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 15th, November 1st and November 15th) 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 2nd sowing date (November 1st). Genotypes produced heaviest 100-seeds in the 1st sowing date, because, plants stayed longer to reach maturity, relative to those planted in both of Novamber1st or November 15th, 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 1st) 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.15th improved growth characters; seed yield and its components of faba bean. Similarly, El-Metwally *et al.* (2013) showed that, sowing date faba bean at 25th 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 25th 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 (Octobar 15th, November 1st and November 15th) 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 (Barttlet,1937). The year x treatments was not significant, so that, means over years were presented.

Each plot involved five ridges each of threemeter long and 60 centimeters apart (9 m²). 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 stu	died	faba	bean	genoty	vpes.
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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^{++}	3.0	6.25
Mg^+	1.36	0.76
K^+	0.98	0.20
Na ⁺	5.12	2.85
Soluble anions		
Co ₃ -	0.00	0.00
Hco ₃	1.51	2.05
Cl	1.72	2.25
So ₄	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 1st)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 15th) 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 31st produced, the highest number of pods, seeds/plant, seed yield/plant (g) and seed yield (ton/fad.). In addition, delaying sowing date, (Nov. 15th), 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, Sakhal 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 gentypes 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 diffierences 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.1st 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. 1st might improve the growth and yield. Sakha 3 cultivar and Sids 19 genotype were preferably recommended because of its superior response to such conditions.

Variable 50% Flowering 90% Maturity No. of baractesity No. of baractesity No. of baractesity No. of baractesity Sowing date(\$) V1 Y2 Mean Y1 Y2 Mean Y1 Y2 Mean Y1 Y2 Mean Y1 Y2 Mean Sowing date(\$) Nov.15 ^m 51.2 52.9 52.0 131.9 127.4 129.6 4.5 3.7 4.1 15.5 16.8 17.6 LS.D.0.05 Z.0 2.1 4.7 2.3 2.6 4.8 0.4 0.7 0.3 1.0 1.6 0.8 Sakha-3 49.3 52.3 50.8 130.1 130.5 5.4 4.8 5.1 22.8 20.5 12.7 130.6 4.1 4.5 1.6 1.7 18.0 1.7 18.0 1.7 18.0 1.7 1.5 1.6 1.7 1.8 1.0 1.7 1.9 1.6 1.7 1.8 1.0 1.1 1.2 <						,	Μ	lallawy lo	ocation					
vial vial <th< th=""><th>Variable</th><th></th><th>50°</th><th>% Flow</th><th>ering</th><th>909</th><th>% Matu</th><th>rity</th><th>bra</th><th>No. of anches/</th><th>f plant</th><th>No. o</th><th>of pods</th><th>/plant</th></th<>	Variable		50°	% Flow	ering	909	% Matu	rity	bra	No. of anches/	f plant	No. o	of pods	/plant
Sowing date(\$) Oct15 th 58.4 60.6 95.7 135.6 136.0 133.4 3.0 3.2 15.7 14.7 15.2 Mov.1 ⁵ 51.2 52.9 52.0 131.9 133.4 133.0 133.4 5.2 4.4 4.8 5.1 5.6 15.8 135.9 12.0 12.0 12.0 12.0 12.0 13.1 13.7 5.0 4.1 4.5 2.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 <th></th> <th></th> <th>Y1</th> <th>Y2</th> <th>Mean</th> <th>Y1</th> <th>Y2</th> <th>Mean</th> <th>Y1</th> <th>Y2</th> <th>Mean</th> <th>Y1</th> <th>Y2</th> <th>Mean</th>			Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean
