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EFFECT OF SOWING DATES AND IRRIGATION INTERVALS ON GROWTH, YIELD AND SEED QUALITY OF FABA BEAN.

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ABSTRACT

Two Field trials were carried out during 2000/01 and 2001/02 seasons at Agric. Exp. Stat., Fac. Agric., Cairo Univ., to study the effect of irrigation intervals (25, 35 or 45 days) on productivity and seed quality of faba bean sown in three dates (mid October, late October and mid November). The soil texture was Clay loam. The obtained results could be summarized as follows:

The highest values of plant height, number of branches/ plant and straw yield / faddan were obtained with October sowings compared to November. However, sowing on late October gave the highest values of seed yield/faddan, 100 seeds weight, bulk density, protein %, ash %, and hydration after cooking % and stewing %. In addition, sowing on late October gave the lowest percentages of tannin, hulls and fiber. However, the highest values of number of pods, number of seeds and seed yield/plant as well as harvest index were obtained from sowing on mid November followed by sowing on late October as compared with Mid October sowing.

It could be concluded that sowing faba bean on late October or mid November produced seeds with high seed quality compared with mid October sowing.

Concerning irrigation interval effect, the highest values of faba bean straw yield and their attributes was obtained at irrigation interval of 25 or 35 days as compared with 45 days. The highest seed yield per plant, 100 seeds weight and number of seeds per plant as well as seed yield/ faddan were obtained at irrigation interval of 35 days as compared with 25 or 45 days. With increasing irrigation interval up to 45 days, seed protein content statistically increased while fiber content significantly decreased. The highest total carbohydrate percentage and the lowest content of tannin were recorded from irrigation at 35 days compared to irrigation at 45 or 25 days. The highest values of cooking quality traits (bulk density, hydration coefficient after cooking %, total soluble solids % and stewing %) were obtained by irrigation faba bean plants at 35 days interval. In addition, irrigation at 45 days interval resulted in producing seeds characterized by high values of hydration after soaking and minimum values of hulls percentage.

INTRODUCTION

Faba bean, *Vicia faba* L. had three types: the large-seeded beans (var. *major*), intermediate (var. *equina*), and the small, round-oval seeded (var. *minor*). Faba bean is used as human food in some countries and as animal feed, in another countries mainly for animals, poultry… et,. It can be used as a vegetable, green or dried, fresh or canned. It is a common food in the Middle East, Mediterranean region, China and Ethiopia. In Egypt, the most popular dishes of faba bean are called "Medamis" (stewed beans), "Falafel" (deep fried cotyledon paste with some vegetables and spices), "Bissara" (cotyledon paste poured onto plates) and "Nabet" (germinated beans). Large-seeded cultivars are used as vegetable. In India, roasted seeds are eaten like “peanuts". In addition, faba bean has been considered as a folk medicine, it can be used as diuretic, expectorant, or tonic.

Faba bean requires a moderate season for best development. Growing seasons should have little or no excessive heat. Optimum range temperatures for production is 18 - 27°C (Duke, 1981). Sowing date is an important factor, affects the duration of the vegetative and reproductive stages. In Egypt, faba bean sowing dates varied among different locations. At Giza, El-Shaer *et al.* (1987) reported that seed and straw yields per faddan were depressed significantly by delaying sowing date from 27 October to 27 December. El-Murshedy (1996) achieved the greatest seed yield by sowing early on November 7. Losses in yield due to planting on November 27 and December 17 were 29% and 42.5%, respectively. Ben Mohamed (2003) found that sowing on November 5 produced the highest faba bean straw and biological yields/faddan and their attributes compared to sowing later on November25. Mekky *et al.* (2003) obtained the highest values of seed yield/faddan and its attributes from sowing on November 30 as compared with sowing on November 1 or November15. The increase in seed yield/faddan reached 5-8 % and 23-32 % with sowing on 15 and 30 November, respectively as compared with earlier sowing.

