

## Evaluation of Some Faba Bean Genotypes Under Three Planting Dates in Middle Egypt

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### ABSTRACT

The recent work was conducted in the Agricultural Research Stations of Mallawy, El-Minia Governorate and Sids, Beni-Suif Governorate, Egypt, during two successive winter seasons of 2016/2017 and 2017/2018 to study the effect of sowing date on productivity of eight faba bean genotypes, (Sakha-1, Sakha-3, Giza-843, Giza-716, Pop.-10, SB-1, BF-10 and Sids-19). Three sowing dates (October 15<sup>th</sup>, November 1<sup>st</sup> and November 15<sup>th</sup>) were used. The results of the combined analysis of the two growing seasons 2016/2017 and 2017/2018 showed that, number of days to both flowering and maturity and number of branches were significantly affected by sowing date. The productivity traits were significantly affected by sowing date, specially, seed yield per faddan. The results revealed significant differences among the eight faba bean genotypes in their performance in both of number of days to flowering and maturity. The earliest faba bean genotypes were Giza-843, Sakha-3 and Giza-716 in both Sids and Mallawy. It was found that, late sowing showed a shorter period until to maturity. Genotypes produced higher seed yield/plant at the 2<sup>nd</sup> sowing date (November 1<sup>st</sup>). Genotypes produced heaviest 100-seeds in the 1<sup>st</sup> sowing date, because, plants stayed longer to reach maturity, relative to those planted in both of November 1<sup>st</sup> or November 15<sup>th</sup>, since seeds given much time to grow. Sakha-3 in both Mallawy and Sids, attained the highest seed yield (ton/fad.). The second sowing date (November 1<sup>st</sup>) was most proper and any of Sakha-1 and Sakha-3 Sids-19 might be adopted to Middle Egypt.

**Keywords:** faba bean, sowing dates, yield components, upper Egypt.

### INTRODUCTION

Faba bean is the most important food legume crop in Egypt, as a source of plant protein, and plays a good role in farming, as a break crop in intensive cereal cropping systems. Breeding activities have been employed for combining genes for adaptability and high yield from elite faba bean genotypes with those for earliness (Bekheit, 2007 and Mohamed, 2010). Moreover, in Egypt, there were success in breeding efforts for faba bean cultivars combining both earliness and high yield in one genotype, such as Giza 716, Sakha 1 and others. During the last five years (2015-2019), the cultivated area, in Egypt, was about 113.810 faddans, with an average productivity of 9.2 ardabs/ faddan.

Sowing date is an important factor which significantly affects the timing and duration of vegetative and reproductive stages consequently yield and its components and seed quality. Many farmers intend to sow faba bean at the beginning of October, while, the optimum sowing date, for the commercial cultivars is recommended to be at mid- November, as reported by Refay (2001), El-Deeb *et al.* (2006), Hussein *et al.* (2006) in upper Egypt, Amer *et al.* (2008) in North delta and El-Galaly *et al.* (2008). Talal and Ghalib (2006) reported that, early planting resulted in a significant yield advantage (157%), over the late sowing date. They concluded that, much of this advantage resulted from the extended period of vegetative growth which resulted in the improvement of several agronomic characters. Badran *et al.* (2010) indicated that, sowing date

had a significant effect on number of days to maturity, number of branches/plant, number of seeds/plant, seed weight/plant, 100-seed weight and seed yield/faddan. Also, they concluded that, planting faba bean on Nov.15<sup>th</sup> improved growth characters; seed yield and its components of faba bean. Similarly, El-Metwally *et al.* (2013) showed that, sowing date faba bean at 25<sup>th</sup> October recorded the highest values of growth characters and pigment content (total chlorophyll). While, the greatest values of yield and its components were resulted from sowing at 25<sup>th</sup> November. Also Amer *et al.* (2008) and Badr *et al.* (2013) found that early sowing date produced the highest faba bean seed yield and its components.

The objective of this recent study was to detect the most convenient time of sowing for faba bean genotypes with promising levels of yield and earliness in Middle Egypt.

### MATERIALS AND METHODS

Field experiments were conducted at Sids and Mallawy Research Stations, (Middle Egypt) during two successive seasons (2016/2017 and 2017/2018) to study the effect of sowing dates on the productivity of eight faba bean genotypes i.e.; Sakha-1, Sakha-3, Giza-843, Giza-716, Pop.-10, SB-1, BF-10 and Sids 19. The origin and pedigree of the studied genotypes were presented in Table 1. The chemical and physical soil properties of experimental soil at Sids and Mallawy agricultural research stations are recorded in Table (2).

Experiments were carried- out in a split plot design. Sowing dates (October 15<sup>th</sup>, November 1<sup>st</sup> and November 15<sup>th</sup>) occupied the main plots. Whereas, faba bean genotypes were arranged in sub-plots. Data of the two years were combined when the assumption of error homogeneity can not be rejected (Bartlett,1937). The year x treatments was not significant, so that, means over years were presented.

