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DEVELOPMENT OF SOME NEW BEAN LINES BY SELECTION

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ABSTRACT

This investigating was carried out during the period from 2007 to 2011 at Barrage Horticulture Research Station, Kalyobia Governorate, Egypt to study the genetic coefficient of variance and heritability for some plant and pod characteristics of new bean lines. Nine lines of bean in F_6 selected from F_2 generation were produced from the crosses Paulista x Bronco, Paulista x Tema and Tema x Bronco for using pedigree selection. The selection was done between and within the lines for different characters i. e., plant height, number of branches/plant, total green yield/plant, number of pods/plant, weight of 10 pods, pod length and pod thickness.

Estimated coefficient of variance (C. V %) for nine lines were selected from F_6 population. From results of the first season four lines showed homogeneity as compared with the commercial cultivars Paulista and Bronco. In 2011 season four F_7 lines were evaluated compared with the check cultivars Paulista and Bronco. The main genetic parameters studied were the phenotypic (P.C.V), genotypic (G.C.V) and broad sense heritability for all studied traits. The results showed significant differences between lines for different studied characters in both seasons. The lines 1-32, 1-36, 2-74, and 3-33 showed the lowest degree for C. V.% for most characters. Those lines showed homogeneity as compared with the commercial cultivars Paulista and Bronco. The lines 2-74 and 3-33 showed superiority for most characters (plant height, total green yield/plant, number of pods/plant and weight of 10 pods). The results showed that the values of G.C.V. % and P.C.V % ranged from 2.94 and 3.69 to 17.32 % and 19.33 % for weight of 10 pod and number of pods/plant, respectively. The results showed slight differences between P.C.V and G.C.V % in all studied traits, this indicates the importance of the genetic effect in controlling the inheritance of these traits. Broad sense heritability ranged from 63.04 to 87.97 % for plant height and pod length, respectively, indicating that all traits were highly heritable while environmental effects were minimal. It could be concluded that the lines 2-74 and 3-33 are considered promising and could be released as new cultivars because they are homogeneous with high productivity and of good pod characters.

Key words: ***Bean, (Phaseolus vulgaris* L.), Selection, C.V, P.C.V, G.C.V, Heritability.***

INTRODUCTION

Bean (*Phaseolus vulgaris* L.) is one of the important legume crops in Egypt and some other countries in the world, because of its high nutritional value. The increasing demands to face the expanding population for food energy necessitates increasing the productivity per unit area. This aim could be achieved through selecting high yielding genotypes with good pod quality. Many workers used selection to obtain new yielding lines of legume crops. Helal *et al* (2000) selected some homogenous F_6 cowpea lines superior in plant height and total yield compared with their parents.

Mehta(2000) used the pedigree selection method for high yield in the F_2 and compared it in segregating F_3 and F_4 generations of four cowpea crosses. Faris and El Gizy (2001) used selection to obtain new high yielding lines of cowpea. Abd El-Hady (2003) studied the inheritance of yield and its components in some cowpea crosses, he observed actual response to selection and showed high values for plant height, pod length and total yield. Selection from F_3 populations is an effective method to improve characters and develop high yield lines of cowpea (Hussein *et al* 2003). Mohamed (2003) estimated 17.20 % increase in yield in selection bean lines and improved pod length. Farag *et al* (2005) on cowpea and Nosser (2007) on pea selected five promising breeding F_7 lines and estimated coefficient of variance (C. V). They showed that there were highly homogeneity for most breeding lines. Two lines were superior in plant height, pod length and total yield in cowpea and pea but two lines were superior in number of branches/plant in cowpea. Abd El-Hady and Hussein(2008) showed that two promising lines F5 of cowpea superior for total yield compared with the control cultivars.

