Response of some new pure lines of faba bean to irrigation treatments

Mehasen , S.A.S.

Dept. of Agronomy,Fac. Of Agric., Moshtphor , Zagazig university.

Abstract

Two field experiments were carried out in the Research and experimental Center of the Faculty of Agriculture at Moshtohor during 1995/96 and 1996/97 seasons. The aim of this study was to determine the effect of irrigation treatments (one , two and three irrigations) on four new pure lines of faba bean i.e (Moshtohor 6,10,43and Shebeen El-Kom 5 as well as the commercial variety (Giza 461). The characters studied were plant height (cm), number of branches/ plant, number of pods/ plant , number of seeds / pod and plant, weight of pods/ plant (g) , weight of 100 seed (g), seed yield /plant(g) and seed yield / fed (kg).

All traits under study in both seasons as well as the combined analysis were significantly increased by the increase in number of irrigations except number of seeds/pod and number of branches/plant in the first and second seasons, respectively.

The differences between faba bean genotypes were significant for all the studied traits in the separate seasons as well as the combined analysis , except weight of pods/ plant in the first season , number of branches/ plant , number of seeds/pod and plant and drought susceptibility index (DSI) in the second season, number of branches/plant, number of seeds / pod and weight of pods/ plant in the combined analysis . Moshtohor 43 had the highest seed yield /fed over the two seasons and out-yielded Moshtohor 6,10,Shebeen 5 and Giza 461 by 10.05.8.99,3.74 and 5.44%, respectively .

Significant positive phenotypic correlation values were detected between seed yield /fed or plant and each of other traits .Seed yield /plant followed number of pods/ plant had a high and positive direct effect on seed yield /fed.

The direct effect of seed yield /plant followed by indirect effect of number of pod/plant through seed yield/plant at the combined analysis, these effects account for approximately 72.72 % of seed yield/fed variation.

Introduction

Faba bean (*Vicia faba L*.) is considered the most important seed legume in Egypt . Many attempts had been carried out to increase the total production of faba bean to meet increasing human consumption demand . Two of the most important factors that may influence yield ability are ; irrigation treatments and new pure lines.

Many investigators had reported the effect of irrigation number on faba bean for yield and yield components. (Roshdy, 1975; El-Moghraby 1980; Zoromba; 1983; El-Moghraby; 1984; Amer; 1986; Ebaid ; 1990; Ainer; et al 1994; Khalil; 1995 and Pasquale and Antonio; 1995). Roshdy (1975) found that increasing the number of irrigation to 2,3 and 4 irrigations increased the seed yield by 12.36, 12.58 and 13.17% respectively as compared to that of one irrigation. Pasquale and Antonio (1995) reported that the increase in seed yield of faba bean due to irrigation was 14%.

To compare faba bean genotypes, El-Hosary (1981) and salwau and El-Hosary (1989), showed that seed yield of new lines were significantly higher than the commercial variety Giza 2. El-Hosary and Sedhom (1990) found that L66 and L43 had the highest values of seed yield / plant followed by L8 and was significantly higher than the check variety Giza 2 over two seasons by 60.52%, 55.06% and 38.18% respectively .

Thus, the objective of this study is to investigate yield and yield components response to irrigation number using some new promising pure lines.

Material and Methods

Four new pure lines of faba bean (Moshtohor 6, 10, 43and Shebeen El-Koom 5) as well as local variety Giza 461 were evaluated under three irrigation treatments, at the Research and Experimental Center of the Faculty of Agriculture at Moshtohor the irrigation treatments were, one irrigation at vegetative growth (40 DAP[1]); two irrigations at vegetative growth and flowering stages (40 and 75 DAP, respectively) and three irrigations at vegetative growth, flowering and pod formation stages(40, 75 and 110 DAP, respectively), during the two successive seasons of 1995/96 and 1996/97. The soil of the experiment was clay loam with pH 7.9 and organic matter content 1.72 % . The preceding crop was corn in both seasons. The procedures of developing the three new pure lines (Moshtohor 6, 10 and 43) were described by El-Hosary (1990). The pedigree and origin of the four pure lines is presented in table (1)