Each plot involved five ridges each of three-meter long and 60 centimeters apart (9 m<sup>2</sup>). Days to 50% flowering and 90% maturity recorded. were recorded for each plot. At harvest, ten plants were taken randomly from each plot, were, the following characters were recorded: -

- Number of branches/plant
- Number of pods/plant
- Number of seeds/plant
- Seed weight/plant
- 100 seed weight (g).
- Seed yield (ton/faddan.) was the five determined from ridges of each plot.

#### Statistical analysis:-

Data were statistically analyzed according to Sendecor and Cochran (1981). Means were compared by the L.S.D. value at 0.05 level of probability.

**Table 1: The origin and pedigree of the studied faba bean genotypes.**

Genotype	Origin	Pedigree
Sakha-1	Egypt	716/724/88/620/283/85
Sakha-3	Egypt	Single plant selection from Giza716
Giza-843	Egypt	461/845/83/561/2076/85
Giza-716	Egypt	461/842/83/503/453/83
Population-10	Egypt	Single seed-disent from Misr3
SB-1	Egypt	IcarusX Giza843
BF-10	Egypt	Co8/Fam/151 Ter6 X B7/9042/06
Sids 19	Egypt	(Giza 40 X Misr 2) X Giza 716 X T.W.)

**Table 2: Chemical and physical soil properties of experimental soils at Sids and Mallawy research stations**

Properties	Sids	Mallawy
Mechanical:		
Sandy %	9.50	7.90
Silt %	31.9	54.50
Clay %	60.6	37.60
Textural grade	Clay	Silty Clay loam
Chemical:		
pH	7.72	8.20
E.C. (ds/m)	1.04	1.35
Organic matter %	0.91	1.18
Soluble cations		
Ca <sup>++</sup>	3.0	6.25
Mg <sup>+</sup>	1.36	0.76
K <sup>+</sup>	0.98	0.20
Na <sup>+</sup>	5.12	2.85
Soluble anions		
CO <sub>3</sub> <sup>-</sup>	0.00	0.00
HCO <sub>3</sub>	1.51	2.05
Cl <sup>-</sup>	1.72	2.25
SO <sub>4</sub> <sup>-</sup>	7.23	5.85
Available N (ppm)	62.46	20.35
Available P (ppm)	7.62	8.15
Available K (ppm)	311.60	183.0

## RESULTS AND DISCUSSION

### Effect of sowing date:

Results of the combined analysis for the two experimental seasons 2016/2017 and 2017/2018 are presented for each location in Tables (3,4,5 and 6). As for the effect of sowing date, the results showed significant differences among the three sowing dates. The second sowing date (November 1<sup>st</sup>) gave the highest values in number of branches, number of pods, number of seeds/plant, seed weight/plant (g) and seed yield (ton/fad.), (4.8, 3.7), (20.6, 26.6), (57.7, 73.9), (53.8, 67.6), (1.821, 2.133) at Mallawy and Sids locations in the two growing seasons, respectively. On the other hand, the first sowing date (October 15<sup>th</sup>) gave the lowest values in number of branches, number of pods, number of seeds/plant, seed weight/plant (g) and seed yield (ton/fad.), at Mallawy and Sids locations, respectively, (3.2, 2.7), (15.2, 12.2), (34.6, 28.8), (28.0, 24.0), (1.023, 1.098). Badr *et al.* (2013) found that, sowing faba bean, on Oct 31<sup>st</sup> produced, the highest number of pods, seeds/plant, seed yield/plant (g) and seed yield (ton/fad.). In addition, delaying sowing date, (Nov. 15<sup>th</sup>), significantly decreased, days to flowering and maturity, number of branches/ plant, number of pods/plant, number of seeds/plant, seed weight/plant (g), 100- seed weight (g) and seed yield (ton/fad.) (52.0, 53.5), (129.6, 124.8), (4.1, 3.4), (17.6, 18.3), (46.9, 41.6), (40.7, 36.0), (80.6, 75.3), (1.445, 1.697) in Mallawy and Sids locations respectively. The high 100-seed weight (g) obtained from early sowing, might due to the fact that plants had a sufficient longer vegetative period and better utilization of water and nutrients. These results coincided with those obtained by Abbas *et al.* (2010), Khalil *et al.* (2011), El -Metwally *et al.* (2013). and Badr *et al.* (2013).

### Effect of faba bean genotypes:

Data recorded in Tables (3,4,5 and 6) showed that, the differences among faba bean genotypes were significant for days to flowering and maturity, number of branches, number of pods, number of seeds/plant, seed yield/plant, 100- seed

weight and seed yield/fad., in Mallawy and Sids locations. Sakha 3 genotype was the earliest (50.8 day) followed by Giza 843 genotype (54.2 day) in Mallawy. Moreover, Sakha1 genotype was the earliest (53.9 day) followed by SB-1 genotype (54.0 day) in Sids. On the other hand, Sakha 3 genotype, gave the highest values in number of branches, number of pods, number of seeds/plant, seed weight/plant, 100-seed weight and seed yield/fad., (5.1, 3.7), (21.7, 23.9), (56.5, 61.0), (52.8, 55.6), (92.8, 86.0) and (1.838, 1.813) in Mallawy and Sids locations, respectively. Moreover, the least values for these characters were recorded by SB-1 and BF-10 genotypes in Mallawy and Pop- 10 and BF-10 genotypes in Sids location. These results were, in general, agreement with those of Mekky *et al.* (2003), Abbas *et al.*, (2010) and Badr *et al.* (2013) and Abido and Seadh (2014), Mohamed (2012) who concluded that, there were significant differences among genotypes in most traits under sowing dates.