In arid regions, water is limiting factor in crop production. However, where the water supply is inadequate in relation to land use, limited irrigation is often practiced to optimize crop production/unit of applied water rather than maximize yield/unit of land. In Egypt, Abdallah (1986) at Upper and Middle Egypt regions found that drought treatments at flowering stage reduced seed yield as compared to normal irrigation or to those subjected to water stress, at pod development, where this treatment behaved similarly as the control in its effect. El-Far (1994) obtained the maximum seed yield per plant, 100-seed weight and seed yield per faddan from supplying 3 irrigations, i.e., at branching, flowering and pod formation. On the other hand, the highest straw yield/faddan was obtained when plants irrigated at all stages of growth (4 irrigations). Other researchers recorded the highest values of straw and seed yields and their attributes with 5-6 irrigations (Teama, 1994; Gendy *et al.*, 1995 and Abdel Hameed, 1996). El-Tawil (2003) obtained the greatest seed and straw yield with irrigation every fifteen days for all different soils compared to irrigation every 30 days. Allam (2005) showed that increasing number of irrigations to three caused significant increases in seed yields and its attributes. Whereas cotyledon / seed percentage was decreased by increasing the number of irrigations

The maximum protein content in faba bean seeds resulted from one irrigation at branching (El-Far, 1994). The protein content in faba bean seeds was increased under drought conditions especially at pod development stage (Abdallah, 1986). On the other hand, Teama (1994) reported that protein content was not affected by irrigation treatments.

In Egypt, to meet increasing human demand for food, many trials had been carried out to increase the total production of faba bean through several practices. Two of the most important factors that may enhance the production potentialities of faba bean are the appropriate irrigation and sowing dates. The present investigation aimed to study the effect of sowing date and irrigation interval on growth, yield and seed quality of faba bean.

MATERIALS AND METHODS

Field experiments were carried out during 2000/01 and 2001/02 seasons at Agric. Exp. Station, Fac. Agric., Cairo Univ., Giza, to study the effect of irrigation intervals (25, 35, or 45 days) on productivity and seed quality of faba bean Giza 843 sown in three dates (mid October, late October and mid November). In both seasons, the soil texture of the experimental site was clay loam.

The experimental design was split plot in randomized complete blocks with four replications. The main plots were allocated to the three irrigation interval. Sowing dates were assigned to sub plots. Each plot was 10 ridges 6 meters long and 60 cm apart. Seeds were sown at 20 cm on both sides of the ridges. After full germination, plant densities were adjusted by thinning the over plants or replanting the absent plants with leaving one plant per hill.

Phosphorous was added after plowing twice before ridging in the form of super phosphate (15.5% P_2O_5) at the rate of 100 kg/faddan (4200m^2) during land preparation.. Weeds were controlled by hoeing three times through the growing season. The following traits were measured:

A. Growth Attributes:

1. Plant height and number of fruiting branches/plant were determined at harvest from ten individual guarded plants from each plot.
2. Straw yield was determined at harvest from plants of the central three ridges of each plot.

B. Seed Yield and Its Attributes:

1. Number of pods/plant, number of seeds/plant, 100 seeds weight and seed yield/plant were determined at harvest from ten individual guarded plants per plant.
2. Ten days after harvesting, biological and seed yield were determined from plants of the three central ridges of each plot and then harvest index was calculated.

C. Chemical Composition:

1. Protein, carbohydrates, ash, and fiber percentage were determined according to the methods described in A.O.A.C. (1990).
2. Tannins percentage was determined using vanillin hydrochloric acid (V-Hcl) method as described by Burn (1971).

D. Physical Properties of Faba Bean Seeds:

1. Bulk density (g/ml): was calculated by dividing 100-seed weight (gm) on 100-seed volume (ml).
2. Hulls percentage was determined by manual removing of the seed coat from 100 seeds using a small sharp knife. The hulls was weighed and calculated as percentage of 100 seeds weight before dehulling .
3. Hydration coefficient after soaking (%): hundred faba bean seeds were weighed before and after soaking in distilled water for 24 hours at room temperature $\pm$ (25 ºC). Hydration coefficient was calculated by dividing weight after soaking on weight before soaking.

