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EFFECT OF SKIPPING IRRIGATION AT VARIOUS GROWTH STAGES ON YIELD AND QUALITY OF SOME FABA BEAN CULTIVARS (*Vicia faba* L.)

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ABSTRACT

Two field experiments were conducted at Agric. Exp. Res. Sta., Fac. Agric., Cairo Univ., during 2011/2012 and 2012/2013 seasons to study the effect of five irrigation treatments (I1; normal irrigation "control" ; I2: skipping the second irrigation ; I3: skipping the third irrigation; I4: skipping the fourth irrigation and I5: skipping the fifth irrigation) on yield and seed quality of three cultivars of faba bean (Giza 3, Nubaria 1 and Sakha 3). A spilt plot design in a randomized complete blocks arrangement with three replications was used to conduct all trials. Irrigation treatments were randomly assigned for main plots while, faba bean cultivars were randomly arranged for sub plots. Results showed that skipping irrigation at various growth stages had significant effect on all studied traits in both seasons. Skipping the fourth or the fifth irrigation gave the greatest reduction in all yield traits except, seed protein content which increased in both seasons compared with other irrigation treatments. Regarding faba bean cultivars, differences among the three faba bean cultivars were significant except, number of pods plant^{-1}, pods weight^{-1}, number of seeds pod^{-1} and harvest index (%) in both seasons. Giza 3 cultivar gave the highest values all yield traits and seed protein content (%) followed by Nubaria 1. However, Sakha 3 cultivar gave the lowest value of all yield traits and seed protein content (%) in both seasons. For interaction between irrigation regime and faba bean cultivars, all faba bean cultivars were affected by skipping irrigation in both seasons. Giza 3 cultivars was more tolerant to skipping irrigation followed by Nubaria 1 however, Sakha 3 was more sensitive to drought stress.

Keywords: Faba bean, Cultivars, Skipping irrigation, yield , Protein

INTRODUCTION

Faba bean (*Vicia faba* L) is a major leguminous crop that grown in Egypt; it is an important source of protein for human and animal consumption and it plays a role in the crop rotation. However, the total production of this crop is still insufficient to cover the local consumption. From the above-mentioned facts, there is a great need to overcome this gap between local production and demand by expansion through reclaimed areas which represent the most hope of cultivated lands in increasing our agriculture production and subsequently in overcoming the deficiency in food requirements, as well as, increasing the vertical production through introduction of new varieties with high yield potential (Abdellatif et al. 2012). Faba bean is more sensitive to water deficit than some other seed legumes including common bean, pea and chickpea [(McDonald & Paulsen, 1997, Amede & Schubert, 2003) Abdellatif *et al*. 2012]. Faki (1991) suggested that save irrigation water through using more efficient irrigation methods, longer irrigation intervals, higher moisture depletion, skipping irrigation during the

