IRRIGATION SCHEDULING FOR SOME WHEAT CULTIVARS THROUGH PAN EVAPORATION NORMS AND ITS EFFECT ON GROWTH, YIELD AND WATER USE EFFICIENCY

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ABSTRACT

A field experiment was conducted during two successive seasons of 2003/2004 and 2004/2005 at Giza Agric. Res. Station. The study aimed to identify the most effective coefficient of daily pan evaporation records (selected from 1.4, 1.2, 1.0 and 0.8) in scheduling the irrigation for some wheat cultivars namely Sids 1, Gemmeiza 7, Sakha 93 and Giza 168, in order to maximize crop and water productivity. The obtained results could be summarized as follows.

1- The growth characters of plant height and leaf area index were significantly influenced due to the adopted irrigation regimes and generally, tended to increase as the coefficient of pan evaporation records increased. In addition, Gemmeiza 7 cultivar surpassed the other tested wheat cultivars to increase such characters.

2- No of grains/spike and 1000-grain weight traits exhibited similar trends since scheduling irrigation according to 1.2 pan evaporation coefficient(PEC) resulted higher figures for such characters. Gemmeiza 7 surpassed the other tested wheat cultivars to increase such traits. The trait of No. of spikes/m^2 exhibited different trend since higher values were recorded under 1.0 and 1.2 PEC in the first and second seasons, respectively. Sids 1 and Gemmeiza 7 cultivars were superior to produce the highest No. of spikes/m^2 in the first and second seasons, respectively.

3- Straw yield seemed to increase with increasing the value of PEC and Gemmeiza 7 cultivar is still superior to increase such trait more than the other tested wheat cultivars. The highest grain yield was obtained as irrigation was practiced according to 1.2 PEC and tended to reduce under the other assessed PEC treatments and this finding was true in the two seasons.

4- All of agronomic, yield and yield components traits were significantly influenced as the adopted irrigation regimes interacted with the wheat cultivars under study.

5- Number of applied irrigations and water consumptive use (CU) were increased as the value of PEC increased. Moreover, CU for wheat crop was significantly differed due to wheat cultivars, and Sids 1 consumed more water than the other tested wheat cultivars.

6- The lowest water use efficiency (WUE) was recorded under 1.4 PEC, comparable to the other tested PEC values. Values of PEC i.e. 1.2, 1.0 and 0.8 exhibited similar WUE values in first season, while in the second season, WUE tended to decrease as PEC value decreased. Gemmeiza 7 surpassed the other tested wheat cultivars to produce more grain yield per the consumed water unit, and this was true in the two seasons of study.

Key words: Irrigation scheduling, Wheat cultivars and Pan evaporation.

INTRODUCTION

In Egypt, as many regions in the world, wheat is the most important cereal crop, but unfortunately, the local production did not meet the consumption owing to the increased population with limited both cultivated area and water resources. Thus, increasing both of wheat and water productivity are the most concern for crop and field irrigation specialists. The horizontal expansion means cultivating wheat in the newly reclaimed area while, the vertical expansion concerning increasing yield per the and water units and can be accomplished via improved agronomic practices such as sowing date, high-yielding cultivars, irrigation management …..etc.

It is well known that the crop productivity is a function of soil moisture availability during the growing season. **Khater *et al.* (1997)** and **Moussa and Abdel-Maksoud (2004)** reported that No. of spikes/m^2, 1000-grain weight, straw and grain yields were reduced due to irrigation after higher soil moisture depletion. Moreover, stated that exposing wheat crop to late drought reduced water consumptive use and simultaneously increased water use efficiency.

Irrigation is a limiting factor in crop production in arid and semi arid regions and practicing irrigation timely and quantitatively is leading for more precise irrigation management. Early in USA, **Jensen and Midleton (1965)** scheduling crop irrigation via daily records of evaporation pan. In this respect, **Eid *et al.* (1982)** used the evaporation pan method to schedule irrigation for both wheat and Egyptian clover crops. Several field Attempts have been carried out and still continuous in order to find out the most proper coefficient used in irrigation scheduling of wheat crop, via daily accumulative records of class A-pan, to maximize water productivity, (**Rayan *et al.*, 1999** in upper Egypt and **El-Marsafawy – Samia, 2000** in Giza area).

The main objective of the present trial is to find out the impacts of different irrigation regimes, due to different coefficients for daily pan evaporation norms to select the most effective one resulted in improved growth, yield, yield components and water use efficiency for some wheat cultivars.

MATERIALS AND METHODS

Two field experiments were conducted during the two winter seasons of 2003/2004 and 2004/2005 at Giza Agric. Res. Station .Some of soil water constants and bulk density as well as meteorological data of the experimental site are presented in Tables (1) and (2), respectively .

