

DEVELOPMENT OF SOME NEW BROAD BEAN (*Vicia faba* L.) LINES BY SELECTION

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ABSTRACT

This study was conducted at Barrage Horticulture Research Station, Kaluobia Governorate, Egypt during the period from 2007 to 2010. The study started with F_3 population of some plants selected from broad bean F_2 of the crosses Reinamora × Luzudo Otono, Reinamora × Akoadolz and Reinamora × Kassasein 7. The selection was done between and within the lines for the different characters by using pedigree selection. The characters studied i. e., plant height, number of branches/plant, total yield, pod length, pod thickness, weight of ten pods and seeds weight of ten pods.

Coefficient of variance (C.V %) was estimated for nine F_5 lines selected. From the results of the first season, four lines showed high homogeneity compared with the check cultivars, i.e. Reinamora and Kassasein 7. In the second season, four F_6 lines were evaluated compared with the two above mentioned cultivars and estimated of phenotypic and genotypic coefficients variance (P.C.V % and G.C.V %) and broad sense heritability (BSH). The results showed significant differences between lines for different studied characters in both seasons. The lines 1-11, 1-45, 2-80 and 3-86 gave the lowest degree for C.V % for most studied characters. In the second season, all the breed lines significantly superior than the check cultivars for number of branches, total green yield and pod length.

The results revealed high values of genotypic coefficient of variance (G.C.V %) and broad sense heritability (BSH %) for all studied traits. The values of G.C.V % ranged from 10.44 to 26.46 for pod thickness and weight of ten pods, respectively, and BSH % ranged from 70.70 to 91.89 for pod length and weight of ten pods, respectively, indicated that all traits were highly heritable and small environmental effects. It could be concluded that the lines 3-86, 1-45 and 1-11 are considered promising for releasing as new cultivars because they are homogeneous with high productivity and good pod characters.

Keywords : Broad bean, (*Vicia faba* L.), Selection, C.V, P.C.V, G.C.V, Heritability.

INTRODUCTION

Broad bean (*Vicia faba* L.), is one of the most important crops in winter season that supply the Egyptian people with protein, Vitamins and some minerals in their diet. Furthermore it associates with Rizobium and fixes atmospheric nitrogen in the soil. The productivity of broad bean has been reduced due to lack of improvement varieties. Thus, improving broad bean productivity must be done through creating adapted new genotypes by selection in advanced segregating generation. Many workers used selection to obtain a new yielding lines of legume crops. Helal *et al* (2000), Mehta (2000) and Faris and El-Gizy (2001) selected some cowpea lines superior in total yield. Also, Abd El-Hady (2003) observed that response to selection showed for plant height, pod length and total yield. Mohamed (2003) estimated 17.2 % increase in yield in selection bean lines and improved pod length. Farag *et al.*, (2005) on cowpea, Nosser (2007) on pea and Nosser (2011) on bean selected some promising breeding lines F_7 and estimated of coefficient of variance (CV %). They found that there were highly

homogeneity for most breeding lines and found that two lines of cowpea were superior in plant height, number of branches, total yield and pod length. Two lines of pea superior in plant height, pod length and total yield. Also, some lines of bean superior in plant height, total yield, weight of ten pods, pod length and pod thickness.

