weight of the pods for every plant, it reached 14,282,754, followed by the characteristic for the weight of 100 seeds (710.0892), and then for the characteristic of the height of the plant, 236.1667.

It also appears that the phenotypic and genetic variances have been high for plant height characteristics, the number of lateral branches for each plant, the weight of pods in every plant, and the weight of 100 seeds. As it appears from Table 3, that percentage of the heritability in broad sense has been high for the characteristics of number of dry pods/plant, plant height, the weight of pods in each plant, pod length and diameter, number of seeds in every pod, and weight of 100 seeds, as it was (78.7889, 94.1643, 98.6922, 96.5287, 82.0359, 76.2295)., 91.0245) as a percentage, respectively, while the lowest heritability in a broad sense has been for the traits, the number of lateral branches for every plant (33.333%), for the seed yield of the experimental unit (63.4896%) and the trait of the total seed yield ton per acre (51.7490%). As for the expected genetic improvement, it has been high for the pod weight/plant (244.5765), 100 seeds' weight (52.3725), and plant height (28,1002). Many researchers have indicated that the genotypes of the bean vary among themselves in the coefficient of the phenotypic and genetic variance and the percentage of heritability in the general sense, especially for the characteristics of plant height, number of pods, the weight of pods, the weight of a 100 seeds, number of seeds per pod, and total seed yields. These characteristics are among the economic characteristics that plant breeders can From their phenotypic and genetic improvement and resorting to selecting structures with good specifications and choosing parents with good productive characteristics for inclusion in crossbreeding, breeding and improvement programs.

Correlation of phenotypic and genotypic between pairs of traits

Table 4 shows the phenotypic and genetic correlations between pairs of studied traits in seven barley genotypes. It appears from the table above that there are positive significant phenotypic and genetic correlations between plant height and total yield (0.581, 0.940), seed yield for the experimental unit (0.611, 0.914), pod weight characteristic for each plant (0.543, 0.614), and dry pod weight for each plant. Plant (0.865, 0.951) at the probability level of 1% and 5% was negatively significant with properties of seed diameter, length, the number of seeds in every pod, diameter and length of the pod, and with the height of a plant. The trait of number of side branches of each of the plants was also phenotypically and genetically significantly positively correlated with the number of the seeds in every pod and the diameter and length of a pod, which had amounted to (0.529, 0.997; 0.595, 0.978, 0.470, 0.807) at the probability level of 5%, respectively, and it has been significantly negatively correlated With characteristics of total seed yield and seed yield for each experimental unit, with the weight of 100 seeds and seed length. There are positive significant phenotypic and genetic correlations between the number of pods for every one of the plants with total seed yield (0.661, 0.864) and with the seed yield for the experimental unit (0.728, 0.831), the weight of 100 (0.271, 0.273), and the weight of the pods/plant (0.616, 0.650).). There were significant negative correlations with the rest of the other traits. As for the weight of the pods for each plant, there were positive significant phenotypic and genetic correlations with each of the total seed yields (0.373, 0.494), the seed yield of the experimental unit (0.406, 0.507), and the weight of 100 seeds (0.854, 0.913), and phenotypic and genetic correlations appeared. Significant negative with the rest of the studied traits of the genotypes. It also appears from data that had been recorded in the same table that there are positive significant genetic and phenotypic correlations between the length of a pod and each one of seed diameter (0.693, 0.945), the length of the seed (0.363, 0.513), and the diameter of the pod (0.849, 0.909), and negative morale with the rest of the attributes. Significant positive phenotypic and genetic correlations existed between pod diameter and seed diameter (0.480, 0.705), the number of seeds/pod (0.631, 0.733), and negative morale with the rest of the attributes. As for the property of the number of seeds per pod, there had been positive phenotypic and genetic correlations with seed diameter (0.550, 0.846) and a significant positive genetic correlation with pod diameter (0.428).

The characteristic of seed length also showed positive, significant phenotypic and genetic relation with seed diameter (0.702, 0.863) and a positive, significant genetic correlation at the level of 1% (0.246) and a significant negative correlation with the rest of the traits. The trait of seed diameter was also associated with negative significant phenotypic and genetic relationships with the total seed yield (-0.612, -0.747) and seed yield per experimental unit (-0.526, -0.886). There were also significant positive phenotypic and genetic correlations with the total seed yield (0.577, 0.995) at the 5% probability level.

Param-	Traits

eters	X1	X 2	X3	X 4	X5	X 6	X 7	X 8	X 9	X10	X11	X12
Coef. Var.	10.105	18.966	6.0692	2.1504	2.7935	4.6471	8.4661	1.9765	1.2025	5.6338	10.2368	13.940
R. square	0.860	0.5889	0.9616	0.9913	0.9769	0.8834	0.8580	0.7318	0.7775	0.9485	0.7978	0.7253
Б2p	299.7460	1.7619	79.0159	14472.0159	8.7544	0.0530	0.9683	0.3763	0.0477	780.1074	0.0278	0.1115
Б2g	236.1667	0.5873	74.4048	14282.7540	8.4506	0.0435	0.7381	0.2175	0.0315	710.0892	0.0176	0.0577
GCV	8.3470	5.7477	10.4485	8.0059	6.3134	4.2561	6.4976	0.9913	0.7187	7.6890	5.7853	6.1869
PCV	9.4037	9.9553	10.7674	8.0588	6.4259	4.6990	7.4420	1.3039	0.8844	8.0592	7.2607	8.6005
H2	78.7889	33.3333	94.1643	98.6922	96.5287	82.0359	76.2295	57.7984	66.0391	91.0245	63.4896	51.7490
GA	28.1002	0.9115	17.2429	244.5765	5.8835	0.3891	1.5452	0.7304	0.2972	52.3725	0.2179	0.3560
GA. MEAN	35.6128	15.9505	48.7350	38.2293	29.8152	18.5291	27.2683	3.6226	2.8073	35.2611	22.1577	21.3928