early vegetative growth or during maturation stage, and timing the length of irrigation interval with the stage of plant growth. . Farag and El-Shamma (1994) showed that irrigation faba bean every 7 days intervals gave the highest values of plant height. Mwanamwenge *et al*. (1999) found that the early podding stage of development was the most sensitive to water deficit in faba bean, causing a reduction in harvest indices and seed yields of at least 50% in all three genotypes. In contrast, genotypes showed a better ability to recover from stress at floral initiation and first flower stages than at early podding. Duc et al. (1999) and Duranti and Cristina (1997) concluded that water deficit increased protein content of faba bean. Singer *et al*.(2001) concluded that water stress significantly decreased plant height Ricciardi *et al*.(2001) mentioned that faba bean is well known for its susceptibility in growth, flowering and pod formation and yield when exposed to water deficit. Tayel and Sabreen (2011) found that skipping two irrigations decreased all yield traits. Also, they added that faba bean stressing must be avoided at flowering stage Balasio et al. (2006) found that irrigation intervals 28 and 14 days during the vegetative and reproductive stages ,respectively, produced the highest seed yield. Al-Suhaibani (2009) indicated that decreasing water supply (2000 or 3000 m^3 ha^{-1}) caused slight decrease in most yield and yield component characters viz., plant height, number of branches/plant, number of pods/plant, seed weight/plant (g), 100-seed weight (g) and biological yield (ton ha^{-1}) However, increased crude protein in seeds. Dashadi *et al*.(2011) reported that water deficit (irrigation after 75 mm evaporation from Class A pan) decreased number of pods $plant^{-1}$, number of seed pod^{-1}, 100-seed weight, seed yield (kg/ha), straw yield (kg/ha) and biological yield (kg/ha) compared with full irrigation. Alghamdi (2009) stated that protein content increased during water stress treatment (4800 m^3 ha/season) compared with other irrigation treatments. Ghassemi-Golezani *et al*.(2009) showed that water limitation reduced seeds per plant, grain filling duration and grain weight. Consequently, grain yield per unit area under limited irrigation(irrigation after 130 mm evaporation from Class A pan) was considerably lower than under well-watering. Emam et al.(2010) reported that plant height ,number of pods/plant of common bean were significantly decreased by water stress. Ghassemi-Golezani et al. (2013) mentioned that pods per plant, seeds per plant,100-seed weight, seed yield, biological yield and harvest index decreased with decreasing water supply in chickpea. Ouzounidou *et al.* (2014) reported that drought stress increased protein content in seed of faba bean. Mansour *et al.* (2014) found that water deficit (irrigation at 50% of field capacity) decreased seed yield (kg/feddan) compared with normal irrigation. Mohammad (2014) stated that irrigation at 75% available water depletion (water stress) significantly decreased plant height and seed yield ha^{-1} , however, increased seed protein content of faba bean. Sadeghi *et al*. (2014) fond that irrigation every 21 days intervals (water deficit) decreased pod length, number of pods, number of seeds m^{-2}, seed yield, biological yield and harvest index (%) compared with irrigation every seven days. Regarding faba bean cultivars, many investigators had reported high variability among faba bean cultivars for growth characters, yield and yield components and quality among of them Gomaa, 1996; El-Hosary and

Mehasen, 1998 and Tageldin and Mehasen, 2004. Moreover, Abdellatif *et al.*(2012) reported that Giza 3 faba bean cultivar gave the highest mean through the genotypes for the most of the morphological traits, it was the most drought susceptible variety.

The objective of this research was to study the effect of skipping irrigation at various growth stages on yield, yield component and seed quality of some faba bean cultivars.

MATERIALS AND METHODS

Field experiments were conducting in two successive seasons 2011/2012 and 2012/2013 at the Agricultural Experimental Research Station, Faculty of Agriculture, Cairo University to study the effect of five irrigation treatments (I_1: full irrigation, I_2: skipping the 2nd irrigation, I_3: skipping the third 3rd irrigation, I_4: skipping the fourth irrigation and I_5: skipping the fifth irrigation) on yield and seed quality of three cultivars of faba bean (Giza 3, Nubaria 1 and Sakha 3).

Table 1: Irrigation timing

Irrigation	**I_2**	**I_3**	**I_4**	**I_5**
Growth stages	Vegetative	Vegetative	Flowering & podding	Maturity

A spilt plot design in a randomized complete blocks arrangement with three replications was used to conduct all trials. The five irrigation treatments were randomly assigned for main plots. The three faba bean cultivars were randomly arranged for sub plots. The experimental plot consisted of 5 ridges spaced 60 cm apart with 4 meters long (12 m^2). The preceding summer crop was maize in both seasons. The soil texture was clay loam. Sowing date was on November 21th and 22th in 2011/2012 and 2012/2013 seasons, respectively. Phosphorus was added before ridging in the form of super phosphate (15.% P_2O_5) at the rate of 100 kg/feddan. Ammonium nitrate (33%) as a source of nitrogen was applied at the level of 20 kg N/feddan, also potassium sulphate (48-52 K_2O) was used as a source of potassium on the level of 24 kg K_2O/feddan, both nitrogen and potassium fertilizers were supplied before the first irrigation. The normal cultural practices for growing faba bean were practiced. At harvest, ten individual guarded plants were randomly taken from the central three ridges that are devoted to determine seed yield and its components. The following traits were estimated: Plant height (cm): from ground level to the top of plant, number of branches/plant, number of pods/plant, pods weight/plant, number of seeds/pods,100-Seed weight (g), seed yield /plant (g). Seed, straw and biological yield (kg/plot): was determined at harvest from plants of the central three ridges of each plot and then convert to (kg/feddan). Harvest index percentage: Ratio of seed weight to biological yield without dropped leaves at harvest.