### Effect of interaction:-

Data of Tables (3, 4, 5 and 6) revealed that, the interaction effect between faba bean genotypes and sowing dates was significant in days to flowering and maturity, number of branches, number of pods, number of seeds/plant, seed weight/plant and seed yield/fad., in Mallawy. Also, the interaction between sowing date and faba bean genotypes was significant for days to flowering and maturity, number of branches, number of pods, number of seeds, seed weight/plant (g), seed yield (ton/fad.), 100-seed weight (g) at Sids.

It was clear from the data at Sakha3 and Sids 19 genotypes on Nov.1<sup>st</sup> sowing date gave the highest values for seed yield/fad. in Mallawy and Sids Locations.

## CONCLUSION

Generally, it can be concluded that, sowing faba bean genotypes on Nov. 1<sup>st</sup> might improve the growth and yield. Sakha 3 cultivar and Sids 19 genotype were preferably recommended because of its superior response to such conditions.

**Table 3: Days to flowering, maturity, number of branches/plant and number of pods/plant of eight faba bean genotypes as affected by sowing dates at Mallawy research station (Combined over the two seasons 2016/2017 and 2017-2018)**

Variable	Mallawy location												
	50% Flowering			90% Maturity			No. of branches/plant			No. of pods/plant			
	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	
Sowing date(S)	Oct15 <sup>th</sup>	58.4	60.6	59.5	135.6	136.6	136.1	3.3	3.0	3.2	15.7	14.7	15.2
	Nov.1 <sup>st</sup>	54.9	57.4	56.1	133.8	133.0	133.4	5.2	4.4	4.8	21.4	19.8	20.6
	Nov.15 <sup>th</sup>	51.2	52.9	52.0	131.9	127.4	129.6	4.5	3.7	4.1	15.5	16.8	17.6
<b>L.S.D. 0.05</b>	<b>2.0</b>	<b>2.1</b>	<b>4.7</b>	<b>2.3</b>	<b>2.6</b>	<b>4.8</b>	<b>0.4</b>	<b>0.7</b>	<b>0.3</b>	<b>1.0</b>	<b>1.6</b>	<b>0.8</b>	
Genotypes (G)	Sakha-1	55.1	56.6	55.8	132.2	131.3	131.7	5.0	4.1	4.5	20.3	18.7	19.5
	Sakha-3	49.3	52.3	50.8	130.8	130.1	130.5	5.4	4.8	5.1	22.8	20.5	21.7
	Giza 843	52.6	55.8	54.2	130.2	129.7	130.0	4.6	4.0	4.3	18.2	17.7	18.0
	Giza-716	54.6	57.8	56.2	132.4	131.0	131.7	3.9	3.4	3.6	17.3	15.9	16.6
	Pop.10	59.2	60.4	59.8	136.7	134.4	135.6	4.3	3.3	3.8	17.7	15.9	16.8
	SB-1	57.4	58.8	58.1	138.1	134.5	136.3	3.4	3.1	3.2	16.4	15.0	15.7
