

Influence of Sowing Dates and Broomrape Control Methods on Yield and Yield Components of some Faba Bean Cultivars

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ABSTRACT

In order to study the effect of sowing dates (10th Nov., 20th Nov. and 30th Nov.), resistance methods (control, manual resistance and spray with Round up with recommended rate, 80 cm³/fed) of some faba bean cultivars (Misr 3, Giza 843 and Nubaria 1) and their interactions on yield and yield components. Two field experiments were conducted at El-Tamamah village, Kafr El-Dawer, El-Behera Governorate, Egypt, during 2016/2017 and 2017/2018 seasons. The results indicated that the difference between sowing dates for number of branches per plant, number of days broomrape appearance days, infestation % per plot, number of pods per plant, seed yield per fed, harvest index as % were significant in both seasons. While, plant height, 100 seed weight and biological yield /fed were significant in the second season only. Sowing on 10th Nov gave the maximum values of most studied traits in the two seasons, compared with sowing 20 or 30th Nov. However sowing on 30th Nov. gave the lowest value of infestation % per plot. Results showed the superiority of Giza 843 and Misr 3 cultivars on Nubaria 1 in most studied traits in both seasons. Misr 3 cultivar gave the best values for most studied traits in the two seasons. Results indicated that faba bean plants spraying with Round up at 80 cm³/fed three times or manual resistance gave the best values of most studied traits compared with the control in both seasons. Interactions between sowing dates × faba bean cultivars × resistance methods were significant for most studied traits in the two seasons. Results showed that Misr 3 cultivar sowing on 10th Nov. with Roundup at 80 cm³/fed times three gave the maximum values of most studied traits, except infestation % in the two seasons under experimental soil conditions.

Keywords: Faba bean, *Orobanche crenata*, sowing dates, cultivars, control methods.

INTRODUCTION

Faba bean (*Vicia faba*, L) is considered the most important food legume in Egypt. It is very important as source of the plant protein, in addition to, the dry seeds contain about 58% carbohydrates, which considered as a good source of energy. Besides its contribution to soil nitrogen fertility through N₂ fixation. The cultivated area in 2018 year was 82000 fed. Approximately with an average yield of 8.87 ard/fad. There is need to increase total production to meet the increasing demand for faba bean in Egypt. This could be achieved through enhancing crop breeding to broomrape infection and agronomic practice. Legume production in Egypt considered damage from infestation with the root-parasitic weed (*Orobanche crenata*, Forsk), which, can inflict devastating yield losses on faba bean. In Egypt, broomrape can cause total crop failure, where as, the percentage of infection by broomrape could reach up to 90-100% Anonimoas 1994. Various control methods have been proposed, ranging from cultural practices such as hand weeding, sowing dates, resistance cultivars and foliar spraying with herbicides. Planting time is the major factor affecting development, source sink relationship and assimilation in faba bean plants, also, planting time is crucial in many farming systems to avoid frost, drought, pests and diseases, which, may occur early or late in the growing season (Sahile *et al.* 2008). Mekky *et al.* (2003) referred that sowing faba bean on 15th and 30th Nov. decreased broomrape infestation by 44.8 and 92% compared with 1st of Nov. in both seasons, with addition to, increasing seed yield by 6.55 and 27.7% respectively. Also, Mekky *et al.* (2003) They added that the increase in temperature encourages the earlier germination of broomrape seeds than late sowing date. Sahile *et al.* (2008) indicated that the late sowing date on 10th December gave the lowest values of previous traits. compared with 10th Nov. and 25th October. El. Metwally *et al.* (2013) showed that the late sowing date on 10th December significantly reduced both the number and dry weight of broomrape as compared with sown on (25th October, 10th Nov. and 25th Nov). The decreasing percentage in dry weight of broomrape by sowing dates 10 Nov., 25 Nov

and 10 December were 27.7, 65.9 and 87.2% respectively, compared with the early sowing date on 25th October. El-Degwy *et al.* (2010) indicated that the late sowing date from 1st Nov or mid Nov. to the first of Dec. significantly increased number of branches per plant and decreased broomrape dry weight per plot. Hamdi (2002) showed that late sowing date to the first of Dec. significantly decreased broomrape dry weight/m². The decreasing percentage were 85.1% compared with the control. The added that the indicated that late sowing date with glyphosate and Giza 429 cultivar planted gave the lowest broomrape plants number per m² compared with Giza2 cultivar. The decreases percentages were 87, 87, 88, 81 and 90% compared with the control treatment (Giza2 cultivar). Ashrie *et al.* (2010) indicated that the Five genotypes X_1714, Giza843, X_1671, X1720 and Misr 1 gave the highest values for yield, yield components compared with Giza 40 cultivar under infested soil. El-Degwy *et al.* (2010) indicated that late sowing date to first Dec. with Misr 1 or Giza 843 cultivars and application of 75cm³/fed Roundup twice gave the maximum values for seed yield/fed. and the lowest Orobanche dry weight/plot broomrape infested soil. Bayoumi *et al.* (2013) showed that Giza 3, Misr 1 and Giza 843 cultivar using Roundup with 75 cm³ gave the highest growth and seed yield compared with Triple white cultivar as susceptible Eid *et al.* (2017) indicated that the best control package for faba bean in sandy soil infested with broomrape is by planting Misr 3 or Giza 843 cultivars on November and using 2 spray of Roundup at seeding rate 30 kg in compared with the susceptible cultivar Giza 3, that significantly increased of seed yield and yield components, as well as, decreased infestation %. Consequently, these study was aimed to investigate the effect of broomrape control treatments on seed yield and yield components of some faba bean cultivars.

