A FIELD EVALUATION OF THE EFFECT OF WATER DEFICIT ON BARELY

HUSSEIN, M.M.[1]; OKASHA E.M. [1]; SALWA E. SOLIMAN[2] AND ABOEL-LIEL A.A.[1]

1. *Water Relations and Field Irrigation Dept., National Research Centre, Dokki, Cairo, Egypt.*
2. *Agron. Dept., Fac. of Agric. Cairo Univ. Giza, Egypt.*

Keywords: Barley- Cultivars-Drought-Growth- Yield-Water use efficiency.

Abstract

Two field experiments were conducted in the Experimental Farm, National Research Centre, Shalakan, Kalubia Governorate, Egypt during 2004/2005 and 2005/2006 seasons. Three barley cultivars (Giza 124,Giza 125 and Giza 129) were tested under the effect of three water. deficits; no deficit (1500 m^3/fed, control), skipping one irrigation at elongation stage, 1200 m^3/fed, and skipping one irrigation at dough stage, 1200 m^3/fed. A split plot design was used A combined analysis was performed. Ten traits were considered .

Significancy was obtained among cultivars on all morphological traits. The superiority among cultivars was in favor to Giza 125 followed by Giza 124, in respect of yield aspects too. Only straw yield/fed. and biological yield/fed. showed significant responses with Giza 124. Such cultivar surpassed the other ones with respect to straw yield/fed. Meanwhil~, Giza 129 was the superior with both grain to straw and grain to biological yields ratios. It was noticed the most aspects were significantly affected by water deficit treatments. No significant differences were detected on grain / biological yields ratio. Control achieved the highest values with

all aspects. Skipping one irrigation at elongation stage showed less detrimental effect as compared to skipping at dough stage .

Interaction significantly affected only, No. of leaves/plant, No. of spikes/plant, grain yield/fed. and grain to straw ratio. The combination (Control x Giza 125) produced the highest significant values on grain yield/fed (2.63 ton), while (Control x Giza 124) gave the corresponding values on No. of leaves/ plant (26.0) and No of spikes/plant (5.7) .

Water use efficiency (WUE) varied according to irrigation treatments and tested varieties. However, the highest WUE was recorded when skipping one .irrigation at elongation stage (1.86 kg/m^3). The corresponding highest value among cultivars, i. e. 1.86 kg/m^3 was recorded on Giza 125. The interaction between the two previous factors maintained the highest WUE In the study, i. e. 2.16 kg/m^3 .

INTRODUCTION

In Egypt, barley (*Hordeum vulgare* L.) occupies the fifth position among cereal crops, in terms of production and area . Its importance lies in human nutrition, medicine purposes, animal feeding and investment in the new reclaimed areas, where the problems ef salinity, water shortage and lack of nutrients are common. Water deficit is frequently the primary factor limiting crop production under arid and semi-arid conditions. It is in full agreement that barley losses in yield from water stress probably exceed the losses from all other causes.

In Egypt, several new cultivars were released. Each cultivar suits certain environment. Plant height varied according cultivar, however Giza 124 is charactized as a tall- stem over Giza 125 and Giza129 cultivars, (Omar, 1993). In some studies, Giza 124 was considered the superior cultivar by El Hindi et al (1998), in plant height and grain yield fed. In different researshes, Noaman et al

(1997) as well as El Kholy and El Bawab (1998) reported the superiority of Giza 125 cv in grain yield. Also, Ouda et al (2007) found that grain yield was in favor to Giza 129.

Generally, barley cultivars show a wide variation in yield and yield components. In addition, Jones and Kirby (1977) concluded that genotypes which produce few tillers should be able to achieve relatively high yield in drought conditions. Barley is considered, in many cases, as a hard affectable plant species. Hence, the environmental effects are less important than genotype for different variable, (Oscarsson et al., 1998). Genotypes commonly vary in growth and yield. In this respect, Acevedo (1985) stated that variation among barley; genotypes could be shown in water flow, growth vigor, plant height and grain yield. Varietal differences in growth and yield of barley varieties under water deficit were reported by Li, et al (2006) and Oukarroum, et al (2007).

