

INTEGRATED CONTROL OF CERTAIN FOLIAGE DISEASES ON FABA BEAN (*Vicia faba*) IN EGYPT

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ABSTRACT

An experiment was conducted at Sakha Agric. Res Station, ARC, Egypt in 1997/1998, 1998/1999, 1999/2000 and 2000/2001 seasons to study the effect of sowing dates (Oct. 20th, Nov. 5th and Nov. 20th.) of certain faba bean cultivars namely Giza 461 as a resistant one, Giza 843 as a moderately resistant and Yossuf El-Sedeek the susceptible cultivar as well as plant densities (33,22 and 17 plants /m²) on faba bean (*Vicia faba*) foliage diseases i.e. Chocolate spot and rust caused by *Botrytis fabae* and *Uromyces fabae*, respectively and seed yield.

The data indicated that the lowest values of chocolate spot and rust diseases were recorded throughout the second and third sowing dates (Nov. 5th. and Nov. 20th.) on the resistant cultivar Giza 461 and the moderately resistant cultivar Giza 843. Also medium and low plant densities, 22 and 17 plants/m² gave the lowest infection. The interaction effect between sowing dates and cultivars on foliage diseases showed that the lowest infection with Giza 461 and Giza 843 cultivars were found under the late sowing date followed by the optimum sowing date (Nov. 5th). Also the lowest infection with rust disease was observed under the low plant density for the resistant and moderately resistant cultivars, Giza 461 and Giza 843. The highest seed yield was obtained from the second sowing date on Nov. 5th. in the four seasons. Also, Giza 461 and Giza 843 cultivars exceeded Yossuf El-Sedeek cultivar. The 22-plants/m² density gave the optimum seed yield. The highest seed yield was obtained from Giza 461 cultivar when it was planted in the optimum sowing date on Nov. 5th. in the second and third seasons, while in the first and fourth seasons, the two cultivars Giza 461 and Giza 843 recorded the highest seed yield under the same sowing date. The optimum seed yield was recorded for 22 plants /m² for sowing date on Nov. 5th. The plant densities 33 and 22 plants/m² gave the highest seed yield under Giza 461 and Giza 843 cultivars without significant differences in the most cases.

It can be concluded that, sowing Giza 461 as a resistant faba bean cultivar to both chocolate spot and rust diseases on Nov. 5th., with the

optimum plant density (22 plants/m²) reduced significantly infection by foliage diseases and gave the highest seed yield.

INTRODUCTION

The national area planted with faba bean in the last five years (1997/2001) was about 350,000 feddan with an average productivity of 8.1 ardab/feddan. In north parties of Egypt the planted area represented about 60%*. This area is severely attacked by foliar diseases i.e. chocolate spot and rust diseases caused by *Botrytis fabae* and *Uromyces fabae*, respectively.

The losses as a result to foliage diseases infection were estimated to be more than 55% for susceptible cultivar Repaya 40 which was left for natural infection at Sakha (Mohamed *et al* 1980). In the last few seasons, two severe epidemics were recorded in Egypt, the first was in 1988 and the second was in 1991 due to the high relative humidity prevailing. The yield was reduced by 50% in both seasons (Nassib *et al*, 1991). Johanson *et al.*, 1994 found that losses in broad bean yield is normally expressed as a reduction in the total dry weight harvested seed yield produced from an infected crop as compared to a healthy crop. Solh *et al.*, (1994) mentioned that chocolate spot and rust diseases are the most limiting biotic stresses of faba bean in the Delta area of Egypt. Yield losses as high as 50% under chocolate spot epiphytotic conditions was reported and 5-20% yield losses were estimated annually. Mahmoud, (1996) studied the severity of chocolate spot on faba bean plants and determined the losses by 42% in the epidemic season 1991 compared with 15% in season 1992 when Giza 402 cultivar was planted under natural infection at Sakha. Also, 36% reduction in the yield under natural infection with foliar diseases were found when the susceptible cultivar Giza 402 was used at Sakha in 1997 season (Amer *et al.*, 1997).

