

PERFORMANCE OF SOME FABA BEAN (*Vicia faba*, L.) CULTIVARS UNDER NUMEROUS BROOMRAPE (*Orobanche crenata*, Forsk.) CONTROL TREATMENTS.

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ABSTRACT

Two field experiments were conducted during 2005/06 and 2006/07 winter seasons at Sakha Agricultural Research Station, Egypt to investigate the performance of three cultivars of faba bean (Misr 1, Giza 843, and Sakha 2) under some broomrape control treatments and their effects on yield and its components of faba bean. Orobanche control treatments were: glyphosate 36 g a.i. applied once or twice; imazapic 20 g a.i. applied once or twice; in addition to hand pulling and weedy check.

Results indicated that faba bean Misr 1 variety decreased number of broomrape spikes/m² by 42.89 and 27.38%; weight of broomrape spikes/m² by 20.43 and 20.17%; spikes length by 19.94 and 19.68% and number of capsules/spikes by 28.5 and 42.65 %, respectively during 2005/06 and 2006/07 seasons. Faba bean variety Misr 1 recorded the highest values of yield and its component characters, followed by faba bean Giza 843 variety as compared to faba bean Sakha 2 variety during both seasons. Also, data revealed that all weed control treatment significantly decreased broomrape infestation parameters and increased crop yield and its components, significantly in both seasons.

Results revealed that all broomrape control treatments gave highly significant increase in seed yield (ardad/ fed), the highest values was obtained from imazapic (twice) and hand pulling (twice), followed by imazapic (once), glyphosate (twice) and glyphosate (once) by 106.93, 99.01, 82.83, 70.96 and 41.58% in the first season, and by 101.27, 94.62, 91.77, 63.29 and 37.03% in second season, respectively.

The interaction between varieties and weed control treatments exerted a significant impact on broomrape infestation characters in both seasons, and this reflected on faba bean yield and its components. These results indicate that under heavy infested soil with broomrape, it is possible to grow tolerant cultivars (Misr 1 and Giza 843) with the application of herbicides i.e imazapic or glyphosate (twice). These practices gave the highest reduction in broomrape injury and increased faba bean yield and its components.

INTRODUCTION

Faba bean (*Vicia faba*, L.) is main winter leguminous crop and highly demanded crop as main popular diets for the majority of Egyptian population. Broomrape (*Orobanche crenata*, Forsk.) infection is a major constraint to legume cultivation in the Mediterranean region, affecting 1.12 million ha of the faba bean (*Vicia faba*, L.) area (Manschadi *et al.* 1997). Total cultivated area by faba bean in Egypt was estimated by 345000 feddans with average yield production of 1.2 tons/fed. The productivity of the crop decreased dramatically due to broomrape (*Orobanche crenata*, Forsk.) infestation. The reduction of faba bean yield due to broomrape infestation varied from 0 to 50 % depending on broomrape infestation levels (Mesa-Garcia and Garcia-Torres 1984). Sauerborn and Saxena (1986) pointed out that losses in faba bean yield due to *Orobanche* infestation were from 5 to 24 %). The control of

broomrape in the crop is very difficult due to its production of huge amount of tiny seeds, which disperse very quickly and the long life span of these seeds. Different methods were suggested to control broomrape and alleviate its damage. Such methods include cultural practices as sowing dates, hand pulling, flooding, crop rotation and chemical control but, every method was not sufficient by it self. The devastating effect that *O. crenata* attack on legumes forces many farmers to delay or abandon their cultivation. In Egypt, Khalil (1983) found that faba bean variety, Giza 402 was tolerant to broomrape infestation and yield more than one metric ton of seed / ha. Also, found some faba bean new lines have been described with appreciable resistance such as Giza 429, Giza 674, and X-843. Broomrapes resistant and tolerant faba bean cultivars now is one of the major tasks of many breeding programs. Saber *et al* (1998) mentioned that ,the breeding program of faba bean has resulted in releasing the new *Orobanchae* resistant varieties, Giza 429, Giza 674 and Giza 843. The three varieties were significantly less infested by *Orobanchae* and gave higher seed yield than susceptible check cultivars.