MATERIALS AND METHODS

Two field experiments were conducted at El-Tamamah village, Kafr El-Dawer, El-Behera Governorate, Egypt, during 2016/2017 and 2017/2018 Seasons, to study the effect of sowing dates, broomrape control methods and

their interactions on seed yield and yield components of some faba bean cultivars. three faba bean cultivars were evaluated on an Orobanche naturally Infested soil. Soil analysis for two seasons were carried out according to Jackson (1973).the results of analysis are shown in Table (1).

Table 1. Mechanical and chemical analysis of experimental soil at two seasons 2016/2017 and 2017 /2018.

Mechanical analysis	2016/2017 season	2017/2018 season
Sand%	56	60
Silt%	20	19
Clay%	24	21
Texture class	Sandy clay loam	Sandy clay loam
Chemical analysis		
PH	7.80	7.85
EC(ds/l)	0.75	0.73
Available Ca ⁺⁺ (meg/l)	1.15	2.13
Available Mg ⁺⁺ (meg/l)	0.92	1.70
Available Na ⁺ (meg/l)	2.67	4.94
Available K ⁺ (meg/l)	0.03	0.06
Available Co ₃ ⁻ (meg/l)	0.00	0.00
Available HCo ₃ ⁻ (meg/l)	0.27	0.50
Available CL ⁻ (meg/l)	2.61	4.82
Available So ₄ ⁻ (meg/l)	1.90	3.50

Studied factors:

Three factors were studied includes sowing dates as follows:

- 1-10th November
- 2-20th November

Table 2. The Original pedigree, reaction to broomrape and some of three faba bean cultivars.

Cultivars	Origin	Pedigree	Reaction to Orobanche
Misr 3	FCRT	L66×7(Caira 241×G.461)	Tolerant
Giza 843	FCRT	Cross 461× Cross 561	Tolerant
Nubaria 1	FCRT	Selected form Giza Blanca	Highly susceptible

FCRT=Field Crops Research Institute, Giza, Egypt.

Studied attributes:

At harvest, ten individual plants were chosen at random form plot to record the experimental data, while, biological yield/fed and seed yield /fed were taken from whol plot.

- 1-Number of branches / plant.
- 2-Number of broomrape appearance days
- 3-Infestation% per plot, as % form total number of plant/ plot.
- 4-Plant height, (cm).
- 5-Number of pods / plant.
- 6-100 seeds weight, (g).
- 7-Biological yield kg/fed were taken form whole plot in kg.
- 8-Seeds yield kg/ fed were taken form whole plot in kg.
- 9-Harvest index(HI) computed as

$$\text{Harvest index (HI)} = \frac{\text{seed yield (kg/fed) / Biological yield (kg/fed)} \times 100.$$

- 10-Protein % in seeds, was determined by (Lowry *et al.*1951).

The obtained data were statistically analyzed according to the methods suggested by Gomez and Gomez (1984).Means were compared by using the L. S. D. at 5% level of significance

RESULTS AND DISCUSSION

Effect of sowing dates, cultivars methods control and their interactions on yield and yield components of some

3-30th November

The second factors includes three faba bean cultivars as follows:

- 1-Misr 3 (tolerant)
- 2- Giza 843 (tolerant)
- 3- Nubaria 1 (susceptible)

Three third factor includes three of control methods as follows:

- 1-Control (with out applications any treatment)
- 2-Manual resistance
- 3-Chmical control roundup (glyphosate 48% WSC 3 times after 65,80 and 95 day from sowing at 80 cm³/fed. each spray.