Integrated control of foliage diseases includes resistant cultivars, appropriate cultural practices and others. Nassib *et al.*, (1991) found 20-41% increase in seed yield of faba bean by cultivating the resistant cultivar Giza 461 and applying fungicide and early sowing date (mid November) in certain locations. The result obtained by Khalil *et al.*, (1996), clarified that six cultivars, Giza 461, Giza 643, Giza 714 Giza 716, Giza 717 and Giza Blanka significantly outyielded the recommended cultivar Giza 3 and were more resistant for foliage diseases. Samia Mahmoud *et al.*, (1996), selected four genotypes adapted to Nubaria conditions particularly for drought and

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foliage diseases. On the other hand the appropriate cultural practices such as planting in the first two weeks of Nov. and 22-27 plants/m² for the resistant cultivars play a major role for controlling foliage diseases and gave the highest seed yield, (Amer 1986, Hussein *et al.*, 1994, Amer *et al.*, 1992, 1994 and 1997).

The main objective of this study is to integrate varietal resistance, optimum sowing date and plant density for higher yield and minimum chocolate spot and rust infection of faba bean.

MATERIALS AND METHODS

An experiment was carried out at Sakha Agric. Res. Station in 1997/1998, 1998/1999, 1999/2000 and 2000/2001 seasons to study the effect of sowing dates, cultivars and plant densities on faba bean foliage diseases and seed yield. A split split plot design with four replicates was used. The main plots represented three sowing dates, early sowing date on Oct. 20th, optimum sowing date on Nov. 5th and late sowing date on Nov. 20th. The sub plots represented three cultivars, Giza 461 as a resistant one, Giza 843 as moderately resistant cultivar and the susceptible cultivar Yossuf El-Sedeek. The sub-sub plots represented three-plant densities 33, 22 and 17 plants/m². The infection with chocolate spot and rust diseases were determined according to scale from 1-9 (1 highly resistant and 9 highly susceptible) by Beruier *et al.*, (1984) at the maximum level of infection (March-April) each season. The plot size consisted of six ridges 3 meters long and 60 cm. width. The harvested area of 7.2m² was taken from each plot to determine the seed yield in ardab/feddan (1 ardab = 155Kg, 1 feddan = 4200 m²). All data collected were analyzed according to the analysis of variance procedures and treatments means were compared by the least significant difference method (Snedecor and Cochran 1982).

RESULTS AND DISCUSSION

Infection with foliage diseases in the second season (1998/1999) was too low to record. However, results of the other three seasons will be presented. Chocolate spot and rust infections were significantly lower in the third sowing date Nov. 20th followed by the second sowing date Nov. 5th., comparing to the highest infection under the first sowing date Oct. 20th., Table (1). Similar findings were obtained by Amer. (1986), Amer *et al.* (1992, 1994 and 1997), and Mahmoud (1996).

The resistant cultivar Giza 461 recorded the lowest values of foliage diseases followed by Giza 843 compared to the susceptible cultivar Yossuf El-Sedeek (Table 1). Nassib *et al.*, (1991) and Khalil *et al.*, (1996) found Similar results. Lower chocolate spot infection was found in the three seasons of the study with lower plant densities. While, rust infection was

decreased in the lower plant density (17 plants/m²) in 1999/1998 and 1999/2000 than the other two densities (22 and 37 plants/m²). However, higher infection was found at the lower (17 plants/m²) than the other two plant densities 22 and 33 plants/m², (Table 1). These results suggested that 17-22 plants/m² in general, is more preferable than the higher one to minimize foliage disease.

The highest seed yield was obtained from the second sowing date on Nov. 5th in all seasons (Table 2). Similar results were recorded by Amer, (1986) and Nassib *et al.*, (1991). The resistant cultivar Giza 461 gave the highest seed yield followed by Giza 843 (Table 2) in 1998/1999, 1999/2000 and 2000/2001 seasons, while Giza 843 gave the highest value in 1997/1998 season. Similar results were found by Amer (1986) and Nassib *et al.*, (1991). The medium plant density 22 plants/m² produced high seed yield in 1997/1998 season, while 33 plants/m² gave high seed yield in the other seasons but without any significant differences between the two densities (Table 2). This is in line with earlier findings of Amer *et al.*, (1992).