Concerning phenotypic (P.C.V %) and genotypic (G.C.V %) coefficient of variance, Rangaiah and Mohadevu (2000) studied G.C.V and P.C.V of two crosses from cowpea. They found a wide range 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. Abd El-Hady and Hussein (2008) studied P.C.V and G.C.V in cowpea lines. They found small differences were observed between G.C.V and P.C.V in plant height, pod length and total yield. Nosser (2011) found that small differences between G.C.V and P.C.V on bean lines for plant height, number of branches/plant, total yield, weight of ten pods, pod length and pod thickness. As to Broad sense heritability (BSH %) Ramesh and Sangwan (2000) studied heritability in 72 genotypes of cowpea. They found that BSH % were moderate to high for plant height and pod length. Farag and Darwish (2005) estimated BSH for three crosses of Faba bean. They found BSH were moderate to high for plant height, number of branches/plant, total yield green and pod length. Salem (2007) studied BSH for six Faba bean genotypes, he showed that BSH were moderate to high for number of branches/plant and total yield. Abd El-Hady and Hussein (2008) studied BSH in cowpea lines. They found that BSH ranged from moderate to high for plant height, pod length and total yield. Bhnan (2008) studied BSH for six crosses of pea, she found that that BSH were 50.9 for plant height and 62.48 for total yield. Nosser (2011) studied BSH for breeding lines of bean, he observed that BSH were moderate to high for plant height, number of branches/plant, total yield, pod length and pod thickness.

The present study aimed to develop some new promising broad bean lines by selection and also to evaluate these new breeding lines to close the superior ones which can 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 2010. The study was started with F_3 populations as some plants were selected from F_2 of the crosses. Reinamora \times Luzudo Otont, Reinamora \times Akoadolz and Reinamora \times Kassasein 7 (Nosser 2006).

In the winter season of 2007, 60 plant from the progeny of each of the 25 F_3 selected plants, were sown on October 4th. Twenty plants from each progeny were selected and selfed to produce the F_4 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, pod length, pod thickness, weight of ten pods and seeds weight of ten pods.

Twenty plants were selected and picked each individual and seeds were separately collected to produce the F_4 seeds. In the winter season of 2008, 60 plants from each progeny, the progenies of the selected plants were

sown at the first week of October. Each population contain 60 plants distributed in three replications. Observations and selection continued. Twenty plants were selected and selfed to produce the F₅ population. Nine F₅ populations evaluations were conducted in the successive winter planting of 2009 and 2010 seasons and included as they showed high homogeneity. In the first season the seeds of F₅ populations for the nine selected lines were sown on October 4th with two check cultivars, viz., Reinamora and Kassasein 7. 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 four evaluated lines showed homogeneity. The superior selected four F₆ lines i. e. , 1-11, 1-45, 2-80 and 3-86 as well as the two check cultivars were planted on October 4th 2010. A randomized complete block design with three replicates was used. Each plot consisted of three rows, 4 m. long 0.6 m. width, 30 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 of branches/plant, total yield, pod length, pod thickness, weight of ten pods and seeds weight of ten pods.

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 values of coefficient of variance (C. V %) for all studied genotypes concerning some traits are presented in Table 1 and 2.

As for plant height, data of first season (Table 1) observed that genotypes 1-45, 3-86, 2-80, 2-116, 1-11 and 1-48, since they gave the lowest (C.V %) values. The (C V %) values in these lines ranged from 25.64 to 28.53 but the lowest homogeneity was showed in the lines 2-14 and 3-9 (30.97 and 30.12, respectively). The C.V % for the check cultivars were 26.18 and 32.76 in the cultivars Reinamora and Kassasein 7, respectively. Coefficient of variance value of the second season (Table 2) ranged from 19.57 to 22.49 % in the lines 2-80 and 1-11 respectively, while CV % were 21.09 and 24.54 in the check cultivars Reinamora and Kassasein 7, respectively. Data of the two seasons observed that the lines 1-11, 1-45, 2-80 and 3-86 showed the lowest variance within their plants, since they showed C.V % values lower or close to the check cultivars. So, we can say that these lines were homogeneous.

Concerning number of branches/plant, data of the first season (Table 1) showed that the lines 1-11, 3-86, 1-45 and 2-80 gave the lowest C.V %

values, it ranged from 2.45 to 2.84 in these lines. On the other hand, the lowest homogeneity was observed in the lines 3-96, 2-14 and 3-9 where they gave the highest C.V % (4.33, 3.09 and 3.07, respectively). The C.V % values for the check cultivars 2.85 and 2.97 in the check cultivars Reinamora and Kassasein 7, respectively. Coefficient of variance values of the second season (Table 2) ranged from 1.85 to 2.36 in the lines 3-86 and 2-80, respectively, while, it ranged from 2.11 to 2.47 in the check cultivars Kassasein 7 and Reinamora, respectively. The lines 3-86, 1-11, 1-45 and 2-80 had high homogeneity in this trait, as they reflected CV % values close lower than those given by the check cultivars.