At laboratory, Seed crude protein percentage was estimated according the improved Kjeldahl method of AOAC (1990). Data were subjected to analysis of variance according to the split plot design according to the

procedure outlined by Steel and Torrie (1997). Treatment means were compared based on least significant difference (LSD) at probability level of 0.05. Finally, all statistical analysis was carried out using "MSTAT-C" program.

RESULTS AND DISCUSSION

Effect of irrigation regime :

Yield and its components:

Data in Table (2) showed that effect of irrigation skipping on yield and its components was significant in 2011/12 and 2012/13 seasons. Plant height was significantly decreased by skipping irrigation at various growth stages compared with normal irrigation in both seasons. The high reduction in plant height was observed with skipping the second irrigation (22.85 and 23.33%) followed by skipping the third irrigation (20.89 and 22.4 %) ,respectively, in both seasons. Number of branches plant^{-1} was significantly decreased by skipping irrigation at various growth stages in both seasons. Skipping the second or the third irrigation gave the highly reduction number of branches plan^{-1} compared with normal irrigation (control treatment) in both seasons. However, slightly reduction in number of branches plant^{-1} were recorded at skipping the fourth or the fifth irrigation , this may be due to growth stages at this periods is flowering and maturity. The results in Table (2) showed that skipping irrigation treatments significantly decreased number of pods plant^{-1} in both seasons. Skipping the fourth irrigation was decreased number of pods plant^{-1} (33.32 and 31.05 %) followed by (35.21 and 37.59 %) with skipping the fifth irrigation compared with normal irrigation in both seasons, respectively. On the other hand, low reduction number of pods plant^{-1} was observed at skipping the second (12.63 and11.87%) or the third irrigation (12.78 and 9.76%), respectively, in both seasons compared with full irrigation (control treatment).

Data in Table (2) cleared that irrigation regime treatments had significantly affected pods weight plant^{-1} in both seasons. Skipping the fourth irrigation decreased pods weight by (31.76 and 33.44%) compared with normal irrigation in both seasons, respectively. Skipping the third irrigation caused reduction in pods weight by (28.86 and 34.90%), respectively, compared with normal irrigation. However, skipping the second irrigation decreased pods weight plant^{-1} by (18.56 and 18.52 %) followed by (17.91 and 17.36) at skipping the third irrigation compared with normal irrigation in both seasons. Skipping irrigation treatments significantly decreased number of seeds pod^{-1} in both seasons (Table 2). The reduction in number of seeds pod^{-1} was (26.01 and 25.80%), (27.47 and 27.68%), (39.84 and 40.32%) and (44.78 and 42.74%) when faba bean plants were skipped the second, third, fourth and fifth irrigation, respectively, compared with the control treatment (full irrigation) in both seasons.

Table 2: Effect of skipping irrigation on yield and its components in 2011/2012 and 201/2013 seasons.

Characters	Seasons	Skipping irrigation treatments*					$LSD_{0.05}$
		I_1	I_2	I_3	I_4	I_5	
Plant height (cm)	2011/12	105.3	81.23	83.30	87.33	93.67	2.8
	2012/13	109.0	83.60	84.98	91.65	96.14	2.6
No. of branches /plant	2011/12	3.23	2.20	2.30	2.45	2.68	0.12
	2012/13	3.40	2.37	2.40	2.53	2.70	0.14
No. of pods /plant	2011/12	19.00	16.60	16.57	12.67	12.31	2.21
	2012/13	19.87	17.51	17.93	13.70	12.40	2.34
Pods weight/plant	2011/12	42.03	34.23	34.50	28.68	29.90	1.87
	2012/13	43.20	35.20	35.70	28.75	28.12	1.92
No. of seeds/pod	2011/12	3.64	2.69	2.64	2.19	2.01	0.42
	2012/13	3.72	2.74	2.69	2.22	2.13	0.31
100-Seed weight (g)	2011/12	68.13	66.60	67.64	62.33	61.00	2.25
	2012/13	68.83	67.60	68.07	63.47	62.37	2.38
Seed yield/plant (g)	2011/12	34.99	32.33	32.55	28.26	27.63	1.87
	2012/13	35.94	33.80	34.00	28.78	28.27	1.49
Seed yield (kg /fed.)	2011/12	1843	1613	1557	1437	1412	29.84
	2012/13	1922	1637	1583	1537	1503	27.54
Straw yield (kg/fed.)	2011/12	4845	4058	4133	4681	4513	39.3
	2012/13	4868	4076	4200	4766	4793	32.87
Biological yield (kg/fed.)	2011/12	6688	5671	5690	6118	5925	31.81
	2012/13	6790	5713	5783	6303	6476	34.73
Harvest index (%)	2011/12	27.55	28.44	27.36	23.48	23.83	1.12
	2012/13	28.31	28.65	27.37	24.38	23.20	1.11