Table (1). Soil moisture constants and bulk density of the experimental site at Giza Agricultural Research Station

Soil depth (cm)	Field capacity (wt/wt%)	Wilting point (wt/wt%)	Available soil moisture(mm)	Bulk density (gcm^{-3})
0.0-15	41.85	18.61	23.24	1.15
15-30	33.68	17.50	16.18	1.24
30-45	28.38	14.02	14.36	1.20
45-60	28.05	16.54	11.51	1.28

The present trial aimed to find out the impacts of scheduling irrigation via different coefficients of daily norms of pan evaporation (Class A pan) on yield components and some water – yield relations for some wheat cultivars namely Sids 1, Gemmeiza 7, Sakha 93 and Giza 168. The experimental treatments were arranged in split-plot design with four replicates .The main plots were represented the irrigation scheduling according to pan-evaporation coefficients as follows:

1- Pan-evaporation coefficient of 1.4
2- Pan-evaporation coefficient of 1.2
3- Pan-evaporation coefficient of 1.0
4- Pan-evaporation coefficient of 0.8

Table (2). Some meteorological data* at Giza Agric. Res. Station, 2002/2003 and 2003/2004 seasons

Month	T max	T min	WS	RH	RF	SS	SR	E pan
	2002/2003 season							
Nov	26.8	15.3	1.8	72	-	8.2	326	3.2
Dec	21.7	11.5	2.2	74	5.4	7.0	268	2.0
Jan	19.8	10.9	1.9	64	-	7.0	280	2.2
Feb	21.4	10.2	2.7	61	1.7	7.9	453	3.3
Mar	23.9	11.2	2.3	59	2.6	8.6	441	3.5
Apr	28.3	15.8	2.7	54	-	906	519	5.7
	2004/2005 season							
Nov	25.5	16.3	1.1	69	1.3	8.2	326	2.5
Dec	20.9	11.2	1.1	63	2.9	7.0	268	2.0
Jan	19.9	9.3	1.8	59	1.9	7.0	280	2.0
Feb	20.4	10.2	1.6	59	0.4	7.9	453	3.4
Mar	24.5	13.3	1.5	57	0.4	8.6	441	4.2
Apr	28.3	15.9	1.4	54	-	9.6	519	5.3

* T max and T min = maximum and minimum temperatures, C^o ; WS = wind speed, m /sec ; RH = relative humidity % ; RF = rain fall, mm ; SS = actual sunshine, hr ; SR = solar radiation, $cal/cm^2/day$; Ep = pan evaporation ,mm/day

The sub-plots were assigned to the tested wheat cultivars . The sub –plot area was 10.5 m^2 i.e.1/400 feddan .Sowing date was November,15 in 1st season and November,20 in 2nd season . Irrigation water was applied in the two sites of the following formula;

Available soil moisture, mm (to 60 cm depth of soil profile) = Accumulative of daily pan – evaporation records x Pan-evaporation coefficient

Irrigation dates, under different Pan-evaporation coefficients, are shown in Table (3).

All of the agronomic practices i.e. sowing date, nitrogen fertilization, pest control …etc were executed as recommended for wheat production in the area. The harvest was done as the plants reached the physiological ripening.

Water consumptive use (Cu):

Water consumptive use was determined via soil samples from the sub plots just before each irrigation and 48 hrs later in addition at harvesting, in 15 cm increment system to 60 cm depth of the soil profile. The Cu was calculated according to **Israelsen and Hansen (1962)** as follows:

$$Cu = \frac{(Q_2 - Q_1)}{100} \times D \times Bd \quad \ldots\ldots$$ where

Cu = Water consumptive use, mm
D = Soil layer depth , mm

Bd = Bulk density of soil layer, gcm^{-3}
Q_2 = Soil layer moisture content, wt/wt %, 48 hrs post irrigation, and
Q_1 = Soil layer moisture content, wt/wt %, just before irrigation .

Water use effcicincy (WUE)

Water use efficiency,in the present work, wheat grains yield produced for 1 m^3 of water consumed and estimated according to **Vites (1965)** as follows:

$$\textit{\textbf{WUE , kg grain / m}}^{\textbf{3}} \textit{\textbf{ consumed water}} = \frac{Grain\ yield\ , kg\ /\ fed}{Water\ consumed, m3\ /\ fed}$$

Table (3). Date of applied irrigations under different coefficients of accumulative daily pan evaporation records in 2003/2004 and 2004/2005 seasons