Regarding the total yield, in the first season (Table 1) observed that the lines 2-80, 1-11, 1-45 and 3-86 gave the lowest C.V % values, it ranged 2.58 to 2.91 in these lines however, the lines 3-96 and 2-116 gave the highest C.V % values (4.90 and 4.17, respectively). The C.V % values for the check cultivars 2.81 and 3.06 in Reinamora and Kassasein 7 respectively.

Table 1: Estimated coefficient of variance (C.V %) value of the new broad bean breeding lines and the original cultivars in 2009 winter season.

Characters	Plant height	Number of branches/plant	Total yield	Pod length	Pod thickness	Weight of ten pods	Seeds weight of ten pods
Genotype							
1-11	28.11	2.45	2.62	4.81	0.32	72.50	28.78
1-45	25.64	2.83	2.89	4.98	0.26	81.43	32.55
1-48	28.53	2.94	3.57	5.29	0.31	78.76	41.69
2-14	30.97	3.09	3.64	4.70	0.32	86.85	44.93
2-80	27.76	2.84	2.58	4.54	0.27	79.23	29.55
2-116	27.86	2.94	4.17	5.53	0.30	99.05	41.10
3-9	30.12	3.07	3.18	4.80	0.33	96.03	37.79
3-86	27.30	2.51	2.91	4.80	0.28	77.67	25.19
3-96	29.89	4.33	4.90	5.56	0.37	83.26	37.55
Check cultivars							
Reinamora	26.18	2.85	2.81	4.64	0.31	85.78	31.14
Kassasein7	32.76	2.97	3.06	5.11	0.33	86.82	37.88

Coefficient of variance values in the second season (Table 2) ranged from 1.98 to 2.89 in the lines 3-86 and 1-45, respectively. It ranged from 2.32 to 2.60 in the check cultivars Kassasein 7 and Reinamora, respectively. Coefficient of variance values close or lower than that given by the check cultivars. When the new lines were compared with the check cultivars, the breed lines viz., 3-86, 2-80, 1-11 and 1-45 became high homogenous in this trait.

Concerning pod length, the breeding lines in the first season (Table 1) showed that the coefficient of variance values ranged from 4.54 to 5.56 (2-80 and 3-96), respectively. Meanwhile, it was 4.64 and 5.11 in the check cultivars Reinamora and Kassasein 7 respectively. The lowest (C.V %) values for these lines in this characters indicated that they were more uniform than the check cultivars. Therefore they were chosen to evaluated with check cultivar in the second season (Table 2) the coefficient of variance values in

the second season ranged from 3.49 to 4.09 in the lines 1-45 and 1-11, respectively, but in the check cultivars were 3.52 and 3.79 in Reinamora and Kassasein 7, respectively. The C.V % values close or lower than the check cultivars. So, we can say that these lines were homogeneous.

Table 2: Estimated coefficient of variance (C.V %) value of the new broad bean breeding lines and the original cultivars in 2010 winter season.

Characters Genotype	Plant height	Number of branches/ plant	Total Yield	Pod length	Pod thickness	Weight of ten pods	Seeds weight of ten pods
1-11	22.49	2.12	2.62	4.09	0.29	46.86	27.58
1-45	20.71	2.18	2.89	3.49	0.26	56.34	30.38
2-80	19.57	2.36	2.34	4.06	0.24	55.05	27.84
3-86	20.88	1.85	1.98	3.73	0.23	62.19	26.73
Check cultivars							
Reinamora	21.09	2.47	2.60	3.52	0.27	69.47	28.15
Kassasein7	24.54	2.11	2.32	3.79	0.25	64.78	31.75