Sowing date(S) Nov.1 ^{an} 54.9 57.4 56.1 13.8 13.0 13.4 5.2 4.4 4.8 21.4 49.8 20.6 LS.D. 0.05 - 20 21.4 47.7 23 2.6 4.8 0.4 0.7 0.3 0.1 1.6 0.8 Sakha-1 55.1 56.6 55.8 13.2 13.13 13.17 5.0 4.1 4.5 20.3 18.7 18.0 Giza A16 55.1 56.6 55.8 13.2 13.10 13.17 3.0 4.4 4.5 12.3 12.3 13.6 Giza A16 55.8 56.2 13.2 13.10 13.17 3.9 3.4 3.6 17.3 15.9 16.6 Giza A16 57.6 56.8 13.2 13.40 13.10 3.1 3.3 3.8 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 <th1< td=""><td>а ·</td><td>Oct15th</td><td>58.4</td><td>60.6</td><td>59.5</td><td>135.6</td><td>136.6</td><td>136.1</td><td>3.3</td><td>3.0</td><td>3.2</td><td>15.7</td><td>14.7</td><td>15.2</td></th1<>	а ·	Oct15 th	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.15 th 51.2 52.9 52.0 13.9 12.74 12.96 4.5 3.7 4.1 15.5 16.8 17.6 LS.D.0.05 2.0 2.1 4.7 2.3 2.6 4.8 0.4 0.7 0.3 1.0 1.6 0.8 Sakha-1 55.1 56.6 55.8 132.2 131.3 131.7 50. 4.1 4.5 20.3 18.7 19.5 Genotypes Giza-716 54.6 57.8 56.2 132.4 131.0 131.7 3.9 3.4 3.6 17.7 15.9 16.8 Op.10 59.2 60.4 59.8 136.7 134.4 135.6 3.4 3.1 3.2 16.4 15.9 15.8 Genotypes 19 5.4 56.5 56.0 134.3 134.6 136.3 3.4 3.6 1.6.1 1.9 1.9 1.9 1.9 1.9 1.4 1.5.5 1.6.8 1.5.7 Giza-	Sowing date(S)	Nov.1 st	54.9	57.4	56.1	133.8	133.0	133.4	5.2	4.4	4.8	21.4	19.8	20.6
L.S.D. 0.052.02.02.13.72.32.64.80.40.70.31.01.01.00.8Sakha-349.352.350.8130.2131.3131.7504.851.220.521.5Giza 84352.655.854.2130.2120.7130.04.64.04.318.217.718.0Giza 71654.667.856.2132.4131.0131.73.03.43.617.315.916.6Giza 71654.667.850.2132.4134.4135.63.43.13.216.415.015.7Giza 71654.657.856.1134.3134.5134.613.43.33.313.216.414.015.0Sint 151.557.458.6136.0134.5134.613.43.43.43.616.214.015.0Sint 151.557.458.6136.0136.7136.33.83.43.616.316.215.0Sint 257.557.458.6136.0136.7136.33.83.43.616.316.515.0Sint 357.557.657.5131.6136.7136.33.83.717.017.318.5Sint 357.659.357.5131.6136.7136.33.83.717.017.318.5Sint 457.659.3 </td <td>date(b)</td> <td>Nov.15th</td> <td>51.2</td> <td>52.9</td> <td>52.0</td> <td>131.9</td> <td>127.4</td> <td>129.6</td> <td>4.5</td> <td>3.7</td> <td>4.1</td> <td>15.5</td> <td>16.8</td> <td>17.6</td>	date(b)	Nov.15 th	51.2	52.9	52.0	131.9	127.4	129.6	4.5	3.7	4.1	15.5	16.8	17.6
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Sakha-3 90.3 52.8 53.8 130.1 130.5 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 4.8 5.6 7.7.7 18.0 Giza 716 54.6 57.8 56.2 132.4 131.0 131.7 3.9 3.4 3.6 17.7 15.9 16.8 Pop.10 59.2 60.4 59.8 136.7 134.4 135.6 3.4 3.1 3.2 16.4 15.0 15.7 BF-10 57.4 56.2 135.5 136.6 136.4 4.8 4.1 15.2 14.8 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 18.2 17.7 18.3		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
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	Genotypes	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
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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 LS.D. 0.05 19 1.9 5.2 2.9 3.1 3.9 0.4 0.3 0.4 1.1 1.2 0.7 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 3.1 3.3 15.7 14.5 15.1 Oct 15 ^h Giza-716 59.0 62.0 60.5 134.6 135.6 132.1 3.1 3.2 15.7 14.4 (S1) Pop.10 63.9 64.0 63.8 139.0 139.0 139.0 3.3 3.1 3.2 15.7 14.3 14.4 S16-19 59.0 61.3 60.1 136.6 137.0 138.5 3.3 16.1 <		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
L.S.D. 0.05 1.9 1.9 5.2 2.9 3.1 3.9 0.4 0.3 0.4 1.1 1.2 0.7 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 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 62.0 139.0 139.0 130.0 2.0 2.9 14.2 13.3 13.7 BF-10 59.6 60.0 59.8 132.6 136.8 3.5 3.1 3.3 16.1		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
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 716 59.0 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 59.8 135.0 136.8 136.8 3.5 3.1 3.3 16.1 15.2 15.7 Sakha-1 55.3 57.3 56.3 132.6 131.0 131.3 5.0 5.1	L.S.D. 0.05		1.9	1.9	5.2	2.9	3.1	3.9	0.4	0.3	0.4	1.1	1.2	0.7