Concerning phenotypic (P.C.V), genotypic (G.C.V) coefficient of variance and broad sense heritability (BSH). Ramesh and Sangwan (2000) estimated heritability in 72 genotypes of cowpea. Moderate to high heritability coupled with high genetic advance as a percentage of mean were recorded for plant height and pod length. It was suggested that traits may be used during selection for yield in cowpea. Rangaiah and Mahadevu (2000) studied G.C.V and P.C.V of two crosses from cowpea. They found a wide rang of variability in plant height and total yield. The differences between G.C.V and P.C.V was narrow with respect to genetic advance. Tyagi *et al* (2000) estimated the coefficient of variability and heritability for plant height, pod length and total yield in 24 cowpea genetypes. They found high values for G.C.V and heritability for plant height and total yield. Farag and Darwish (2005) estimated BSH for three crosses of faba bean. They found that BSH was moderate to high in magnitude with values between 51.75 for number of branches/plant to 71.72 for total green yield. Salem (2007) estimated BSH for some traits. Who found that BSH were moderate to high for number of branches/plant, number of pods/plant and total yield. Also, Abd El-Hady and Hussein (2008) estimated P.C.V, G.C.V and BSH. They found small differences between G.C.V and P.C.V in plant height, pod length and total yield. BSH ranged from moderate to high for the same traits.

The main objective of this study was to develop some new promising bean lines by selection and evaluation of these breeding new lines for some plant and pod characteristics to chose the superior breeding lines to be used as new cultivars.

MATERIALS AND METHODS

The present study was carried out at El-Kanater Agriculture Research Station, Kalubia Governorate Egypt, during the period from 2007 to 2011. The study was started with F_2 populations as some plants were selected from of the crosses. Paulista x Bronco, Paulista x Tema and Tema x Bronco (Nosser, 2005).

In the fall season of 2007, 60 plant from the progeny of each of the 25 F_2 selected plants, were sown on September 4th. Twenty plants from each progeny were selected and selfed to produce the F_3 population. Observation and selection were made between and within the F_3 populations in order to chose the best plants for the characters plant height, number of branches/plant, total yield/plant, number of pods/plant, weight of 10 pods, pod length and pod thickness.

Twenty plants were selected and picked each individual and seeds were separately collected to produce the F_4 seeds. In the summer season of 2008, 60 plants from each progeny, the progenies of the selected plants were sown at the first week of March. Each population contain 60 plants distributed in three replications. Observations and selection continued. Twenty plants were selected and selfed to produce the F_5 population were sown in March 9th 2009. Observations and selection were made in F_5 population between and within the different populations. Nine F_6 populations evaluations were conducted in the successive summer planting of 2010 and 2011 seasons and included as they showed high homogeneity. In the first season the seeds of F_6 populations for the nine selected lines were sown on March 7th with two check cultivars, viz., Paulista and Bronco. About 60 plants from each selected populations and check cultivars arranged in three replicates. Observations and selections were made between the different populations. In the second season only four populations from the nine evaluated lines showed homogeneity. The superior selected four F_7 lines i. e. , 1-32, 1-36, 2-74 and 3-33 as well as the two check cultivars were planted on March 1st 2011. A randomized complete block design with three replicates was used. Each plot consisted of three rows, 4 m. long 0.6 m. width, 10 cm within plants. Normal cultural practices were applied according to the recommendations of Ministry of Agriculture. Data were taken and recorded for the following characters and the mean of each line was used in the statistical analysis for the data. The characters studied were plant height, number branches/plant, total yield/plant, number of pods/plant, weight of 10 pods, pod length and pod thickness.

Statistical and genotypic analysis

Statistical analysis of the data were done according to Snedecor and Cochran (1982). Mean values representing the various investigated

genotypes were compared by the Duncan multiple range test (Duncan 1955). Coefficient of variance (C. V %) for some traits was calculated by Steel and Torri (1960). The phenotypic coefficient of variance (P.C.V) and genotypic coefficient of variance (G.C.V) were estimated according to Burton (1952). Broad sense heritability BSH were estimated according to Singh and Chaudhary (1995).

RESULTS AND DISCUSSION

Degree of homogeneity

Estimated coefficient of variance (C. V %) for plant height, number of branches/plant, total green yield/plant, number of pods/plant, weight of 10 pods, pod length and pod thickness are presented in Tables 1 and 2.

Table 1. Estimated coefficient of variance (C.V %) value of the new breeding lines and the original cultivars in 2010 summer season.