Although hand pulling of broomrapes shoots is one of the most techniques practiced by farmers to control *Orobanchae*, this method is inefficient, particularly in highly infested faba bean fields. Indeed, continuous hand pulling of broomrape had slightly increased faba bean yield but not significantly, compared to the control in infested fields that were sown with a susceptible variety at Beja (Kharrat and Halila 1996). Herbicides are the most important of the available methods for broomrape control. Shaban *et al.* (1986) in Egypt studied the effect of different doses of glyphosate (0.82 and 122 a.i.g /ha) on broomrape in faba bean. They noticed that faba bean plant height and number of pod per plant decreased, while number of branches per plant increased with increasing the dose of glyphosate. Kharrat and Halila (1996) indicated that glyphosate gave a good control of *Orobanchae* with two sprays at 15 days intervals, starting at attachment or budding stages, with 60 to 70 g a.i./ha.. Hassanein and Kholosy (1997) revealed that glyphosate applied twice at the rate of 178.7 cc/ha. achieved more than 96% control for broomrape and increased faba bean seeds and straw yield by 103 and 68%, respectively. Meanwhile, The foliar application of glyphosate at a rate of 36 g a.i./ fed twice or three times with hand pulling once produced the highest number of pods and seeds and seed yield per plant, 100–seed weight and straw and seed yield per fed of faba bean. (Ghalwash 2003).This work aimed to study the impact of faba bean varieties, broomrape control treatments and their interaction on broomrape infestation and yield and its components of faba bean.

MATERIALS AND METHODS

Two field experiments were conducted at Sakha Agricultural Research Station, Kafer El-Sheikh Governorate during 2005/06 and 2006/07 winter seasons to investigate the performance of faba bean (*Vicia faba*, L varieties under numerous broomrape (*Orobanchae crenata*, Forsk.) control treatments. Faba bean cultivars (Misr 1, Giza 843 and Sakha 2) were planted in

November, 15th in both seasons. Soil texture of the experimental site in both seasons was clay loam. Treatments of each experiment were arranged in a split plot design with four replicates. The sub plot area was 10.5 m² contains five rows 3.5 m length and 60 cm apart. The treatments were as follow:

A- Main plots (Faba bean varieties):

- 1- Misr 1
- 2- Giza 843
- 3- Sakha 2

B- Sub plots (broomrape control treatments):

- 1- Roundup (glyphosate 48% WSC) at 36 g a.i./fed. (once) at the beginning of faba bean flowering.
- 2- Roundup (glyphosate 48% WSC) at 36 g a.i./fed. (twice) with three weeks interval, the first spray was applied at beginning of faba bean flowering.
- 3- Orobán (imazapic 10 % EC) at 20 g a.i./fed. (once) at the beginning of faba bean flowering.
- 4- Orobán (imazapic 10 % EC) at 20 g a.i./fed. (twice) with three weeks interval, the first spray was applied at beginning of faba bean flowering.
- 5- Hand pulling (twice) at 70 and 90 days from sowing.
- 6- Weedy check.

The herbicides in both experiments were sprayed by knapsack sprayer Cp3 with water volume of 200 liters/fed . Nomenclature of herbicides are listed in Table (1).

Table (1): Common, trade and chemical names of the two tested herbicides.

Common name	Trade name	Chemical name
Glyphosate	Round up	N- (phosphonomethyl) glycine
Imazapic	Orobán	[(±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid.]

In both seasons, calcium super phosphate (15.5% P₂O₅) at the rate of 100 kg/fed was added before sowing and ammonium nitrate (33.5% N) at the rate of 50 kg/fed was added before the 1st irrigation.

C- Collected data:

1-On broomrape: Prior faba bean harvesting, number of broomrape spike/m², weight of broomrape /m², spike length (cm) and number of capsules/spike were estimated.

2-On faba bean yield and its components: At harvest, 1st May, samples of ten plants were collected at random from the central rows of each plot to assess the following criteria: plant height (cm), number of branches/plant, number of pods/plant, weight of pods per plant (g), weight of seeds per plant (g) and 100-seed weight (g). Faba bean plants were harvested from each plot, seed yield per plot was weighed and estimated as ardab per feddan.

The collected data were subjected to proper statistical analysis of split plot design according to procedure outlined by Snedecor and Cochran (1990) and the least significant differences (LSD) at 5% level of significance were calculated.