Significance of interactions between the three factors in the study i.e. sowing dates (A), cvs (B), and plant densities (C) and its effect on chocolate spot and rust infection are shown in (Table 1).

Results indicated that significant interaction between cvs and sowing dates (Ax B) on rust infection was found in seasons 1997/1998 and 2000/2001. Also, between sowing dates and plant densities (BxC) in 1997/1998 only. While, for chocolate spot infection it was found between sowing dates and cvs (Ax B) in 2000/2001 only. So, results will be presented for these significant interactions only (Tables 3 and 4).

In general, the lowest value of rust and chocolate spot infection were recorded under late and medium sowing dates for Giza 461 and Giza 843 cultivars (Table 3). These findings were similar to those obtained by Mahmoud (1996), and Amer (1986). On the other hand, the interaction effect between cultivars and plant densities on rust infection in 1997/1998 season (Table 4) indicated that low plant density recorded the lowest values for the three tested cultivars. Similar results were obtained by Amer (1986).

Results of interaction effects between sowing dates and cultivars on seed yield ardeb/feddan in the four seasons of the study (Table 5), show that the highest seed yield was obtained from Giza 461 and Giza 843 under the optimum sowing date Nov. 5th as found earlier by Amer *et al.*, (1997). While, interaction effect between sowing dates and plant densities on seed

yield (Table 6) show that the highest seed yield was recorded under 22 plants /m² for the second sowing date Nov. 5th. in 1997/1998 and 1999/2000 seasons. The same results were found by Amer (1986) and Amer *et al.*, (1994). In 1998/1999 season, the highest seed yield was obtained from 33 plants/m² under the same sowing date Nov. 5th. without significant differences between 33 and 22 plants/m². With regard to cultivars x plant densities interaction on seed yield, Giza 461 cultivar gave high seed yield with plant densities of 33 and 22 plants /m² in 1998/1999 and 1999/2000 seasons (Table 7). This agrees with earlier findings of Amer (1986). The obtained results indicate that the resistant and moderately resistant faba bean cultivars Giza 461 and Giza 843 could be planted in the first week of November with plant density of 22 plant/m² to obtain high seed yield with minimum chocolate spot and rust infections in an integrated crop management system.

Table (1) : The effect of sowing dates, cultivars and plant densities on chocolate spot and rust infections of faba bean in 1997/1998, 1999/2000 and 2000/2001 seasons.

Variables	Chocolate spot	Rust	Chocolate spot	Rust	Chocolate spot	Rust
	1997 / 1998		1999 / 2000		2000 / 2001	
Sowing dates (A)						
Oct. 20 th	6.00	5.26	2.30	5.78	2.93	5.74
Nov. 5 th	4.26	4.08	1.41	3.64	2.70	4.78
Nov. 20 th	3.30	3.12	1.33	2.66	1.78	3.96
L.S.D. 0.05	1.8	0.74	0.17	0.98	0.75	1.43
Cultivars (B)						
Giza 461	3.78	3.48	1.37	2.96	1.96	3.93
Giza 843	4.56	4.22	1.41	2.35	2.04	4.37
Y.El-Sedeek	5.22	4.74	2.26	5.64	3.41	6.19
L.S.D. 0.05	0.35	0.56	0.12	0.48	0.75	1.43
Plant densities (C)						
33 plants/m ²	4.82	4.22	1.74	4.38	2.52	4.78
22 plants /m ²	4.44	4.38	1.70	4.08	2.44	4.67
17 plants/m ²	4.30	3.86	1.59	3.64	2.44	5.04
L.S.D. 0.05	0.26	0.36	-	0.36	-	-
Interactions: A x B	N.S	*	N.S	N.S	*	*
A x C	N.S	N.S	N.S	N.S	N.S	N.S
B x C	N.S	*	N.S	N.S	N.S	N.S

* Chocolate spot and Rust Scale : 1-9, 1 highly resistant and 9 highly susceptible.

Table 2 : The effect of sowing dates, cultivars and plant densities on faba bean seed yield (ardab per feddan) in 1997/1998, 1998/1999, 1999/2000 and 2000/2001 seasons.