The experiment design was split-split-plot design with three replications, sowing dates were allocated in main plots, while, faba bean cultivars were arranged in the sup-plots and control methods were occupied in the sub-sub-agricultural practices for faba bean production were applied at the proper time. Phosphorus fertilizer at the rate of 15.5 kg p₂o₅/fad. in the form of calcium superphosphate (15.5% p₂o₅) was added during soil preparation. Potassium fertilizer was soil added at the rate of 24 kg k₂o/fed.as potassium sulphate(48 % k₂o)in one dose at first irrigation after sowing. Faba bean seeds for three cultivars was sown at the rate of 60 kg/fed.The origin, pedigree, reaction to broomrape of three faba bean cultivars are presented in Table (2).

faba bean cultivar during 2016/2017 and 2017 /2018 seasons are presented in Tables 3-11. Results indicated that the difference between sowing dates for number of branches per plant, number of days broomrape appearence, infestation % per plot, number of pods per plant, seed yield per fed . and harvest index as% were significantly affected in both seasons, While. Plant height, 100 seed weight and biological yield per fed were significantly affected only in the second season. Sown on 10th Nov. gave the maximum values of most studied traits in the both seasons, compared with sawn on20th and 30th Nov .However sown on 30th Nov. gave the lowest value of infestation % per plot seed yield and yield components compared with the other sowing dates . The increases in seed of yield and yield components may be due to the fact that the plants had sufficient longer vegetative period and best utilization of water and nutrients. While, late sowing produced less pods per plant, consequently decreased in seed yield per fed. Also, the low yield might be due to cold weather during December sown . Which, hindered the normal growth, photosynthesis and rhizobial activitis and the crop did not produce enough leaf area to intercept most of incoming radiation and convert them to chemical energy through photosynthesis. Moreover, the reduction in yield may be due to poor growth, shorter seed filling duration maturity period, less number of fruiting nodes and pods per plant and minimum seeds per pod (sahile *et al.*, 2008),These results are in harmony with those obtained by El-Metwally *et al.* (2013). On the other hand,

decreases in infestation % with late sowing date might be due to the increase in temperature, which, encourages the earlier germination of broomrape seeds than late sowing date, (Mekky *et al.* (2003))

The result presented in Tables from 3_11 showed that spraying of faba bean plants with Round up 3 times after 65 , 80 and 95 day from sowing at 80cm³/fed . gave the best values of most studied traits in both seasons, compared with the control (without any treatment). The reduction percentage of broomrape dry weight by Roundup three times or manual resistance were 27.26 and 19.06% in the first season, 17.43 and 9.68% in second season, compared with the control 33.90 and 21.78% in both seasons. These the results may be due to the stimulant is secreted by the roots at a certain stage of development of the host, exactly the stage just before or during flowering causing broomrape germination and attachment to the host. The results are in agreement with those of Mekky *et al.* (2003), Ghalwash *et al.* (2008) and Ghannam *et al.* (2012) who reported that the action of Roundup on broomrape is attachment to its selective accumulation in the young parasite plant to a level four times as high as that in faba bean host root three days after spraying, with addition to, application of Roundup led to that the competition between crop and broomrape was minimized and this made the crop plants to utilize available resources and synthesized photo synthates more effectively throughout crop growth period which, in turn positively influenced the fruit yield by improving yield components. Roundup was sprayed on the host crop and translocated to the parasite to kill it. Its phytotoxicity is most limiting factor. Necrosis of installed broomrape tubercles was

noticed in faba bean plants after application Roundup. Nassr and Mekky(2002).

The results clearly indicated that the superiority of Giza 843 and Misr 3 cultivars on Nubaria 1 in most studied traits in both seasons. Misr 3 cultivar exceeded the tolerant check cultivars. Nubaria 1 and Giza 843 of most studied traits. These results may be due to host plants might escape broomrape infection by reduced plant maturity. The occurrence of phenolics, carbohydrates, proteins and chlorophyll content were also recorded in extractes of host plants. Misr 3 and Giza 843 cultivars accumulated more phenolics, carbohydrate and proteins as defence mechanism against broomrape. It might be concluded that such substances metabolites can be assumed as existing normally at genetically determined levels either in host root or the parasite as a means of routine mechanical support and natural defense. But, in presence of broomrape it is tentatively suggested that a signal is received and transduced to host genome, resulting in a general up regulation of genes encoding the phenyl propanoid pathway, thus providing the host cells with extra precursors of defensive compounds. These results are in agreement with those reported Bora *et al.* (1998) , Bayoumi *et al.* (2013).

The interaction between sowing dates and faba bean cultivars was significant for number of branches per plant, infestation % per plot and seed yield per fed in both seasons, number of day broomrape appearance and plant height in second season only. While, 100 seed weight and harvest index% in the first season only. Sawn on 10th Nov. of Misr 3 or Giza 843 cultivars gave the maximum values of most studied traits in both seasons, where sawn on 30th Nov. of Misr 3 or Giza 843 cultivars gave the best values for infestation% in both seasons.