Table (1): pedigree and origin of the four Faba bean lines used in this work :

Pure line	Pedigree	Origin
Moshtohor 6	NEB 319 x I131	Moshtohor
Moshtohor 10	F 482 x I 131	Moshtohor
Moshtohor 43	Aquadols x Romi	Moshtohor
Shebeen El-Koom 5	61/1311/66 x Giza 1	Shebeen El-Koom

Split plot design with three replications was used in the two seasons.The irrigation treatments were randomly assigned to the main plots, and five faba bean genotypes represented in the sub-plots.

Each sub-plot was 5 ridges 3.5 m long and 60 cm wide, the sub-polt area 10.5m2 (1/400 fed). Planting was carried out on 8th Nov. in 1995/96 season, and on 16th Nov. in 1996/97 season .

At harvest ,ten guarded plants were taken at random from the central ridge to estimate : plant height (cm), number of branches / plant, number of pods / plant (g) , 100 seed weight (g) and seed yield plant (g) . Seed yield kg/fed, was determined from the three central ridges . Susceptibility index for drought (DSI) was calculated independently for each of one and third irrigation from original data for yield, whereas the original data from each replicate were transformed before analysis using a generalized formula Ali Dib et al (1990).

Drought susceptibility index (DSI) = (Yi – Yni)/Yi

[1]DAP = Day after planting

were Yi and Yni are the seed yield of irrigated and non-irrigated plants, respectively.

All the data for each experiment were subjected to the analysis of variance procedure (Snedecor and Cochran ,1981).Combined analysis was done for the data of both seasons, when the homogeneity test was not significant according to (Cochran and Cox, 1957) sample correlation coefficient of path analysis were calculated using the method given by Wright (1921,1923 and 1934).Duncan's multiple range test (1955) was used for comparison between means.

Results and Discussion.

A. Effect of growing season:

Data in Table (2) show that significant seasonal effects existed for all characters studied except number of seeds/ pod and 100-seed weight. Higher mean values for most characters were detected in the first season, whereas ,plant height and number of branches/plant maximum values were in the second one .It could be concluded that the increase in seed yield/fed on the first season may be due to the significant increase in number of seeds/ plant and weight of pods/ plant .

Table (2) : Mean values of seasonal effect.

Season	Plant height cm	No. of branches/ plant	No. of pods /plant	No. of seeds/ Plan	No. of seed/ Plant	wt. of pods /plant g	wt. of 100-seed g	wt. of seeds/ plant g	Seed yield kg/ fed
1995/96	74.85b	2.99b	15.08a	3.28a	49.71a	30.41a	56.90a	27.83a	1544.6a
1996/97	94.73a	3.31a	14.36b	3.20a	45.60b	28.60b	56.90a	25.64b	1394.6b

B- Effect of number of irrigation

All traits under study in separate seasons as well as the combined analysis were significantly increased by increasing the number of irrigation except number of seeds/pod in the first season and number of branches/plant in the second one as shown in Table (3).

Plant height and number of branches per plant significantly decreased by decreasing number of irrigations from three times to two or one . This is to be expected since water plays an important role in plants and moisture deficits can have a deleterious effect on most physical processes. Similar trend was reported by Roshdy, (1975); El-Moghraby (1980); Zoromba; (1983); El-Moghraby; (1984); Amer; (1986); Ebaid ; (1990); Ainer; et al(1994); Khalil; (1995) and Pasquale and Antonio; (1995).

Seed yield/fed or per plant and yield components in separate seasons and the combined analysis increased significantly by watering faba bean plathree irrigation treatment to two and to one irrigation Table (3).

The decrease of seed yield/fed, seed yield /plant,100-seed weight, number of seeds /plant, number of seeds/pod and number of pods/plant over both seasons were 31.67 and 12.67%; 35.14 and 13.77%; 9.22and 4.27%; 29.49 and 10.94% ; 10.78 and 5.53% and 22.22 and 7.22% respectively by decreasing the number of irrigations as shown in the combined analysis .The reduction in photosynthetic assimilates during seed filling period is considered to be the major cause for reduced seed yield components under drought where

the seed is considered to be the major sink for non-structural carbohydrates during that period (Fischer, 1973).