For pod thickness, data of first season (Table1) showed that the genotypes 1-45, 2-80, 3-86, 2-116, 1-48, 1-11 and 2-14 were the highest homogeneous ones, since they showed the lowest variance within their plants. The obtained C.V % in these lines ranged from 0.26 to 0.32 %. Meanwhile, C.V % were 0.31 and 0.33 for the check cultivars Reinamora and Kassasein 7, respectively. Coefficient of variance values close or lower than that given by the check cultivars. Also, in the 2010 season, the obtained C.V % (Table 2) ranged from 0.23 to 0.29 in the lines 3-86 and 1-11 respectively. The C.V % for the check cultivars were 0.25 and 0.27 in Kassasein 7 and Reinamora, respectively. Data of the two seasons showed that the four lines 1-11, 1-45, 2-80 and 3-86 gave the lowest (C.V %) values indicating that they became enough homogenous.

Regarding the weight of ten pods, the estimated (C.V %) of the first season values ranged from 72.50 to 99.05 in the breed studied lines, while it ranged from 85.78 to 86.82 in the check cultivars Reinamora and Kassasein 7, respectively. The highest homogeneity was obtained for the lines 1-11, 3-86, 1-48, 2-80 and 1-45. Coefficient of variance values of the second season (Table 2) ranged from 46.86 to 62.19 in the lines 1-11 and 3-86, respectively, while it ranged from 64.78 to 69.47 % in the check cultivars Kassasein 7 and Reinamora., respectively. The lines 1-11, 2-80, 1-45 and 3-86 showed the lowest variation within their plants, since they showed C.V % values lowest than the check cultivars. So, we can say that lines were homogeneous.

Concerning seeds weight of ten pods, the coefficient of variance values in the first season (Table 1) ranged from 25.19 to 44.93 % in the breeding lines, compared with the check cultivars C.V % values was 31.14 and 37.88 in Reinamora and Kassasein 7, respectively. The lowest (C.V %) values, i.e., 25.19, 28.78, 29.55 and 32.55 were recorded for the lines 3-86, 1-11, 2-80 and 1-45 respectively, indicated that they were more phenotypically uniform than other lines. This evaluated with the check cultivars in the second season (Table 2), the C.V % values ranged from 26.73

to 30.38 while the check cultivars ranged from 28.15 to 31.75 in Reinamora and Kassasein 7. The (C.V %) values close or lower than the check cultivars. So, the tested breeding lines indicating that they became high homogeneous in this trait. These results similar with Farag *et al.*, (2005) in cowpea, Nosser (2007) in pea and Nosser (2011) in bean, who estimated the coefficient of variance for some selected lines. They found that there were highly homogeneity for some breeding lines in the most studied traits. Estimated of coefficient of variance in the new breed lines for the studied traits showed high homogeneity for some breed lines in the most studied traits.

Mean performance of the studied breed lines

Data presented in (Tables 3 and 4) observed significant difference among all broad bean genotypes in all the studied characters.

Concerning plant height, the breed lines ranged from 73.55 to 116.20 in the lines 2-14 and 2-80, respectively, in the first season (Table 3) and ranged from 91.40 to 119.95 in the lines 1-45 and 2-80 in the second season (Table 4). The check cultivars Reinamora gave taller plant height than Kassasein 7 in both seasons. In the first season, the lines 2-80 (116.20) had the tallest plant height compared with the other lines and the tallest check cultivars with significant difference followed by the lines 1-11 (101.32), 3-86 (95.98), 1-48 (93.73), 2-116 (88.08) and 1-45 (87.80) without significant differences between these lines and the tallest check cultivars (91.75). Also, in the second season, the line 2-80 had the tallest plant height with significant differences than tallest check cultivar Reinamora followed by 1-11 and 3-86 without significant difference than the tallest cultivar Reinmaomra. These results were in agreement with obtained by Abd El-Hady (2003), Farag *et al.*, (2005) and Nosser (2007 and 2011) who found that some selected legume lines superior the check cultivar in plant height.