Table 3 . Means of number of braches/plant of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		control methods (C)				control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	5.33	6.00	5.67	5.67	5.40	5.87	5.80	5.69
	Giza 843	4.93	5.73	5.37	5.35	4.90	5.97	5.27	5.38
	Nubaria 1	8.33	9.23	8.57	8.71	5.10	5.73	5.50	5.45
Mean		6.20	6.99	6.54	6.58	5.13	5.86	5.52	5.50
20 th Nov.	Misr 3	4.20	4.70	4.90	4.60	3.83	4.53	4.90	4.42
	Giza 843	4.03	4.24	4.23	4.17	4.10	4.43	4.80	4.44
	Nubaria 1	5.07	5.53	5.83	5.48	4.83	5.03	6.10	5.32
Mean		4.43	4.82	4.99	4.75	4.26	4.67	5.27	4.73
30 th Nov	Misr 3	3.73	4.00	3.70	3.81	4.27	4.40	3.73	4.13
	Giza 843	4.07	3.47	3.73	3.76	4.07	3.73	3.93	3.91
	Nubaria 1	5.07	4.07	5.00	4.71	5.50	4.50	4.87	4.96
Mean		4.29	3.84	4.14	4.09	4.61	4.21	4.18	4.33
Mean	Misr 3	4.42	4.90	4.76	4.69	4.50	4.93	4.81	4.75
Over all means for cultivars	Giza 843	4.34	4.48	4.45	4.42	4.36	4.71	4.67	4.58
	Nubaria 1	6.16	6.28	6.47	6.30	5.15	5.09	5.49	5.24
Mean		4.97	5.22	5.22	5.14	4.67	4.91	4.99	4.86
L . S . D at 5% for:									
A			0.52				0.26		
B			0.55				0.27		
AB			0.95				0.47		
C			0.15				0.25		
AC			0.26				0.43		
BC			NS				NS		
ABC			0.46				NS		

Table 4 . Means of broomrape appearance days of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	95.33	95.67	101.00	97.33	92.33	93.67	36.67	74.22
	Giza 843	90.33	92.67	96.00	93.00	89.33	91.33	96.33	92.33
	Nubaria 1	75.67	74.67	83.00	77.78	76.33	75.67	85.33	79.11
Mean		87.11	87.67	93.33	89.37	86.00	86.89	72.78	81.89
20 th Nov.	Misr 3	92.00	90.67	100.67	94.44	91.67	91.00	100.33	94.33
	Giza 843	87.33	90.00	97.33	91.56	90.33	90.00	97.67	92.67
	Nubaria 1	76.00	76.67	83.33	78.67	76.00	78.67	84.67	79.78
Mean		85.11	85.78	93.78	88.22	86.00	86.56	94.22	88.93
30 th Nov	Misr 3	72.67	73.00	76.00	73.89	00.00	00.00	00.00	00.00
	Giza 843	71.00	70.67	73.67	71.78	103.67	72.33	37.33	71.11
	Nubaria 1	81.67	80.00	92.67	84.78	81.67	81.67	92.00	85.11
Mean		75.11	74.56	80.78	76.82	61.78	51.33	43.11	52.07
Mean	Misr 3	86.67	86.44	92.56	88.56	61.33	61.56	45.67	56.19
Over all means for cultivars	Giza 843	82.89	84.44	89.00	85.44	94.44	84.56	77.11	85.37
	Nubaria 1	77.78	77.11	86.33	80.41	78.00	78.67	87.33	81.33
Mean		82.44	82.67	89.30	84.80	77.93	74.93	70.04	74.30
L . S . D at 5% for:									
A				NS				21.84	
B				NS				14.67	
AB				NS				25.41	
C				1.19				NS	
AC				NS				NS	
BC				2.06				NS	
ABC				3.57				32.38	

Table 5 . Means of infestation%/plot of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	16.00	8.89	5.78	10.22	8.00	4.45	0.89	4.45
	Giza 843	32.44	24.89	15.55	24.29	18.22	12.00	4.45	11.56
	Nubaria 1	73.11	59.11	57.33	63.19	41.78	35.56	18.67	32.00
Mean		40.52	30.96	26.22	32.57	22.67	17.33	8.00	16.00
20 th Nov.	Misr 3	10.22	9.33	5.33	8.30	8.44	6.67	4.00	6.37
	Giza 843	24.89	21.78	6.67	17.78	25.33	20.44	6.22	17.33
	Nubaria 1	73.33	64.89	56.00	64.74	55.11	48.00	34.67	45.93
Mean		36.15	32.00	22.67	30.27	29.63	25.04	14.94	23.21
30 th Nov	Misr 3	4.45	2.22	1.33	2.67	0.00	0.00	0.00	0.00
	Giza 843	9.78	6.67	3.10	6.52	5.78	4.00	0.44	3.41
	Nubaria 1	60.87	47.55	20.44	42.96	33.33	25.78	17.78	25.63
Mean		25.04	18.81	8.30	17.38	13.04	9.93	6.07	9.68
Mean	Misr 3	10.22	6.82	4.15	7.06	5.48	3.70	1.63	3.61
Over all means for cultivars	Giza 843	22.37	17.78	8.44	16.20	16.44	12.15	3.70	10.77
	Nubaria 1	69.11	57.19	44.59	56.96	43.42	36.45	23.70	34.52
Mean		33.90	27.26	19.06	26.74	21.78	17.43	9.68	16.30
L . S . D at 5% for:									
A				8.374				2.658	
B				3.107				2.898	
AB				5.382				5.020	
C				1.911				1.598	
AC				NS				2.768	
BC				3.310				2.768	
ABC				5.733				NS	