Literature concerned irrigation of barley are too voluminized. The main conclusion that could be obtained lies in the positive effect of irrigation at all levels on barley growth and yield. Many researchers summarize such relation in one sentence: Abundant watering means good growth and yield (positive relationship). Irrigation treatments could be expressed at some forms;. water stress or moisture stress (Mansour, 1992), supplementary irrigation (Mourad et al, 1993), Depletion of soil water (EI- Hawary, 2000) and number of irrigations (Assey et al, 1990) .. ect. The effect of watering on grain yield passes through growth and yield conttributors. Possitive effects of sufficient irrigation on some aspects were reported by many authors, of them Saadia et al (1983) on spike length, Navolotskii and Lyashok (1984) on No. of tillers/plant, Salam et al (1991) on No. of spikes/plant, Abo EI-Enin et al (1998) on straw yield, EI-Bawab (2003) on plant height and Abd EI-Iateef (2004) on grain yield/fed .

Interaction between irrigation treatments and cultivars is unquestionable phenomenon. Such appearance was observed by Assey et al, (1990) on straw yield. El Sayed et al (1995) generalized the success of such interaction on some aspects. Abd EI Lateef (2004) found such interaction on plant height, No. of tillers plant and spike length .

Water use efficiency (WUE) studies showed that the less water use (WU) under water deficit led to increase its values under the considerable yield depression, where the reverse was true under the severe drought (Kang et al, 2002, Katerji et aI, 2008 and Hussein et al, 2008). On the other hand, some others reported no difference in this criterion between varieties or its interaction with water regime, (Tambussi et al, 2005 and AI-Sabbagh et al, 2005) .

The undertaken study aimed to investigate the response of some barley cultivars to water deficit in some growth stages. The final goal is to give a proposal for a maximal grain yield with fit use of watering .

MATERIALS AND METHODS

Two field experiments on barley (*Hordeum vulgare* L.) were conducted in the Experimental Farm of the National Research Centre Shalakan, Kalubia Governorate, Egypt during 2004/2005 and 2005/2006 seasons, to study the performance of some barley cultivars under water deficit. Physical and chemical properties of the site soil are given in Table (1) .

Table (1): Physical and chemical properties of soil, at Shalakan, kalubia, average over the two seasons .

Physical properties					
Depth (cm)	Coarse sand %	Fine sand %	Silt %	Clay %	Texture
0-10	0.65	32.35	39.50	27.50	Loamy
10-20	0.75	26.25	45.24	27.56	Clay-Io.amy
20-30	0.75	31.25	33.15	34.58	Clay-loamy

Chemical properties										
Depth (cm)	pH	$ECdsm^{-1}$	Soluble cations (meq/L)				Soluble anions (meq/L)			
			Ca^{++}	Mg^{++}	Na^{++}	K^{+}	CO_3^{--}	HCO_3^{-}	Cl^{-}	SO_4^{--}
0-10	7.8	0.8	3.5	3.01	3.01	0.14	Nil	4.03	3.1	2.52
10-20	7.8	0.5	2.5	1.96	1.96	0.10	Nil	3.10	1.5	0.96
20-30	7.8	0.5	2.5	1.62	1.62	0.09	Nil	3.10	1.3	1.61

Treatments :

A. Cultivars :

Giza-124, Giza125, both hulled and Giza 129, Hull-less cultivars were seeded. In both seasons, every experiment included the possible nine combination treatments. The experimental design was split plot in three replicates. Water treatments occupied the main plots, meanwhile the sub ones were devoted to cultivars. Plot area was 10.5 m^2 (3 x 3.5) m. Barley was sown in the 1st of December, by 50.0 kg/fed of commercial seeds. Calcium super phosphate (15.5 % P_2O_5) and potassium sulfate (48.5 % K_2O) were broadcasted before sowing at 200 and 100 Kg/fed, respectively. Ammonium sulfate (20.5 % N) at 200 Kg/fed was applied in two equal portions; the 1st, 21 days after sowing and the other two weeks latter. Harvest was on April 15th . The other cultural practices were done as usual .

