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Morphological Identification of some Faba Bean Genotypes

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ABSTRACT

A study of 8 promising lines (from G1-G8) and 4 varieties (Misr1, Giza 843, Roomy, and Peter15) of faba bean genotypes. Was carried out at Sakha Agricultural Research Station, ARC, Kafr El-Shikh Governorate during the winter seasons of 2017/2018 and 2018/2019. Agro- morphological variability based on the internationally recognized descriptors of the International Union for Protection of new Varieties (UPOV, 2015) was used to characterize these genotypes. The results showed that G1 had broad leaflet, two pods/ node, strong curved pod and highest weight of 100 seeds. The angle between pod and the main axis in G2 was perpendicular. Narrow leaflet and pod curvature was absent in G4. Flower ground color was light purple, strong curved pod in G5. Strong intensity of stem anthocyanin coloration in G6, with beige ground flower color and with angles on its dry seed shape. Misr1 recorded the shortest genotype. G8 identified with longest leaflet and was the highest genotype. Each pod and seed of Roomy genotype had the maximum length and width with elongated flattened seed shape. Giza 843 was ovate leaflet shape. Peter15 had two pods/node but ranked the short pods, lowest 100 seed weight short and narrow seed. The morphological variation of these genotypes was useful and can allow breeders identify faba bean plants with desirable characteristics that can be used in breeding programs.

Keywords: Faba bean, genotypes identification, morphological identification, quantitative characters, qualitative characters.

INTRODUCTION

Faba bean (*Vicia faba* L.) is one of the most remarkable crops for its seed nutritional value and is considered to be one of the main sources of protein in the human diet (Crepona *et al*, 2010). It also has value as an export crop for feed markets (Gong *et al*, 2011). The world cultivated area for faba bean was 2.4 million hectares, which yielded a total output of 4.5 million tons (FAOSTATE, 2017). The cultivated area of Faba bean crop in Egypt reached about 198000 fed in 2006, with an average dry seed production 9.10 ardab per fed. (1 ardab =155 kg). This production covers 67% from consumption (Agriculture Economics Bulletin of, Ministry of Agriculture, Egypt, 2006).

Utilizing a selection of faba beans that have variations in their morphological attributes such as flowering, number of pods, number of seeds, and seed size may be useful in the construction of selection indices for the improvement of faba bean yields (El-Hady *et al*, 1998). The number of pods / plant, number of seeds/ pod, and number of branches / plant had been recommended by Terzopouloset *et al* (2003) as the most relevant traits to be used for population classification of faba bean. Yahia *et al* (2012) analyzed agro-morphological diversity of southern Tunisia faba bean (*vicia faba* L.) germplasm. They observed significant differences among populations for the thirty five descriptors.

Many investigators had reported high variability among faba bean genotypes and varieties for growth characters, yield and its components (El-Hosary and Sedhom, 1990; Dawwam and Abdel-Aal, 1991; Gomaa, 1996 and El-Hosary and Mehasen, 1998). Morphological characters for identification of some faba bean varieties using qualitative characters like pod, seed coat and helium color. In addition, the quantitative characters like number of flowers, plant height, leaflet length, leaflet width, number of branches/plant, number of seeds/pod and pod characters are important descriptors for discrimination among different faba bean genotypes which evaluated by Naguib (2000) , Sozen and Karadavut (2016) and Asfaw *et al* (2018).