RESULTS AND DISCUSSION

I- Effect of faba bean varieties:

1.1. On broomrape:

Data presented in Table 2 showed that tested faba bean varieties had significant effect on the number of spikes/m², weight of broomrape spikes/m², spike length (cm) and number of capsules/spike of broomrape parasite weed in the two seasons. Faba bean variety Misr 1 decreased these mentioned characters by 42.89, 20.40, 19.94 and 28.50%, respectively in 2005/06 and by 27.38, 20.17, 19.68 and 42.65 %, respectively in 2006/07 season, followed by variety Giza 843 as compared with faba bean variety Sakha 2. The results may be due to the death of broomrape plants under Misr1 plants, or difficulty of penetration of the haustorium into the host root, based on lignifications, or mechanical barriers formation, or inhibition of broomrape seed germination by allelochemicals substances released by cereal roots. Therefore, it decreased the above mentioned characters of broomrape. These results similar with that obtained by Ghalwash (2003).

Table 2: Effect of faba bean varieties on broomrape growth, in 2005/06 and 2006/07 winter seasons

Faba bean Varieties	2005/06 season				2006/07 season			
	No. of spikes per m ²	Weight of spikes per m ²	Spike length (cm)	No. of capsules per spike	No. of spikes per m ²	Weight of spikes per m ²	Spike length (cm)	No. of capsules per spike
Misr 1	4.50	28.75	15.58	6.17	6.63	28.54	17.67	6.67
Giza 843	6.00	33.71	16.21	8.54	7.50	34.54	16.54	10.21
Sakha 2	7.88	36.13	19.46	8.63	9.13	35.75	22.00	11.63
L.S.D _{5%}	0.92	3.57	1.64	1.78	0.67	1.60	1.51	1.16

1.2. On faba bean yield and its components:

Data recorded in Table 3 show that faba bean Misr 1 and Giza 843 varieties significantly exceeded in all growth characters and seed yield (ardab/fed) in two seasons than faba bean Sakha 2 variety except weight of pods / plant (g) in first season and number of branches / plant in the second season. Faba bean Misr 1 variety recorded highest values of plant height (cm), number of branches/ plant, number of pods / plant, weight of pods / plant (g), weight of seeds / plant (g), 100- seed weigh (g) and seed yield (ardab/ fed), followed by Giza 843 variety as compared with Sakha 2 variety. Seed yield of faba bean varieties Misr 1 and Giza 843 were higher by 67.42 and 64.84% respectively, in first season and 44.21 and 41.32% in second season, respectively as compared with that of Sakha 2 variety. These results are similar to those reported by Khalil (1983) and Ghalwash (2003).

Table 3: varieties differences between Misr 1, Giza 843 and Sakha 2 of faba bean in seed yield and yield components in 2005/06 and 2006/07 winter seasons

Varieties	2005/06 season						
	Plant height (cm)	No. of branches / plant	No. of pods /plant	Weight of pods / plant (g)	Weight of seeds / plant (g)	100 - seed weight (g)	Seed yield ardab / fed.
Misr 1	81.38	2.42	12.71	21.58	33.25	88.71	5.19
Giza 843	81.33	1.92	12.54	21.29	32.71	83.08	5.11
Sakha 2	78.75	1.75	9.71	21.13	18.92	76.29	3.10
L.S.D _{5%}	3.69	0.27	0.73	NS	1.79	2.44	0.50
2006/07 season							
Misr 1	91.17	2.13	15.00	22.13	34.79	83.42	5.48
Giza 843	89.17	1.92	14.46	22.13	33.54	80.92	5.37
Sakha 2	87.50	1.88	11.54	20.79	21.21	76.88	3.80
L.S.D _{5%}	2.07	NS	1.64	1.78	0.83	1.76	0.49

2- Effect of broomrape control treatments:

2.1. On broomrape infestation:

Data illustrated in Table 4 indicated that all broomrape control treatments decrease significantly number of spikes/ m², weight of spikes/ m², spike length (cm) and number of capsules/spike of broomrape parasite weed in both seasons.

Table 4 : Effect of broomrape control treatments on broomrape infestation, in 2005/06 and 2006/07 seasons

Broomrape control treatments	2005/06 season				2006/07 season			
	Number of spikes / m ²	Weight of spikes / m ²	Spike length (cm)	Number of capsules / spike	Number of spikes / m ²	Weight of spikes / m ²	Spike length (cm)	Number of capsules / spike
Glyphosate 36 g a.i./fed (once)	5.42	19.33	15.67	7.83	6.33	21.00	16.58	7.33
Imazapic 20 g a.i./fed (once)	3.50	16.67	13.17	4.42	4.58	18.58	12.83	5.83
Glyphosate 36 g a.i./fed (twice)	3.75	19.50	14.92	6.50	5.50	21.92	14.50	7.92
Imazapic 20 g a.i./fed (twice)	2.25	14.17	7.00	3.42	4.00	18.50	8.83	4.08
Hand pulling twice	2.75	16.92	9.92	3.75	4.17	19.17	10.25	5.08
Weedy check	19.08	110.58	41.83	20.75	21.92	98.50	49.42	26.75
L.S.D _{5%}	1.05	3.57	2.19	1.37	1.03	2.37	1.895	1.43