Table 6 . Means of Plant height, In Cm of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	137.97	143.13	123.63	134.91	133.13	137.23	126.37	132.24
	Giza 843	137.13	143.93	119.50	133.52	127.20	137.40	132.27	132.29
	Nubaria 1	125.77	125.60	118.67	123.34	128.67	134.90	124.20	129.26
Mean		133.62	137.56	120.60	130.59	129.67	136.51	127.61	131.26
20 th Nov.	Misr 3	141.90	137.83	132.63	137.46	140.43	127.10	122.50	130.01
	Giza 843	140.50	139.03	143.13	140.89	130.40	125.27	139.07	131.58
	Nubaria 1	119.93	124.30	119.73	121.32	111.80	120.10	111.37	114.42
Mean		134.11	133.72	131.83	133.22	127.54	124.16	124.31	125.34
30 th Nov	Misr 3	124.60	127.80	120.67	124.36	111.23	121.33	106.37	112.98
	Giza 843	134.80	126.13	117.90	126.28	129.33	118.73	117.43	121.83
	Nubaria 1	120.07	123.50	112.03	118.53	123.27	124.60	118.00	121.96
Mean		126.49	125.81	116.87	123.06	121.28	121.56	113.93	118.92
Mean	Misr 3	134.82	136.26	125.64	132.24	128.27	128.56	118.41	125.08
Over all means for cultivars	Giza 843	137.48	136.37	126.84	133.56	128.98	127.13	129.59	128.57
	Nubaria 1	121.92	124.47	116.81	121.07	121.24	126.53	117.86	121.88
Mean		131.47	132.36	123.10	128.96	126.16	127.41	121.95	125.17
L . S . D at 5% for:									
A				NS		2.73			
B				5.29		1.41			
AB				NS		2.45			
C				2.03		2.02			
AC				3.51		3.50			
BC				NS		3.50			
ABC				6.09		6.07			

Table 7 . Means of number of pods/ plant of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	35.53	41.73	38.23	38.50	28.30	32.63	30.47	30.47
	Giza 843	29.27	38.07	36.57	34.63	27.80	29.30	28.30	28.47
	Nubaria 1	22.90	21.43	26.33	23.56	24.03	19.60	25.30	22.98
Mean		29.23	33.74	33.71	32.23	26.71	27.18	28.02	27.30
20 th Nov.	Misr 3	26.33	30.43	23.70	26.82	26.03	30.17	24.13	26.78
	Giza 843	21.73	26.77	28.70	25.73	24.23	31.40	35.33	30.32
	Nubaria 1	18.43	19.83	23.30	20.52	19.90	22.97	25.03	22.63
Mean		22.17	25.68	25.23	24.36	23.39	28.18	28.17	26.58
30 th Nov	Misr 3	19.47	21.27	18.67	19.80	18.63	17.77	15.40	17.27
	Giza 843	21.77	22.20	20.80	21.59	15.60	17.27	15.20	16.02
	Nubaria 1	12.20	13.60	15.93	13.91	11.53	13.13	14.90	13.19
Mean		17.81	19.02	18.47	18.43	15.26	16.06	15.17	15.49
Mean	Misr 3	27.11	31.14	26.87	28.37	24.32	26.86	23.33	24.84
Over all means for cultivars	Giza 843	24.26	29.01	28.69	27.32	22.54	25.99	26.28	24.94
	Nubaria 1	17.84	18.29	21.86	19.33	18.49	18.57	21.74	19.60
Mean		23.07	26.15	25.80	25.01	21.79	23.80	23.79	23.13
L . S . D at 5% for:									
A				2.70		1.46			
B				2.92		1.76			
AB				NS		NS			
C				1.01		1.21			
AC				1.75		2.10			
BC				1.75		2.10			
ABC				3.02		3.64			