Using some morphological characters such as: plant height, number of stems, number of nodes, anthocyanine coloration, width of leaflet, length of flower, extent of anthocyanin coloration, number of pods, length of pods, degree of curvature of pod and 100-seed weight to identified and characterized of 10 faba bean genotypes were studied by Behairy (2007) and found morphological characters differences among the studied genotypes. Significant phenotypic variation was found among faba bean genotypes in number of pods/ node, number of seeds/ pod and the weight of 100 seeds (Nasto *et al*, 2016). In Egypt, 37 faba bean genotypes from different areas based on 11 morphological traits including plant height, stem number of nodes, stem anthocyanin coloration, leaflet length and leaflet width. Large variation existed among genotypes for all traits (Arab *et al*, 2013). El-manzalawy *et al* (2013) studied morphological identification of six faba bean genotypes by using descriptor of the International Union for Protection of new Varieties (UPOV) and showed that there were variations among genotypes in plant height, anthocyanin coloration, number of pods, pod length without beak and dry seed weight. Highly significant differences in pod length, plant height, number of seeds per plant and thousand seeds weight reported also by Alghamdi (2007), Sharifi (2014) , Sharifi (2015) and Ammar *et al* (2015). Consequently, such information would supply a great deal of knowledge which in turn support quality control and certification procedures thus, keep the purity of the superior faba bean genotypes under multiplication and to avoid or minimize genetic contamination under the different environmental conditions. El-Emam *et al* (2014) identified and discriminated

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ten faba bean genotypes using morphological characters. The results revealed that some morphological characters such as pod corner with stem, lines density of flag flower, pod color at maturity, testa color, and pod shape were useful to identify some genotypes from each other.

The purpose of the present study was to identify 12 faba bean genotypes by using some morphological traits and classify theses genotypes to assessment furnish standard uniform and definitive information of the characteristics of the genotypes.

MATERIALS AND METHODS

A field experiment was carried out during the winter seasons of 2017/2018 and 2018/2019 at Sakha Agricultural Research Station, ARC, Kafr El-Shikh Governorate. The main objective of this study was to identify 12 faba bean genotypes by using some morphological traits. Seed of different promising lines (from G1 to G8) and 2 varieties (Misr1 and Giza 843) were kindly obtained from Agricultural Research Center, Legume Crop Research Institute, Sakha.While, Roomy and Peter15 seed were obtained from personal source. Studied faba bean genotypes Pedigree of promising lines and names of genotypes and their appreviations are shown in Table1.

Table 1. Code and pedigree of promising lines and names of genotypes.

Lines	Pedigree	Lines	Pedigree
G1	Nubaria1× Determinate	G2	Giza 40×Ohishima- Zaira
G3	Santamora	G4	(Giza716 ×Atona)×Atona
G5	Giza716×Sakha1	G6	Sakha1× Ohishima- Zaira
G7	Sakha 2× Atona	G8	Sakha1× Sakha 2
Roomy	Roomy	Pet15	Peter 15
Misr 1	Misr 1(Giza3 ×123A/45/76)	Giza 843	Giza 843 (561/2076/85× 461/845/83).

Several quantitative and qualitative traits have been described and analyzed according to International Union for Protection Of new Varieties (UPOV, 2015) including:

Quantitative characters:

Stipule length (cm), Stipule width (cm), Leaflet length (cm), Leaflet width (cm), Plant height (cm), Stem thickness (cm), Number of nodes, Number of pods/node, Pod length (cm), Pod width (cm), Seed length (cm), Seed width (cm), Number of seed/pod and 100 seeds weight.

Qualitative characters:

Stem: Intensity of anthocyanin coloration.

Leaflet: Position of maximum width, shape.

Flower: Extent of anthocynin coloration, ground color, wing melanin spot, color of wing melanin spot.

Pod: degree of curvature at maturity, angle of pod with main axis.

Seed: Dry seed shape, color of testa.

A randomized complete block design (RCBD) with three replications was used in this study. The area of each plot was 10.5m² (1/400 fed.). Each plot consisted of 5 rows (3.5m long and 3m width with 60 cm between rows and 20 cm between hills). Soil perpetration, seeding, fertilization and other agriculture practices were applied properly as recommended by Egyptian agriculture ministry for faba bean cultivation.

Statistical analysis:

All obtained data were statistically analyzed according to the technique of analysis of variance (ANOVA) for the randomized complete block design (RCBD) as published by Gomez and Gomez (1984) by using "MSTAT-C" computer software package. Means of treatments were compared using Duncan's multiple range tests (DMRT) at 5% level of probability as described by Duncan (1955).