Table (3) . Effect of irrigation treatments on yield and yield components of faba bean in both seasons as well as combined analysis .

Irrigation treat.	Plant height cm	No.of branches/ plant	No.of pods /plant	No.of seeds/ pod	No.of seeds/ plant	wt.of pods /plant g	wt.of 100-seed g	wt.of seeds/ plant g	Seed yield kg/ fed
1995/96 season									
One	70.92 b	2.74 b	13.00 c	3.18 a	41.28 c	24.50 c	53.51 c	21.76c	1245.2c
Two	75.78 a	3.05 a	15.50 b	3.28 a	50.73 b	31.41b	57.30 b	28.47 b	1566.4b
three	77.86 a	3.18 a	16.76 a	3.40 a	57.14a	35.32 a	59.91 a	33.27 a	1822.4a
1996/97 season									
One	87.22 c	3.10 a	12.40c	2.94 c	36.39c	23.85 c	54.67c	19.68 c	1111.5c
Two	95.72 b	3.43 a	14.80 b	3.21 b	47.39b	29.18 b	56.79b	26.63 b	1445.6b
three	101.25 a	3.41 a	15.89 a	3.46 a	53.03a	32.79 a	59.26 a	30.62 a	1626.7a
Combined									
One	79.07 c	2.92 b	12.70 c	3.06 c	38.84c	24.18 c	54.09 c	20.72 c	1178.3c
Two	85.75 b	3.24 a	15.15 b	3.24 b	49.06b	30.29 b	57.04 b	27.55 b	1506.b
three	89.56a	3.30 a	16.33a	3.43 a	55.09a	34.06a	59.59a	31.95a	1724.6a
I.S	**	n. s	n. s	n. s	n .s	n. s	n. s	n. s	*

C- Performance of pure lines

Table (4) shows that the differences between faba bean genotypes were significant for all the studied traits in separate seasons as well as the combined results except 100-seed weight in the first season , number of branches per plant ,number of seeds per pod, number of seeds per plant and DSI in the second season ,number of branches per plant, number of seeds per pod and weight of pods per plant in the combined over both seasons.

For plant height, Giza 461gave the highest mean values followed by Moshtohor 43 in the first season as well as combined analysis.Moshtohor 43 gave the highest values for number of pods per plant, number of seeds per plant, weight of pods per plant, seed yield per plant and seed yield /fed . While, it gave the best value for (DSI) in the combined analysis followed by Giza 461.Moshtohor 6 and 10 gave the lowest values for yield per plant and yield/fed at the combined analysis .Moshtohor 43 had the highest seed yield /fed over the combined and outyielded Moshtohor 6,10, Shebeen 5 and Giza 461 by 10.05% ,8.99%, 3.74% and 5.44% respectively . The high seed yield /fed of Moshtohor 43 could be attributed to the high seed yield / plant and some of its components and low value of (DSI) (Table 4). These results are in harmony with those obtained by ; El-Hosary (1981); Salwau and El-Hosary (1989); El-Hosary and sedhom (1990) and Gomaa (1996).

Table(4) Effect of genotypes on yield and yield components of faba bean in both seasons as well as combined analysis .1995/96 season

Genotypes	Plant height cm	No.of branches /plant	No.of Pods/ plant	No.of Seeds/ pod	No.of Seeds/ plant	wt.of Pods/ plant g	wt.of 100-seed g	wt.of seeds/ plant g	Seed yield kg/fed	DSI
Moshtohor 6	74.40 b	3.06 ab	14.55bc	3.46a	49.01ab	30.68a	57.01ab	27.78a	1497.6c	0.43a
Moshtohor 10	72.86bc	3.04ab	13.80c	3.36a	47.15b	26.25a	55.62b	25.47b	1441.9d	0.25c