Table 3: Mean performances of the evaluated broad bean lines and check cultivars for some traits in 2009 winter season.

Characters	Plant height (cm)	Number of branches/Plant	Total yield (Ton/fed)	Pod length (cm)	Pod thickness (cm)	Weight of ten pods (g)	Seeds weight of ten pods (g)
Genotype							
1-11	101.32 b	9.28 a	14.55 a	19.23 abc	1.95 a	365.06 ab	152.24 ab
1-45	87.80 cd	8.80 a	14.73 a	20.38 ab	1.73 bcd	347.42 b	138.67 c
1-48	93.73 bc	6.28 b	12.93 b	15.83 def	1.55 e	325.91 c	124.15 d
2-14	73.55 f	5.45 b	12.91 b	18.50 bcd	1.60 cde	304.84 d	116.35 e
2-80	116.20 a	8.65 a	14.37 a	22.00 a	1.80 ab	357.77 ab	146.95 b
2-116	88.08 cd	6.63 b	11.98 c	17.05 cde	1.63 cde	303.42 d	109.69 e
3-9	82.85 de	6.37 b	8.57 d	15.90 def	1.58 de	134.48 e	63.45 f
3-86	95.98 bc	8.05 a	15.15 a	18.98 bc	1.88 ab	370.34 a	156.18 a
3-96	78.2 ef	5.35 b	7.82 de	14.15 ef	1.35 f	131.61 e	52.46 g
Check cultivars							
Reinamora	91.75 bc	5.53 b	12.86 b	17.53 bcd	1.75 bc	350.66 b	152.68 ab
Kassasein7	63.53 g	5.13 b	7.35 e	13.53 f	1.34 f	131.34 e	58.96 fg

Number of branches/plant, the highest number of branches/plant was found in the lines 1-11, 1-45, 2-80 and 3-86 compared with the check cultivars in the first season (Table 3). In the second season (Table 4) all the lines produced number of branches/plant more than the check cultivars. Line

1-45 gave the highest value for this trait (9.8) followed by line 1-11 (8.93) and 2-80 (8.6) without significant differences between them. These results agree with those of Farag *et al.*, (2005) who showed that some selected cowpea lines superior than the check cultivars for this trait.

Table 4: Mean performances of the evaluated broad bean lines and check cultivars for some traits in 2010 winter season

Characters	Plant height (cm)	Number of branches/Plant	Total yield (Ton/fed)	Pod length (cm)	Pod thickness (cm)	Weight of ten pods (g)	Seeds weight of ten pods (g)
Genotype							
1-11	106.55 b	8.93 ab	14.74 ab	20.20 b	1.90 a	368.84 a	152.55 ab
1-45	91.40 d	9.80 a	14.95 ab	20.10 b	1.80 ab	351.09 b	144.14 b
2-80	119.95 a	8.60 ab	14.57 b	22.53 a	1.83 ab	359.07 ab	149.80 ab
3-86	102.13 bc	8.50 b	15.49 a	19.65 b	1.77 ab	371.16 a	158.57 a
Check cultivars							
Reinamora	94.88 cd	6.05 c	13.05 c	17.40 c	1.70 b	350.22 b	153.09 ab
Kassasein7	67.03 e	5.07 c	7.17 db	13.35 d	1.30 c	143.56 c	60.24 c

Regarding total yield, significant differences among the evaluated breeding lines were observed in (Tables 3 and 4). The total yield ranged from 7.82 to 15.15 and 14.57 to 15.49 in 2009 and 2010 seasons, respectively. The check cultivar Reinamora gave the higher total yield than Kassasein 7 cultivar in both seasons. The new lines 3-86, 1-45, 1-11 and 2-80 gave the higher total yield comparing with the check cultivars in the first season (Table 3) without significant differences between them than the check cultivars. In the second season (Table 4). All lines gave higher total yield than the check cultivars. The line 3-86 gave the highest value of total yield (15.49) followed by the line 1-45 (14.95) and 1-11 (14.74) without significant differences between them. These results similar with Helal *et al* (2000), Mehta (2000), Faris and El-Gizy (2001), Abd El-Hady (2003), Mohamed (2003), Farag *et al.*, (2005) and Nosser (2007 and 2011). They selected some lines of legume superior for total yield compared with the check cultivars.