E. Cooking Properties:

1. Stewing percentage (seed cook ability): the stewing percentage means the percentage of cooked seeds that exhibited less hardiness through feeling of fingers. It was determined by using autoclave at 121°C and 1 IP/m^2 and oven at 90°C for 18 hr.
2. Hydration coefficient after cooking (HAC): percentage of absorbed water by dry seed sample (10 g) after cooking using glass tube (100cm^3) containing 50 cm^3 in oven for 24 h at 100°C
3. Total soluble solids (TSS %): TSS % is the percentage of total solids after water evaporation of the solution poured into a porcelain pot in an oven at 60ºC overnight relative to initial seed weight.(Shehata *et al*., 1985).

The standard analysis of split plot design as described by Gomez and Gomez, (1984) was applied for individual years. A heterogeneity test was performed before combining the data. When homogeneity among error terms of individual environments was found then the combined analysis of variance was computed. The Duncan multiple range test was used for comparison among means.

RESULTS AND DISCUSSION

1. Effect of Sowing Date:

1.1 Growth Attributes:

Plant height tended to increase in earlier sowing date however, the differences between the tested sowing dates did not reach to the level of affected by sowing dates. The highest values were obtained with October sowings compared to November sowing (Table 1). These results declared the effect of high temperature during the early vegetative growth stage on stimulating plant height and branching. Bakheit *et al.* (2001) and Ben Mohamed (2003) reported that plant height of faba bean significantly decreased by delaying sowing dates.

Table 1: Effect of sowing dates on plant height, branches bean and straw yield of faba bean (combined data over 2000/2001 and 2001/2002 seasons)

Characters	Sowing dates		
	Mid October	**Late October**	**Mid November**
Plant height (cm)	130.6 a	131.1 a	130.3 a
Branches/plant (No.)	2.5 a	2.4 a	1.9 b
Straw yield/faddan* (ton)	8.0 a	7.5 a	3.5 b

*** One faddan =4200m^2**

Means followed by the same letter/s in the same row are not significantly) different (*P>0.05)*.

1. 2. Seed Yield of Fababean and its Attributes:

Highest values of number of pods, number of seeds and seed yield/plant as well as harvest index were obtained from sowing on mid November followed by sowing on late October as compared with early sowing mid October (Table, 2). The previous results may be due to the effect of high

temperature on fertilization and pod development. These results are in agreement with those reported by Bakheit *et al.* (2001) Ben Mohamed (2003) and Mekky *et al.* (2003).

Concerning weight of 100 seeds and seed yield /faddan, sowing on late October realized the highest values compared with earlier (mid October) or later (mid November) sowings (Table, 2). These results are in general agreement with those obtained by El-Murshedy (1996), Hussein *et al.* (2002). However, opposite results were found by Abd El-Rahman *et al.* (1980), Bakheit *et al.* (2001) and Ben Mohamed (2003).

Table 2: Effect of sowing dates on seed yields of faba bean and its attributes (combined data over 2000/01 and 2001/02 seasons)

Characters	Sowing date		
	Mid October	Late October	Mid November
Pods/plant (No.)	5.10 c	7.10 b	7.80 a
Seeds/plant (No.)	12.3 c	16.7 b	21.6 a
100 seeds weight (gm)	88.9 b	91.2 a	79.1 c
Seed yield/plant (gm)	10.9 c	15.2 b	17.6 a
Seed yield/faddan (Kg)	1249 c	1443 a	1372 b
Harvest index (%)	17.9 c	24.9 b	31.4 a

Means followed by the same letter/s in the same row are not significantly different. (*P>0.05*)

1.3. Chemical Composition of Seeds:

Results in Table (3) showed that seeds of faba bean sown on late October contained the highest percentage of protein, and ash and the lowest tannin and fiber percentage compared with seeds of mid October and mid November sowings. Total carbohydrate percentage was not statically affected by sowing date (Table, 3).