	BF-10	55.4	56.5	56.0	134.3	134.0	134.1	3.5	3.1	3.3	16.2	14.8	15.5
	Sids-19	55.1	57.4	56.2	135.5	133.6	134.6	4.8	4.1	4.4	19.5	18.2	18.9
<b>L.S.D. 0.05</b>	<b>1.9</b>	<b>1.9</b>	<b>5.2</b>	<b>2.9</b>	<b>3.1</b>	<b>3.9</b>	<b>0.4</b>	<b>0.3</b>	<b>0.4</b>	<b>1.1</b>	<b>1.2</b>	<b>0.7</b>	
Oct 15 <sup>th</sup> (S1)	Sakha-1	57.6	59.6	58.6	136.0	136.7	136.3	3.8	3.4	3.6	16.3	16.8	16.5
	Sakha-3	51.6	56.3	54.0	132.2	134.0	133.1	3.9	3.5	3.7	19.7	17.3	18.5
	Giza 843	55.6	59.3	57.5	131.6	132.6	132.1	3.4	3.1	3.3	15.7	14.5	15.1
	Giza-716	59.0	62.0	60.5	134.6	135.6	135.1	3.1	2.8	2.9	15.0	13.9	14.4
	Pop.10	63.9	64.0	63.8	139.0	139.0	139.0	3.3	3.1	3.2	15.3	14.3	14.8
	SB-1	61.3	62.6	62.0	139.6	139.6	139.6	3.0	2.7	2.9	14.2	13.3	13.7
	BF-10	59.6	60.0	59.8	135.0	138.6	136.8	2.8	2.7	2.7	13.7	12.4	13.1
	Sids-19	59.0	61.3	60.1	136.6	137.0	136.8	3.5	3.1	3.3	16.1	15.2	15.7
Nov.1 <sup>st</sup> (S2)	Sakha-1	55.3	57.3	56.3	132.6	131.3	132.0	5.6	4.5	5.1	23.3	20.0	21.6
	Sakha-3	49.6	52.0	50.8	131.6	131.0	131.3	6.7	6.0	6.3	25.5	23.1	24.6
	Giza843	52.0	56.0	54.0	130.0	130.0	130.1	5.6	4.7	5.1	20.6	21.3	20.9
	Giza-716	55.3	58.3	56.8	132.0	131.6	131.8	4.1	4.1	4.1	19.3	18.5	18.9
	Pop.10	58.3	60.0	59.1	136.6	135.0	135.8	5.2	3.8	4.5	20.4	18.3	19.4
	SB-1	57.3	59.3	58.3	138.0	135.3	136.6	3.6	3.5	3.5	18.6	16.4	17.5
	BF-10	56.0	58.0	57.0	134.3	135.3	134.8	4.4	3.5	4.0	19.2	18.0	18.6
	Sids-19	55.7	58.3	57.0	135.6	134.0	134.8	6.4	5.0	5.7	24.8	23.0	23.9
Nov.15 <sup>th</sup> (S3)	Sakha-1	52.3	53.0	52.6	128.0	126.0	127.0	5.6	4.4	5.0	21.4	19.4	20.4
	Sakha-3	46.6	48.6	47.6	128.6	125.3	127.0	5.7	5.0	5.3	23.3	21.1	22.2
	Giza843	50.3	52.3	51.3	129.0	126.3	127.6	4.8	4.1	4.4	18.4	17.4	17.9
	Giza-716	49.6	53.3	51.5	130.6	125.6	128.1	4.4	3.3	3.8	17.7	15.3	16.5
	Pop.10	55.6	57.3	56.5	134.6	129.3	132.0	4.3	3.1	3.7	17.4	15.2	16.3
	SB-1	53.6	54.6	54.1	136.6	128.6	132.6	3.6	3.1	3.3	16.6	15.2	15.9
	BF-10	50.6	51.6	51.1	133.6	128.0	130.8	3.4	3.0	3.2	15.8	14.0	14.9
	Sids 19	50.6	52.6	51.6	134.3	130.0	132.1	4.4	4.1	4.3	17.8	16.5	17.1
<b>L.S.D. 0.05</b>	<b>1.2</b>	<b>1.3</b>	<b>1.3</b>	<b>1.9</b>	<b>1.9</b>	<b>1.3</b>	<b>0.8</b>	<b>0.6</b>	<b>0.5</b>	<b>1.8</b>	<b>2.0</b>	<b>1.9</b>	