Imazapic twice and hand pulling twice decreased number of broomrape spikes/ m² by 88.21 and 87.19 %; weight of spikes/ m² by 83.27 and 89.52%; broomrape spike length by 85.56 and 84.7%; and number of capsules/spike by 76.82 and 81.93%, respectively, in 2005/2006 season as 81.75 and 81.22%; 82.13 and 84.75%; and 80.52 and 80.20% and 79.26 and 81.01%, respectively, followed by imazapic once, glyphosate twice and glyphosate once. These results are in agreement with those of Kharrat and Halila (1996); Hassanein and Kholosy (1997) and Ghalwash (2003) who reported that the

action of glyphosate on broomrape is attributable to its selective accumulation in the young parasite plant up to a level four times as high as that in faba bean host root three days after spraying.

2.2. On faba bean seed yield and its components:

Data presented in Table 5 indicated that all herbicidal treatments as well as hand pulling increased faba bean seed yield and its components significantly in the two seasons as compared to weedy check.

Table 5: Effect of broomrape control treatments on faba bean seed yield and its components in 2005/06 and 2006/07 seasons

Broomrape control Treatments	2005/06 season						
	Plant height (cm)	Number of branches / plant	Number of Pods / plant	Weight of pods / plant (g)	Weight of seeds / plant (g)	100 - seed Weight (g)	Seed yield ardab / fed.
Glyphosate 36 g a.i./fed (once)	75.58	2.00	10.33	19.42	26.17	80.67	4.29
Imazapic 20 g a.i./fed (once)	84.75	2.25	12.00	23.42	27.33	87.42	5.54
Glyphosate 36 g a.i./fed (twice)	77.67	2.17	10.75	22.75	29.08	82.79	5.18
Imazapic 20 g a.i./fed (twice)	87.92	2.33	14.25	25.50	33.92	89.75	6.27
Hand pulling (twice)	87.42	2	14.08	23.92	31.42	85.17	6.03
Weedy check	68.83	1.42	8.50	13.00	21.83	73.17	3.03
L.S.D 5%	3.31	0.28	0.73	2.11	2.17	3.78	0.54
2006/07 season							
Glyphosate 36 g a.i./fed (once)	85.08	2.17	12.17	21.25	28.00	79.83	4.33
Imazapic 20 g a.i./fed (once)	92.58	2.00	17.408	24.83	29.75	83.25	6.06
Glyphosate 36 g a.i./fed (twice)	89.75	2.08	12.75	21.50	29.5	80.25	5.16
Imazapic 20 g a.i./fed (twice)	94.33	2.08	17.17	26.42	35.5	86.72	6.36
Hand pulling (twice)	95.67	1.92	16.42	23.50	31.42	80.5	6.15
Weedy check	78.25	1.58	9.42	12.75	24.92	72.58	3.16
L.S.D 5%	3.33	NS	1.24	2.08	1.28	1.97	0.49

Imazapic (twice) and hand pulling (twice) gave the highest values of plant height (cm), number of branches/plant, number of pods/plant, weight of pods/plant (g), seeds weight /plant (g), 100-seed weight (g) and seed yield (ardab/fed) in both seasons followed by imazapic (once), glyphosate (twice) and glyphosate (once). These treatments increased seed yield (ardab/fed) by 106.93, 99.01, 82.83, 70.96 and 41.58%, respectively in 2005/06 season and by 101.27, 94.62, 91.77, 63.29 and 37.03%, respectively in 2006/07 season as compared to weedy check. The influence of such treatments on seed yield had the same trend of the above-mentioned yield attributes characters. It is worthwhile to mention that, these treatments which gave the highest values

of faba bean seed yield were also showed the lowest numbers of broomrape spikes/ m² and capsules per spike and the smallest weight and of spikes (Table3).

In this respect fayed et al 92002) reported that faba bean seed yield (kg/fed) showed a strong negative correlation with number of Orobanche /m² (r=-0.689**). Also, treatments which had low Orobanche infestation had good growth patterns and hence showed high seed yield. These results agreed with those also obtained by **Shaban et al.(1986)**, **Hassanein and Kholosy (1997)** and **Ghalwash (2003)**.