***I_1: Full irrigation , F_2: skipping 2nd irrigation , F3: Skipping 3rd irrigation, F4: Skipping 4th irrigation and F5:Skipping 5th irrigation.**

Regarding 100-seed weight data in Table (2) presented significant differences among irrigation treatments in both seasons. Skipping irrigation at various growth stages reduced 100-seed weight compared with normal irrigation in both seasons. The greatest reduction in 100-seed weight was observed when faba bean plants were
omitted from the fifth or the fourth irrigation as follow; (10.46, 9.39, 8.52 and 7.78) , respectively, in both seasons in compared with normal irrigation.

Seed yield plant^{-1} was significantly decreased by skipping irrigation treatments in both seasons (Table 2). Skipping the fourth or fifth irrigation reduced seed yield plant^{-1} by (19.23, 19.92 , 21.03 and 21.34%), respectively, in both seasons compared with full irrigation treatment. Also, skipping the second or the third irrigation decreased seed yield plant^{-1} by (7.60, 5.95, 6.97 and5.39 %), respectively, in both seasons compared with control treatment.

Skipping irrigation at various growth stages had significant effect on seed yield (kg feddan^{-1}) in two seasons (Table 2). The results showed that markedly decreasing in seed yield kg feddan^{-1} was observed when faba bean plants exposed to skipping the fourth and fifth irrigation (22.03, 20.03, 23.39 and 21.80 %), respectively, in both seasons compared with normal irrigation. However, skipping the second or the third irrigation gave a reduction in seed yield kg feddan^{-1} by (12.47, 1482 , 15.52 and 17.63%), respectively, in both seasons, compared with full irrigation treatment.

Results in Table (2) showed that skipping irrigation at various growth stages induced a significant reduction in straw yield kg feddan^{-1} in both seasons. Skipping irrigation at the second or the third irrigation decreased straw yield by (16.24, 16.26, 14.69 and 13.72%), respectively, in both seasons compared with control treatment. Also, skipping the fourth or the fifth irrigation gave a slight reduction in straw yield kg feddan^{-1} (3.38, 2.09,7.29 and 1.54 %), respectively, in two seasons compared with full irrigation treatment.

Data manifested in Table (2), clearly indicated that there is significant differences between irrigation treatments in biological yield kg feddan^{-1}. Skipping irrigation at various growth stages caused decreasing in biological yield kg feddan^{-1} in both seasons compared with normal irrigation. The highly reduction in biological yield (15.20, 15.86, 14.92 and 14.83 %), respectively, was recorded when plants omitted from the second or the third irrigation compared with normal irrigation in both seasons.

As shown in Table (2) results revealed significant differences between irrigation treatments in harvest index in 2011/2012 and 2012/2013 seasons. It is clearly that lower values of harvest index % were observed at skipping the fourth or the fifth irrigation (23.48, 24.38,23,83 and 23.20 %), at the first and second respectively, compared with other treatments in both seasons.