Irrigation Regimes (pan evaporation coefficients)	Irrigation and dates							
	Sowing	Mohayah	2nd	3rd	4th	5th	6th	7th
2003/2004 season								
1.4	Nov.22	Dec.15	Jan.1	Jan.22	Feb.12	Mar.2	Mar.20	Apr.6
1.2	Nov.22	Dec.15	Jan.5	Jan.29	Feb.21	Mar.16	Apr.6	
1.0	Nov.22	Dec.15	Jan.8	Feb.4	Mar.1	Mar.30		
0.8	Nov.22	Dec.15	Jan.15	Feb.12	Mar.12			
2004/2005 season								
1.4	Nov.22	Dec.15	Jan.9	Jan.26	Feb.12	Feb.28	Mar.14	Apr.1
1.2	Nov.22	Dec.15	Jan.12	Jan.31	Feb.17	Mar.7	Mar.29	
1.0	Nov.22	Dec.15	Jan.16	Feb.9	Mar.3	Mar.23		
0.8	Nov.22	Dec.15	Jan.22	Feb.17	Mar.14			

Growth, yield and some yield attributes:

Leaf area index was estimated at flowering stage for the different wheat cultivars under the adopted irrigation regimes. At harvesting, the plants of each entire sub-plot were sampled in order to determine straw and grain yield which converted to ton and ardab /fed, respectively. No of spikes/m^2 was estimated by counting all spikes per square meter selected in random from each sub-plot. Ten spikes were randomly taken, from each sub-plot, and No. of grains/spike and 1000-grain wt (g) were estimated. Data of growth, yield and yield components were subjected to statistical analysis of variance as described by **Sendecor and Cochoran (1980)**. The mean values were compared according to Duncan's multiple relng test**, Duncan (1955).**

RESULTS AND DISCUSSION

1- Plant height:

Regarding irrigation regimes, data in Table (4) reveal a significant effect on plant height in both seasons of study. The tallest plants (95.90 and 97.77 cm) was obtained under irrigating according to 1.4 pan evaporation coefficient (PEC), while the shortest plants (85.02 and 89.23 cm) resulted from irrigating at 0.8 PEC treatment, and this was true in the two seasons of study.. These results are in agreement with those of **Ali (1997) and Hefnawy and Wahba (2003).** Data also clear out that, there are significant differences among wheat cultivars to influence plant height trait in both seasons. Gemmeiza 7 cultivar gave the tallest plants (93.68 and 94.89 cm), while, Giza 168 gave the shortest ones (86.96 and 93.06) in the first and second seasons, respectively.. Such results could be attributed to the genetic differences (**Moussa and Abdel-Maksoud, 2004)** reported the same results and justifications. The interaction between irrigation regimes and wheat cultivars was significant to alter such trait in both seasons, and the tallest plants were obtained for Gemmeiza 7 cultivar as irrigated with 1.4 PEC.

2- Leaf area index:

Data in Table (4) show that irrigation regimes significantly affected the leaf area index in the two seasons. The highest values of leaf area index (8.39) and (10.50) were obtained with irrigating according to 1.2 in the first season and with 1.4 PEC treatment in the second one, respectively. The lowest values (4.43 and 5.46) resulted from irrigating at 0.8 PEC treatment in first and second seasons, respectively. Similar results were obtained by **Moustafa *et al.* (1996), Tawfiles *et al.* (1997)** and **Moussa and Abdel–Maksoud (2004).** Data also reveal that the leaf area index was highly significant influenced due to the tested wheat cultivars in the first season. Gemmeiza 7 cultivar significantly exceeded the other cultivars, while the lowest value was obtained by Giza 168 cultivar and these findings were true in the two seasons of study . Such differences may be attributed to the variability among the wheat cultivars. These results are in agreement with those obtained by **Ali (1997), Abd El-Majeed *et al.* (1998), Abd El-All-Azza (1999) and Moussa and Abdel-Maksoud (2004).** The interaction between irrigation regimes and wheat cultivars exerted significant effect to influence leaf area index in both seasons. Gemmeiza 7 cultivar, under 1.4 and 1.2 PEC irrigation treatments, exhibited higher values (9.90 and 11.95) in both seasons, respectively.

3- Number of grains/spike:

Data in Table (4) show that the adopted irrigation treatments significantly affected number of grains/spike trait in the two seasons of study. The highest number of grains/spike (63.73 and 60.52) were obtained under irrigating with 1.2 PEC, whereas the lowest values (49.41 and 52.31) were resulted from 0.8 PEC treatment in first and second seasons, respectively. This may be due to less available soil moisture in the root zone under 0.8 PEC throughout the growing season. Similar results were obtained by **Moustafa *et al.* (1996), Tawfiles *et al.* (1997)** and **Moussa and Abdel –Maksoud (2004)** who found that the soil drought reduced number of kernels/spike which is the most yield components negatively affected by drought stress conditions. Moreover, **Ali (1997)** reported that, the number of kernels/spike were increased as irrigation frequency increased from 3 to 4 irrigations. Data also indicated that number of grains/spike trait was highly significant influenced by the tested wheat cultivars. Gemmeiza 7 cultivar significantly exceeded the other cultivars, while the lowest values were obtained by Giza 168 cultivar and this true in both seasons of study. Such differences in number of grain/spike trait may be due to variability among the wheat cultivars. These results are in agreement with those obtained by **Ali (1997), Abd El-Majeed *et al.* (1998), Abd El-All-Azza (1999) and Moussa and Abdel-Maksoud (2004).** The interaction between irrigation regimes and wheat cultivars had a significant effect on number of grains/spike in both seasons, and Gemmeiza 7 cultivar as irrigated according to 1.2 PEC treatment gave the high values (68.35 and 65.35) in first and second seasons, respectively.