B- Water deficit :

1. No deficit (Nod), Regular irrigation, (control).
2. Skipping one irrigation in elongation stage (SIES).
3. Skipping one irrigation in dough stage (SIDS).

Watering regime declares that, the first treatment (Nod) consumed 1500 m^3/fed (five irrigations each of 300 m^3/fed). Meanwhile, each of the second and third ones used only 1200 ID m^3/fed (four irrigations each of 300 m3/fed). Water discharge was adjusted by using triangular weirs CV notch). The height of flowing water was fixed at 30.0 cm. Water discharge was counted according to the equation of Hansen et al (1980) as follows :

$Q = 0.0138 \times h^{2.5} \times 3.6$ where :

Q= Water discharge (m^3/hr).

0.0138 and 3.6 == Constant values, where (3.6) was added for obtaining (Q) in (m3/hr).

h = Water height or pressure head, cm .

Studied topics :

I - Aspects :

At the end of each season, five traits were studied, on a random sample of ten plants from the inner area of the sub plots. In addition, yield aspects were determined on the base of plot area, then yields / fed. were calculated. Studied aspects were as follows :

a-Morphological aspects:	**b- Yield aspects:-**
1. Plant height, cm .	1. Grain yield / fed.
2. No. of leaves/ plant .	2. Straw yield / fed .
3. No. of tillers/plant.	3. Biological yield, t/fed, (Bio Y) as the summation of grain + straw yields.
4. No. of spikes/plant.	4. Grain to straw yields ratio.
5. Spike length, cm.	5. Grain to biological yields ratio .

II- Water relationships :

Water use efficiency (W.U.E. kg/m^3) was estimated according to Vites (1965) as follows - :

$$W.U.E = \frac{\text{(Grain yield, Kg/fed).}}{\text{WCU, m}^3\text{/fed}}$$

Data were subjected to the proper statistical analysis. Means were compared by L.S.D test at 0.05 level of significance as described by. Gomez and Gomez (1984) .

RESULTS AND DISCUSSIONS

Results herein are presented as combined data for the two seasons. However, Bartlett's test for homogeneity was used and did not declare significant difference between the two mean squares of error, of the two seasons.

In the present research, year effect and its different interactions are not involved, to be discussed in another study .

I - Aspects :

A- Cultivar effect :

a- Morphological aspects :

Table (2) indicates that significant differences were obtained on all studied traits. In all cases, Giza 124 and Giza125 cvs, did not significantly vary to each other. Both cultivars significailtly exceeded Giza 129. In addition, Giza 124 cultivar produced barley plants of 103.68 cm. which was taller than those of Giza 125, i.e. 99.36 cm. These results mean that most morphological products were in favor to Giza 124 cv. Meanwhile, Giza 129 occuppied the lesser position. Significant differences in growth traits were detected by Noaman, et al (1990), as well as Ashour and Selim (1994), El-Agroudy and. Mohamed (1994) and Zhou, et al

(2003). Moreover, Chen et al (2008) reported that such differences were in different with plant height, number of leaves and shoots according to varieties .

b- Yield aspects :

Table (2) shows that significant effects were shown with all yield traits. Obviously, the cultivar Giza 124 produced the sounded straw yield /fed, i.e. 2.011 ton, surpassing the two other cultivars. Such superior straw yield seemed to be a nature result of some· positive effects which were turn in straw yield, including all morphological aspects. For biological yield, Giza 124 significantly out yielded, the other two cultivars, producing 4.19 t/fed. With such trait, Giza 129 cv. gave the lowest biological yield, i.e. 2.79 t/fed. Such different performances' by cultivars may be attributed to their different genotype. The greatest grain yield/fed i. e. 2.40/ ton was the product of' Giza 125, where Giza 124 followed it (2.18 t/fed). The cultivar Giza 129 yielded the poorest one, i. e. 2.02 t/fed. It seemed that Giza l25 motphological the positive effects which were previously mentioned on all morphological traits. Sharaan and Abd EI-Samei (2000) obtained similar results. Alberta (2007) recorded that barley cultivars differed in their growth as well as yield. Ouda et al (2007) indicated that Giza 125 showed the highest grain yield, however, Giza 129 gave the highest straw and biological yields. Skribanek and Tomcsanyi (2008) recorded differences among varieties in yield which may be attributed to growth characters .