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 63.8 139.0 139.0 139.6 3.0 2.7 2.9 14.2 13.3 13.7 BF-10 59.0 61.3 60.1 136.6 136.8 2.8 2.7 2.7 1.7 12.4 13.1 Sids-19 59.0 61.3 60.1 136.6 131.0 131.3 6.7 6.0 6.3 25.5 23.1 24.6 Giza843 52.0 50.6 54.0 130.0 130.0 130.1 5.6 4.7 <t< td=""><td></td><td>Sakha-1</td><td>57.6</td><td>59.6</td><td>58.6</td><td>136.0</td><td>136.7</td><td>136.3</td><td>3.8</td><td>3.4</td><td>3.6</td><td>16.3</td><td>16.8</td><td>16.5</td></t<>		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
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 3.3 3.1 3.2 15.3 14.3 14.8 SB-1 61.3 62.6 62.0 139.6 139.6 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 60.1 130.6 131.0 131.3 6.7 6.0 6.3 25.5 23.1 24.6 Giza-843 52.0 56.0 54.0 130.0 130.0 131.6 131.8 4.1 4.1 <td< td=""><td></td><td>Sakha-3</td><td>51.6</td><td>56.3</td><td>54.0</td><td>132.2</td><td>134.0</td><td>133.1</td><td>3.9</td><td>3.5</td><td>3.7</td><td>19.7</td><td>17.3</td><td>18.5</td></td<>		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
Oct 15 th (S1) 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 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 3.3 161 15.2 15.7 Sakha-3 49.6 52.0 50.8 131.6 131.0 131.3 6.6 4.5 5.1 23.3 20.0 21.6 Giza-716 55.3 58.3 56.8 132.0 131.6 131.6 131.8		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
(S1) 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 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 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 Nov.1 ^a S5	Oct 15th	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
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 Sakha-1 55.3 57.3 56.3 131.6 131.0 131.3 6.7 6.0 6.3 25.5 23.1 24.6 Giza843 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 50.8 53.0 130.0 130.0 130.1 5.6 4.7 5.1 20.6 21.3 20.9 (S2) Fop.10 58.3 50.0 57.0 134.0 131.6 131.8 4.1	(S1)	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
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 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 54.0 130.0 130.1 5.6 4.7 5.1 20.6 21.3 20.9 Nov.1 ^{at} Giza-716 55.3 58.3 56.8 132.0 131.6 131.8 4.1 4.1 4.1 4.1 4.3 14.3 14.4 14.9 14.3 14.4 14.9 14.5 14.5 14.5 14.5		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
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 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 Mov.1st 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 S20 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 57.0 134.3 135.3		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
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 54.0 130.0 130.1 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 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 58.3 138.0 135.3 134.8 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 <td< td=""><td></td><td>Sids-19</td><td>59.0</td><td>61.3</td><td>60.1</td><td>136.6</td><td>137.0</td><td>136.8</td><td>3.5</td><td>3.1</td><td>3.3</td><td>16.1</td><td>15.2</td><td>15.7</td></td<>		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
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 57.7 58.3 57.0 135.6 134.0 134.8 6.4 5.0 5.7 24.8 23.0 23.9 Sakha-1 52.3 53.0 52.6 128.0 126.0 127.0 <t< td=""><td></td><td>Sakha-1</td><td>55.3</td><td>57.3</td><td>56.3</td><td>132.6</td><td>131.3</td><td>132.0</td><td>5.6</td><td>4.5</td><td>5.1</td><td>23.3</td><td>20.0</td><td>21.6</td></t<>		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
Nov.1st (S2) 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 Nov.1st (S2) 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 th Sakha-1 52.3 51.3 129.0		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
Nov.1st (S2) 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 (S2) 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 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		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