Table 3. The genetic parameter in faba genotypes during the growing period of 2020/2021

DISCUSSION

Genetics and their life cycle under the environmental conditions under which this study was conducted. Results came with [7, 28, 8, 11, 9, 29, 30, 14, 31, 32] that the genotypes or genotypes of the bean vary among themselves in properties of the vegetative and flowering growth, properties of the yield and its components and that the presence of these discrepancies between the genotypes and varieties is necessary to continue studying the genetic behavior of these traits in order to develop and improve future breeding programs and introduce them In different crosses in order to transfer good traits to offspring in breeding programs. In addition to the variation in the genetic factors carried by each composition or variety, which in turn was reflected in the growth characteristics, yield, and dry seeds, the variations in the varieties in the character of the number of pods in each plant are because of variety's ability to express its genetic contents and to the increase in the number of the flowering nodes on the main stem, which This is reflected in the increases in the number of the pods, 100 seeds weight, these results came with what was obtained by several researchers [10, 41, 42, 43, 44, 45, 15, 17, 18, 16]. It is clear from the results that the traits showed a wide range of genetic and phenotypic variance of vegetative growth traits, the weight of 100 seeds, and seed traits for each area unit. Affect these characteristics. These results came with what was found by [7, 33, 34, 35, 36, 37, 31, 32]. The results of genetic and phenotypic correlations indicate the possibility of taking the dry seed weight for each plant as an electoral guide for the varieties under study for use in future breeding and improvement programs. This was confirmed by [33, 36]. Phenotypic and genetic correlation of pairs of traits in the genotypes of barley with those mentioned [above 38, 39, 40, 8, 32].

Traits		Corr.	X 12	X11	X 10	X9	X8	X 7	X 6	X 5	X4	X3	X 2
1		Rp	0.581 **	0.611**	0.156	-0.654**	-0.395**	-0.701**	-0.772**	-0.874**	0.543**	0.865**	-0.489**
		Rg	0.940**	0.914**	0.232*	-0.961**	-0.516	-0.796**	-0.970**	-0.967**	0.614**	0.951**	-0.763**
2		Rp	-0.229*	-0.230*	-0.513**	0.231*	-0.032	0.529**	0.595**	0.470**	-0.627**	0.416**	
		Rg	-0.256*	-0.375**	-0.826**	0.722**	-0.223*	0.997**	0.978**	0.807**	-0.993	-0.513**	
3		Rp	0.661**	0.728**	0.271*	-0.701**	-0.388**	-0.744**	-0.659**	-0.817**	0.616**		
		Rg	0.864**	0.831**	0.273*	-0.961	-0.475**	-0.873**	-0.768**	-0.846**	0.650**		
4		Rp	0.373**	0.406**	0.854**	-0.388**	-0.022	-0.585**	-0.589**	-0.449**			
		Rg	0.494**	0.507**	0.913**	-0.480**	-0.045	-0.698**	-0.681**	-0.468**			
5		Rp	-0.583**	-0.620**	-0.027	0.693**	0.363**	0.624**	0.849**				
		Rg	-0.855**	-0.825**	-0.035	0.945**	0.513**	0.674**	0.909**				
6		Rp	-0.359**	-0.395**	-0.326**	0.480**	0.155	0.631**					
		Rg	-0.644**	-0.673**	-0.349**	0.705**	0.154	0.733**					
7		Rp	-0.359**	-0.120	-0.361**	0.550**	0.172						
		Rg	-0.644**	-0.488**	-0.497**	0.846**	0.428**						
8		Rp	-0.086	-0.464**	0.169	0.702**							
		Rg	-0.586**	-0.564**	0.246*	0.863**							
9		Rp	-0.612**	-0.526**	-0.038								
		Rg	-0.747**	-0.886**	-0.070								
10		Rp	-0.577**	0.131									
		Rg	-0.995**	0.049									
11		Rp	0.106										
		Rg	0.025										

Table 4. The genotypic and phenotypic coefficient correlation among characteristics in faba genotypes throughout the growing period of 2020/2021

CONCLUSION

After the study, the results revealed highly significant variance amongst 7 genotypes of the faba beans for all characteristics, seed parameters, and vegetative growth. For properties of the weight of the whole plant, the number of fruits (pod) for each plant, total seed yield per area unit, maximal genotypic and phenotypic coefficient of variation, heritability had been over 60% for all of the characteristics, with the high GA as a percentage of the average for most characteristics.

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