For the pod length, in the first and second seasons presented in Tables 3 and 4 showed significant differences among the studied lines. The line 2-80 produced the highest pod length in both seasons 22.00 and 22.53, respectively. On the other hand for the check cultivars, Kassasein 7 cultivar gave the lowest values 13.53 and 13.35 in both seasons, respectively. Meanwhile the Reinamora cultivar gave the highest values 17.53 and 17.40 in both seasons, respectively. These results confirmed with Abd El-Hady (2003), Mohamed (2003), Farag *et al.*, (2005) and Nosser (2007 and 2011). They selected some lines of legumes superior in pod length.

Concerning pod thickness, in the first season and second season presented in (Tables 3 and 4) observed significant differences among the studied lines. The line 1-11 gave the highest value of pod thickness in both seasons 1.95 and 1.90 respectively. In the check cultivars, Ksassen 7 cultivars gave the lowest value 1.34 and 1.30 in both seasons. However the cultivar Reinamora gave the highest value 1.75 and 1.70 in both seasons, respectively. These results similar with Nosser (2011) who selected some lines of bean superior in pod thickness.

As to weight of ten pods, the breeding lines ranged from 131.61 to 370.34 in the lines 3-96 and 3-86, respectively compared with the check cultivars which ranged from 131.34 to 350.66 in the cultivars Kassasein 7 and Reinamora, respectively, in the first season (Table 3).

In the second season (Table 4) The line 3-86 gave the highest value of weight ten pods (371.16) followed by the lines 1-11 (368.84) and 2-80 (359.07) without significant differences between them. In the check cultivars ranged from 143.56 to 350.22 in Kassasein 7 and Reinamora, respectively. Similar results recorded by Nosser (2011) who selected some lines of bean superior in weight of ten pods.

Concerning seeds weight of ten pods ranged from 52.46 to 156.18 in the lines 3-96 and 3-86, respectively, compared with the check cultivars which ranged from 58.96 to 152.96 in Kassasein 7 and Reinamora, respectively, in the first season (Table 3). In the second season, the line 3-86 gave the highest value for this trait (158.57) followed by 1-11 (152.55) and 2-80 (149.80) without significant differences between them. The check cultivars ranged from 60.24 to 153.09 in the cultivars Kassasein 7 and Reinamora, respectively.

Genotypic and Phenotypic coefficient of variance presented in (Table 5) were 15.74 and 18.56 for plant height, 19.84 and 22.28 for number of branches/plant, 19.13 and 27.06 for total yield, 13.66 and 19.33 for pod length, 10.44 and 13.98 for pod thickness, 26.46 and 28.79 for weight of ten pods and 26.19 and 29.28 for seeds weight of ten pods. Small differences were showed between PCV and GCV in all traits indicating the importance of the genetic effect in controlling the inheritance of these traits. These result agree with Rangaiah and Mohadevu (2000), Abd El-Hady and Hussein (2008) and Nosser (2011). They found small differences between PCV and GCV in most the characters. Broad bean sense heritability were 84.53 for plant height, 89.05 for number of branches/plant, 70.71 for total yield, 70.70 for pod length, 74.67 for pod thickness, 91.89 for weight of ten pods and 89.47 for seeds weight of ten pods, BSH was high for these traits. These results recorded that a small environmental effect and large genetic component in comparison to the phenotypic variation therefore these traits can be improved through selection based on phenotypic observations. Similar recorded by Ramesh and Sangwan (2000), Farag and Darwish (2005), Salem (2007) Abd El-Hady and Hussein (2008), Bhnan (2008) and Nosser (2011). They recorded that BSH ranged from moderate to high for the most studied characters.