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Nov.1 st	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
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 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 47.6 128.6 127.0 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 Nov.15 th Giza-716 49.6 53.3 51.5 130.6 125.6 128.1 4.4	(S2)	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
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		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
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 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 Nov.15 th 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 (S3) 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		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
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 <td< td=""><td></td><td>Sids- 19</td><td>55.7</td><td>58.3</td><td>57.0</td><td>135.6</td><td>134.0</td><td>134.8</td><td>6.4</td><td>5.0</td><td>5.7</td><td>24.8</td><td>23.0</td><td>23.9</td></td<>		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
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 <td< td=""><td></td><td>Sakha-1</td><td>52.3</td><td>53.0</td><td>52.6</td><td>128.0</td><td>126.0</td><td>127.0</td><td>5.6</td><td>4.4</td><td>5.0</td><td>21.4</td><td>19.4</td><td>20.4</td></td<>		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
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 Nov.15 th 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 (S3) 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 L.S.D. 0.05 1.2 1.3 1.9 1.9 1.3		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
Nov.15 th (S3) 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 (S3) 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 Ls.D. 0.05 1.2 1.3 1.9 1.9 1.3 0.8 0.6 0.5 1.8 2.0 1.9		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
(S3) 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 3.7 17.4 15.2 16.3 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 L.S.D. 0.05 1.2 1.3 1.9 1.9 1.3 0.8 0.6 0.5 1.8 2.0 1.9	Nov.15 th	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
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 L.S.D. 0.05 1.2 1.3 1.9 1.9 1.3 0.8 0.6 0.5 1.8 2.0 1.9	(S3)	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
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 L.S.D. 0.05 1.2 1.3 1.3 1.9 1.3 0.8 0.6 0.5 1.8 2.0 1.9		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
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 L.S.D. 0.05 1.2 1.3 1.3 1.9 1.9 1.3 0.8 0.6 0.5 1.8 2.0 1.9		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
L.S.D. 0.05 1.2 1.3 1.3 1.9 1.9 1.3 0.8 0.6 0.5 1.8 2.0 1.9		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
	L.S.D. 0.05		1.2	1.3	1.3	1.9	1.9	1.3	0.8	0.6	0.5	1.8	2.0	1.9

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)

VariableNo. of seeds/plantSeedweight/plant (g)100-seedweight (g)Seedyield(tom/fed)Sowing date(S)Oct 332.037.234.636.229.892.592.592.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.692.6							N	/Iallawy l	ocation	1				
VI V2 Mean V1 V2 Mean V1 V2 Mean V1 V2 Mean Sowing date(S) Nov.15 th 32.0 37.2 34.6 26.2 29.8 28.0 92.9 92.5 92.7 1.069 0.977 10.23 Mov.15 th 47.3 46.5 46.9 40.9 40.5 40.7 81.6 79.6 80.6 1.532 1.359 1.445 LS.D.0.05 2.9 4.1 2.1 1.8 38 1.7 1.5 2.2 0.96 0.165 0.99 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 Girae-716 42.3 43.3 42.8 36.4 37.8 37.1 85.9 85.5 1.350 1.171 1.200 Genotypes (G) 39.0 41.2 40.1 30.9 33.8 32.3 78.4 80.9	Variable		No. d	of seeds	s/plant	Seed v	veight/pl	lant (g)	100-s	eed we	ight (g)	Seed y	vield (t	ton/fed.)