Characters / Genotype	Plant height	Number of branches/plant	Total Yield/plant	No. of pods/ plant	Weight of 10 pods	Pod length	Pod thickness
1-32	7.99	1.97	1.62	8.82	13.33	1.99	0.91
1-36	5.75	1.54	1.79	7.84	12.89	1.84	0.77
1-45	11.46	2.77	2.07	9.47	25.14	2.73	1.61
2-61	7.31	2.99	2.60	11.96	25.14	3.24	0.99
2-74	8.86	1.92	1.67	8.79	17.77	1.86	0.96
2-82	14.56	3.03	3.39	10.25	21.16	3.44	1.22
3-11	12.57	2.44	2.71	10.43	15.87	2.62	0.99
3-33	9.62	1.74	1.59	9.41	14.33	1.76	0.95
3-56	11.70	2.47	2.57	17.14	28.74	2.26	1.37
Check cultivars							
Paulista	10.43	2.04	1.67	8.81	19.94	2.13	0.85
Bronco	9.93	2.25	2.17	10.22	18.12	2.43	0.97

Table 2. Estimated coefficient of variance (C.V %) value of the new breeding lines and the original cultivars in 2011 summer season.

Characters / Genotype	Plant height	Number of branches/plant	Total Yield/plant	No. of pods/ plant	Weight of 10 pods	Pod length	Pod thickness
1-32	7.75	1.84	1.62	7.72	11.11	1.91	0.89
1-36	5.61	1.68	1.79	5.91	9.90	1.68	0.77
2-74	7.03	1.77	1.67	6.03	13.07	1.99	0.77
3-33	5.63	1.74	1.60	8.32	13.06	1.73	0.95
Check cultivars							
Paulista	8.07	1.96	1.67	7.02	15.95	2.02	0.85
Bronco	8.25	2.25	2.17	10.09	16.49	2.04	0.97

For plant height, data of first season (Table 1) showed that C. V. % values ranged from 5.75 to 14.56 % in the breeding lines. While it was 10.43 and 9.93 in the check cultivars Paulista and Bronco, respectively. The genotypes 1-36, 2-61, 1-32, 2-74 and 3-33 showed the highest homogeneity, since they showed the lowest variance within their plants. The obtained C .V % values in these lines ranged from 5.75 to 9.62 %, but the lowest homogeneity was observed in 2-82 and 3-11 (14.56 and 12.57, respectively). In the second season (Table 2) showed that the C. V % values ranged from 5.61 to 7.75 % in the lines 1-36 and 1-32. The C. V % values for the check cultivars 8.07 and 8.25 in the check cultivars Paulista and Bronco, respectively. Data of the two seasons showed that the four lines 1-32, 1-36. 2-74 and 3-33 gave the lowest C. V % values indicating that they became relatively homogeneous.

Regarding number of branches/plant, data in (Table 1) showed that C. V % values ranged from 1.54 to 7.03 % in the breeding lines while, the check cultivars Paulista and Bronco were 2.04 and 2.25, respectively. The highest homogeneity was observed in the lines 1-36, 3-33, 2-74 and 1-32, they gave the lowest (C. V %) values. Therefore, they were chosen for evaluation in the second season. Coefficient of variance values for the breeding lines in the second season (Table 2) were less than those of the check cultivars. When the breeding lines were compared with the check cultivars, all the breeding lines had high homogeneity in this trait.

Concerning the total green yield, in the first season (Table 1) showed that C. V. % values ranged from 1.59 to 3.39 % in the breeding lines while, the check cultivars were 1.67 and 2.17 in Paulista and Bronco, respectively. The highest homogeneity for the total green yield was observed in lines 3-33, 1-32, 2-74 and 1-36. They gave the lowest C. V. % values, i. e., 1.59, 1.62, 1.67 and 1.79, respectively. Indicating that they were more phenotypically uniform than other lines. When, these lines were evaluated with the check cultivars in 2011 season (Table 2). They showed C. V. % values close or lower than the check cultivars.