Table (2): Morphological and yield aspects as affected by cultivars, combined data .

Varieties / Aspects	Giza 124	Giza 125	Giza 129	LSD a10.05
a- Morphological				
Plant heighl cm.	103.68 a	99.36 a	75.68 b	5.66
No. of leaves/plant	24.07 a	23.77 a	15.57 b	1.32
No. of tillers/plant	4.58 a	4.48 a	4.07 b	0.25
No. of soikes/plant	5.00 a	4.80 a	4.39 b	0.28
Spike length, cm.	15.23 a	15.47 a	12.40 b	0.86
b-yield				
Grain/fed, ton.	2.18 b	2.40 a	2.02 c	0.13
Straw/fed, ton	2.01	0.89 b	0.76 c	0.08
Bioloitical/fed, ton.	4.19 a	3.29 b	2.79 c	0.21
Grain/straw yield ratio	1.084 b	2.72 a	2.69 a	0.14
Grainlbiololiical vield ratio	0.52 b	0.72 a	0.73 a	0.04

B- Water Deficit effect :

a- Morphological aspects :

Table (3) declates significant differences on all studied traits. It is obvious that skipping one irrigation either in elongation or dough stage significantly reduced all measurements. In addition, skipping one irrigation during elongation stage showed lesser bad effect on most traits. However the differences between such stage and dough one. were significant with respect to plant height and No. of leaves/plant. Generally, these findings assure that complete irrigation (control) could produce taller plants (99.01 cm.), No. of leaves/plant (23.5), No. of tillers/plant (4.86), No. of spikes/plant (5.23) and higher spike length (15.6 cm.). Such results could be accepted, however sufficient water allows plant cell to good' division, expansion, and elongation producing taller plants. Such tall plants allow greater number of leaves and tillers/plant. The latter component is the main maker of No. of spikes/plaht. No doubt, these two latter characters are in close positive correlation. Baligar and Duncan (1999) reported the negative effect of individual grain weight. Ultimatly Qureshi and Neibling (2009) found that water cut off in the soft dough stage produced the highest grain yield of barley, while water cut off-before or after soft dough stage significantly reduced the grain yield .

Drought on growth of barley plants. EI-Kholy, et al (2005) recorded depression in plant height, number of . leaves/plant, number of spikes/plant, and spike length of barley plants. Neumann (2008) mentioned that the first plant-stress symptom induced by drought is often a rapid inhibition of shooting

b- Yield aspects :

Water treatments were significantly different with all traits except grainlbiological yield ratio, (Table, 3). With respect to the three former traits, in the table, it was quietly clear that complete irrigation promoted their three products, as compared to skipping irrigàtion in both stages. No significant effect was detected when comparing straw yields of skipping irrigation in elongation or dough stage. The highest yields were 2.390, 1.40, and 3.79 tlfed for grain yield, straw yield and biological yield, respectively. With respect to the remainder two traits, it was observed that skipping irrigation at elongation stage gave the highest significant values of grain/straw yield ratio. The same trend was observed in grain/biological yield ratio, in spite of the absence of significance .

It seemed that the enhancing effect of enough watering on the previously mentioned morphological traits was turn in the three traits of yield. In addition, negative effect of skipping irrigation was extended to cover yield traits too. The present results confirm the findings of some authors, of them; EI-Seidy and

Khattab (2000) who pointed out that the reduction in grain yield/plant could be attributed to incomplete development of some grains in spike due to the lack of water in the soil. In addition, Martyniak (2001) revealed that drought stress reduced grains yield by reducing the number of tillers, spikes and grains per plant and

Table (3): Morphological and yield aspects as affected by water deficit in some growth stags, combined data .