Sowing date(\$) Oct15 th 32.0 37.2 34.6 26.2 29.8 28.0 92.9 92.5 92.7 1.069 0.977 1.023 Mov.1 ⁴⁷ 58.9 56.5 57.7 55.1 52.5 53.8 85.5 86.2 1.883 1.759 1.821 LS.D.0.05 2.9 4.1 2.1 1.8 3.8 1.7 1.5 2.2 0.96 0.165 0.99 Sakha-1 50.7 48.5 52.8 52.7 52.8 94.2 91.4 92.8 1.896 1.781 1.569 1.653 Sakha-3 55.7 72.5 52.8 52.7 72.8 94.2 91.4 92.8 1.896 1.781 1.838 Giza 413 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 417 39.0 39.2 39.1 31.0 31.9 31.5 37.9 37.2			Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean
Sowing date(S) Nov.1s ^a 56.5 57.7 55.1 52.5 53.8 85.5 86.2 1.831 1.759 1.821 Nov.1s ^{ba} 47.3 46.5 66.9 40.9 40.5 40.7 81.6 79.6 80.6 1.532 1.359 1.421 LS.D 0.05 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 1.806 1.633 1.573 Giza AT16 42.3 43.3 42.8 36.4 37.8 37.1 85.1 85.5 1.528 1.503 1.171 1.200 Genotypes (G) Sak-1 30.0 44.6 37.3 37.2 86.2 74.0 1.129 1.031 1.171 1.030 Genotypes (G) Sak-1 31.0 31.0 31.0 31.0		Oct15 th	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.15 th 47.3 46.5 46.9 40.9 40.5 40.7 81.6 79.6 80.6 1.532 1.339 1.445 LS.D. 0.05 2.9 4.1 2.1 1.8 3.8 1.7 1.5 2.2 0.96 0.165 0.95 Sakha-1 50.7 49.8 50.3 47.0 45.0 40.0 91.4 92.8 1.890 1.738 1.838 Genotypes (G) 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 85.5 1.328 1.262 1.30 1.171 1.260 Sids-19 51.0 51.4 51.2 47.2 46.3 46.7 71.2 89.9 1.741 1.384 1.663 LS.D. 0.05 2.4 2.5 1.8 51. 31.1 2.9 52.3	Sowing	Nov.1st	58.9	56.5	57.7	55.1	52.5	53.8	85.5	86.5	86.2	1.883	1.759	1.821
LS.D. 0.05 2.9 4.1 2.1 1.8 3.8 1.7 1.5 2.2 0.96 0.165 0.99 Sakha-3 55.8 50.7 49.8 50.3 47.0 45.0 46.0 91.5 89.6 90.6 1.738 1.569 1.658 Sakha-3 55.8 57.2 56.2 52.7 52.8 94.2 91.4 92.8 1.896 1.731 1.838 1.645 1.503 1.573 Genotypes (G) Giza-716 42.3 43.3 42.8 36.4 37.8 37.1 85.1 85.5 1.328 1.171 1.260 SB-1 30.0 39.2 39.1 31.0 31.9 31.5 7.78 80.2 79.0 1.129 1.031 1.031 Sids-19 51.0 51.4 51.2 47.2 46.3 46.7 91.2 88.7 97.4 1.384 1.600 0.00 0.00 0.00 0.016 0.016 0.016 0.016	uale(S)	Nov.15 th	47.3	46.5	46.9	40.9	40.5	40.7	81.6	79.6	80.6	1.532	1.359	1.445
	L.S.D. 0.05		2.9	4.1		2.1	1.8	3.8	1.7	1.5	2.2	0.96	0.165	0.99
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 R43 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 R43 46.4 49.7 41.0 30.9 33.8 52.3 73.2 84.7 88.5 1.353 1.645 1.201 1.171 1.200 BP-10 39.0 41.2 41.0 30.9 33.8 32.3 78.4 80.9 79.7 1.129 1.031 1.081 SB-1 39.0 51.4 51.2 47.2 46.3 46.7 91.2 88.7 89.9 1.731 1.584 1.663 LSD.0.05 24 51.0 51.8 51.1 31.6 31.2 29.2 94.2 95.2 1.36 1.141 1.381 1.34 Giza 130 30.0 32.5 26.3 32		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
Genotypes (G) 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 1.037 1.083 1.663 LS.D.0.05 2.4 2.5 1.8 5.1 31. 2.9 5.2 3.5 4.4 0.12 0.96 0.106 Sakha-1 34.6 41.2 37.9 30.1 34.6 32.2 94.2 95.2 1.369 1.044 1.343 1.363 Giza A16 31.0 30.0 32.5 26.1 32		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
Genotypes (G) 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 BF-10 39.0 39.2 39.1 31.0 31.9 31.5 77.8 80.2 79.0 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 Sids1-10 51.4 51.2 47.2 46.3 46.7 91.2 80.2 94.2 95.2 1.369 1.204 1.284 1.663 LSD.0.05 2.4 2.5 1.8 5.1 31.1 2.9 5.2 3.5 4.4 0.112 0.06 1.204 1.284 1.363 Giazaria 31.0 40.0 35.5 26.3 32.2 90.42 95.4 94.8 1.194 1.384 1.343 1.363 Giza 453 31.0 32.4		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
	Genotypes	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
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 LS.D. 0.05 2.4 2.5 1.8 5.1 31.1 2.9 5.2 3.5 4.4 0.112 0.96 0.106 Sakha-1 34.6 41.2 37.9 30.1 34.6 32.3 96.2 94.2 95.2 1.364 1.343 1.363 Oct 15 th 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 (S1) 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 24.4 33.2 30.8 29.5 33.0<	(G)	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
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 LS.D. 0.05 2.4 2.5 1.8 5.1 3.1 2.9 5.2 3.5 4.4 0.112 0.96 0.106 Sakha-1 34.6 41.2 37.9 30.1 34.6 32.3 96.2 94.2 95.2 1.38 1.341 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 Oct 15 th Giza-716 30.0 33.5 21.7 24.1 26.2 25.1 90.2 93.6 91.9 0.863 0.816 0.393 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<		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
L.S.D. 0.05 2.4 2.5 1.8 5.1 3.1 2.9 5.2 3.5 4.4 0.112 0.96 0.106 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 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 (S1) 70.1 30.0 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 85.1 84.1 0.70 0.800 0.728 0.764 BF-10 27.0 30.0 28.5 19.0 21.6 20.3 88.1		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