Table 8 . Means of 100 seed weight,ing of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	74.67	72.90	70.74	72.77	80.63	77.03	75.67	77.78
	Giza 843	75.50	78.15	70.95	74.87	78.87	76.90	76.27	77.34
	Nubaria 1	107.00	113.00	116.93	112.31	110.20	116.03	112.30	112.84
Mean		85.72	88.02	86.21	86.65	89.90	89.99	88.08	89.32
20 th Nov.	Misr 3	74.47	72.87	71.33	72.89	76.43	71.33	74.80	74.19
	Giza 843	79.50	73.57	75.93	76.33	78.47	76.77	75.87	77.03
	Nubaria 1	102.87	103.87	96.37	101.03	93.60	103.50	100.60	99.23
Mean		85.61	83.43	81.21	83.42	82.83	83.87	83.76	83.49
30 th Nov	Misr 3	69.17	66.83	65.90	67.30	75.17	74.87	77.33	75.79
	Giza 843	76.93	79.93	68.07	74.98	77.33	76.53	76.03	76.63
	Nubaria 1	100.47	100.43	100.57	100.49	94.27	102.47	101.70	99.48
Mean		82.19	82.40	78.18	80.92	82.26	84.62	85.02	83.97
Mean	Misr 3	72.77	70.87	69.33	70.97	77.41	74.41	75.93	75.92
Over all means for cultivars	Giza 843	77.31	77.22	71.65	75.34	78.22	76.73	76.06	77.00
	Nubaria 1	103.44	105.77	104.62	104.61	99.36	107.33	104.87	103.85
Mean		84.51	84.62	81.87	83.66	87.99	86.16	85.62	85.59
L . S . D at 5% for:									
A			NS				2.54		
B			3.01				4.57		
AB			5.22				NS		
C			NS				NS		
AC			NS				NS		
BC			NS				3.06		
ABC			NS				NS		

Table 9 . Means of Biological yield/fed of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments		2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)	Cultivars (B)	Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	5905.8	5845.9	5590.8	5780.8	5960.6	5609.9	5495.8	5688.8
	Giza 843	5019.5	5284.2	5162.9	5155.6	4932.3	4954.1	5212.3	5032.9
	Nubaria 1	4062.7	4775.6	5047.3	4628.5	3940.4	4254.6	4666.6	4287.2
Mean		4995.9	5301.9	5267.0	5188.3	4944.4	4939.5	5124.9	5002.9
20 th Nov.	Misr 3	5973.0	5715.4	5932.2	5873.5	5871.9	5833.6	5773.6	5826.4
	Giza 843	4380.7	4774.6	4710.6	4621.9	5027.3	4743.7	4962.0	4911.0
	Nubaria 1	4199.3	4585.3	4955.9	4580.2	4023.4	4431.9	4357.9	4271.1
Mean		4851.0	5025.1	5199.6	5025.2	4974.2	5003.1	5031.2	5002.8
30 th Nov	Misr 3	5315.5	5274.9	5679.4	5423.3	5936.8	6026.1	5886.9	5949.9
	Giza 843	5859.2	5377.4	5447.3	5561.3	5383.7	5249.9	5072.4	5235.3
	Nubaria 1	4672.3	5330.9	5224.8	5076.0	4283.6	5927.5	5809.8	5340.3
Mean		5282.4	5327.8	5450.5	5353.5	5201.4	5734.50	5589.7	5508.5
Mean	Misr 3	5731.4	5612.1	5734.2	5692.6	5923.1	5823.2	5718.8	5821.7
Over all means for cultivars	Giza 843	5086.5	5145.4	5106.9	5112.9	5114.4	4982.6	5082.2	5059.7
	Nubaria 1	4311.4	4897.3	5076.0	4761.6	4082.5	4871.4	4944.8	4632.9
Mean		5043.1	5218.3	5305.7	5189.0	5040.0	5225.7	5248.6	5171.4
L . S . D at 5% for:									
A			NS				251.12		
B			391.71				322.11		
AB			NS				NS		
C			185.02				164.50		
AC			NS				NS		
BC			320.47				284.93		
ABC			NS				493.51		