Shebeen 5	70.40c	2.88ab	15.55ab	3.04b	47.29b	31.42a	59.31a	27.88a	1571.2b	0.32b
Moshtohor 43	78.00a	3.28a	16.10a	3.24 ab	52.37a	31.71a	58.22a	29.61a	1616.1a	0.24c
Giza 461	78.62a	2.68b	15.44ab	3.33d	52.77a	31.98a	54.39b	28.43a	1596.6a	0.31b

1996/97 season

Moshtohor 6	94.40b	3.43a	13.91b	3.11a	43.73a	27.26b	55.96ab	23.69c	1303.4d	0.29a
Moshtohor 10	92.73b	3.15a	14.86a	3.14a	45.39a	29.48a	56.66a	25.32bc	1393.3b	0.26a
Shebeen 5	93.08b	3.31a	13.86b	3.25a	45.47a	28.95a	58.03a	26.32ab	1427.zb	0.39a
Moshtohor 43	94.26b	3.33a	14.88a	3.24a	47.08a	30.33a	58.41a	27.54a	1499.2a	0.28a
Giza 461	99.17a	3.35a	14.28ab	3.26a	46.35a	27.00b	55.47b	25.35bc	1349.1	0.34a

Combined

Moshtohor 6	84.40bc	3.25a	14.23b	3.20a	46.37b	28.97a	56.49b	25.74bc	1401.1c	0.37a
Moshtohor 10	82.80cd	3.10a	14.33b	3.26a	46.27b	27.87a	56.14b	25.39c	1417.6c	0.26c
Shebeen 5	81.74d	3.10a	14.71b	3.15a	46.38b	30.18a	58.67a	27.10ab	1499.2b	0.36ab
Moshtohor 43	86.13b	3.31a	15.49a	3.24a	49.72a	31.02a	58.32a	28.58a	1557.6a	0.26c
Giza 461	88.90a	3.02a	14.86a	3.30a	49.56a	29.49a	54.93b	26.89b	1472.8b	0.33b
geno. x s.	n.s	n.s	* *	* *	n.s	n.s	n.s	n.s	* *	n.s

D-Effect of the interaction.

Effect of the interaction between irrigation treatments and seasons was not significant for all the studied traits except plant height, revealing that the effect of irrigation treatments was stable from seasons to another (Table 3). Also, the effect of the interaction between genotypes and seasons was not significant for all traits except number of pods/ plant number of seeds / pod and seed yield/ fed are shown in (Table 4) . This result indicates that genotypes performance were constant from seasons to another.

Table (5) Effect of the interaction between irrigation treatments and genotypes on seed yield /fed (kg) of faba bean in the combined analysis of 1995/ 96 and 1996/97 seasons.

Genotypes Irrigation treat	Moshtohor 6	Moshtohor 10	Shebeen 5	Moshtohor 43	Giza 461
One irrigation	1050.3Cc	1215.8C ab	1144.7C b	1305.8C a	1175.2C b
Two irrigation	1475.9B bc	1397.3B c	1561.8 B ab	1595.2B a	1499.8B b
Three irrigation	1676.7A bc	1639.7A c	1791.1 A a	1771.9A a	1743.5A ab

The differences between the averages of the studied traits were not significant for all traits under study except seed yield/ fed at combined analysis due to the interaction effects between number of irrigation and genotypes. This result indicates that no relationship existed between the genotypes performance and number of irrigation under study. For the exceptional trait, Moshtohor 43 gave the highest seed yield/fed followed by Moshtohor 10 and Shbeen 5 at one and two irrigation, respectively . Seed yield/fed reached its maximum yield under three irrigation for Shebeen 5, whereas the minimum yield was obtained under one irrigation for Moshtohor 6.Gnerally seed yield/fed decreased by decreasing number of irrigations (Table 5).