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 24.1 262 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 SB1 28.4 33.2 30.8 21.6 20.3 88.1 88.1 0.700 0.655 0.723 Sids-19 34.2 40.5 37.3 29.5 33.0 31.2 97.7 96.4 97.0	L.S.D. 0.05		2.4	2.5	1.8	5.1	3.1	2.9	5.2	3.5	4.4	0.112	0.96	0.106
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 Oct 15 th (S1) 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 0.836 0.898 BF-10 27.0 30.0 28.5 19.0 21.6 20.3 88.1 88.1 88.1 0.70 0.655 0.723 Sids-19 34.2 40.5 37.2 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		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
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 0.889 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 0.70 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 Sakha-1 63.4 66.0 90.7 88.2 89.5 85.3 1.682 1.66		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
Oct 15 th (S1) 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 (S1) 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 BF-10 27.0 30.0 28.5 19.0 21.6 20.3 88.1 88.1 0.700 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 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 Giza-716 52.4 53.2 52.7 47.5 49.9 48.7 84.9 85.5 85.5 1.689 1.632 1.660 (S2) Pop.10 57.6 49.1 53.3 54.1		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
(S1) 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 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 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 K2) 90.10 57.6 49.1 53.3 54.1 44.9 49.5 83.2 83.4 1.711 1.482 1.610 Sb1	Oct 15 th	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
SB-1 28.4 33.2 30.8 20.8 25.4 23.1 85.2 84.2 84.7 0.800 0.728 0.744 BF-10 27.0 30.0 28.5 19.0 21.6 20.3 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 Sakha-1 63.4 57.2 60.3 61.2 53.7 57.4 91.5 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 1.933 1.978 1.960 (S2) Pop.10 57.6 49.1 53.3 54.1 44.9 49.5 83.2 83.5 </td <td>(S1)</td> <td>Pop.10</td> <td>30.9</td> <td>34.0</td> <td>32.4</td> <td>24.9</td> <td>27.1</td> <td>26.0</td> <td>93.8</td> <td>91.3</td> <td>92.5</td> <td>0.961</td> <td>0.836</td> <td>0.898</td>	(S1)	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
BF-10 27.0 30.0 28.5 19.0 21.6 20.3 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 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 Mov.1 ^{at} 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 S2 Pop.10 57.6 49.1 53.3 54.1 44.9 <td< td=""><td></td><td>SB-1</td><td>28.4</td><td>33.2</td><td>30.8</td><td>20.8</td><td>25.4</td><td>23.1</td><td>85.2</td><td>84.2</td><td>84.7</td><td>0.800</td><td>0.728</td><td>0.764</td></td<>		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
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 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 S2) Pop.10 57.6 49.1 53.3 54.1 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 6		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
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 83.4 1.741 1.482 1.611 SB-1 46.0 48.1 47.0 39.3 40.9 40.5 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.		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
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<		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
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 Nov.1st (S2) 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 BB-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 Sakha-1 54.3 51.0 52.6 49.7 46.7 <		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
Nov.1st (S2) 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 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 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		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
(S2) 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 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 (S3) </td <td>Nov.1st</td> <td>Giza-716</td> <td>52.4</td> <td>53.2</td> <td>52.7</td> <td>47.5</td> <td>49.9</td> <td>48.7</td> <td>84.9</td> <td>85.5</td> <td>85.3</td> <td>1.689</td> <td>1.632</td> <td>1.660</td>	Nov.1 st	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
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 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 (S3) Giza-716 44.7 43.4 44.0 37.6 37.3 37.4	(S2)	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