Aspects \ Deficit stage	Nod. (Control)	SIES Elongation	SIDS Dough	LSD at 0.05
a- Morphological				
Plant height, cm.	99.01 a	93.01 b	86.69 c	3.420
No. of leaves/plant.	23.50 a	21.33 b	18.57 c	0.633
No. of tillers/plant	4.86 a	4.13 b	4.13 b	0.176
No. of spikes/plant	5.23 a	4.54 b	4.41 b	0.207
Spike length, cm.	15.60 a	13.73 b	13.77 b	0.528
b- yield				
Grain/fed,ton.	2.39 a	2.23 b	1.98 c	0.08
Straw/fed, ton.	1.40 a	1.16 b	1.11 b	0.03
Biological/fed,ton.	3.79 a	3.39 b	3.09 b	0.16
Grain/straw yield ratio	1.99 c	2.29 a	2.21 b	0.01
Grain/biological yield ratio	0.64	0.67	0.66	N.S.

Nod. = no deficit SIES = skipping one irrigation in elongation stage = SIES, skipping irrigation in dough stage = SIDS

C - Interaction effect :

a- Morpbological aspects :

Table (4) shows that most morphological aspects were insignificantly affected. However, only No. of leaves/plant and No. of spikes/plant showed significant response. It is clear that plant height, No. of tillers/plant and spike length insignificantly varied' among cultivars. within the three watering treatments. This indicates that most studied cultivars did not succeed to interact with the studied three watering levels. Between the two significant responded traits, the combination of the controlx Giza 124 or Giza 125, without significant differences between them, produced the pronounced values. In addition, the combination of Giza 124 with the other watering levels produced relatively high values with No. of leaves/plant and No. of spikes/plant. The combinations of Giza 129 revealed poorest values. with the three watering levels. Generally, such results draw the attention that good morphological aspects could be available by combinations of Giza 124 or Giza 125 with somewhat wide watering deficit. Similar results were mentioned, by El-Siedy and Khattab (2000), Li, et al (2006), Oukarroum et al (2007), Skribanek and Tomcsanyi (2008). The former authors found significant effect of the interaction genotype x irrigation Efeoglu, et al (2009) revealed that growth of all cultivars was retarded under drought stress conditions .

b - Yield aspects :

Table (4) illustrates that only grain yield / fed and grain yield / straw yie.ld ratio were significantly affected by interaction combination. It was obtained that the combination (NodxGiza 125) yielded the highest values of grain yield (2.649 tlfed), meanwhile the combination of Giza 125 cultivar with SIES gave the pronounced grain yield/straw yield ratio (3.208). This indicates that Giza 125 cv may succeeded to interact with both control and skipping one irrigation at elongation stage. The combination (SIDSxGiza 129) gave the highest ratio between grain and stJ:'aw yield (3.174). Such greater value was calculated depending upon the lower value of straw yield (0.638 t / fed) in the denominator of the ratio. These results are in line with those reported by El-Kholy, et al (2005), Ouda et al (2007),. and Skribanek and Tomcsanyi (2008). The middle authors found that six barley cultivars showed reductions in grain yield as a result of skipping one irrigation at different growth stages .

Table (4): Morphological and yield aspects as affected by interaction treatments, combined data .

a- Morphological aspects.

Water deficit	Cultivars	Plant Height (cm)	No. of Leaves leaves/ Plant	No.of tillers/ Plant	No.of spikes/plant	Spike Length (cm)
Nod. control	Giza 124	110.00	28.00a	5.03	5.33 a	16.20
	Giza 125	104.00	26.00 ab	5.03	5.70 a	16.30
	Giza 129	83.03	16.50 e	4.50	4.67 bc	14.30
SIES	Giza 124	102.00	22.50 c	4.20	4.83 b	14.70
	Giza 125	103.03	25.30 b	4.20	4.50 bc	14.80
	Giza 129	74.00	16.20 ef	4.00	4.30 c	11.70
SIDS	Giza 124	99.03	21.70 cd	4.50	4.83 b	14.80
	Giza 125	91.03	20.0 d	4.20	4.20 c	15.30
	Giza 129	70.00	14.0	3.70	4.20 c	11.20
LSD at 0.05		N.S.	2.29	N.S.	0.487	N.S.

b- yield aspects .