E –Correlation studies:

1. Simple phenotypic correlation.

The simple correlation coefficients between each two traits of yield and its components were calculated at the combined analysis. Table (6) shows significant positive phenotypic correlation values between seed yield / fed or plant and each of other traits. Therefore, selection for each of these traits, is more effective for obtaining new higher yielding varieties. Also, significant positive phenotypic correlation values between 100-seed weight and each of other yield components were detected (Table 6). These results might indicate that selection for hight values of the four characters are more effective for increasing 100 – seed weight.

Table(6) Correlation coefficient between yield and yield component of faba bean combined over the two growing seasons 1995/96 and 1996/97.

Yield Components	No. of pods/ plant	No. of seeds/ pod	No of seeds / plant	wt. of pods/ plant (g)	wt. of 100 seed (g)	wt. of seeds/ plant(g)	Seed yield (kg/fed)
-No. of pods/ plant	1.00	0.77**	0.97**	0.96**	0.81**	0.98**	0.98**
-No. of seeds/pod		1.00	0.88**	0.80**	0.59*	0.84**	0.80**
-No. of seeds/plant			1.00	0.96**	0.76**	0.98**	0.98**
-wt. of pods /plant				1.00	0.85**	0.97**	0.97**
-wt. of 100 seed(g)					1.00	0.85**	0.85**
-wt. of seeds/ plant (g)						1.00	0.992**

Significant positive phenotypic correlation values were found between weight of pods/ plant and each of number of pods/ plant, number of seeds/pod and per plant indicating that selection for high valuof these traits are very effective for increasing pods weight. Also, significant positive correlation values were detected between number of seeds/ plant and each of number of pods and seeds/ pod. Significant positive correlation values was detected between number of seed per pod and number of seeds / plant.

2 – path coefficient

Partitioning of simple correlation coefficient between seed yield / fed. and number of pods /plant , number of seeds / pod and per plant, weight of pods / plant, 100 – seed weight and seed yield / plant at the combined analysis is presented in Table (7).Seed yield / plant had a high and positive direct effect on seed yield / fed by 0.86 in the combined analysis over the two seasons. Also, its indirect effect was important through weight of pods, number of seeds / plant, number of pods , 100-seed weight and number of seeds/pod. Number of pods/ plant had a high and positive direct effect on seed yield / fed in the

combined analysis (Table 7). The other cases had a small direct effect or indirect effect on seed yield/fed.

The coefficients of determination were calculated for the direct and indirect effect of the studied characters and transformed into percentages in order to evaluate these factors according to their importance as sources of variation in yield / fed. The component of percentage for seed yield /fed variation at the combined analysis are presented in Table (8). From this table, it could be concluded that the most

Table (7) Direct and indirect effect of some yield attributes to faba bean yield over two seasons Seed yield kg/fed

`

Yield Components	No. of pods/ plant	No. of seeds/ pod	No of seeds / plant	wt. of pods/ plant (g)	wt. of 100 seed (g)	wt. of seeds/ plant(g)	Seed yield (kg/fed)
-No. of pods/ plant	0.35	-0.004	-0.175	-0.03	0.00008	0.84	0.99**
-No. of seeds/pod	0.27	-0.006	-0.157	-0.025	0.00006	0.72	0.80**
-No. of seeds/plant	0.34	-0.005	-0.18	-0.03	0.00008	0.85	0.98**
-wt. of pods /plant (g)	0.34	-0.004	-0.171	-0.03	0.00009	0.84	0.97**
- wt. of 100- seed (g)	0.28	-0.003	-0.137	-0.027	0.0001	0.74	0.85**
- wt. of seeds /plant (g)	0.34	-0.005	-0.177	-0.031	0.00009	0.86	0.99**

important sources of variation in seed/ fed were the direct effect of seed yield /plant followed by indirect effect of number of pod/plant through seed yield/plant at the combined analysis. These effects account for approximately 72.72% of seed yield/fed variation.