Table 10 . Means of seed yield/fad of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments	Cultivars (B)	2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)		Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	2169.3	2220.0	2261.3	2216.9	1966.7	2000.0	2106.7	2024.4
	Giza 843	1908.0	2244.0	2055.0	2069.0	1856.7	2026.7	1936.7	1940.0
	Nubaria 1	1210.0	1626.7	1916.7	1584.4	1130.0	1328.3	1580.0	1346.1
Mean		1762.4	2030.2	2077.7	1956.8	1651.1	1785.0	1874.4	1770.2
20 th Nov.	Misr 3	1660.0	1806.7	1706.7	1724.4	1696.7	1906.7	1726.7	1776.7
	Giza 843	1353.3	1626.7	1640.0	1540.0	1593.3	1650.0	1790.0	1677.8
	Nubaria 1	1238.3	1440.0	1706.7	1461.7	1100.0	1303.3	1360.0	1254.4
Mean		1417.2	1624.4	1684.4	1575.4	1463.3	1620.0	1625.6	1569.6
30 th Nov	Misr 3	1866.7	1826.7	1783.3	1825.6	1970.0	1956.7	1783.3	1903.3
	Giza 843	1766.7	1776.7	1751.7	1765.0	1723.3	1820.0	1736.7	1760.0
	Nubaria 1	1356.7	1660.0	1740.0	1585.6	1170.0	1680.0	1770.0	1540.0
Mean		1663.3	1754.4	1758.3	1725.4	1621.1	1818.9	1763.3	1734.4
Mean	Misr 3	1898.7	1951.1	1917.1	1922.3	1877.8	1954.4	1872.2	1901.5
Over all means for cultivars	Giza 843	1676.0	1882.4	1815.6	1791.3	1724.4	1832.2	1821.1	1792.6
	Nubaria 1	1268.3	1575.6	1787.8	1543.9	1133.3	1437.2	1570.0	1380.2
Mean		1614.3	1803.0	1840.2	1752.5	1578.5	1741.3	1754.4	1691.4
L . S . D at 5% for:									
A			65.63				75.19		
B			53.61				68.13		
AB			92.85				117.99		
C			38.13				37.70		
AC			66.04				65.30		
BC			66.04				65.30		
ABC			114.38				113.10		

Table 11. Means of harvest index% of as affected by sowing dates, cultivars and control method as well as their interaction.

Treatments	Cultivars (B)	2016 / 2017 Season				20017/2018season			
		Control methods (C)				Control methods (C)			
Sowing date (A)		Control	Manual	Spray	Mean	Control	Manual	Spray	Mean
10 th Nov.	Misr 3	36.89	38.14	40.62	38.55	33.14	35.77	38.40	35.77
	Giza 843	38.15	42.50	39.84	40.16	37.82	40.91	37.17	38.64
	Nubaria 1	29.82	34.12	37.98	33.97	28.68	31.20	33.97	31.28
Mean		34.95	38.26	39.48	37.56	33.21	35.96	36.51	35.23
20 th Nov.	Misr 3	27.86	31.61	28.82	29.43	28.95	32.68	29.99	30.54
	Giza 843	30.92	34.09	34.81	33.28	31.67	34.79	36.07	34.18
	Nubaria 1	29.49	31.47	34.43	31.80	27.41	29.52	31.22	29.39
Mean		29.42	32.39	32.69	31.50	29.34	32.33	32.43	31.37
30 th Nov	Misr 3	35.26	34.80	31.43	33.83	33.18	32.49	30.35	32.00
	Giza 843	30.20	33.10	32.82	32.04	32.18	34.75	34.40	33.78
	Nubaria 1	29.24	31.49	33.49	31.41	27.37	28.53	30.54	28.81
Mean		31.57	33.13	32.58	32.43	30.91	31.92	31.76	31.53
Mean	Misr 3	33.33	34.85	33.62	33.94	31.75	33.65	32.91	32.77
Over all means for cultivars	Giza 843	33.09	36.56	35.82	35.16	33.89	36.82	35.88	35.53
	Nubaria 1	29.52	32.36	35.30	32.39	27.82	29.75	31.91	29.83
Mean		31.98	34.59	34.92	33.83	31.16	33.40	33.57	32.71
L . S . D at 5% for:									
A			2.39				1.21		
B			2.15				1.85		
AB			3.73				NS		
C			0.77				0.91		
AC			1.34				NS		
BC			1.34				1.57		
ABC			2.32				2.72		

The interaction between sowing dates and control methods was significant for number of branches per plant, infestation % per plot, plant height, number of pods per plant and seed yield per fed in both seasons, infestation% per plot in second season and harvest index% in the first season only. Sawn on 10th Nov. and manual resistance or spraying with Round up at 80 cm³ concentrate gave the best values of most studied traits in both seasons.

Regarding to the interaction between faba bean cultivars and control methods significantly of affected most studied traits in both seasons. swan Misr 3 and using manual gave the highest values for number of pods per plant, seed yield per fed. The interaction between Misr 3 and spraying Roundup number of days broomrape appearance in the first season only. whilst, Giza 843 cultivar and spraying with Roundup at 80 cm³ /fed in one spray or using manual gave the best values for most the other traits.