In respect of number of pods/plant, data obtained are presented in Table (1). The coefficient of variance values in the breed lines ranged from 7.84 to 17.14 % where the check cultivars Paulista and Bronco were 8.81 and 10.22 %, respectively. Compared with the check cultivars the lines 1-36, 2-74, 1-32, 3-33, and 1-45 showed the lowest homogeneity. The lower C. V. % values for those lines for this trait indicates that they were more uniform than the check cultivars. Moreover they became more homogeneous. Therefore, they were chosen to be evaluated with the check cultivars in 2011 season (Table 2) In this season, the highest homogeneity

was observed in these lines, since they showed C. V. % values close or lesser than the check cultivars.

As for weight of 10 pods, data in (Table 1) showed that C. V. % values in the breeding lines ranged from 12.89 to 28.74 % where the check cultivars, Paulista and Bronco were 19.94 and 18.12, respectively. The lines 1-36, 1-32, 3-33, 3-11 and 2-74 showed the highest homogeneity, since they showed lowest variation within their weight of 10 pods. Also, in 2011 season, data in (Table 2) observed that these lines gave C. V. % values less, and so they became relatively homogenous in this trait, since their C. V. % values were less than those of the check cultivars.

Concerning pod length, estimated C. V. % values ranged from 1.76 to 3.44 in the studied lines, while it was 2.13 and 2.43 in the check cultivars Paulista and Bronco, respectively (Table 1). In the second season, it ranged from 1.68 to 1.99 for the breeding lines and were 2.02 and 2.04 for the check cultivars Paulista and Bronco, respectively (Table 2). The lines 1-36, 3-33, 1-32 and 2-74 showed the lowest variation within their pods since they showed C. V. % values less than the check cultivars.

Regarding pod thickness, data in (Table 1) showed low C. V. % values ranging from 0.77 to 1.61 in the breeding lines. While it was 0.85 and 0.97 in the check cultivars Paulista and Bronco, respectively. The highest homogeneity was observed within pods of the lines 1-36, 1-32, 3-33 and 2-74 since they gave the lowest C. V. % values. In the second season, they recorded C. V. % values close or less than that of the check cultivars (Table 2). When the new lines were compared with the check cultivars it could be noticed that breed lines, i. e. 1-32, 1-36, 2-74 and 3-33 became highly homogenous in all the studied traits. These results are in agreement with those reported by Farag *et al* (2005) and Nosser (2007) they estimated the coefficient of variance for some selected lines of cowpea and pea. They found high homogeneity in some breeding lines in most studied characters.

Finally, estimated C. V. % values in the new breeding lines for studied characters revealed high homogeneity within plants exceeding that of the check cultivars. These new breed lines are enough homogeneous and could be considered new breeding lines.

Mean performance of the studied bean lines.

Data presented in Tables 3 and 4 showed significant differences among all evaluated bean genotypes in the studied traits.

Plant height of the breeding lines ranged from 38.29 to 62.95 in the lines 2-82 and 2-74, respectively, in the first season (Table 3) and from 60.14 to 63.35 in the lines 1-32 and 2-74, respectively, in the second season (Table 4). The check cultivar Paulista had the highest plant height as compared with Bronco in both season. By comparing the studied lines with the check cultivars in both seasons (Table 3 and 4) the lines 2-74, 1-36, 1-32

and 3-33 were taller than the tallest check cultivar without significant differences. These results agree with those of Helal *et al* (2000), Abd El-Hady (2003), Farag *et al* (2005) and Nosser (2007) as they found that some selected legume lines overcame check cultivars in plant height.

Regarding number of branches/plant, the highest number of branches/plant was found in line 2-74 (7.50) followed by the lines 3-33, 1.32, and 1-36 as (7.23, 7.00 and 6.93), respectively, without significant differences between them in the first season and all lines produced number of branches/plant more than the check cultivars in the second season. Line 1-32 gave the highest value for this trait (7.25) followed by line 2-74 (6.88) and 1-36 (6.60) without significant differences between them. These results are in agree with those of Farag *et al.* (2005) who found that some selected cowpea lines surpassed the check cultivars for this trait.