Table (8) Direct and indirect effect of some yield attributes to faba bean yield over two seasons

Source of variation	C.D	RI%
- Direct effect of No. of pods/plant	0.1225	6.0777
Indirect effect via No. of seeds /pod	-0.003234	0.1604
Indirect effect via No. of seeds/plant	-0.12222	6.0638
Indirect effect via w. of pods / plant	0.02016	1.0002
Indirect effect via seed index	0.0000567	0.0028

Indirect effect via seed yield / plant	0.58996	29.27
- Direct effect of seeds/pod	0.000036	0.0017
Indirect effect via No. of seeds /plant	0.0019008	0.0943
Indirect effect via w. of pods / plant	0.000288	0.0142
Indirect effect via seed index	-0.00000071	0.000035
Indirect effect via seed yield / plant	0.0086688	0.43009
- Direct effect of No. of seeds/ plant	0.0324	1.6075
Indirect effect via w. of pods/plant	0.010368	0.5144
Indirect effect via seed index	-0.00002736	0.00135
Indirect effect via seed yield / plant	-0.303408	15.0533
- Direct effect of w. of pods / plant	0.0009	0.0446
Indirect effect via seed index	-0.0000051	0.000253
Indirect effect via seed yield / plant	-0.050052	2.4832
- Direct effect of seed index	0.00000001	0.0000005
Indirect effect via seed yield / plant	0.0001462	0.00725
- Direct effect of seed yield plant	0.7396	36.6946
Residual	0.0096202	0.47729

CD.: Coefficient of determination.

RI .: Relative importance.

References

Ainer, N.G.; Miseha, W.I. and Abdel- Maksoud, H.H. (1994) Water management for faba bean in the Delta. Zagazig J. Agric. Res . 20(6): 2045-2053 .

Ali Dib, T. P. Monneveux , and I.Araus (1990). Breeding durum wheat for drought tolerancei : analytical , synthetical approaches and their connection . Proc. Int. Symp. June 4^{th} – 8^{th} , Albena, Bulgaria, Agricultural Academy, 224 – 240.

Amer, M.I.A.(1986) Effect of water regime , nitrogen and phosphatic fertilizers on growth and yield of broad bean (Vicia faba l.) M.Sc. Thesis, Fac. Agric Moshtohor.

Cochran, W. G. and G.M. cox 1957. Experimental Designs. 2 d ed., Wiley, New York.

Duncan.D.B.(1955). Multiple range and multiple ''F'' test . Biomatrics 11:1.42

Ebaid, M.A. (1990) Effect of weed control method and irrigations number on growth and yield of field bean (*Vcia faba L*.) Annals of Agric. Sc., Moshtohor 28(3): 1429-1439.
El-Hosary, A.A.(1981) Genefic studues on field bean(*Vicia faba L*.) Ph.D. Thesis. Fac. Agric. Menoufia Univ.
El-Hosary, A.A. and sedhom, S.A. (1990) Evaluation of some new lines of faba bean (vicia Raba L.) proc 4 th Conf. Agron. Cairo 1: 435-445.
El-Moghraby , S.S.M. (1980). Effect of water regine , nitrogen and phosphatic fertilizers on growtg and yiela of broad bean (*Vicia faba L*.) M.Sc. Thesis , Fac. Agric Moshthor Zagazig Univ.
El – Moghraby, S.S.M.. (1984) Effect of some aricultural practices on yield and quality characters of gaba bean (*Vicia faba L*.) Ph.D. Thesis, Fac Agric, Moshtoher, Zagazig Univ.
Fischer, R. A. (1973). The effect of water stress at various stages of devolepment on yield processes in wheat. Proceeding of the uppsala Symposium. Paris, France, Unesco P,P. 233-241
Gomaa, M. R. (1996) : Response of faba bean genotypes to plant population Patterns. J. Agric. Sc., Mansoura Univ. 21(1) :21-31.
Khalil,A.F.(1995) Scheduling irrigation of faba bean using The evaporation pan method.M.Sc. Thesis, fac Agric . Moshtohor zagazing Univ.
Roshdy, M.A.(1975) Some chemical changes in *Vicia faba* plant during maturity stages under different levels of fertilization and irrigation. M.Sc. Thesis Fac. Agric, Ain shams univ.
Pasquale Martiniello and Antonio , Ciola (1995) Dry matter and seed yield of Mediterranean annual legume species .Agron. J. 87 (5): 985-993.
Salwau, M.I.M. and El-Hosary, A.A. (1989). Evaluation of some new lines of faba bean (*Vicia faba L*.) Egypt. J. Appl. Sci., 4 (3) 442-453.
Snedecor GW and Cochran WG (1981) Statistical Methods. Seventh Edition . Iowa state univ Press, Ames , Iowa , USA.
Wright, S. (1921). Correlation and cauation . J. Agric . Res., 20. 557 – 585.
---------- (1923). The theory of path coefficients. Genetics , 8:239-285.
---------- (1934). The method of path coefficients. Ann Math. Stat., 5: 161-215.
Zoromba, M.S. (1983) Response of some broad bean cultivars to some agonomic practices .M.Sc. Thesis, Fac. Agric., Zagazig Univ.