Table 3: Effect of sowing date on some chemical composition of faba bean seeds (combined data over 2000/01 and 2001/02 seasons)

Characters	Sowing date		
	Mid Oct.	Late Oct.	Mid Nov.
Protein (%)	27.1 b	27.3 a	26.6 c
Total carbohydrate (%)	52.1 a	52.5 a	52.2 a
Ash (%)	3.27 c	3.48 a	3.33 b
Tannin (mg/100 gm)	547 b	474 c	596 a
Fiber (%)	7.94 b	7.38 c	8.18 a

Means followed by the same letter/s in the same row are not significantly) different. (*P>0.05).*

The low content of tannin and the high content of protein are indicators for better faba bean seed quality. El-Murabaa *et al*. (1987) found that early or late sowing reduced seed protein content. On the other hand, Abd El-Rahman *et al.* (1980) found that sowing dates did not affect protein and carbohydrate contents.

1.4. Physical and Cooking Properties:

The highest values of bulk density, hydration coefficient after cooking %, and stewing percentages as well as the lowest hulls % were recorded with sowing on late October compared with sowing on mid October and mid November (Table 4).

Table 4: Effect of sowing dates on some physical and cooking properties of faba bean seeds(combined data over 2000/01 and 2001/02 seasons).

Characters	Sowing date		
	Mid October	late October	Mid November
Bulk density (gm/cm^3)	1.34 a	1.33 a	1.31 b
Hydration after soaking (%)	121 b	119 c	123 a
Hulls (%)	11.4 b	11.2 c	11.9 a
Hydration after cooking (%)	176 b	180 a	177 b
Total soluble solids (%)	12.7 c	13.1 b	14.9 a
Stewing (%)	89.8 ab	93.1 a	87.5 b

Means followed by the same letter/s in the same row are not significantly different. (*P>0.05*)

Total soluble solids and hydration after soaking percentages significantly increased in seeds of mid November sowing. It could be concluded that sowing faba bean on late October or mid November produced seeds with high seed quality compared with mid October sowing.

2. Effect of Irrigation Intervals:

2.1. Growth Attributes:

Irrigation interval of 25 days followed by 35 days significantly increased straw yield / faddan as a result for increasing plant height and number of branches /plant compared with irrigation interval of 45 days. The differences in number of branches /plant did not reach the level of significance. This could be explained by the assumption that water content was not a stress for this character. These results are in agreement with those obtained by EL-Zeiny *et al.* (1990), Gendy *et al.* (1995) and Abd El-Hameed (1996).

Table 5: Effect of irrigation intervals on growth attributes of faba bean (combined data over 2000/2001 and 2001/2002 seasons).

Characters	Irrigation interval (days)		
	25	35	45
Plant height (cm)	134.0 a	131.0 ab	127.0 b
Branches/plant (No.)	2.36 a	2.19 a	2.23 a
Straw yield/faddan (ton)	6.80 a	6.42 a	5.79 b

Means followed by the same letter/s in the same row are not significantly different (*P>0.05*).

2.2. Yield and their Attributes:

Results in Table (6) showed that the effect of irrigation interval on seed yield, number of seeds and number of pods per plant, 100 seeds weight and seed yield per faddan was significant. The highest faba bean seed yield/

faddan and per plant as well as its attributes (100 seeds weight and number of seeds per plant) were obtained with irrigation interval of 35 days as compared with 25 or 45 days. This could be explained by the enhancing effect of more water, nutrients, metabolic materials translocation and accumulation of dry matter to faba bean seeds.

The highest harvest index (25.8%) was obtained when plants irrigated at 45 days compared to 25 or 35 days. This may be due to the reduction in straw yield. These results are in harmony with those obtained by Ebaid (1990), El- Zeiny *et al.* (1990), El-Far (1994), Gendy *et al.*(1995), Abdel Hameed (1996), El-Tawil (2003) and Allam (2005).

Table 6: Effect of irrigation intervals on yield and its attributes of faba bean (combined data over 2000/01 and 2001/02 seasons).