For total yield of the breeding lines ranged from 172.55 to 231.03 in the lines 2-61 and 2-74, respectively, in the first season (Table 3) and from 208.75 to 243.80 in lines 1-32 and 2-74, respectively in the second season. (Table 4). The check cultivar Paulista gave the higher total green yield/plant than Bronco cultivar in both seasons but without significant differences between them.

The new lines comparing with the check cultivars in the first season (Table 3). The lines 2-74, 3-33, 1-32, 1-36 and 3-56 gave the highest total green yield than the check cultivar. In the second season, all the new breeding lines gave higher total green yield than the check cultivars with significant differences in the lines 2-74 and 3-33. These results are in agreement with those obtained by Helal *et al* (2000), Mehta (2000), Faris and El-Gizy (2001), Abd El-Hady (2003), Hussein *et al* (2003), Mohamed (2003), Farag *et al* (2005), Nosser (2007) and Abd El- Hady and Hussein (2008) They selected some lines of legume superior for total yield compared with the check cultivars.

As to number of pods/plant, which ranged from 14.68 to 31.90 in lines 3-11 and 3-33 in the first season (Table 3) and from 26.93 to 34.55 in the lines 1-36 and 3-33, respectively in the second season (Table 4). The check cultivar Paulista gave higher pods/plant than Bronco without significant differences between them in both seasons. In the first season, comparing the new lines with the check cultivars data showed that the line 3-33 gave the highest value (31.90) followed by the line 2-74 (31.18) and 1-32 (29.63) without significant differences between them. In the second season all the new breed lines gave higher values for this trait compared with the check cultivars.

Weight of 10 pods ranged from 55.05 to 65.76 in the lines 2-61 and 2-74 in the first season, but in the second season it ranged from 64.21 to 67.51 in the lines 1-36 and 3-33, respectively. In the first season, comparing the new lines with the check cultivars data observed the lines 2-74 gave the highest

Table 3. Mean performances of the evaluated bean lines and check cultivars for some traits in 2010 summer season.

Characters / Genotype	Plant height (cm)	Number of branches/ Plant	Total yield/plant (g)	No. of pods/ plant	Weight of 10 pods (g)	Pod length (cm)	Pod thickness (mm)
1-32	56.51 ab	7.00 a	221.55 a	29.63 a	64.68 ab	15.98 a	7.55 bc
1-36	58.62 a	6.93 a	207.18 b	22.00 bc	63.99 ab	13.63 b	7.23 cd
1-45	41.99 de	4.93 b	175.80 de	18.33 cd	58.04 cd	12.45 bc	6.78 de
2-61	41.03 de	4.55 b	172.55 e	18.50 cd	55.05 d	12.70 bc	8.78 a
2-74	62.95 a	7.50 a	231.03 a	31.18 a	65.76 a	13.53 b	8.25 ab
2-82	38.29 e	5.00 b	186.30 c	21.65 bc	57.28 cd	13.33 b	7.15 cd
3-11	46.90 cde	4.80 b	173.53 e	14.68 d	57.55 cd	10.90 d	6.45 e
3-33	56.09 abc	7.23 a	230.65 a	31.90 a	63.42 ab	12.88 bc	7.75 bc
3-56	47.82 bcd	5.08 b	205.25 b	21.98 bc	59.39 bcd	12.78 bc	7.78 bc
Check cultivars							
Paulista	54.84 abc	5.53 b	190.58 c	23.80 b	60.25 bcd	12.77 bc	8.03 b
Bronco	48.45 bcd	5.50 b	184.70 cd	20.05 bc	61.55 abc	11.93 cd	8.75 a

Table 4. Mean performances of the evaluated bean lines and check cultivars for some traits in 2011 summer season