استجابة بعض السلالات الجديدة من الفول البلدى لمعاملات الرى

صديق عبد العزيز صديق محيسن

قسم المحاصيل – كلية الزراعة بمشتهر جامعة الزقازيق – فرع بنها

أجريت هذه الدراسة بمركز البحوث الزراعية بكلية الزراعة بمشتهر جامعة الزقازيق خلال موسمى ١٩٩٦\٩٥ ، ١٩٩٧\٩٦ م بهدف دراسة تأثير عدد الريات على بعض السلالات الجديدة من الفول البلدى .

تضمنت الدراسة ١٥ معاملة عبارة عن التوافيق بين ٣ معاملات للرى وهى إعطاء رية واحدة وريتين وثلاث ريات طول موسم النمو بخلاف رية الزراعة وأربعة تراكيب وراثية جديدة مع صنف تجارى وهى (مشتهر ٦،١٠،٤٣ وشبين الكوم ٥ والصنف التجارى جيزة ٤٦١) . وذلك فى تصميم القطع المنشقة مرة

واحدة فى ثلاثة مكررات . والصفات التى درست هى : طول النبات (سم) – عدد الأفرع/نبات–عدد القرون /نبات – عدد بذور القرن – عدد بذور النبات – وزن قرون النبات (جم) وزن الـ١٠٠ بذرة (جم) – وزن بذور النبات (جم) – محصول الفدان (كجم).

وتتلخص أهم النتائج فيما يلى :

تأثرت كل الصفات تحت الدراسة معنوياً بزيادة عدد الريات فى كل من موسمى الزراعة والتحليل المشترك للموسمين فيما عدا عدد البذور / قرن فى الموسم الأول وعدد الأفرع فى الموسم الثانى لم تكن الزيادة معنوية .

تفوقت السلالة مشتهر ٤٣ فى كل الصفات المدروسة معنوياً فى كلا الموسمين والتحليل المشترك فيما عدا وزن قرن النبات فى الموسم الأول وعدد الأفرع/نبات وعدد بذور القرون والنبات وكذلك معدل الحساسية بالجفاف فى الموسم الثانى وعدد الأفرع /نبات وعدد بذور القرن ووزن قرون النبات فى التحليل المشترك حيث لم تكن الزيادة معنوية .

زاد محصول الفدان من البذور زيادة معنوية للسلالة مشتهر ٤٣ عن باقى السلالات وكذلك عن صنف جيزة ٤٦١ فى الموسم الثانى والتحليل المشترك .

أوضحت علاقة الارتباط بين الصفات المختلفة والمحصول أن صفات محصول النبات الفردى وعدد ووزن القرون للنبات وعدد بذور النبات وكذلك باقى الصفات المدروسة من أهم الصفات التى يمكن الانتخاب لها لزيادة محصول.

أظهرت نتائج معامل المرور أن التأثير المباشر لمحصول النبات من البذور ويليه التأثير الغير مباشر لعدد القرون من خلال محصول النبات الفردى يكون مقدار ٧٢.٧٢% من مصادر الاختلافات فى محصول الفدان من البذور .