Characters	Irrigation interval (days)		
	25	35	45
Pods/plant (no.)	7.05 a	6.73 ab	6.08 b
100 seeds weight (gm)	86.3 b	88.0 a	84.9 c
Seeds/plants (no)	17.2 a	17.3 a	16.2 b
Seed yield/plant (gm)	14.8 a	14.7 a	14.2 a
Seed yield/faddan (Kg)	1265 c	1440 a	1359 b
Harvest index (%)	23.5 b	25.0 ab	25.8 a

Means followed by the same letter/s in the same row are not significantly different. (*P>0.05*)

2.3. Seed Chemical Composition:

Significant differences in chemical composition of faba beans seeds; protein, total carbohydrates, tannin and fiber were noticed among irrigation intervals, however, ash percentage was not statistically affected (Table 7).

Table 7: Effect of irrigation intervals on seed chemical composition of faba bean (combined data over 2000/2001 and 2001/2002 seasons)

Characters	Irrigation interval (days)		
	25	35	45
Protein (%)	26.4 c	27.1 b	27.5 a
Total carbohydrate (%)	52.6 a	52.9 a	51.3 b
Ash (%)	3.35 a	3.34 a	3.38 a
Tannin (mg/100gm)	568 a	494 c	555 b
Fiber (%)	8.13 a	7.83 b	7.53 c

Means followed by the same letter/s in the same row are not significantly different (*P>0.05*).

With increasing irrigation interval up to 45 days, protein content of seeds significantly increased, however, fiber content significantly decreased. Concerning total carbohydrate, the highest values were recorded in seeds of plants irrigated every 35 or 25 days compared with irrigation every 45 days (Table 7). The lowest content of tannin (494 mg) was achieved with irrigation every 35 days compared to irrigation every 45 days (555 mg) or irrigation every 25 days (568mg). Differences among the irrigation treatments in ash content were not significant. Similar trend were obtained by Abd El-Rahman

et al. (1980), Abdallah (1986) and El-Far (1994) who found that drought increased protein percentage. On the other hand, Amer *et al*. (1992) and Teama (1994) found that irrigation had no effect on protein percentage.

2.4. Physical and Cooking Properties:

As shown in Table (8) there is significant effect of irrigation interval on physical characters; i.e. bulk density, hydration coefficient after soaking %, hulls %, hydration coefficient after cooking %, total soluble solids % and stewing %.

Irrigation every 35 days gave the highest values of bulk density, hydration coefficient after cooking %, T.S.S. % and stewing % compared to irrigation at 25 or 45 days interval. Irrigation at 45 days gave the highest values of hydration coefficient after soaking %, hulls % and dehulled seeds % compared to irrigation at 25 or 35 days.

From the previous results, it is evident that the best cooking quality (bulk density, hydration coefficient after cooking, total soluble solids and stewing %) were obtained by irrigation faba bean plants every 35 days. In addition, irrigation every 45 days resulted in seeds characterized by high values of hydration after soaking and minimum values of hulls percentage (Table, 8). Farah *et al.* (1990) found that hydration coefficient was not affected by irrigation. Allam (2005) found that cotyledon / seed percentage was decreased by increasing the number of irrigations.

Table 8: Effect of irrigation intervals on some physical and cooking properties of faba bean (combined data over two seasons).

Characters	Irrigation interval (days)		
	25	35	45
Bulk density (gm/cm^3)	1.32 b	1.33 a	1.33 a
Hydration after soaking (%)	121 b	120 c	122 a
Hulls (%)	11.4 c	11.5 b	11.6 a
Hydration after cooking (%)	175 c	180 a	177 b
Total soluble solids (%)	13.2 b	14.3 a	13.2 b
Stewing (%)	89.5 ab	92.9 a	87.9 b

Means followed by the same letter/s in the same row are not significantly different (*P>0.05*).

3. Interaction Effects:

3.1 Growth Attributes.

Plants sown either in mid or end of October with irrigation at 25, 35 or 45 days interval significantly gave the greatest number of branches and straw yield. However, the lowest values were obtained from sowing in mid November with all irrigation intervals. The tallest plants at harvest were that of sowing at late October with irrigation every 25 days however, the shortest ones were that sown in late October or mid November and irrigated every 45 days (Table 9).