Characters / Genotype	Plant height (cm)	Number of branches/ plant	Total yield/plant (g)	No. of pods/ plant	Weight of 10 pods (g)	Pod length (cm)	Pod thickness (mm)
1-32	60.14 a	7.25 a	208.75 b	30.68 ab	64.57 abc	16.58 a	7.98 bc
1-36	61.59 a	6.60 ab	211.75 b	26.93 b	64.21 abc	14.50 b	8.35 ab
2-74	63.35 a	6.88 ab	243.80 a	33.78 a	66.74 ab	13.20 bc	7.70 c
3-33	61.03 a	6.35 bc	238.65 a	34.55 a	67.51 a	12.78 c	8.00 bc
Check cultivars							
Paulista	56.99 ab	5.73 cd	204.55 b	25.45 bc	61.57 c	12.58 cd	8.10 bc
Bronco	51.18 b	5.43 d	193.58 b	20.88 c	63.56 bc	11.28 d	8.85 a

valueof weight of ten pods (65.76) fol owed by the line 1-32 (64.68), 1-36 (63.99) and 3-33 (63.42). without signi ficant differences between them. Also, in the second season, the line 3-33 gave the highest value of weight of ten pods (67.51) followed by 2-74 (66.74), 1-32 (64.57) and 1-36 (64.21) without significant differences betwee n them.

Regarding pod length of the breeding lines which ranged from 10.90 to 15.98 in lines 3-11 and 1-32, resp ectively, in the first season (Table 3) and from 12.78 to 16.58 in line 3-33 and 1-32, respectively in the second season (Table 4). The check cultivar Paulista gave taller pods than Bronco cultivar in both seasons by comparing the studied lines with the check cultivars in the first season (Table 3) The line 1-32 gave tallest pods with significant differences with the check cultivars, but the other lines gave taller pods but without significant differences with the check cultivars except the line 3-11 which gave the shortest pods (10.90). In the second season, all the new lines gave highe values of pod length than the check cultivars. The lines 1-32 gave highes value of pod length (16.58) followed by the line 1-36 (14.50) with signifi ant differences between them. Nearly similar results were recorded by Abd El-Hady (2003), Mohamed (2003), Farag *et al* (2005) and Nosser (2007) They selected some lines of legumes superior in pod length.

Concerning pod thickness, which ranged from 6.45 to 8.78 in the lines 3-11 and 2-61, respectively in the first season, but ranged from 7.70 to 8.35 in the lines 2-74 and 1-36, respectively, in the second season. In the first season, comparing the new lines with the check cultivars. The lines 2-61 and 2-74 gave the highest values for pod thickness (8.78 and 8.25), respectively, without significant differences with the check cultivar Bronco (8.75). In the second season the line 1-36 gave the highest value of pod thickness (8.35) without significant differences with Bronco cultivar.

Phenotypic and genotypic coefficients of variance obtained in Table (5) were 8. 23 and 6.53 % for plant height, 17.25 and 15.26 % for number of branches/plant, 9.68 and 8.69 % for total green yield/plant, 19.33 and 17.32 % from number of pods/plant, 3.69 and 2.94 % in weight of ten pods, 14.06 and 13.18 % for pod length and 5.34 and 4.33 % for pod thickness, respectively. Also, the data in Table 5 showed that all the traits had high G.C.V/P.C.V percent, such values ranged from 79.39 for plant height to 93.79 % for pod length. Small differences were observed between P.C.V and G.C.V in all traits and high G.C.V/P.C.V percent indicating the importance of the genetic effects in controlling the inheritance of these traits. These results were in agreement with those obtained by Rangaiah and Mahadevu (2000), Tyagi *et al* (2000), and Abd El-Hady and Hussein (2008). They found small differences between PCV and GCV in most of the traits. Estimates of broad sense heritability values were 63.04 for plant height. 78.24 for number of branches/plant, 80.64 for total green yield,

Table 5. Phenotypic (P.C.V %) and genotypic (G.C.V %) coefficient of variation, G.C.V/P.C.V percentage and Broad sense heritability (BSH %) for some traits of 2011 summer season.

Characters	P.C.V %	G.C.V %	G.C.V/ P.C.V	BSH %
Plant height	8.23	6.53	79.39	63.04
Number of branches/plant	17.25	15.26	88.45	78.24
Total green yield/plant	9.68	8.69	89.77	80.64
Number of pods/plant	19.33	17.32	89.59	80.28
Weight of 10 pods	3.69	2.94	79.64	63.42
Pod length	14.06	13.18	93.79	87.97
Pod thickness	5.34	4.33	81.22	65.98

80.28 for number of pods/plant, 63.42 weight of ten pods, 87.97 for pod length and 65.98 for pod thickness. These results indicated low environmental effect and large genetic component in comparison to the phenotypic variation therefore, these characters can be improved through selection based on phenotypic observations. These results were in agreement with those by Ramesh and Sangwan (2000), Tyagi *et al* (2000), Farag and Darwish (2005), Salem (2007)and Abd El-Hady and Hussein (2008). Who found that BSH ranging from moderate to high for most traits.