3- Interaction between varieties and broomrape control treatments:

3.1. On broomrape control:

Results presented in Table 6 showed that number and weight of spikes/ m², spike length (cm) and number of capsules/spike of broomrape were highly significant by affected by the interaction between faba bean varieties and broomrape weed control treatments in both seasons. The greatest reduction for above-mentioned characters were obtained by the interaction between faba bean Misr 1 variety with broomrape control treatments followed by faba bean Giza 843 variety with broomrape control treatments as compared to faba bean Sakha 2 variety with the same broomrape control treatments, in both seasons.

Table 6 : Effect of interaction between varieties and broomrape control treatments on broomrape Control in 2005/2006 and 2006/2007 winter seasons.

Faba bean Varieties	Broomrape control treatments (g a.i./fed)	2005/06 season				2006/07 season			
		Number of spikes / m ²	Weight of spikes / m ²	Spike length (cm)	Number of capsules / spike	Number of spikes / m ²	Weight of spikes / m ²	Spike length (cm)	Number of capsules / spike
Misr 1	Glyphosate 36 once	3.00	16.75	15.00	7.00	6.75	17.75	16.75	6.75
	Imazapic 20 once	2.25	13.00	11.00	2.50	3.25	16.75	12.25	3.50
	Glyphosate 36 twice	2.25	17.25	15.25	4.00	4.00	17.75	7.75	3.25
	Imazapic 20 twice	2.00	13.00	7.25	3.75	3.75	14.25	7.25	3.75
	Hand pulling twice	2.00	15.00	10.25	2.50	3.50	16.5	9.50	3.75
	Weedy check	15.50	97.50	34.75	17.25	18.50	88.25	42.50	9.00
Giza 843	Glyphosate 36 once	5.50	21.75	17.25	10.00	5.50	23.75	15.50	8.75
	Imazapic 2 once	3.00	17.75	10.50	4.00	3.75	19.75	11.50	5.25
	Glyphosate 36 twice	3.75	19.25	13.50	9.00	5.75	21.5	11.50	10.50
	Imazapic 20 twice	2.50	14.25	7.75	4.50	4.50	19.50	8.25	4.75
	Hand pulling twice	2.75	17.25	10.75	3.75	4.25	20.50	9.75	5.25
	Weedy check	18.50	111.75	37.50	20.00	21.25	102.25	42.75	26.75
Sakha 2	Glyphosate 36 once	8.50	21.50	15.75	6.50	7.75	23.50	15.50	9.50
	Imazapic 20 once	4.00	86.25	17.00	5.75	5.00	19.25	15.75	5.75
	Glyphosate 36 twice	4.50	20.00	15.00	6.50	5.75	24.50	16.25	7.00
	Imazapic 20 twice	3.50	68.25	7.00	3.00	5.50	21.75	10.00	6.75
	Hand pulling twice	3.50	18.25	8.75	5.00	4.50	20.50	11.50	6.25
	Weedy check	23.25	122.50	53.25	25.00	26.00	105.00	63.00	34.50
L.S.D _{0.05 V X T}		1.82	6.18	3.79	2.37	1.78	4.02	3.28	2.47

3.2. On faba bean yield and its components:

Data in Table 7 indicated that all interaction between varieties and broomrape control treatments significantly increased faba bean seed yield and its components except for number of branches /plant and number of pods / plant in both seasons.

Table 7 : Effect of interaction between varieties and broomrape control treatments on yield and yield components of faba bean in 2005/06 and 2006/07 winter seasons.

The tallest plants were obtained from faba bean Misr 1 variety with hand pulling twice and imazapic twice, but the shortest plants were resulted from faba bean sakha 2 variety with weedy check treatment. The interaction between faba bean Misr 1 variety with imazapic twice gave the highest values for weight of pods (g), weight of seeds / plant, 100- seed weight and seed yield (ardab /fed) while, the lowest values for this characters were obtained from faba bean Sakha 2 variety with weed check treatment in the two seasons.

The best seed yield (6.58 and 6.88 ardab/fed) were obtained from the interaction between faba bean Misr1 variety with hand pulling broomrape control treatment in 2005/2006 and 2006/2007 seasons, respectively followed by imazapic twice, while, the lowest seed yield (3.40, 3.68 ardab/fed), were resulted from the interaction between faba bean Sakha 2 variety with weedy check treatment in both seasons.

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PERFORMANCE OF SOME FABA BEAN (*Vicia faba*, L.) CULTIVARS UNDER NUMEROUS BROOMRAPE (*Orbanche crenata*, Forsk.) CONTROL TREATMENTS.