Table 9: Effect of interaction between sowing dates and irrigation interval on some traits of faba bean (combined data over 2000/01 and 2001/ 02 seasons).

Characters	15 October			31 October			15 November		
	25 days	35 days	45 days	25 days	35 days	45 days	25 days	35 days	45 days
Growth traits									
Plant height at harvest (cm)	129.0 bc	130.9 b	131.9 ab	139.1 a	131.6 ab	122.6 c	133.8 ab	130.6 b	126.5 bc
Number of branches/plant	2.4 ab	2.6 a	2.3 ab	2.5 ab	2.3 ab	2.4 ab	2.2 bc	1.6 d	2.0 c
Straw yield /faddan (ton)	7.70 a	7.74 a	8.65 a	8.41 a	8.71 a	6.38 ab	4.30 b	2.79 b	2.35 b
Seed yield traits									
Number of pods/plant	5.8 cd	5.0 de	4.4 e	7.3 ab	7.3 ab	6.4 bc	8.1 a	7.9 a	7.5 ab
Number of seeds/plant	13.4 d	13.4 d	10.4 e	17.3 bc	15.7 c	16.6 bc	21.1 ab	23.8 a	21.5 ab
100-Seed weight (gm)	89.9 c	87.6 e	89.3 d	88.9 d	91.2 b	93.5 a	79.9 g	75.9 h	81.3 f
Seed yield/plant (gm)	11.9 d	11.7 d	9.26 e	15.4 bc	14.3 c	15.8 abc	17.1 ab	18.1 a	17.5 ab
Seed yield/faddan* (Kg)	1218 de	1238 de	1293 cde	1186 e	1643a	1507 ab	1392 bcd	1443 bc	1279cde
Harvest index (%)	17.3 e	17.8 de	18.6 de	23.9 c	21.5 cd	29.2 b	29.1 b	35.7 a	29.5 b
Seed chemical composition									
Protein (%)	26.3 h	27.3 d	27.8 b	26.5 g	27.4 c	28.0 a	26.3 h	26.7 f	26.9 e
Total carbohydrate (%)	52.9 bc	53.7 ab	49.7 e	52.3 c	51.3 d	54.0 a	52.5 c	53.6 ab	50.4 de
Tannin (mg/100gm)	67.5 a	402 g	564 c	440.f	474 e	507 d	589 b	605 b	595 b
Ash (%)	3.25 e	3.26 e	3.30 de	3.58 a	3.39 c	3.48 b	3.24 e	3.39 c	3.36 cd
Fiber (%)	8.06 c	7.88 d	7.89 d	7.74 e	7.34 g	7.06 h	8.60 a	8.27 a	7.66 f
Physical and cooking properties									
Bulk density (gm/cm^3)	1.35 a	1.33 b	1.33 bc	1.30 e	1.35 a	1.35 a	1.32 cd	1.31 d	1.31 de
Hydration after soaking (%)	120.5 f	117.7 h	127.6 a	122.2 e	119.6 g	115.7 i	122.9 d	125.4 b	123.2 c
Hulls (%)	11.4 d	11.2 e	11.8 b	11.1 f	11.2 e	11.4 d	11.7 c	12.2 a	11.8 b
Hydration after cooking (%)	174.1 d	179.7 b	177.0 c	178.6 bc	183.1 a	178.2 bc	173.7 d	179.6 b	177.7 bc
Total soluble solids (%)	13.0 cd	13.3 cd	11.7 e	2.9 cd	13.6 c	12.7 d	13.6 c	16.1 a	15.1 b
Stewing (%)	88.8 ab	93.1 ab	87.5 ab	93.5 ab	95.0 a	90.6 ab	86.3 b	90.6 ab	85.6 b

***one faddan = 4220 m^2**

Means followed by the same letter/s in the same row are not significantly (*P>0.05*) different.