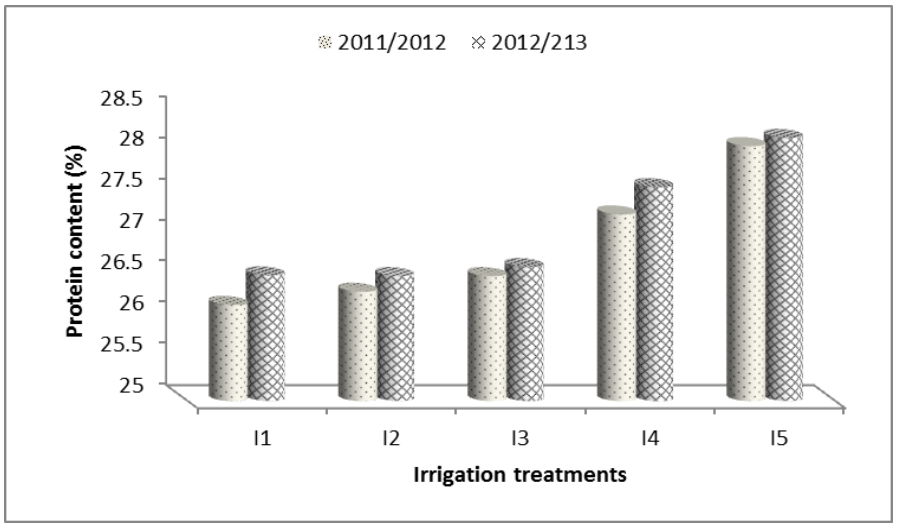
From the above mention that seed yield potential of faba bean, estimated as number of branches plant^{-1}, number of pods plant^{-1}, 100-seed weight and seed yield plant^{-1} . The obtained results indicated that skipping irrigation (drought stress) at any growth stage caused decreasing in all yield traits compared with normal irrigation in both seasons. Moreover, the highly reduction was observed when faba bean plants exposed to prevent from the fourth or fifth irrigation. Emam *et al*.(2010) explained that, bean seed yield reduction due to drought stress are attributed to adverse effects of the stress on individual yield components (number of pods plant-1, number of seeds pod^{-1}, seed weight and harvest index). Also, Sadeghi et al. (2014) reported that the increase of deficit irrigation severity led to the decrease of plant photosynthesis and consequently the decrease of assimilates production in plant, so that the irrigation –off stress during the flowering stage and pod development stage reduced the number of pods in plant and the number of seeds per pod. In addition, Daneshian et al. (2009) said that, under stress conditions, less photosynthetic material is produced in the plant and vegetative and reproductive growth and consequently the grain yield has decreased under water stress.

These results are parallel to Mwanamwenge et al. (19990, Duc *et al.* (1999), Durant and Cristina (1997), Singer *et al*. (2001), Balasio et al. (2006), Tayel and Sabreen (2011), Ghassemi-Golezani (2013), Mansour et al. (2014), Mohammad (2014) and Sadeghi et al. (2014).

Protein content %:

Fig. 1 illustrated the effect of irrigation treatments on protein content(%) of faba bean in 2011/2012 and 2012/2013 seasons. The results showed that there is significant differences between irrigation treatments in both seasons. An increasing trend in seed protein content with skipping

irrigation i.e. second, third , fourth and fifth in both seasons. The highest protein content in seed was observed at skipping the fifth irrigation (28.1 and 28.2%), respectively, in both seasons compared with other treatments. These results are in agreement with those obtained by Duc *et al*. (1999) , Alghamdi (2009) and Ouzounidou *et al*. (2014).



***I_1: Full irrigation , F_2: skipping 2nd irrig. , F3: Skipping 3rd irrig., F4: Skipping 4th irrig. and F5:Skipping 5th irrig.**

Fig. 1: Effect of irrigation treatments on protein content of faba seeds in 2011/12 and 2012/13 seasons.

Effect of faba bean cultivars :

Yield and its components:

Data presented in Table (3) showed the differences between faba bean cultivars in yield traits in 2011/2012 and 2012/2013 seasons. The effect of faba bean cultivars on yield and yield traits were significant except, number of pods plants^{-1}, pods weight plant^{-1}, number of seeds pod^{-1} and harvest index(%) in both seasons. Giza 3 faba bean cultivar gave the tallest plants (92.32 and 95.37 cm) followed by Nubaria 1 cultivar (90.12 and 92.61 cm), respectively, in both seasons. However, Sakha 3 cultivar produced the shortest plants (88.o8 and 91.26 cm), respectively in both seasons.

Data given in Table (3) clearly indicate that faba bean cultivar Giza 3 produced the highest number of branches plant^{-1} (2.70 and 2.80) followed by Nubaria 1 (2.56 and 2.68) , respectively, in both seasons. While, Sakha 3 cultivar gave the lowest number of branches plant^{-1} (2.43 and 2.56), respectively.

Regarding the effect of faba bean cultivars, the results revealed significant differences between cultivars in 100-seed weight (g) in both seasons. Nubaria 1 cultivar produced the heaviest seeds expressed as 100-

seed weight (68.71 and 69.62 g) followed by Giza 3 cultivar (64.06 and 64.76 g), respectively, in both seasons. However, Sakha 3 cultivar gave the lowest value of 100-seed weight (62.66 and 63.84 g), respectively, in both seasons.