With rasped to the interaction between sowing dates, cultivars and control methods was significant in most studied traits. The interaction between sown on 10th Nov. of Misr 3 or Giza 843 cultivars and using manual or spraying with Roundup at 80 cm³ three times gave the maximum values for most studied traits. While, sown on 30th Nov. of Misr 3 cultivar and spraying Roundup gave the lowest infestation % in both seasons.

It could be concluded that, sown Misr 3 cultivar on 10th Nov. and using manual resistance or spraying with Roundup with 80 cm³ three times gave the highest seed yield per urinet area.

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تأثير مواعيد الزراعة وطرق مقاومة الهالوك علي المحصول ومكوناته لبعض أصناف الفول البلدي الغريب عبدالله الغريب ، عزب محمد عزب ، السيد عبدالله مصباح و نصرالله السيد عطيوه قسم المحاصيل- كلية الزراعة- جامعة الأزهر – القاهرة- مصر

اجريت تجربتان حقلين بقرية التمامه مركز كفر النوار محافظة البحيرة-جمهورية مصر العربية، خلال موسمي الزراعة ٢٠١٧/٢٠١٦ و ٢٠١٧/٢٠١٦ لدراسة تأثير مواعيد الزراعة (١٠ نوفمبر، ٢٠ نوفمبر، ٣٠ نوفمبر) وطرق المقاومة (كنترول بدون اي معاملة)، المقاومة اليدويه، الرش بمبيد رواند اب بتركيز ٤٨% بمعدل ٨٠ سم^٣/فدان (ثلاث مرات)) لبعض أصناف الفول البلدي وهي مصر ٣ ،جيزه ٨٤٣، نوبارية ١ علي المحصول ومكوناته تحت ظروف الأراضي الموبوءه بالهالوك. ويمكن تلخيص أهم النتائج المتحصل عليها فيما يلي:- اظهرت النتائج تأثيراً معنوياً لمواعيد الزراعة على عدد الفروع/نبات، عدد الأيام اللازمه لظهور نباتات الهالوك، والنسبة المئوية للإصابة/وحدة تجريبية، عدد القرون/نبات، محصول البذور/فدان، دليل الحصاد في موسمي النمو بينما كانت معنويه في الموسم الثاني فقط لصفات ارتفاع النبات، وزن ال ١٠٠ بذره بالجرام والمحصول البيولوجي/فدان وكانت لزراعة الفول البلدي في ١٠ نوفمبر اعطي اعلي القيم لمعظم الصفات المدروسة في كلا الموسمين، مقارنة بميعاد الزراعة في ٢٠ و ٣٠ نوفمبر، أوضحت النتائج ان الزراعة في ٣٠ نوفمبر أعطت أقل القيم لصفة النسبة المئوية للإصابة بالهالوك/وحدة تجريبية في موسمي النمو، مقارنة بالميعادين الآخرين . أشارت النتائج تقوى الصنف مصر ٣ و جيزه ٨٤٣ علي صنف نوبارية ١ في معظم الصفات المدروسة في كلا الموسمين .وقد اعطي الصنف مصر ٣ احسن القيم لمعظم الصفات المدروسة في كلا الموسمين . أوضحت النتائج أيضاً أن الرش بمبيد رواند اب بتركيز ٤٨% بمعدل ٨٠ سم^٣/فدان ثلاث مرات أو المقاومة اليدويه سجلت احسن القيم لمعظم الصفات المدروسة في كلا الموسمين مقارنة بمعاملة الكنترول .لقد سجل التفاعل بين ميعاد الزراعة وطرق المقاومة مع أصناف الفول البلدي تأثيراً معنوياً موجباً لمعظم الصفات المدروسة في موسمي الزراعة، وقد ادت زراعة الفول البلدي صنف مصر ٣ أو جيزه ٨٤٣ في ميعاد الزراعة ١٠ نوفمبر مع رش النباتات بمبيد رواند اب بتركيز ٤٨% بمعدل ٨٠ سم^٣/فدان ثلاث مرات أو إجراء المقاومة اليدويه الي زيادة معنويه لمعظم الصفات المدروسة في كلا الموسمين .أوصت النتائج ان زراعة الفول البلدي صنف مصر ٣ في ١٠ نوفمبر مع رش النباتات بمبيد رواند اب ادني الي زيادة محصول بذور الفدان بينما سجل زراعة اي صنف في ٣٠ نوفمبر بدون الرش قد ادني الي انخفاض النسبة المئوية للإصابة بالهالوك أيضاً تحت ظروف أرض التجريبية .توصي الدراسه بزراعة الصنف مصر ٣ أو جيزه ٨٤٣ في العاشر من نوفمبر والمقاومة اليدويه او الكيميايه بمبيد رواند اب بتركيز ٤٨% بمعدل ٨٠ سم^٣/فدان ثلاث مرات عظمت إنتاجية وحدة المساحة لمحصول الفول البلدي.