أداء بعض أصناف الفول البلدي تحت عدة معاملات لمكافحة الهالوك

عادل مصطفى غلوش ، ابراهيم السيد سليمان و عزة السيد خفاجي

المعمل الفرعي لبحوث الحشائش – معهد بحوث المحاصيل الحقلية - مركز البحوث الزراعية – الجيزة – جمهورية مصر العربية .

أقيمت تجربتان حقليتان في مزرعة محطة البحوث الزراعية بسخا- كفر الشيخ خلال موسمي الدراسة ٢٠٠٦/٢٠٠٥ و ٢٠٠٦/٢٠٠٧م – لدراسة تأثير ثلاثة أصناف من الفول البلدي (مصر ١ – جيزة ٨٤٣ – سخا ٢) وبعض معاملات مكافحة الهالوك (جليفوسيت مرة واحدة ، جليفوسيت مرتين ، ايمزابك مرة واحدة و ايمزابك مرتين بالإضافة الى معاملة النقاوة اليدوية مرتين) على مكافحة الهالوك و تأثير تلك المعاملات على مكونات المحصول ومحصول البذور في الفول البلدي.

أظهرت النتائج أن الصنف مصر ١ قلل كل من عدد ووزن الشماريخ /م، طول الشمراخ وعدد الكبسولات / شمراخ هالوك بنسبة ٤٢,٨٩ ، ٤٣,٢٠ ، ١٩,٩٤ و ٢٨,٥ % على الترتيب في الموسم الأول وبنسبة ٢٧,٣٨ ، ١٧,٢٠ ، ١٩,٦٨ و ٤٢,٦٥ % في الموسم الثاني مقارنة بالصنف سخا ٢ – وحقق هذا الصنف أيضا معنوية لمكونات محصول الفول البلدي مثل طول النبات ، عدد الأفرع /نبات ، عدد القرون /نبات ، وزن القرون /نبات، وزن ال ١٠٠ بذرة ومحصول البذرة بالإردب للقدان.

أعطت جميع معاملات مكافحة الحشائش نقص معنوي في جميع صفات الهالوك وزيادة معنوية في جميع صفات مكونات المحصول سالفة الذكر خلال موسمي الدراسة و أعطت جميع معاملات مكافحة الحشائش زيادة في محصول البذور للقدان وسجل مبيد ايمزابك مرتين ومعاملة النقاوة اليدوية مرتين أعلى نسبة زيادة تلاها في ذلك معاملة ايمزابك مرة واحدة ، الجليفوسيت مرتين ثم الجليفوسيت مرة واحدة وذلك مقارنة بمعاملة الكنترول ، حيث كانت نسبة الزيادة المسجلة في الموسم الأول لتلك المعاملات على التوالي ١٠٦,٩٣ ، ٩٩,٠١ ، ٨٢,٨٣ ، ٧٠,٩٦ و ٤١,٥٨ % أما في الموسم الثاني فكانت ١٠١,٢٧ ، ٩٤,٦٢ ، ٩١,٧٧ ، ٦٣,٢٩ و ٣٧,٠٣ % على التوالي مقارنة بمحصول بذور معاملة المقارنة.

أعطى التفاعل بين الأصناف ومعاملات مكافحة الحشائش نقص معنوي في كل من العدد والوزن لشماريخ الهالوك ، طول الشمراخ وعدد الكبسولات/ شمراخ هالوك في كلا الموسمين. و تم الحصول على أعلى محصول بذرة (إردب / فدان) بزراعة صنف الفول مصر ١ مع استخدام مبيد ايمزابك مرتين أو النقاوة اليدوية مرتين ثم مبيد ايمزابك مرة واحدة ، جليفوسيت مرتين وأخيرا جليفوسيت مرة واحدة يليه في ذلك التفاعل بين الصنف جيزة ٨٤٣ مع المعاملات السابقة وذلك مقارنة بالتفاعل بين الصنف سخا ٢ مع معاملة الكنترول.

توصى هذه الدراسة باستخدام أصناف الفول البلدي الأكثر تحملا للإصابة بالهالوك مثل (صنف مصر ١ ، جيزة ٨٤٣) مع استخدام أي من مبيدات الحشائش (ايمزابك أو جليفوسيت) بالمعدلات الموصى بها حيث أعطت مكافحة جيدة للهالوك وزيادة معنوية في إنتاجية محصول الفول البلدي.