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 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 (S3) Pop.10 44.0 42.8 35.9 36.2 81.6 79		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
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 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 (S3) Pop.10 44.0 42.8 36.5 35.9 36.2 81.6 79.5 80.5 1.348 1.091 1.270 SB-1 42.7 42.4 42.5 32.8 35.1 33.9 73.		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
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<		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
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 Nov.15 th 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 43.3 86.7 <td< td=""><td></td><td>Sakha-1</td><td>54.3</td><td>51.0</td><td>52.6</td><td>49.7</td><td>46.7</td><td>48.2</td><td>86.8</td><td>83.6</td><td>85.2</td><td>1.829</td><td>1.622</td><td>1.725</td></td<>		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
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 Nov.15 th (S3) 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 1.93 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 43.3 86.7 81.4 84.1 1.777 1.467 1.622 LS.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S <td< td=""><td></td><td>Sakha-3</td><td>55.9</td><td>58.7</td><td>57.3</td><td>52.9</td><td>54.2</td><td>53.5</td><td>89.5</td><td>859</td><td>87.7</td><td>1.937</td><td>1.756</td><td>1.846</td></td<>		Sakha-3	55.9	58.7	57.3	52.9	54.2	53.5	89.5	859	87.7	1.937	1.756	1.846
Nov.15 th (S3) 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 (S3) 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 LS.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S 0.195 N.S 0.166 0.136		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
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 LS.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S 0.195 N.S 0.166 0.136	Nov.15 th	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
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 LS.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S 0.195 N.S 0.166 0.136	(S3)	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
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 L.S.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S 0.195 N.S 0.166 0.136		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
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 L.S.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S 0.195 N.S 0.166 0.136		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
L.S.D. 0.05 4.2 4.4 4.5 N.S 5.5 6.4 N.S N.S 0.195 N.S 0.166 0.136		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
	L.S.D. 0.05		4.2	4.4	4.5	N.S	5.5	6.4	N.S	N.S	0.195	N.S	0.166	0.136

Table	4:]	Numl	ber of	seeds/j	plant, seed	wei	ight/plant	(g),	100-see	d weig	ht ((g) and see	ed yield (t	on/fad.)
	of	eight	t faba	bean	genotypes	as	affected	by	sowing	dates	at	Mallawy	research	station
	(C	ombi	ned ov	er the	two season	s 20)16/2017 a	nd	2017-201	18)				

							Sids loc	ation					
Variable		50	% Flov	vering	90	% Matu	urity	bra	No. o nches/	f plant	No.	of pod	s/plant
		Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean
a :	Oct15 th	61.5	63.0	62.2	140.9	139.5	140.9	2.9	2.5	2.7	12.7	11.8	12.2
Sowing date(S)	Nov.1 st	58.7	60.0	59.3	136.4	134.8	136.4	3.8	3.6	3.7	27.9	25.3	26.6
dute(b)	Nov.15 th	53.0	54.0	53.5	126.2	123.4	126.2	3.5	3.2	3.4	18.4	18.2	18.3
L.S.D. 0.05		3.0	3.8	2.0	1.5	1.9	1.6	0.5	0.6	0.4	1	1.6	0.8
	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
Genotypes	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
(G)	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
L.S.D. 0.05		1.9	2.5	1.7	1.8	2.6	1.3	0.2	0.2	0.3	2.3	3.9	1.5
	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
Oct 15th	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
(S1)	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
	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
Nov.1 st	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
(S2)	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
	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
Nov.15 th	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
(\$3)	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
L.S.D. 0.05		N.S	N.S	1.7	2.1	2.4	3.5	N.S	0.4	3.6	3.6	4.5	3.9

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

							Sids loc	ation							
Variable		No. d	of seeds	s/plant	Seed v	Seed weight/plant (g) 100-seed weig						ght (g) Seed vield (ton/fed.)			
		Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean	Y1	Y2	Mean		
	Oct15 th	35.2	22.4	28.8	25.1	23.0	24.0	89.4	91.4	90.4	1.181	1.015	1.098		
Sowing	Nov.1 st	78.0	69.8	73.9	69.8	65.4	67.6	75.0	85.4	80.2	2.209	2.056	2.133		
date(S)	Nov.15 th	44.4	38.9	41.6	33.5	38.4	36.0	70.8	79.8	75.3	1.761	1.634	1.697		
L.S.D. 0.05		5.2	7.2	4.3	1.8	3.8	2.4	1.5	2.2	3.4	0.92	0.161	0.43		
	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		
Genotypes	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		
(G)	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		
L.S.D. 0.05		9.8	5.9	5.7	5.1	3.1	4.9	5.2	3.5	3.4	0.112	0.159	0.65		
	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		
Oct 15 th	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		
(S1)	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		
	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		
Nov.1 st	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		
(S2)	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		
	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		
Nov.15 th	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		
(S3)	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		
L.S.D. 0.05		10.0	11.4	14.2	N.S	5.4	11.9	N.S	N.S	8.7	0.112	0.119	0.170		

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)

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تقييم بعض التراكيب الوراثية من الفول البلدى تحت ثلاث مواعيد زراعة

فى 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 والمزرعة البحثية لمحطة البحوث الزراعية بسدس، محافظة بني سويف، خلال موسمين شتويين متتاليين متاليين ٢٠١٧/٢٠١٢ ٢ ٢٠١٨/٢٠١٢ ، لدراسة مدى استجابة بعض التراكيب الوراثية من الفول البلدي (سخا ١، سخا ٣، جيزة ٨٤٣، جيزة ٢١٦، عشيرة ١٠، SB1، ٥١-BF، سدس ٩١) لمواعيد الزراعة. زرعت التراكيب الوراثية في ثلاثة مواعيد زراعة وهى (١٠ أكتوبر، ١ نوفمبر، ١٠ نوفمبر). تم الزراعة. زرعت التراكيب الوراثية في ثلاثة مواعيد زراعة وهى (١٠ أكتوبر، ١ نوفمبر، ١٠ نوفمبر). تم الزراعة. زرعت التراكيب الوراثية في ثلاثة مواعيد زراعة وهى (١٠ أكتوبر، ١ نوفمبر، ١٠ نوفمبر). تم تطبيق المعاملات الزراعية الخاصة بمحصول الفول البلدي. ولقد اظهرت نتائج التحليل التجميعي ان مواعيد ومحسول الفراعة كان لها تأثير معنوي على صفة عدد الايام من الزراعة حتى التزهير والنضج وعدد الفروع/نبات ومحصول البدي. ومحصول البدي. والما تما تراعة محمول الفروع/نبات مواعيد ومحسول الفرل البلدي. ولقد الفهرت نتائج التحليل التجميعي ان مواعيد مراعة كان لها تأثير معنوي على صفة عدد الايام من الزراعة حتى التزهير والنضج وعدد الفروع/نبات ومحصول البدور. كما اظهرت النتائج وجود فروق معنوية بين الثمانية تراكيب وراثية في صفات عدد الايام من الزراعة حتى التزهير والنضج في منهات عدد الايام من الزراعة حتى الترهير والنضج وعدد الايام ومن الزراعة معنوية بين الثمانية تراكيب وراثية في منهات عدد الايام ومن الزراعة حتى الترهير وراثية في صفات عدد الايام من الزراعة حلي البراية وحمول البدور. كما اظهرت النتائج وجود فروق معنوية بين الثمانية تراكيب وراثية في صفات مد الايام من الزراعة حلي ما مروراثية في صفات مد الايام من الزراعة حلي ما مرايي في ما ما مروراثية في ما ما مروراثيام من الزراعة حلي الثمانية تراكيب وراثية في صفات مد الايام ومحسول البدور. كما طهرت النتائج وحمولة التراكيب الوراثية سفا ٣،جيزه ٢٤٢٠ ما ما ما موى وسدس على التربيب.