Water deficit	Cultivars	Grain yield T/fed	Straw yield T/fed	Bio. Y T/fed	Grain/straw ratio	Grain/ Bio ratio
Nod. control	Giza 124	2.32 b	2.24	4.56	1.04 c	0.51
	Giza 125	2.65 a	1.05	3.69	2.54 b	0.72
	Giza 129	2.20 bc	0.91	3.11	2.41 b	0.72
SIES	Giza 124	2.25 bc	1.92	4.17	1.17 c	0.54
	Giza 125	2.60 a	0.81	3.40	3.21 a	0.76
	Giza 129	1.85 d	0.74	2.59	2.49 b	0.71
SIDS	Giza 124	1.95 d	1.87	3.83	1.04 c	0.51
	Giza 125	1.97 d	0.82	2.78	2.41 b	0.71
	Giza 129	2.03 cd	0.64	2.66	3.17 a	0.76
LSD at 0.05		0.23	N.S.	N.S.	0.25	N.S.

II- Water relationships :

Water use efficiency (W.U.E.)

A - Water Deficit effect :

Generally WUE could be greater by a higher numerator (grain yield) or a lower denominator (total applied water) or by both . The opposite. is quite true. Water use efficiency values as estimated by Vites (1965) equation were different according to watering treatments. However, the highest W.U.E., i. e. 1.86 kg/m^3 was detected with SIES treatment. This means that pronounced W.U.E. could be achieved by skipping one irrigation in plant elongation stage. In addition, the lowest value of WUE, i. e. 1.60 kg/m^3 was observed with control, which could be mainly attributed to the higher quantity of water applied, i. e. 1500m^3 /fed. Water use efficiency with SIDS, i.e. 1.65 kg/m^3 was in between for the same reasons previously mentioned. AI-Sabbagh, et al (2005), on sunflower indicated that water use efficiency values increased with infrequent irrigation intervals .

B - Cultivar effect :

Table (2) shows that Giza 125 cv yielded the greatest grain yield/fed, ie. 2403 kg, which occupies the numerator in Vites equation, resulting a higher value of WUE. (1.86 kg/m^3) Through the same look, Giza 129 yielded the lowest grain yield, i. e. 2024 kg/fed giving the poorest WUE, i.e. 1.57 kg/m^3. Nagaz, et al (2001) observed the varietals differences in WUE between barley varieties. Oppositely Tambussi, et al (2005) observed that water use efficiency was similar between the two studied barley cultivars, (graphic and Kym). Katerji, et al (2008) observed that WUE could be attributed to plant factors (species and variety) .

C - Interactions effect :

It is obvious from Table (5) that the combination (Gizal25 x SIES) gave the highest WUE, i. e. 2.16 kg/m^3. such value depended on the high numerator value, i.e. 2595 kg/fed and the low denominator, i. e. 1200 m^3/fed. On the other hand, the lowest WUE, i.e. 1.47 kg/ m^3. was the ratio between 2200 kg/fed. (modest yield) in the numerator and 1500 m3/fed. highest watering in the denominator. Thus, WUE was in such case the poorest one .

Table (5): Water use efficiency (WUE) as affected by water deficit, cultivars and their interaction, combined data .

Water Deficit / Varieties	Nod. control	SIES Elongation	SIDS Dough	Mean
Giza I24	1.55	1.88	1.63	1.69
Giza I25	1.77	2.16	1.64	1.86
Giza I29	1.47	1.54	1.69	1.57
Mean	1.60	1.86	1.65	1.70

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تقييم حقلى على تأثير نقص المياه على الشعير