The results in Table (3) indicate that the effect of faba bean cultivars on seed yield plant^{-1} (g) was significant in both seasons. Giza 3 cultivar recorded the greatest seed yield plant-1 (31.73 and 32.64 g) followed by Nubaria 1 (31.38 32.49 g), respectively, in both seasons. However, Sakha 3 cultivar gave the lowest values of seed yield plant^{-1} (30.35 and 31.34 g) ,respectively, in both seasons.

Table3: Effect of some faba bean cultivars on yield and yield components in 2011/2012 and 2012/2013 seasons.

Characters	Season	Faba bean cultivars			$LSD_{0.05}$
		Giza 3	Nubaria 1	Sakha 3	
Plant height (cm)	2011/12	92.32	90.12	88.08	1.10
	2012/13	95.37	92.61	91.26	0.94
No. of branches /plant	2011/12	2.72	2.56	2.43	0.12
	2012/13	2.80	2.68	2.56	0.11
No. of pods/plant	2011/12	16.36	15.34	14.58	NS*
	2012/13	17.02	16.23	15.60	NS
Pods weight /plant (g)	2011/12	33.82	33.20	32.79	NS
	2012/13	34.31	34.13	34.14	NS
No. of seeds/pod	2011/12	2.76	2.59	2.54	NS
	2012/13	2.79	2.68	2.62	NS
100-Seed weight (g)	2011/12	64.06	68.71	62.66	1.21
	2012/13	64.74	69.62	63.84	1.26
Seed yield /plant (g)	2011/12	31.73	31.38	30.35	0.21
	2012/13	32.64	32.49	31.34	0.34
Seed yield (kg/fed.)	2011/12	1639	1556	1521	16.51
	2012/13	1695	1624	1590	18.35
Straw yield (kg/fed.)	2011/12	4553	4487	4298	31.2
	2012/13	4606	4526	4491	43.2
Biological yield (kg/fed.)	2011/12	6192	6043	5819	28.73
	2012/13	6301	6150	6081	29.64
Harvest index (%)	2011/12	26.46	25.74	26.13	NS
	2012/13	26.90	26.40	26.14	NS

***NS= Not significant**

Results presented in Table (3) show that, seed yield (kg feddan-1) of faba bean cultivars in both seasons significantly differed. It was evident that Giza 3 cultivar produced the highest seed yield (1639 and 1695 kg feddan^{-1}) followed by Nubaria 1 (1556 and 1624 kg feddan^{-1}), respectively, in both seasons. While, Sakha 3 faba bean cultivar gave the lowest values of seed yield (1521 and 1590 kg feddan^{-1}), respectively, in both seasons.

The results given in Table (3) clear that, straw and biological yields of three faba bean cultivars in both seasons significantly differed. Giza 3 was superior in straw yield(kg feddan^{-1}) in both seasons compared with other two cultivars. Nubaria 1 ranked in the second order followed by Sakha 3 cultivar in both seasons. Concerning biological yield data in Table (3), revealed significant differences among faba bean cultivars, where, the highest value of biological yield was recorded by faba bean cultivar Giza 3 (6192 and 6301 kg feddan^{-1}) followed by Nubaria 1 (6043 and 6150 kg feddan^{-1}), respectively,

while, Sakha 3 faba bean cultivar attained the lowest value (5819 and 6081 kg feddan^{-1}).

It can be concluded that from the above mention results, Giza 3 faba bean cultivar was superior in all yield traits compared with Nubari1 and Sakha 3 cultivars.These results are agreement with those obtained by Abdellatif *et al*. (2012)

Protein content:

Fig. 2 illustrated the effect of faba bean cultivars on seed protein content (%) in 2011/2012 and 2012/2013 seasons. Giza 3 cultivar was surpassed other two faba bean cultivars in both seasons. Giza 3 gave the highest seed protein content (27.05 and 27.20 %) followed by Nubaria 1 (26.55 and 27.11 %), respectively, in both seasons. However, Sakha 3 cultivar recorded the lowest protein content (26.72 and 26.98 %), respectively, in both seasons. The results are in line with Abdellatif *et al.* (2012)