Y1- the first season 2016/2017, Y2- the second season 2017/2018.

**Table 4: Number of seeds/plant, seed weight/plant (g), 100-seed weight (g) and seed yield (ton/fad.) of eight faba bean genotypes as affected by sowing dates at Mallawy research station (Combined over the two seasons 2016/2017 and 2017-2018)**

Variable	Mallawy location												
	No. of seeds/plant			Seed weight/plant (g)			100-seed weight (g)			Seed yield (ton/fed.)			
	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	
Sowing date(S)	Oct15 <sup>th</sup>	32.0	37.2	34.6	26.2	29.8	28.0	92.9	92.5	92.7	1.069	0.977	1.023
	Nov.1 <sup>st</sup>	58.9	56.5	57.7	55.1	52.5	53.8	85.5	86.5	86.2	1.883	1.759	1.821
	Nov.15 <sup>th</sup>	47.3	46.5	46.9	40.9	40.5	40.7	81.6	79.6	80.6	1.532	1.359	1.445
<b>L.S.D. 0.05</b>	<b>2.9</b>	<b>4.1</b>	<b>2.1</b>	<b>1.8</b>	<b>3.8</b>	<b>1.7</b>	<b>1.5</b>	<b>2.2</b>	<b>0.96</b>	<b>0.165</b>	<b>0.99</b>		
Genotypes (G)	Sakha-1	50.7	49.8	50.3	47.0	45.0	46.0	91.5	89.6	90.6	1.738	1.569	1.653
	Sakha-3	55.8	57.2	56.5	52.8	52.7	52.8	94.2	91.4	92.8	1.896	1.781	1.838
	Giza 843	46.4	49.7	48.0	42.1	44.3	43.2	89.9	87.9	88.5	1.645	1.503	1.573
	Giza-716	42.3	43.3	42.8	36.4	37.8	37.1	85.1	85.9	85.5	1.328	1.262	1.294
	Pop.10	44.2	41.9	43.0	38.5	35.9	37.2	86.2	84.7	85.5	1.350	1.171	1.260
	SB-1	39.0	41.2	40.1	30.9	33.8	32.3	78.4	80.9	79.7	1.129	1.033	1.081
	BF-10	39.0	39.2	39.1	31.0	31.9	31.5	77.8	80.2	79.0	1.129	1.017	1.073
	Sids-19	51.0	51.4	51.2	47.2	46.3	46.7	91.2	88.7	89.9	1.743	1.584	1.663
<b>L.S.D. 0.05</b>	<b>2.4</b>	<b>2.5</b>	<b>1.8</b>	<b>5.1</b>	<b>3.1</b>	<b>2.9</b>	<b>5.2</b>	<b>3.5</b>	<b>4.4</b>	<b>0.112</b>	<b>0.96</b>	<b>0.106</b>	
Oct 15 <sup>th</sup> (S1)	Sakha-1	34.6	41.2	37.9	30.1	34.6	32.3	96.2	94.2	95.2	1.369	1.204	1.286
	Sakha-3	39.6	45.0	42.3	35.6	38.7	37.1	98.0	96.7	97.4	1.384	1.343	1.363
	Giza 843	31.0	40.0	35.5	26.3	32.2	29.2	94.2	95.4	94.8	1.194	1.038	1.116
	Giza-716	30.0	33.5	21.7	24.1	26.2	25.1	90.2	93.6	91.9	0.863	0.816	0.939
	Pop.10	30.9	34.0	32.4	24.9	27.1	26.0	93.8	91.3	92.5	0.961	0.836	0.898
	SB-1	28.4	33.2	30.8	20.8	25.4	23.1	85.2	84.2	84.7	0.800	0.728	0.764
	BF-10	27.0	30.0	28.5	19.0	21.6	20.3	88.1	88.1	88.1	0.790	0.655	0.723
	Sids-19	34.2	40.5	37.3	29.5	33.0	31.2	97.7	96.4	97.0	1.193	1.198	1.195
Nov.1 <sup>st</sup> (S2)	Sakha-1	63.4	57.2	60.3	61.2	53.7	57.4	91.5	91.2	91.4	2.015	1.880	1.974
	Sakha-3	71.8	68.0	69.9	70.0	65.3	67.6	94.7	92.2	93.5	2.367	2.242	2.304
	Giza843	58.0	60.0	59.0	54.6	57.4	56.0	90.7	88.2	89.5	1.943	1.978	1.960
	Giza-716	52.4	53.2	52.7	47.5	49.9	48.7	84.9	85.5	85.3	1.689	1.632	1.660
	Pop.10	57.6	49.1	53.3	54.1	44.9	49.5	83.2	83.5	83.4	1.741	1.482	1.611
	SB-1	46.0	48.1	47.0	39.3	40.9	40.1	76.9	82.6	79.7	1.483	1.332	1.407
	BF-10	52.3	50.9	51.6	46.1	44.9	45.5	75.2	80.4	77.8	1.570	1.436	1.503
	Sids-19	69.8	65.2	67.5	68.3	63.2	65.7	89.3	88.2	88.8	2.258	2.087	2.173
Nov.15 <sup>th</sup> (S3)	Sakha-1	54.3	51.0	52.6	49.7	46.7	48.2	86.8	83.6	85.2	1.829	1.622	1.725
	Sakha-3	55.9	58.7	57.3	52.9	54.2	53.5	89.5	85.9	87.7	1.937	1.756	1.846
	Giza843	50.3	49.0	49.6	45.6	43.3	44.4	84.7	80.2	82.5	1.798	1.492	1.645
	Giza-716	44.7	43.4	44.0	37.6	37.3	37.4	80.3	78.1	79.2	1.431	1.338	1.384
	Pop.10	44.0	42.8	43.4	36.5	35.9	36.2	81.6	79.5	80.5	1.348	1.193	1.270
	SB-1	42.7	42.4	42.5	32.8	35.1	33.9	73.2	76.0	74.6	1.105	1.038	1.071
	BF-10	37.6	36.6	37.1	28.1	29.3	28.7	70.0	72.0	71.0	1.028	0.960	0.994
	Sids-19	49.2	48.6	48.9	43.9	42.8	43.3	86.7	81.4	84.1	1.777	1.467	1.622
<b>L.S.D. 0.05</b>	<b>4.2</b>	<b>4.4</b>	<b>4.5</b>	<b>N.S</b>	<b>5.5</b>	<b>6.4</b>	<b>N.S</b>	<b>N.S</b>	<b>0.195</b>	<b>N.S</b>	<b>0.166</b>	<b>0.136</b>	

Y1- the first season 2016/2017, Y2- the second season 2017/2018.