RESULTS AND DISCUSSION

Quantitative characters:

A faba bean phenotypic variation was found among characterized genotypes for several traits. Results in Table 2 showed that the highest stipule length ranges from 2.28 to 2.09 cm which expressed by Misr1 in both seasons while, Roomy surpassed others studied genotypes in the second season only (2.07 cm). However, the shortest stipule expressed by G1and G7which were 1.64 and 1.63 cm in the 1st season and 1.64 and 1.67cm in the 2ndseason. The maximum stipule width(0.967, 0.980 cm) was reported by Roomy in both seasons.

Also the results indicated that the differences among studied genotypes had a significant effect on leaflet length, leaflet width and plant height in both seasons (Table2). The longest leaflet was obtained by G8 with (8.36 and 8.23cm) in the first and second seasons, respectively. The maximum leaflet width was resulted from G1 in both seasons. Whereas, G4 and G7 gave the minimum leaflet width in both seasons. Abd-El-Rahman and Abd El- Khalek (2013) found that studied faba bean genotypes varied in leaflet length and its width and stem thickness. Regarding the plant height G8 was the tallest one in both seasons with corresponding data 79.00 and 76.83cm followed by G4 (76.26 and 75.03 cm). However, G5, G2, G1 and Giza 843 had medium plant height. On the other hand, the shortest genotype in both seasons produced with Misr1 (38.80 and 37.90cm). These results are in agreement with those stated by Asfaw *et al* (2018), Naguib (2000), Sozen and Karadavut (2016).

Table 2. Means of stipule length, stipule width, leaflet length, leaflet width and plant height of identified faba bean genotypes during 2017/2018 and 2018/2019 seasons.

Characters	Stipule length (cm)		Stipule width (cm)		Leaflet length (cm)		Leaflet width (cm)		Plant height(cm)	
Seasons	2017/ 2018	2018/ 2019	2017/ 2018	2018/ 2019	2017/ 2018	2018/ 2019	2017/ 2018	2017/ 2018	2018/ 2019	2017/ 2018
Genotypes										
G1	1.64 f	1.63 f	0.533 g	0.593 h	7.16 bc	7.32 b	4.38 a	4.32 a	60.23 e	59.96 d
G2	1.86 cd	1.91 bc	0.617 f	0.673 f	6.47 e	6.46 cde	3.36 c	3.16 cd	61.76 d	60.16 d
G3	1.82 de	1.84 cd	0.680 de	0.640 g	5.76 g	5.66 f	2.80 d	2.70 ef	51.73 h	52.60 h
G4	1.90 cd	1.86 cd	0.637 ef	0.630 g	5.70 g	5.63 f	2.46 e	2.60 f	76.26 b	75.03 b
G5	1.93 c	1.98 b	0.657 ef	0.680 f	6.76 d	6.73 c	3.26 c	3.13 d	63.46 c	62.13 c
G6	1.73 ef	1.72 e	0.853 b	0.877 b	6.66 de	6.56 cd	3.66 b	3.23 cd	59.66 ef	57.96 f
G7	1.64 f	1.67 ef	0.670 ef	0.700 e	6.13 f	6.30 de	2.50 e	2.56 f	46.73 i	48.00 i
G8	1.91 cd	1.97 b	0.737 c	0.780 c	8.36 a	8.23 a	2.80 d	2.80 e	79.00 a	76.83 a
Roomy	2.18 b	2.07 a	0.967 a	0.980 a	7.33 b	7.40 b	3.30 c	3.26 cd	57.83 g	56.76 g
Giza-843	1.70 f	1.72 e	0.863 b	0.870 b	7.06 c	7.33 b	3.83 b	3.90 b	59.36 f	59.08 e
Peter 15	1.84 cd	1.83 d	0.757 c	0.770 c	6.26 f	6.43 cde	3.16 c	3.33 c	45.30 j	45.60 j
Misr-1	2.28 a	2.09 a	0.730 cd	0.727 d	5.90 g	6.16 e	3.26 c	3.20 cd	38.80 k	37.90 k
F. test	*	*	*	*	*	*	*	*	*	*

Means followed by the same letter in the same column are not significantly differed according to DMRT at 5 % level of probability.