In general, it can be concluded that during this selection program the lines 2-74 and 3-33 are considered promising lines for producing new cultivars of bean because they showed high homogeneity with high productivity and good pod characters.

REFERENCES

Abd El-Hady. M. A. H. (2003). Inheritance studies of yield and its components in some cowpea crosses. Ph. D. Thesis. Department of Horticulture, Faculty of Agriculture. Assiut University.

Abd El-Hady, M. A. and A. H. Hussein (2008). Selection for earliness, yield and its components in two populations of cowpea. Egypt. J. Plant Breed. 12 (1) : 57-74.

Burton, G., W. (1952). Quantitative inheritance in grasses proceedings of the 6 th. International Grassland Cong. Pennsylvania USA. 277-283.

Duncan, D. B. (1955). Multiple range and mult ple F test. Biometrics 11 : 1 - 42.

Farag, S. T. and I. H. Darwish (2005). Types of gene action of some economic traits in faba bean (*Vicia faba* L.). Egypt. J. Plant Breed. 9 (1) : 77 - 90.

Farag, S. T . , F. A. Helal and F. S. Faris (2005). Development and release of some new cowpea lines by selection. Minufiya J. Agric. Res. 30 (3) :1011 – 1024.

Faris, F. S. and S. El-Gizy (2001). Dokk 126 Anew cowpea cultivars. J. Agric. Sci. Mansoura Univ., 26 : 4151 – 4157.

Helal, F. A. , S. M. El-Gizy and F. S. Faris (2000). Genetic variation in yield, its attributes and growth characteristics of cowpea. **Egypt. J. Appl. Sci. 15 : 147-162.**

Hussein, A. H. , KH. Okasha, M. E. Ragab, and F. S. Faris (2003). Pedigree selection for some economic characters in cowpea (*Vigna unguculata* L. Walp). **Arab Univ. J. Agric. Sci. Ain Shams Univ., Cairo, 11 : 675 – 688.**

Mehta, D. R. (2000). Comparison of selection procedures in cowpea. Advances in plant Sci. 13 (1) 167 – 173. (c. a. Plant Breed. Abst., 2001, 71, 8421).

Mohamed, S. M. A. (2003). A study or selection seed yield and some of its components among selected populations of the common bean (*Phaseolus vulgaris* L. Walp). Minufiya J. Res. 28 (3) 965-971.

Nosser, M. A. (2005). Genetic improvement of bean (*Phaseolus vulgaris* L). under high temperature condition. J. Agric. Sci. Mansoura Univ., 30 (7) : 4119-4133.

Nosser, M. A. (2007). Improvement of some new pea lines by selection. Egypt. J. of Appl. Sci., 22 v(3) : 219 – 229.

Ramesh, K. and R. S. Sangwan (2000). Genetic variability and heritability in cowpeas (*Vigna unguculata* L. Walp). Annals of Biology 16 (2) : 181 – 183. (C.A Plant Breed. Abst. 2001, 71, 8421).

Rangaiah, S. and P. Mahadevu (2000). Genetic variability, correlation and path coefficient analysis in cowpea (*Vigna unguculata* L. Walp). Madras Agric. J. 86 (7/9) : 381 – 384 (c. a Plant Breed. Abst. 2001, 71, 6721).

Salem, S. A. (2007). Genetic behavior of some selected Faba bean genotypes. African Crop Science Society 8 : 709 – 714.

Singh, R. K. and B. D. Chaudhary (1992). Biometrical Methods in Quantitative Genetic Analysis. Kalyani Publishers, New Delhi, India.