Table 5: Phenotypic (P.C.V %) and genotypic (G.C.V %) coefficient of variation and Broad sense heritability (BSH %) for some traits of 2010 winter season.

Characters	P.C.V %	G.C.V %	BSH %
Plant height	18.56	15.74	84.53
Number of branches/plant	22.28	19.84	89.05
Total yield	27.06	19.13	70.71
Pod length	19.33	13.66	70.70
Pod thickness	13.98	10.44	74.67
Weight of 10 pods	28.79	26.46	91.89
Seeds weight of ten pods	29.28	26.19	89.47

Conclusion

The lines 3-86, 1-45 and 1-11 could be considered promising lines for releasing new cultivars because they are homogeneous with high productivity and good pod characters.

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استنباط بعض السلالات الجديدة من الفول الرومي بالانتخاب

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اجريت هذه الدراسة فى محطة بحوث البساتين بالقناطر الخيرية محافظة القليوبية فى الفترة من ٢٠٠٧ الى ٢٠١٠ بدأت هذه الدراسة بعشائر الجيل الثالث الناتجة من بعض النباتات المنتخبة من الفول الرومي من الجيل الثانى والناتجة من التهجينات رينامورا × لونودو اتونو ، رينامورا × اكودولز ، رينامورا × قصاصين ٧.

تم استخدام طريقة الانتخاب مع تسجيل النسب وتم الانتخاب بين وداخل السلالات لعدد من الصفات المختلفة ارتفاع النبات ، عدد الاقارع للنبات ، المحصول الكلى ، طول القرن ، سمك القرن ، وزن عشرة قرون ، و وزن بذور عشرة قرون.

تم تقدير معالم الاختلاف داخل تسعة سلالات وتم انتخابهم من الجيل الخامس ثم تم انتخاب اربعة سلالات منهم والتي اظهرت درجة عالية من التجانس بالمقارنة بصنفى الكونترول وهما رينامورا ، وقصاصين ٧. تم تقييم الاربعة سلالات فى الموسم الثانى بالمقارنة بالاصناف السابق ذكرها. تم تقدير معالم الاختلاف المظهرى والوراثى وكذلك درجة التوريث على النطاق العريض.

اظهرت النتائج وجود اختلافات معنوية بين السلالات وبعضها فى الصفات المدروسة فى كلا الموسمين. اظهرت السلالات ١-١١ ، ١-٤٥ ، ٢-٨٠ ، ٣-٨٦ قيم منخفضة من معالم الاختلاف لمعظم الصفات المدروسة مما يشير الى انها اصبحت متجانسة تماما

كل السلالات تفوقت معنويا عن الاصناف المقارنة فى كل من عدد الاقارع ، المحصول الكلى ، وطول القرن فى الموسم الثانى.

كما اظهرت النتائج ايضا قيم عالية لمعامل الاختلاف الوراثى وكذلك كفاءة التوريث فى كل الصفات المدروسة حيث كانت قيم معامل الاختلاف الراجع للنباتين الوراثى تتراوح من ١٠.٤٤ % الى ٢٦.٤٦ % لصفة سمك القرن ، و صفة وزن عشرة قرون على التوالى.

درجة التوريث فى النطاق العريض تتراوح من ٧٠.٧٠ % الى ٩١.٨٩ % لصفة طول القرن ، و صفة وزن عشرة قرون، على التوالى مما يدل على ان كفاءة التوريث عالية وتأثير البيئة منخفض على الصفات.

السلالات ٣-٨٦ ، ١-٤٥ ، و ١-١١ سلالات مباشرة ويمكن الاعتماد عليها كاصناف جديدة لانها ذات درجة عالية من التجانس مع انتاجها العالى ومواصفات قرونها الجيدة.

قام بتحكيم البحث

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