Results in Table 3 showed significant differences between studied genotypes in stem thickness, number of nodes on the main axis, number of pods/node, pod length and pod width over both seasons. G1 exhibited the thickest stem (0.860 and 0.870 cm) in the first and second seasons, respectively. While, Misr1 produced the lowest values (0.520 and 0.527 cm) in both seasons. Also, the largest number of nodes on the main axis was expressed by G8, while the lowest number of nodes expressed by Peter15 in both seasons. Regarding the number of pods/node, the maximum value (2pod/node) were reached by G1 and Peter15. Conversely, the rest genotypes exhibited 1pod/node. Accordingly, it appears rational to consider pods/node as important indicator to differentiate between these faba bean genotypes. The variation between faba bean genotypes in pods/node may be due to the genetically variation of them. Similar observation has been reported by Nasto *et al* (2016).

Table 3. Means of stem thickness, number of nodes, number of pods/node, pod length and pod width of identified faba bean genotypes during 2017/2018 and 2018/2019 seasons.

Characters	Stem thickness (cm)				Number of nodes				Number of pods/node				Pod length (cm)				Pod width (cm)			
Seasons	2017/		2018/		2017/		2018/		2017/		2018/		2017/		2018/		2017/		2018/	
Genotypes	2018		2019		2018		2019		2018		2019		2018		2019		2018		2019	
G1	0.860	a	0.870	a	15.50	d	15.50	e	2.00	a	2.00	a	8.45	g	8.37	h	1.34	de	1.23	fg
G2	0.700	d	0.743	bc	16.56	c	16.66	c	1.00	b	1.00	b	10.81	d	10.63	d	1.42	cd	1.43	c
G3	0.670	e	0.683	def	16.63	c	16.30	d	1.00	b	1.00	b	11.33	c	11.17	c	1.56	b	1.56	b
G4	0.620	f	0.673	defg	16.80	c	16.16	d	1.00	b	1.00	b	9.41	f	9.44	f	1.29	e	1.26	fg
G5	0.727	c	0.710	cde	17.60	b	17.13	b	1.00	b	1.00	b	8.37	g	8.85	g	1.10	f	1.08	hi
G6	0.713	cd	0.657	efg	15.36	d	15.30	e	1.00	b	1.00	b	9.27	f	9.35	f	1.27	e	1.14	h
G7	0.663	e	0.653	efg	14.26	e	13.33	g	1.00	b	1.00	b	11.93	b	11.71	b	1.48	bc	1.35	de
G8	0.780	b	0.770	b	18.46	a	18.90	a	1.00	b	1.00	b	10.29	e	10.21	e	1.27	e	1.21	g
Roomy	0.620	f	0.630	fg	11.53	g	11.60	h	1.00	b	1.00	b	15.45	a	15.24	a	2.90	a	2.89	a
Giza-843	0.610	f	0.727	bcd	13.53	f	13.63	f	1.00	b	1.00	b	8.50	g	8.51	h	1.34	de	1.30	ef
Peter 15	0.623	f	0.620	g	10.36	h	10.60	j	2.00	a	2.00	a	6.43	h	6.16	j	1.08	f	1.02	i
Misr-1	0.520	g	0.527	h	11.36	g	11.33	i	1.00	b	1.00	b	6.73	h	6.79	i	1.44	cd	1.38	cd
F. test	*		*		*		*		*		*		*		*		*		*	

Means followed by the same letter in the same column are not significantly differed according to DMRT at 5 % level of probability.

Pod length and width values represented in Table 3 showed that Roomy gave the longest pod which was (15.45 and 15.24cm) in first and second seasons, respectively. Meanwhile, the shortest pod was achived by Peter15 (6.43 and 6.16 cm) in both seasons followed (above) by Misr1 (6.73cm) in first season only. Roomy recorded the maximum pod width in both seasons (2.90 and 2.89 cm), while Peter 15 and G5 recorded the narrowest pods. The large variability between studied genotypes for pod length and its width is consistent with result reported by Yahia *et al* (2012) and Sharifi (2015) and Ammar *et al* (2015).