محمد مرسى حسين * ، السيد مصطفى عكاشة * ،

سلوى المرسى سليمان ** ، عبد المحسن عبد الغنى أبو الليل

** قسم العلاقات المائية والرى الحقلى – المركز القومى للبحوث – الدقى – الجيزة ج.م.ع.*

*** قسم علوم المحاصيل – كلية الزراعة – جامعة القاهرة – الجيزة ج.م.ع.*

أجريت تجربتان حقليتان بمزرعة المركز القومى للبحوث فى ناحية شلقان – محافظة القليوبية , فى الموسمين ٢٠٠٤/٢٠٠٥ و ٢٠٠٥/٢٠٠٦ . تضمنت كل تجربة إختبار تأثير ثلاثة معدلات من نقص المياه (١٥٠٠ م٣/فدان باسقاط رية واحدة فى مرحلة الاستطالة ، ١٢٠٠ م٣/فدان باسقاط رية واحدة فى مرحلة الطور العجينى والمقارنة بإعطاء الرى العادى) على نمو وإنتاجية ثلاثة أصناف من الشعير السداسى (جيزة ١٢٤, جيزة ١٢٥ وجيزة ١٢٩). وقد رتبت المعاملات العاملية التسع فى تصميم القطع المنشقة مرة واحدة فى ثلاثة مكررات , حيث وزعت معاملات الرى على القطع الرئيسية ووزعت الأصناف فى القطع الشقية وكانت مساحة القطعة التجريبية ١٠,٥ م٢(٣X ٣,٥) م. أجرى التحليل الإحصائى التجميعى للموسمين معاً وكانت الزراعة فى أول ديسمبر والحصاد بمنتصف أبريل.

تضمنت الدراسة فحص عشر صفات على النحو التالى:

أ) الصفات المورفولوجية

١ – طول النبات , سم .
٢ – عدد الأوراق /نبات.
٣ – عدد الأفرع القاعدية/نبات.
٤ – عدد السنابل/نبات.
٥ – طول السنبلة , سم.

ب) صفات المحصول

١ – محصول الحبوب , طن/فدان.
٢ – محصول التبن , طن/فدان.
٣ – المحصول البيولوجى , طن/فدان
٤ – نسبة محصول الحبوب/محصول التبن.
٥ – نسبة محصول الحبوب /المحصول البيولوجى.

وقد أعطت الدراسة النتائج التالية:

- ظهرت الفروق المعنوية بين الأصناف على جميع الصفات المورفولوجية وقد أوضحت النتائج تفوق الصنف جيزة ١٢٤ وتبعه الصنف جيزة ١٢٥ وجاء الصنف جيزة ١٢٩ فى أخر الترتيب.
- بالنسبة لصفات المحصول , ظهرت الفروق المعنوية بين الأصناف مع جميع صفات المحصول موضع الدراسة . وقد بينت الدراسة تفوق الصنف جيزة ١٢٤ على الصنفين الأخرين مع صفة محصول التبن والمحصول البيولوجى ى حين كان الصنف جيزة ١٢٥ متفوقاً فى محصول الحبوب للفدان ونسبة الحبوب/التبن وكذا نسبة محصول الحبوب/للمحصول البيولوجى.
- إستجابت معظم الصفات معنوياً لمعاملات الرى ولم يظهر هذا التأثير مع صفة نسبة محصول الحبوب/للمحصول البيولوجى.
- حققت معاملة المقارنة أعلى القيم على جميع الصفات موضع الدراسة , فى حين أبدت معاملة إسقاط رية واحدة فى مرحلة الإستطالة تأثيراً سلبياً أقل من نظيره عند إسقاط رية واحدة فى مرحلة الطور العجينى.
- أثر التفاعل المتبادل بين الرى والأصناف تأثيراً معنوياً فقط على عدد الأوراق/النبات وعدد السنابل/نبات والمحصول الحيوى/فدان ونسبة محصول الحبوب/التبن وقد أعطت المعاملة (المقارنة X جيزة ١٢٥) أعلى القيم مع محصول الحبوب (٤,٦٥ طن/فدان).
- إختلفت كفاءة استعمال ماء الرى (WUE) تبعا لمعاملات الرى والأصناف , حيث أعطت كل من المعاملتين إسقاط رية واحدة فى مرحلة الإستطالة والصنف جيزة ١٢٥ حوالى ١,٨٦ كجم/م^{٣} وأعطى التفاعل المتبادل بين المعاملتين السابقتين أعلى قيمة لكفاءة استعمال ماء الرى فى الدراسة وقدرها ٢,١٦كجم/م^{٣}.

قام بتحكيم البحث :

أ.د./ عادل الجنايني ، أ.د./ نجاح أبو حجازه

كلية الزراعة – جامعة القاهرة