3.2. Yield and their Attributes:

As shown in Table (9) sowing on mid November with all irrigation intervals was superior in achieving the highest values of pods number, number of seeds and seed yield/ plant as well as harvest index. However, the greatest seed yield per faddan was obtained from sowing on mid or late October and irrigation every 35 or 45 days. 100 seeds weight was highest with sowing on end of October and irrigation every 45 days

3.3. Seed Chemical Composition:

The sowing in late October with irrigation every 45 days produced seeds with higher protein (28 %), and higher total carbohydrate (54 %) and lower fiber content (7.06 %). Whereas, sowing in end October with irrigation every 25 days gave the highest ash percentage (3.58 %). On the other hand, sowing on late October and irrigation every 25 days produced seeds with lower tannin content as compared with other interactions (Table, 9).

3.4. Physical and Cooking Properties:

Significant differences were registered in bulk density as affected by the interaction between sowing date and irrigation interval. The mid planting date (late October) with irrigating every 35 or 45 days produced the highest values of bulk density. Hydration coefficient after soaking was maximized when plants were sown in mid October and irrigated every 45 days. Whereas,

sowing on late October produced seeds characterized by the lowest hydration coefficient after soaking when irrigated every 45 days interval.

Hulls percentage in faba bean seeds was significantly decreased when faba bean was sown on end of October and irrigation every 25 days. Data clearly, indicated that hydration coefficient after cooking and stewing percentage of faba bean were significantly higher when faba bean was sown at end October with irrigation every 35 day interval compared to the other interactions. However, delay of sowing faba bean to mid November with the same irrigation interval was superior in total soluble solids (Table, 9).

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تأثير ميعاد الزراعة والفتره بين الريات على نمو ومحصول و جودة بذور الفول البلدى

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أجريت هذه الدراسة بهدف دراسة تأثير فترات الرى على نمو ومحصول و جودة بذور الفول البلدي المنزرع تحت مواعيد زراعة متباينة و فترات الرى التى تم دراستها هى الرى كل ٢٥ أو ٣٥ أو ٤٥ يوم و الثلاث مواعيد زراعة التى تم اختيارها هى ١٥ أكتوبر، ٣١ أكتوبر، ١٥ نوفمبر، وقد تبين من النتائج ما يلى :

أدت الزراعة فى ١٥ أكتوبر إلى زيادة معنوية في ارتفاع النبات وعدد الأفرع و محصول التبن . وأدت الزراعة في ٣١ أكتوبر و١٥ نوفمبر إلى إنتاج أعلى محصول بذور للفدان ومكوناته، ودليل الحصاد، وأعلى محتوى من البروتين و الرماد في البذور، وأقل محتوى من التانين والألياف، وزيادة الكثافة الكلية للبذور، وزيادة معامل التحلل المائي بعد الطهي ، وزيادة نسبة الطهي. و وزيادة معامل التحلل المائي بعد النقع ، وزيادة نسبة القشرة ، وزيادة المواد الصلبة الكلية الذائبة في بذور الفول البلدي .

أدى الري كل ٢٥ أو ٣٥ يوم الى زيادة حقيقية فى محصول التبن نتيجة لزيادة ارتفاع النبات وعدد الأفرع للنبات. وقد أدى الرى كل ٣٥ يوم إلى الحصول على أكبر محصول بذور للفدان كنتيجة لزيادة مكونات المحصول المختلفة.

تحسنت صفات جودة البذور متمثلة فى زيادة محتوى البذور من البروتين وانخفاض نسبة الألياف والتانينات فى البذور، وزيادة الكثافة الكلية للبذور، و معامل التحلل المائى بعد النقع، ونسبة القشرة، وأعلى قيم لصفات معامل التحلل المائى بعد الطهي، نسبة المواد الصلبة الكلية الذائبة، ونسبة الطهي نتيجة الرى كل ٣٥-٤٥ يوم مقارنة بالرى كل ٢٥ يوم.

تحت ظروف هذه الدراسة (الأراضى الطينية الطميية بمحافظة الجيزة) يمكن الحصول على أعلى محصول بذور وأعلى جودة فى البذور فى محصول الفول البلدي صنف جيزة ٨٤٣ من خلال الزراعة من آخر أكتوبر حتى منتصف نوفمبر مع الرى كل ٣٥ يوم.