The maximum seed length and its width in both seasons resulted from Roomy genotype (Table 4). The corresponding data were 2.33, 2.26 cm in seed length and 1.65, 1.63cm in seed width in the first and second seasons, respectively. Meanwhile, the minimum seed length and its width was produced from Peter15 in both seasons, which were 1.30, 1.24cm in seed length and 1.04, 1.01cm in seed width in first and second seasons, respectively. Such conclusion is in conformity with the findings of El-Manzalawy and El-Marsafawy (2013).

The largest number of seed/pod was given by G7 (4.60) in both seasons Table 4. Vice versa, Peter15 and Misr1 resulted in the lowest number of seed/ pod in the first season without significant differences between them. Meanwhile, Peter15 ranked the lowest number of seed/pod in the second season. Variation regarding the100 seed weight was significant. According to that trait, G1 followed by G6 and 8, with the best performance in both seasons. G1 gave 118.5 and 118.2g in both seasons. However, the lowest 100-seed weight were achieved by Peter15 (69.7, 70.1gm) in both seasons. Similar observations have also been reported by other investigators (Sharifi, 2014; Nasto *et al*, 2016; Asfaw *et al*, 2018).

Table 4. Means of seed length, seed width, number of seeds/pod and 100-seed weight of identified faba bean genotypes during 2017/2018 and 2018/2019 seasons.

Characters	Seed length (cm)				Seed width (cm)				Number of seeds/pod				100-seed weight (g)			
Seasons	2017/		2018/		2017/		2018/		2017/		2018/		2017/		2018/	
Genotypes	2018		2019		2018		2019		2018		2019		2018		2019	
G1	1.88	b	1.81	d	1.39	b	1.40	b	4.30	b	4.10	b	118.5	a	118.2	a
G2	1.72	de	1.76	e	1.28	d	1.27	f	3.70	c	3.76	cd	108.9	d	108.9	g
G3	1.90	b	1.86	b	1.37	bc	1.38	c	3.53	cd	3.50	f	112.1	c	112.3	e
G4	1.88	b	1.84	c	1.39	b	1.36	c	3.40	d	3.10	g	111.4	c	111.6	f
G5	1.80	c	1.71	f	1.28	d	1.26	fg	3.70	c	3.73	cde	85.0	f	87.5	i
G6	1.88	b	1.81	d	1.35	bc	1.31	de	3.60	cd	3.56	ef	117.3	ab	117.0	b
G7	1.76	cd	1.77	e	1.35	bc	1.32	d	4.60	a	4.60	a	89.7	e	89.4	h
G8	1.78	cd	1.77	e	1.39	b	1.32	de	3.70	c	3.63	def	115.8	b	115.9	c
Roomy	2.33	a	2.26	a	1.65	a	1.63	a	3.80	c	3.86	c	115.1	b	115.1	d
Giza-843	1.60	f	1.58	h	1.26	d	1.25	g	3.36	d	3.26	g	79.4	g	79.3	j
Peter 15	1.30	g	1.24	i	1.04	e	1.01	h	2.60	e	2.50	i	69.7	i	70.1	l
Misr-1	1.67	e	1.64	g	1.32	cd	1.30	e	2.63	e	2.86	h	73.6	h	74.4	k
F. test	*		*		*		*		*		*		*		*	

Means followed by the same letter in the same column are not significantly differed according to DMRT at 5 % level of probability.

Qualitative characters:

Data of qualitative characters for the studied 12 faba bean genotypes are presented in Table 5. It is clearly that faba bean genotypes had differences in intensity of anthocyanin coloration of stem in both seasons. The category strong was obtained due to the G6 only. While, the genotypes G2 and G3

were medium and the rest genotypes were absent. The variation among faba bean genotypes was also reported by Arab *et al*, (2013).