Variables	Seed yield ardab /feddan			
	1997 / 1998	1998 / 1999	1999 / 2000	2000 / 2001
Sowing dates (A)				
Oct. 20 th	7.5	5.5	7.7	6.8
Nov. 5 th	10.1	5.9	9.4	8.1
Nov. 20 th	8.9	5.1	7.1	7.1
L.S.D. 0.05	1.2	0.7	1.0	1.0
Cultivars (B)				
Giza 461	9.2	6.5	9.2	8.4
Giza 843	9.8	6.0	8.7	7.4
Y.El-Sedeek	7.5	4.0	6.0	6.2
L.S.D. 0.05	0.7	0.6	0.8	1.1
Plant densities (C)				
33 plants/m ²	8.8	6.5	8.5	7.7
22 plants /m ²	9.1	6.0	8.1	7.5
17 plants/m ²	8.5	4.1	7.6	6.9
L.S.D. 0.05	0.5	0.4	0.5	-
Interactions:				
A x B	*	*	*	*
A x C	*	*	*	N.S
B x C	N.S	*	*	N.S

Table (3) : Interaction effect between sowing dates and cultivars on chocolate spot and rust infections (different seasons).

Cultivar	Season	Rust infection			L.S.D. %
		Oct. 20 th	Nov. 5 th	Nov. 20 th	
Giza 461	1997 /1998	4.00	3.78	2.66	0.9
Giza 843		5.56	4.44	2.66	
Y.El-Sedeek		6.22	4.00	4.00	
Giza 461	2000 /2001	4.00	4.33	3.44	0.8
Giza 843		5.67	4.00	3.44	
Y.El-Sedeek		7.56	6.00	5.00	
Chocolate spot infection					
Giza 461	2000 /2001	2.00	2.33	1.56	0.5
Giza 843		3.00	2.11	1.00	
Y.El-Sedeek		3.78	3.67	2.78	

Table (4) : Interaction effect between cultivars and plant densities on rust infection in 1997 /1998 season.

Plant density	Rust infection / cultivars			L.S.D. 5%
	Giza 461	Giza 843	Y.El-Seddek	
33 plant /m ²	3.56	4.44	4.66	0.62
22 plant /m ²	3.56	4.66	4.88	
17 plant /m ²	3.34	3.56	4.66	

Table (5) : Interaction effect between sowing dates and cultivars on seed yield (ardab/feddan), 1997 / 1998 - 2000 /2001 seasons.

Plant density	Season	Sowing date/Seed Yield (ardab/fed.)			L.S.D. 5%
		Oct. 20 th	Nov. 5 th	Nov. 20 th	
33 plant /m ²	1997 /1998	8.5	10.1	9.0	0.7
22 plant /m ²		9.1	10.8	9.4	
17 plant /m ²		4.8	9.2	8.3	
33 plant /m ²	1998 / 1999	6.1	7.5	6.0	0.6
22 plant /m ²		6.4	6.1	5.4	
17 plant /m ²		4.0	4.1	4.0	
33 plant /m ²	1999 / 2000	8.3	11.3	7.9	0.9
22 plant /m ²		8.5	9.9	7.7	
17 plant /m ²		6.3	6.9	5.8	
33 plant /m ²	2000 / 2001	8.1	8.9	8.3	0.7
22 plant /m ²		6.8	8.9	6.4	
17 plant /m ²		5.5	6.5	6.7	

Table (6) : Interaction effect between sowing dates and plant densities on seed yield (ardab/feddan), 1997 /1998 – 1999/ 2000 seasons.

Plant density	Season	Sowing date/Seed Yield (ardab/fed.)			L.S.D. 5%
		Oct. 20 th	Nov. 5 th	Nov. 20 th	
33 plant /m ²	1997 / 1998	6.83	10.03	9.59	0.87
22 plant /m ²		7.86	10.41	9.16	
17 plant /m ²		7.72	9.75	8.02	
33 plant /m ²	1998 / 1999	6.12	6.77	6.67	0.70
22 plant /m ²		6.15	6.50	5.23	
17 plant /m ²		4.20	4.42	3.52	
33 plant /m ²	1999 / 2000	7.42	9.57	8.45	0.70
22 plant /m ²		7.56	9.97	6.86	
17 plant /m ²		8.18	8.59	5.99	