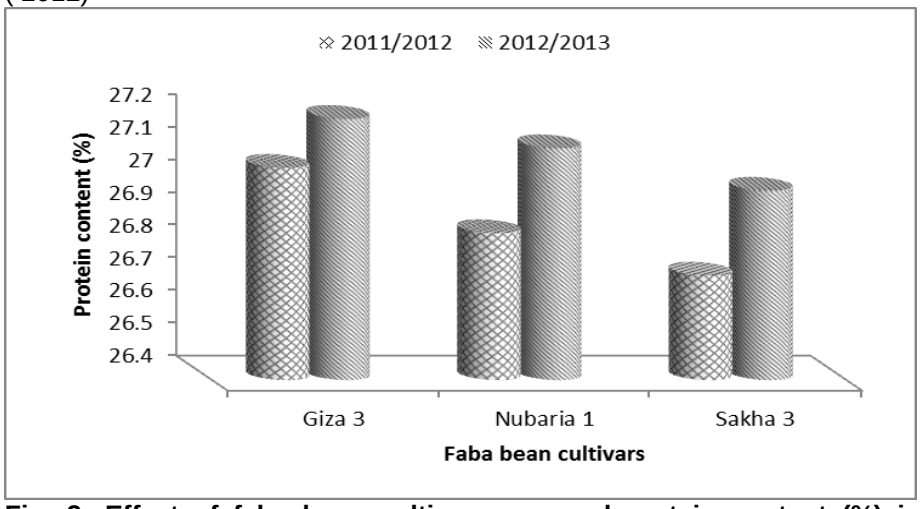


Fig. 2: Effect of faba bean cultivars on seed protein content (%) in 2011/2012 and 2012/2013 seasons.

Effect of interaction :

Seed yield:

The faba bean cultivars interacted with the irrigation regime and had signficant effect on seed yield (kg/feddan) as presented in Fig.3 &4 , respectively. Skipping irrigation at various growth stages markedly decreased in seed yield at all faba bean cultivars in both seasons comaperd with norl irrigation. The greatest reduction in seed yield (kg/feddan) was recorded when faba bean cultivars omitted from the fifth irrigation. Giza 3 faba bean cultivar gave the lowest reduction resulted from skipping irrigation at various growth stages comaperd with other two cultivar. These may be due to Giza 3 cultivar more tolerant for droght stress at various growth stages. Moreover, skipping the second or the third (vegetative growth) irrigation gave less reduction in seed yield (kg/feddan) for all faba bean cultivars comaperd with

skipping irrigation at (flowering and podding stages) in both seasons.These results are in line with Abdellatif *et al*.(2012).

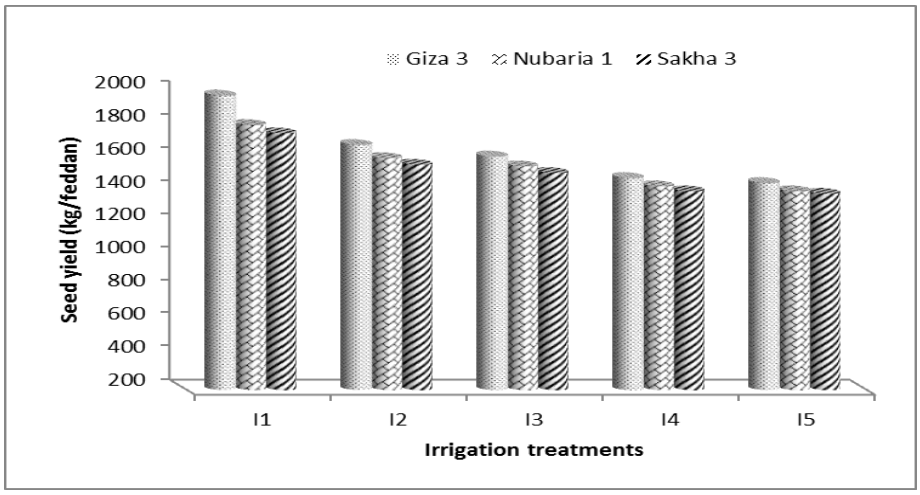


Fig.3: Effect of interaction between irrigation regime and faba bean cultivars on seed yield (kg/feddan) in 2011/2012 season.