**Table 5: Days to flowering, maturity, number of branches/plant and number of pods/plant of eight faba bean genotypes as affected by sowing dates at Sids research station (Combined over the two seasons 2016/2017 and 2017-2018)**

Variable	Sids location												
	50% Flowering			90% Maturity			No. of branches/plant			No. of pods/plant			
	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	
Sowing date(S)	Oct15 <sup>th</sup>	61.5	63.0	62.2	140.9	139.5	140.9	2.9	2.5	2.7	12.7	11.8	12.2
	Nov.1 <sup>st</sup>	58.7	60.0	59.3	136.4	134.8	136.4	3.8	3.6	3.7	27.9	25.3	26.6
	Nov.15 <sup>th</sup>	53.0	54.0	53.5	126.2	123.4	126.2	3.5	3.2	3.4	18.4	18.2	18.3
<b>L.S.D. 0.05</b>	<b>3.0</b>	<b>3.8</b>	<b>2.0</b>	<b>1.5</b>	<b>1.9</b>	<b>1.6</b>	<b>0.5</b>	<b>0.6</b>	<b>0.4</b>	<b>1</b>	<b>1.6</b>	<b>0.8</b>	
Genotypes (G)	Sakha-1	52.8	54.9	53.9	132.3	131.2	131.7	3.4	3.2	3.3	19.6	18.5	19.0
	Sakha-3	58.3	58.5	58.4	135.4	134.1	134.8	3.9	3.6	3.7	24.7	23.2	23.9
	Giza 843	58.6	58.8	58.7	134.3	133.0	133.6	3.3	2.9	3.1	16.8	15.9	16.3
	Giza-716	61.4	63.4	62.4	131.4	129.0	130.2	3.4	3.1	3.2	18.3	16.8	17.6
	Pop.10	55.3	56.4	55.8	135.0	133.2	134.1	3.1	2.8	2.9	16.5	15.3	15.9
	SB-1	52.3	55.8	54.0	138.0	135.2	136.6	3.4	3.1	3.3	21.1	20.3	20.7
	BF-10	60.8	60.5	60.7	134.3	132.5	133.4	3.3	3.0	3.2	18.0	17.0	17.5
	Sids-19	62.0	63.5	62.9	135.3	132.5	133.9	3.6	3.4	3.5	22.2	20.7	21.4
<b>L.S.D. 0.05</b>	<b>1.9</b>	<b>2.5</b>	<b>1.7</b>	<b>1.8</b>	<b>2.6</b>	<b>1.3</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	<b>2.3</b>	<b>3.9</b>	<b>1.5</b>	
Oct 15 <sup>th</sup> (S1)	Sakha-1	55.0	57.3	56.1	138.6	137.0	137.8	3.2	3.0	3.1	13.2	13.5	13.3
	Sakha-3	62.3	62.3	62.3	142.3	141.2	141.7	3.1	2.8	2.9	13.0	12.8	12.9
	Giza 843	62.3	63.9	63.0	141.0	140.1	140.5	2.8	2.4	2.6	12.5	11.0	11.7
	Giza-716	64.6	68.3	66.5	137.6	136.0	136.8	3.0	2.6	2.8	12.9	11.3	12.1
	Pop.10	59.3	59.0	59.1	142.6	142.0	142.3	2.7	2.3	2.5	12.4	11.9	12.1
	SB-1	56.3	61.0	58.6	145.3	143.1	144.2	2.7	2.3	2.5	12.2	11.8	12.0
	BF-10	65.3	64.0	64.6	140.0	139.0	139.5	2.9	2.5	2.7	12.6	11.0	11.8
	Sids-19	66.6	68.3	67.5	139.6	138.1	138.8	3.0	2.8	2.9	12.9	11.5	12.2
Nov.1 <sup>st</sup> (S2)	Sakha-1	55.0	55.7	55.3	133.6	133.6	133.6	3.8	3.7	3.7	29.8	27.2	28.5
	Sakha-3	59.0	59.6	59.3	136.6	137.0	136.8	4.6	4.2	4.4	35.5	33.0	34.2
	Giza843	59.0	58.6	58.8	138.0	136.0	137.0	3.7	3.4	3.5	22.4	20.1	21.2
	Giza-716	63.0	64.5	63.7	134.3	131.5	132.9	3.6	3.1	3.3	22.7	19.8	21.3
	Pop.10	56.0	57.6	56.8	138.0	137.5	137.7	3.6	3.3	3.4	22.2	20.0	21.1
	SB-1	53.6	56.4	55.0	140.0	137.2	138.6	4.0	2.3	3.9	32.6	30.0	31.3
	BF-10	60.6	60.9	60.7	134.3	133.6	133.9	3.7	2.5	3.6	23.7	21.4	22.5
	Sids 19	63.3	66.4	64.8	136.3	132.1	134.2	4.1	2.8	4.0	34.5	31.5	33.0
Nov.15 <sup>th</sup> (S3)	Sakha-1	48.6	51.6	50.1	124.6	123.0	123.8	3.3	3.0	3.1	15.8	15.0	15.4
	Sakha-3	53.6	53.6	53.6	127.3	124.3	125.8	4.0	3.8	3.9	25.6	23.9	24.7
	Giza843	54.6	54.3	54.5	124.0	123.0	123.5	3.4	3.0	3.2	15.5	16.6	16.0
	Giza-716	56.6	57.3	57.0	122.3	119.5	120.9	3.8	3.6	3.7	19.5	19.3	19.4
	Pop.10	50.6	52.6	51.6	124.3	120.3	122.3	3.1	2.8	2.9	15.1	14.2	14.6
	SB-1	47.0	50.0	48.5	128.6	125.4	127.0	3.7	3.4	3.5	18.5	19.2	18.8
	BF-10	56.6	56.6	56.6	128.6	125.0	126.8	3.5	3.1	3.3	17.9	18.8	18.3
	Sids-19	56.0	56.0	56.0	130.0	127.3	128.6	3.7	3.6	3.6	19.3	19.1	19.2
<b>L.S.D. 0.05</b>	<b>N.S</b>	<b>N.S</b>	<b>1.7</b>	<b>2.1</b>	<b>2.4</b>	<b>3.5</b>	<b>N.S</b>	<b>0.4</b>	<b>3.6</b>	<b>3.6</b>	<b>4.5</b>	<b>3.9</b>	

Y1- the first season 2016/2017, Y2- the second season 2017/2018.