Table (7) : Interaction effect between cultivars and plant densities on Seed yield (ardab/feddan) in two seasons 1998 /1999 and 1999 / 2000

Plant density	Season	Cultivars – seed yield			L.S.D. 5%
		Giza 461	Giza 843	Y.El-Seddek	
33 plant /m ²	1998 /1999	7.75	7.10	4.68	0.70
22 plant /m ²		6.77	6.45	4.68	
17 plant /m ²		5.07	4.50	2.60	
33 plant /m ²	1999 /2000	9.57	9.48	6.39	0.76
22 plant /m ²		9.70	8.67	6.02	
17 plant /m ²		8.29	7.94	6.53	

REFERENCES

- Amer, M.I. ; 1986. Effect of some agronomic practices on productivity of some broad bean varieties. Ph.D. Thesis, Fac. Agric, Zagazig. Univesity, Egypt.
- Amer, M.I.; M. M. Radi; M.B. Habeeb and R.F. Dissauky, 1994. Response of three faba bean (*Vicia faba L.*) cultivars to fungicidal chemical in North Egypt. Egyptian J.Appl. Sci., 9(2) 821-830.
- Amer, M.I.; Samia A. Mahmoud and N.M. Abou-Zeid 1997. Integrated control of foliage diseases on faba bean in Egypt. Report on Seven Regional Coordination Meeting Cairo, September.
- Amer, M.I; M.A. El-Borai and M.M. Radi, 1992. Response of three faba bean (*Vicia faba L.*) cultivars to three sowing dates under different plant densities in north delta. J.Agric. Res. Tanta Univ., 18(4) : 591-599.
- Bernicr, C.C., S.B. Hanounik; M.M.Hussein and H.A. Mohamed, 1984. Field Mannual of Common Faba Bean Diseases in Nile Valley. Information Bulletin No.3. ICARDA, P.O. Box 5466, Aleppo, Syria.
- Hussein, A.H., R.F. Diessouky; M.A.El-Deeb and M.M. El-Morsy, (1994). Effect of sowing dates and plants densities on yield components of new faba bean cultivar (Giza Blanka) in newly reclaimed land. J.Agric. Sci. Mansoura Univ., 19 (2) 447-451.

- Johanson, C.; B.Baldev; J.B. Brouwer; W.erskine; W.A. Jermy; L.Li-Suan, B.A. Malik; A.A. Miah and S.N.Silim, 1994.** Biotic and abiotic stresses constraining productivity of cool season food legumes in Asia, Africa and Occanis. Expanding the production and use of cool season food legumes, 175-194. Edited by Muehlbauer and W.J. Kaiser.
- Khalil, S.A.; S.A. Saber, M.M. El-Hady; M.I. Amer, Sami A.Mahmoud and N.M. Abo-Zeid, 1996.** Utilisation of genetic resources in developing new faba bean (*Vicia faba L.*) cultivars. Proceeding, Rehabilitation of faba bean. W. Bertenbreiter and M.Sadki (Eds. I. Moroc, P.P. 47-54). Edited by Mulhlbaure and W.J. Kaiser.
- Mahmoud, Nagwa. M. A., 1996.** Studies on chcolate spot disease of broad bean and loss occurrence. Ph.D. Thesis. Fac. Agric. Minufiya university, Egypt.
- Mahmoud. Samia, A.; M. Shendi; N.M. Abou-Zeid; M.M. Attia; A. Basyony and M.El-Emery, 1996.** Selectoion and adaptation to Nubaria conditions. Report on Eighth Ann. Coordination Meeting Cairo, 14-19 September.
- Mohamed, H.A.; M.E. El-Rafei ; N.M. Abou Zeid; S.A. Omer; Wadaia F. Habib.; I.A. Ismail, ; M. Raof.; and H. Khidr; 1980.** Plant pathobgy research studies ICARDA/IFAD Nile Valley Project on faba beans Annual coordination Meeting 1979-1980, Cairo, Mimeograph, 49 pp.
- Nassib, A.M.; S.A. Khalil; M.A. El-Borai; M.M. Rady and F. Shaban, 1991.** Pilot demonstration plots on a new faba bean cultivar in Behiera and Kafr El-Sheikh Governorates. Nile Valley Regional Program, Third Ann. Regional Meeting, Cairo 15-23 September.
- Snedecor, G.W. and W.G. Cochran (1982).** Statistical methods 7th ED. Iowa State Univ. Press, Ames. Iowa, U.S.A.
- Solh, M.B.; H.M. Halila; G.Hernandez-bravo; B.A. Malik; M.I. Mihov and B. Sardi, 1994.** Biotic and abiotic constraining the productivity of cool season food legumes in different farming systems. Proc. Of the Sec. Int. Food Legume Res. Conf., Cairo, Egypt, 12-16 April, PP. 991.