Referring to the leaves qualitative characters, generally, the position of maximum width of leaflet was at middle in all genotypes, while it was toward base in G7, Giza 843 and Peter15 (Table 5). G10 only had ovate leaflet shape, whereas the elliptic shape was reported with G1, 2, 5, 6 and Misr1. Moreover, G8 and Peter15 was lanceolate shape. Differences in extent of anthocyanin coloration of flower as a result of changing varieties are shown in Table 5. Three classes could be detected, the first class included G3, G5, roomy and Misr1 with large anthocyanin extent, the second class included G1, G2 and G7 which were medium and the last class included G4, G6, G8, Giza843 and Pet15 which were small. Twelve tested genotypes differed in flower ground color (Table 5). For finer distinction, G6 and roomy were beige flowers, while G5 was light purple and the rest of flowers were white. Also, all studied genotypes had melanin spot on its flower wing over both seasons. In addition, this spots were black in all genotypes. Accordingly, these two characters may be not useful in identification between genotypes.

Table 5. Differences in qualitative characters of identified genotypes over both studied seasons. (res table)

Genotypes Characters	G1	G2	G3	G4	G5	G6	G7	G8	Roomy	Giza843	Peter15	Misr1
						A: Stem						
Intensity of anthocyanin coloration	Absent 0	Med. 5	Med. 5	Absent 0	Absent 0	Strong 7	Weak 3	Weak 3	Absent 0	Absent 0	Absent 0	Weak 3
B: Leaflet												
Position of max width	At middle 2	At middle 2	At middle 2	At middle 2	At middle 2	At middle 2	To.base 3	At middle 2	At middle 2	To.base 3	To.base 3	At middle 2
Leaflet shape	Elliptic 4	Elliptic 4	Trullate slighty elongated 2	Trullate slighty elongated 2	Elliptic 4	Elliptic 4	Trullate slightly elongated 2	Lanceolate 1	Trullate slighty elongated 2	Ovate 5	Lanceolate 1	Elliptic 4
						C: Flower						
Extent of anthocyanin coloration	Med. 5	Med. 5	Large 7	Small 3	Large 7	Small 3	Med. 5	Small 3	Large 7	Small 3	Small 3	Large 7
Flower ground color	White 1	White 1	White 1	White 1	Light purple 3	Beige 2	White 1	White 1	Beige 2	White 1	White 1	White 1
Wing melanin spot	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9	Present 9
Wing color of melanin spot	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2	Black 2
						D: Pods						
Intensity of green color	Med. 5	Med. 5	Light 3	Med. 5	Med. 5	Light 3	Med. 5	Med. 5	Med. 5	Med. 5	Med. 5	Med. 5
Color at maturity	Black	Brown	Brown	Dark brown	Black	Black	Black	Black	Black	Black	Black	Black
Degree of curvature	Strong 4	Weak 2	Weak 2	Absent to weak 1	Strong 4	Weak 2	Black 2	Weak 2	Med 3	Med 3	Med 3	Weak 2
Angle of pod with main axis	acutte	prependicular	obtuse	obtuse	obtuse	acutte	obtuse	acutte	acutte	acutte	acutte	acutte
						E: Dry seed						
Dry seed shape	Elongated	Elongated	Elongated	Elongated	Elongated	With angles	Elongated	Elongated	Elongated flattend	Elongated	spherical	Elongated
Color of testa	Light brown	beige	brown	beige	brown	brown	Light brown	beige	Light brown	brown	Dark brown	beige
Black pigmentation of helium.	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black

Results illustrated in Table 5 confirmed that G1 and G5 had strong degree of pod curvature, while G4 was absent to weak. On the other hand, G2, G3, G6, G8 and Misr1 were weak. Whereas, G7, roomy, Giza 843 and pet15 were medium curvature pod. Also, the angle of pod with main axis was perpendicular in G2 and obtuse in G3, G4, G5and G7 genotypes. On the other hand the rest genotypes were acute angle between pod and the main axis. Similar results with Yahia *et al* (2012).