**Table 6: Number of seeds/plant, seed weight/plant (g), 100-seed weight (g) and seed yield (ton/fad.) of eight faba bean genotypes as affected by sowing dates at Sids research station (Combined over the two seasons 2016/2017 and 2017-2018)**

Variable	Sids location												
	No. of seeds/plant			Seed weight/plant (g)			100-seed weight (g)			Seed yield (ton/fed.)			
	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	
Sowing date(S)	Oct15 <sup>th</sup>	35.2	22.4	28.8	25.1	23.0	24.0	89.4	91.4	90.4	1.181	1.015	1.098
	Nov.1 <sup>st</sup>	78.0	69.8	73.9	69.8	65.4	67.6	75.0	85.4	80.2	2.209	2.056	2.133
	Nov.15 <sup>th</sup>	44.4	38.9	41.6	33.5	38.4	36.0	70.8	79.8	75.3	1.761	1.634	1.697
<b>L.S.D. 0.05</b>	<b>5.2</b>	<b>7.2</b>	<b>4.3</b>	<b>1.8</b>	<b>3.8</b>	<b>2.4</b>	<b>1.5</b>	<b>2.2</b>	<b>3.4</b>	<b>0.92</b>	<b>0.161</b>	<b>0.43</b>	
Genotypes (G)	Sakha-1	51.1	44.7	47.9	42.2	42.8	42.5	80.3	86.4	83.3	1.790	1.640	1.715
	Sakha-3	65.0	57.1	61.0	55.7	55.6	55.6	82.7	89.3	86.0	1.891	1.735	1.813
	Giza 843	46.3	36.5	41.4	36.5	35.0	35.7	76.0	84.5	80.2	1.686	1.533	1.601
	Giza-716	51.0	39.4	45.2	40.2	40.1	40.2	79.0	84.7	81.9	1.592	1.453	1.522
	Pop.10	44.0	33.3	38.6	34.3	31.8	33.0	73.8	83.0	78.4	1.542	1.380	1.461
	SB-1	55.5	45.9	50.7	45.6	44.0	44.8	77.6	84.3	81.0	1.680	1.537	1.608
	BF-10	48.3	41.3	44.8	38.7	39.3	39.0	77.5	84.8	81.1	1.707	1.575	1.641
	Sids-19	59.0	51.7	55.3	49.2	49.7	49.4	80.2	87.2	83.7	1.850	1.697	1.773
<b>L.S.D. 0.05</b>	<b>9.8</b>	<b>5.9</b>	<b>5.7</b>	<b>5.1</b>	<b>3.1</b>	<b>4.9</b>	<b>5.2</b>	<b>3.5</b>	<b>3.4</b>	<b>0.112</b>	<b>0.159</b>	<b>0.65</b>	
Oct 15 <sup>th</sup> (S1)	Sakha-1	39.9	29.7	34.8	29.5	29.5	29.5	89.8	92.4	91.1	1.376	1.210	1.293
	Sakha-3	38.2	27.9	33.0	28.3	28.1	28.2	93.5	94.5	94.0	1.355	1.180	1.268
	Giza 843	34.0	17.1	25.5	23.5	18.6	21.0	88.9	90.2	89.5	1.101	0.941	1.021
	Giza-716	36.2	24.3	30.2	26.3	24.5	25.4	85.2	87.5	86.4	1.182	1.050	1.116
	Pop.10	31.7	16.9	24.3	21.5	18.1	19.8	87.7	88.9	88.3	1.059	0.803	0.930
	SB-1	30.0	16.7	23.3	19.8	17.4	18.6	90.1	93.3	91.7	0.918	0.781	0.849
	BF-10	35.1	20.1	27.6	24.9	21.0	22.9	89.0	90.7	89.8	1.127	1.021	1.074
	Sids-19	37.0	27.2	32.1	26.9	27.2	27.0	91.5	94.0	92.8	1.333	1.141	1.237
Nov.1 <sup>st</sup> (S2)	Sakha-1	77.4	74.1	75.7	69.6	68.5	69.0	76.2	83.3	79.7	2.261	2.100	2.180
	Sakha-3	99.1	91.1	95.1	92.5	86.0	89.2	81.2	91.2	86.2	2.446	2.305	2.375
	Giza843	64.9	60.3	62.6	57.7	54.3	56.0	70.9	83.8	77.4	2.207	2.020	2.113
	Giza-716	60.8	45.8	53.2	50.2	49.1	49.6	79.6	86.5	83.1	1.751	1.610	1.680
	Pop.10	70.0	56.0	63.0	61.5	50.1	55.8	66.2	82.5	74.3	2.016	1.910	1.963
	SB-1	89.8	80.5	85.1	80.9	75.0	77.9	76.8	85.3	81.1	2.349	2.180	2.264
	BF-10	70.1	67.3	68.7	62.4	61.1	61.7	72.7	84.2	78.4	2.222	2.060	2.141
	Sids-19	91.6	83.9	87.7	83.8	79.1	81.4	76.2	86.0	81.1	2.423	2.270	2.346
Nov.15 <sup>th</sup> (S3)	Sakha-1	36.1	30.5	33.3	27.5	30.4	28.9	74.8	83.5	79.1	1.732	1.610	1.671
	Sakha-3	57.7	52.3	55.0	46.3	52.7	49.5	73.6	82.3	77.9	1.872	1.720	1.796
	Giza843	39.9	32.1	36.0	28.3	32.0	30.1	68.3	79.5	73.9	1.751	1.640	1.695
	Giza-716	55.9	48.3	52.1	44.2	46.8	45.2	72.3	80.1	76.2	1.843	1.700	1.771
	Pop.10	30.3	27.1	28.7	20.0	27.3	23.6	67.6	77.6	72.6	1.551	1.430	1.490
	SB-1	46.8	40.5	43.7	36.0	39.6	37.8	66.1	74.3	70.2	1.774	1.650	1.712
	BF-10	39.8	36.7	38.2	29.0	36.0	32.5	70.8	79.5	75.1	1.772	1.645	1.708
	Sids-19	48.4	44.0	46.2	36.9	42.8	39.9	73.0	81.5	77.2	1.793	1.680	1.736
<b>L.S.D. 0.05</b>	<b>10.0</b>	<b>11.4</b>	<b>14.2</b>	<b>N.S</b>	<b>5.4</b>	<b>11.9</b>	<b>N.S</b>	<b>N.S</b>	<b>8.7</b>	<b>0.112</b>	<b>0.119</b>	<b>0.170</b>	