Snedecor, G. W. and W. G. Cochran (1982). Statistical Methods (7th Edit, 2nd Printing). The Iowa State Univ. Press, Ames, Iowa, U S A.

Steel, R. G. and J. H. Torri (1960). Principles and Procedures of Statistics. Mc. Grow Hill Book Company; Inc New york.

Tyagi, P. C. , N. Kumar and R. Rathnaswamy (2000). Genetic variability and association of component characters for seed yield in cowpea (*Vigna unguculata* L.) Walp. Central soil and water conservation Research and Training Institute, Dehradun 248195, India. Legume Research 23 (2) : 92 – 96 (c. a. Plant Breed. Abst., 2001, 71, 6717).

استنباط بعض السلالات الجديدة من الفاصوليا بالانتخاب

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اجريت هذه التجربه خلال الفترة من ٢٠٠٧ ال ٢٠١١ فى محطة بحوث البساتين بالقناطر الخيريه محافظة القليوبيه لدراسة معامل الاختلاف الوراثى وكفاءة التوريث لبعض الصفات النباتيه ومواصفات القرون لاستنباط سلالات جديده من الفاصوليا.

تسعة سلالات من الفاصوليا منتخبة فى الجيل السادس من خلال برنامج انتخاب من الجيل الثانى والناتجة من التهجينات (بوليستا x برونكو) و(بوليستا x تيما) و (تيما x برونكو) باستخدام طريقة الانتخاب مع تسجيل النسب ثم الانتخاب بين وداخل السلالات لعدد من الصفات النباتيه وهى ارتفاع النبات، عدد الافرع/النبات، المحصول الكلى الاخضرللنبات، عدد القرون للنبات، وزن عشرة قرون، طول وسمك القرن.

تم تقدير معامل الاختلاف داخل تسعة سلالات من الجيل السادس وبناء على النتائج المتحصل عليها تم الانتخاب لاربعة سلالات حيث اظهرت درجة عالية من التجانس مقارنة بالاصناف التجارية بوليستا ، برونكو. فى الموسم ٢٠١١ تم تقييم الاربعة سلالات (الجيل السابع) مقارنة بنفس الاصناف التجاريه.

كذلك تم تقدير عدد من القياسات الوراثية وهى معامل الاختلاف المظهرى، معامل الاختلاف الوراثى وكذلك درجة التوريث على النطاق العريض لكل الصفات المدروسه.

اظهرت النتائج وجود فروق معنويه بين السلالات فى الصفات المدروسه فى كلا الموسمين. اظهرت السلالات ١-٣٢ ، ١-٣٦، ٢-٧٤ ، ٣-٣٣ قيم منخفضة من معامل الاختلاف لمعظم الصفات المدروسه مما يشير الى انها اصبحت متجانسه تماما مثل الاصناف التجاريه بوليستا وبرونكو. تفوقت السلالات ٢-٧٤، ٣-٣٣ فى معظم الصفات (ارتفاع النبات ، المحصول الاخضر الكلى، عدد القرون/النبات، وزن عشرة قرون).

ايضا اظهرت النتائج ان قيم معامل الاختلاف الوراثى ومعامل الاختلاف المظهرى تتراوح من ٢.٩٤ و ٣.٦٩ % الى ١٧.٣٢ و ١٩.٣٣ % لصفة وزن عشر قرون و عدد القرون/النبات على التوالى. هذة النتائج توضح ان الاختلافات قليله بين معامل الاختلاف المظهرى، ومعامل الاختلاف الوراثى فى الصفات المدروسه وذلك يوضح اهمية التاثير الوراثى فى التحكم فى توريث هذه الصفات.

درجة التوريث فى النطاق العريض تتراوح بين ٦٣.٠٤ الى ٨٧.٩٧ % لصفات ارتفاع النبات و طول القرن على التوالى مما يدل على ان كفاءة التوريث عالية وتاثير البيئه على الصفات منخفض.

السلالات ٢-٧٤ و ٣-٣٣ سلالات مبشرة ويمكن الاعتماد عليها كاصناف جديده لانها ذات درجة عاليه من التماثل مع انتاجها العالى ومواصفات قرونها الجيدة.

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