الملخص العربى

المقاومة المتكاملة لأمراض المجموع الخضرى فى محصول الفول البلىدى

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أقيمت هذه التجربة فى محطة البحوث الزراعية بسخا فى المواسم الزراعية ١٩٩٧ / ١٩٩٨ ، ١٩٩٩ / ٢٠٠٠ ، ٢٠٠٠ / ٢٠٠١ لدراسة تأثير زراعة محصول الفول البلىدى فى مواعيد ٢٠ أكتوبر ، ٥ نوفمبر ، ٢٠ نوفمبر على الإصابة بأمراض المجموع الخضرى والتي أهمها التبقع البنى والصدأ وكذلك الإنتاجية للأصناف جيزة ٤٦١ ، جيزة ٨٤٣ ، يوسف الصديق عندما زرعت بكثافات نباتية ٣٣ ، ٢٢ ، ١٧ نبات فى المتر المربع. قدرت نسبة الإصابة بالتبقع البنى والصدأ عند أعلى معدل لها وكذلك قدر محصول البذور من الفدان بالأردب.

أشارت النتائج إلى إنخفاض نسبة الإصابة بمرض التبقع البنى والصدأ عند الزراعة فى الميعاد المتأخر ٢٠ نوفمبر وكذلك الميعاد الأمثل ٥ نوفمبر . كانت أقل إصابة بهذين المرضين عند زراعة الصنف المقاوم للأمراض جيزة ٤٦١ يليه الصنف متوسط المقاومة جيزة ٨٤٣ . كما كان للزراعة بالكثافة المنخفضة ١٧ نبات/م^٢ والمتوسطة ٢٢ نبات /م^٢ تأثير على خفض نسبة الإصابة بالأمراض . وأعطى الصنفين جيزة ٤٦١ ، جيزة ٨٤٣ أقل نسبة إصابة تحت ميعاد الزراعة المتأخر ٢٠ نوفمبر يليه ميعاد الزراعة الأمثل ٥ نوفمبر . كما سجلت أقل نسبة إصابة بمرض الصدأ تحت الزراعة بمعدل ١٧ نبات /م^٢ للصنفين جيزة ٤٦١ ، جيزة ٨٤٣ .

كما تشير النتائج إلى أن أعلى محصول من البذور يكون عند الزراعة فى الميعاد ٥ نوفمبر وللصنف جيزة ٤٦١ ، وتعطى الكثافة النباتية ٢٢ نبات /م^٢ المحصول الأمثل.

كان لزراعة الصنفان جيزة ٤٦١، جيزة ٨٤٣ فى ميعاد ٥ نوفمبر ، وكذلك الزراعة بمعدل ٢٢ نبات /م^٢ فى الميعاد الأمثل ٥ نوفمبر أثر فى زيادة محصول الفدان من البذور . كما أعطت الكثافة العالية والمتوسطة (٣٣، ٢٢ نبات/م^٢) أعلى محصول للصنفين جيزة ٤٦١، جيزة ٨٤٣ .

من هذه النتائج يمكن التوصية بأن زراعة الفول البلدى بالأصناف المقاومة التى يمثلها الصنف جيزة ٤٦١ فى ميعاد الزراعة الأمثل ٥ نوفمبر بمعدل الكثافة المناسب ٢٢ نبات/م^٢ يقلل بنسبة كبيرة نسبة الإصابة بأمراض المجموع الخضرى التى أهمها التبقع البنى والصدأ ويعطى أعلى محصول من البذور للفدان .