Y1- the first season 2016/2017, Y2- the second season 2017/2018.

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## تقييم بعض التراكيب الوراثية من الفول البلدي تحت ثلاث مواعيد زراعة في منطقة مصر الوسطى

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أجرى هذا البحث بمنطقة مصر الوسطى في كلا من المزرعة البحثية لمحطة البحوث الزراعية بملوي، محافظة المنيا والمزرعة البحثية لمحطة البحوث الزراعية بسدس، محافظة بني سويف، خلال موسمين شتويين متتاليين ٢٠١٦/٢٠١٧ و ٢٠١٧/٢٠١٨، لدراسة مدى استجابة بعض التراكيب الوراثية من الفول البلدي (سحا ١، سحا ٣، جيزة ٨٤٣، جيزة ٧١٦، عشيرة ١٠، SB1، BF-10، سدس ١٩) لمواعيد الزراعة. زرعت التراكيب الوراثية في ثلاثة مواعيد زراعة وهي (١٥ أكتوبر، ١ نوفمبر، ١٥ نوفمبر). تم تطبيق المعاملات الزراعية الخاصة بمحصول الفول البلدي. ولقد اظهرت نتائج التحليل التجميعي ان مواعيد الزراعة كان لها تأثير معنوي على صفة عدد الايام من الزراعة حتى التزهير والنضج وعدد الفروع/نبات ومحصول البذور. كما اظهرت النتائج وجود فروق معنوية بين الثمانية تراكيب وراثية في صفات عدد الايام من الزراعة حتى التزهير والنضج وكانت التراكيب الوراثية سحا ٣، جيزه ٨٤٣، سحا ١، SB-1 هي أبكر التراكيب الوراثية في كلا من ملوى وسدس على الترتيب.

واعطت التراكيب الوراثية اعلى محصول بذور/فدان في الميعاد الثاني (١ نوفمبر) بالمقارنة بالميعادين الاول (١٥ اكتوبر) والثالث (١٥ نوفمبر). كما اعطت التراكيب الوراثية الثمانية اعلى القيم لصفة وزن البذرة في الميعاد الاول (١٥ اكتوبر) ويرجع ذلك الى ان نباتات الفول المنزرعة ١٥ اكتوبر مكثت بالحقل اطول فترة لكي تصل الى النضج مقارنة بالنباتات المنزرعة في (١ نوفمبر، ١٥ نوفمبر) مما أعطى فرصة اطول لامتلاء البذور. ولقد اعطى التركيب الوراثي سحا ٣ اعلى محصول بذور/فدان في كلا من سدس وملوى. وتوضح النتائج المتحصل عليها من هذه الدراسة ان الميعاد الثاني ١ نوفمبر هو افضل ميعاد لزراعة الفول البلدي في منطقة مصر الوسطى وان كلا من التراكيب الوراثية سحا ٣، سحا ١، سدس ٩ يمكن ان يكونوا اكثر تأقلاً مع مصر الوسطى.