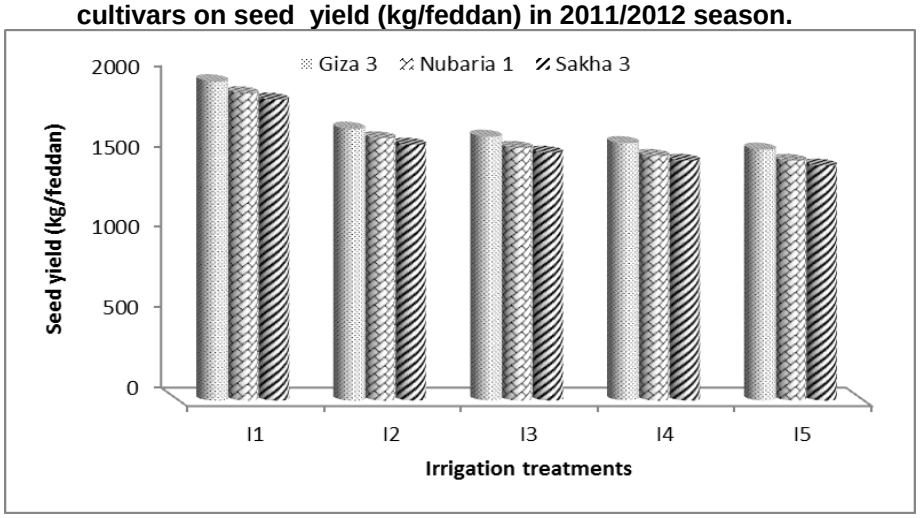


Fig.4: Effect of interaction between irrigation regime and faba bean cultivars on seed yield (kg/feddan) in 2012/2013 season.

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تأثير الحرمان من الري عند مراحل نمو مختلفة على إنتاجية وجودة بعض أصناف الفول البلدي

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أقيمت تجربتان حقليتان خلال موسمي 2012/2011 و 2013/2012 في محطة التجارب و الأبحاث الزراعية – كلية الزراعة –جامعة القاهرة؛ بهدف دراسة تأثير خمسة معاملات من الري (معاملة الكنترول : ري عادى ؛ المعاملة الثانية : حرمان من الرية الثانية ؛ المعاملة الثالثة : حرمان من الرية الثالثة ؛ المعاملة الرابعة : حرمان من الرية الرابعة؛ المعاملة الخامسة : حرمان من الرية الخامسة) على صفات المحصول و مكوناته وجودة بذور ثلاثة أصناف من الفول البلدي "جيزة 3 و نوبارية 1 و سخا 3 " و أوضحت النتائج المتحصل عليها ما يلي :

1- تأثير الحرمان من بعض الريات :

أظهرت النتائج أن هناك تأثيرا معنويا لمعاملات الري على صفات المحصول و مكوناته في موسمي الدراسة حيث أدى الحرمان من الري عند مراحل النمو المختلفة إلى نقص معنوي في صفات المحصول و مكوناته وزيادة محتوى البذور من البروتين مقارنة بمعاملة الكنترول (ري عادى) خلال موسمي الدراسة . و أظهرت النتائج أن حرمان النباتات من الرية الرابعة أو الخامسة أدى نقص كبير في الطول و عدد الفروع و عدد القرون ووزن القرون للنبات وعدد بذور القرن ووزن الـ100 بذرة ووزن بذور النبات ومحصول البذور و القش والمحصول البيولوجي ودليل الحصاد مقارنة بباقي معاملات الري في كلا من موسمي الدراسة.

2- تأثير الأصناف:

تشير النتائج إلى وجود فروق معنوية بين أصناف الفول البلدي الثلاثة في صفات المحصول ومكوناته ونسبة البروتين عدا صفة عدد القرون للنبات و ووزن قرون النبات وعدد بذور القرن و دليل الحصاد خلال موسمي الدراسة ؛ كما توضح النتائج تفوق الصنف جيزة 3 في جميع الصفات المدروسة يليه الصنف نوبارية 1 وسجلت أقل القيم للصنف سخا 3 في موسمي الدراسة ؛

3- تأثير التفاعل :

كان تأثير التفاعل معنويا على صفة محصول البذور (كجم /الفدان) في موسمي الدراسة ؛ حيث تأثرت الأصناف الثلاثة بالحرمان من الري وكان الصنف جيزة 3 أقل الأصناف تأثرا بالحرمان من الري و يليه الصنف نوبارية 1 و كان أكثر الأصناف حساسية للجفاف هو الصنف سخا 3.