Dry seed shape and color of testa for the studied genotypes recorded in Table 5. They were different among genotypes in the two seasons. All studied genotypes were elongated shape except, G6 was with angles, Roomy was elongated flattened and Peter15 was spherical. Testa color was light brown in G1, G6, G7 and roomy. Yellow green color of testa was in G2, G4 and G8. Meanwhile, it was medium brown in G3 and G5.The same trend was obtained by Behairy (2007) and Abd-El-Rahman and Abd El- Khalek (2013).

CONCLUSION

Results of this study indicated that G1 had broad leaflet, two pods/ node, strong curved pod and the highest weight of 100 seed. The angle between pod and the main axis in G2 was perpendicular. G4 had narrow leaflet and its pod curvature was absent. Flower ground color was light purple, strong curved pod in G5. Strong intensity of stem anthocyanin coloration in G6, with beige ground flower color and with angles on its dry seed shape. Misr1 recorded the shortest genotype. G8 identified with longest leaflet and was the highest genotype. Each pod and seed of Roomy genotype was the maximum length and width with elongated flattened seed shape. Giza 843 was ovate leaflet shape. Peter15 had two pods/node but ranked the short pod, lowest 100 seed weight short and narrow seed. The morphological variation of these genotypes was useful and can allow breeders identify faba bean plants with desirable characteristics that can be used in breeding programs.

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التوصيف المورفولوجي لبعض التراكيب الوراثية من الفول البلدي

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تهدف هذة الدراسة إلي إستخدام بعض الصفات المورفولوجية لتمييز 12 تركيب وراثي من الفول البلدي من خلال إجراء تجربة حقلية بمحطة البحوث الزراعية بسخا التابع لمركز البحوث الزراعية خلال موسمي2017/2018 و 2018/2019 م وذلك باستخدام التوصيف المعترف بة دوليا من الإتحاد الدولي لحماية الأصناف الجديدة (UPOV 2015). وقد أوضحت النتائج المتحصل عليها أن بعض الصفات المورفولوجية الكمية والوصفية مثل: إرتفاع النبات , طول الوريقة , عرض الوريقة , طول الأذنة , عرض الأذنة ,عدد القرون في العقدة , عدد العقد علي الساق الرئيسي , سمك الساق , طول القرن , عرض القرن , طول البذرة , عرض البذرة , وزن 100 بذرة , كثافة صبغة الأنثوسيانين علي الساق, موضع أقصي عرض علي الوريقة , شكل الوريقة , لون أرضية الزهرة, درجة إنحناء القرن , الزاوية بين الساق والقرن , لون القصرة , شكل البذرة كانت فعالة للتمييز بين التراكيب الوراثية تحت الدراسة. حيث كان G1 عريض الوريقة ويحتوي قرنين فالعقدة الواحدة وذو قرن شديد الإنحناء كما سجل أعلي وزن ل 100 بذرة بين بقية التراكيب . وكانت الزاوية بين القرن والساق في G2 عمودية بينما كان G4 ذو عرض وريقة ضيق وكان القرن عديم الانحناء أما G5 كان ذو أرضية زهرة بنفسجي خفيف وكان إنحناء القرن شديد وكان تركيز صبغة الأنثوسيانين في الساق قويا في G6 بينما كانت أرضية الزهرة فيه بيج وكانت بذرته ذات زوايا وكان مصر 1 الأقل إرتفاعا بين التراكيب الوراثية المدروسة وتميز G8 بأنه ذو وريقة طويلة وأكثر التراكيب الوراثية إرتفاعا كما سجل صنف رومي القرن والبذرة الأكثر طولا وعرضا وكانت بذرته مبططة ومستطيلة وكان شكل الوريقة في صنف جيزة 843 ذو شكل وريقة بيضاوي أما بالنسبة للصنف Pet15 ذو قرنين في العقدة وقصير في كلا من طول القرن وطول وعرض البذرة كذلك الأقل في وزن 100 بذرة . ويمكن إستخدام نتائج هذة الدراسة لأهميتها الكبيرة في حفظ حقوق مربي النباتات عند تسجيل هذة التراكيب كأصناف تجارية جديدة مما يسهل التحقق من نقاوتها أثناء مراحل الإكثار المختلفة.