4- 1000-grain weight :

As shown in Table (4), 1000-grain weight trait was significantly influenced by the adopted irrigation regimes in the second season only. The highest value of 1000-grain weight (55.24 g) was obtained under irrigating at 1.2 PEC treatment, which gradually tended to be reduced to, 53.39, 51.82 and 47.73 g with irrigating at 1.4, 1.0 and 0.8 PEC treatments, respectively. In the first season the same trend was observed, however, the difference did not reach the significance level. These results are crop with those obtained by **El-Kalla *et al.* (1995), Sonia *et al.* (1996)** and **Moussa and Abdel-Maksoud (2004)** who reported that the 1000-grain weight tended to reduce as soil moisture availability decreased**.** The differences in 1000-grain weight among the wheat cultivars was significant in both seasons. The highest 1000-grain weight (58.97 and 59.78 g) was obtained from Gemmeiza 7, while Giza 168 produced the lowest values (43.05 and 46.06 g) in first and second seasons, respectively. Similar results were obtained by **Shalaby *et al.* (1992)** and **Moussa and Abdel-Maksoud (2004).** The interaction between irrigation regimes and wheat cultivars was significant to affect 1000-grain weight in both seasons and irrigating Gemmeiza 7 according to 1.2 in the first season and 1.4 PEC in the second one gave the heaviest weight of 1000-grain which reached 63.30 and 64.35 g, respectively.

5-Number of spikes/m^2 :

The results in Table (5) reveal that irrigation treatments differently affected number of spikes/m^2 in 2003/2004 and 2004/2005 seasons. The highest number of spikes/m^2 (317.1) was obtained under 1.0 PEC irrigation in the first season , while in the second season the highest number of spikes/m^2 (267.6g) was achieved due to irrigating at 1.2 PEC irrigation treatment. These results are in full agreement with those of **El-Kalla *et al.* (1995), Hefnawy and Wahba (2003)** and **Moussa and Abdel-Maksoud (2004).** Data in Table (5) also indicated that wheat cultivars were varied significantly in number of spikes/m^2 trait. Sids1 and Gemmeiza 7 cultivars gave the highest number of spikes/m^2 in the first and second seasons, respectively, while Giza 168 cultivar gave the lowest value in both seasons. These results are in harmony with those of **El-Kalla *et al.* (1995), Hefnawy and Wahba (2003)** and **Moussa and Abdel-Maksoud (2004).** The interaction between irrigation regimes and wheat cultivars was significant in both seasons and Gemmeiza 7 and Sids 1 cultivars as irrigated according to 1.0 and 1.4 PEC which gave the highest number of spikes/m^2 in the first and second seasons, respectively.

6- Straw yield:

Data in Table (5) show that irrigation treatments significantly affected straw yield in both seasons. The highest values (7.05 and 6.01 ton/fed) were obtained from irrigating at 1.4 PEC treatment, in the first and second seasons and then tended to be gradual by reduced as irrigation was scheduled at 1.2, 1.0 and 0.8 PEC. **Abou-Khadrah *et al.* (1999)** stated that the increase in straw yield as amount of irrigation water increased might be due to the increase of yield components such as number of productive tillers and growth attributes. Data also, reveal significant differences among wheat cultivars in both seasons and Gemmeiza 7 gave the highest straw yield in the two seasons of study. These findings are similar to those obtained by **Abou-Khadrah *et al.* (1999).** The interaction between irrigation regimes and wheat cultivars was significant in both seasons and Gemmeiza 7 cultivar as irrigated according to 1.4 PEC that gave the highest straw yield.

Table 4

Table 5

7- Grain yield:

The results in Table (5) show that the grain yield was significantly influenced due to irrigation regimes in the two growing seasons. Wheat grain yield was higher as the plants were irrigated according to 1.2 PEC with increases comprised 0.69, 12.31 and 33.31 % more than those under 1.4, 1.0 and 0.8 PEC treatments in the first season, respectively. The same trend was observed in the second season with corresponding increase percentages reached to 5.42, 16.69 and 35.81 in the same order. These results are in agreement with those obtained by **El-Marsafawy-Samia (2000)** who found that the maximum wheat grain yield was achieved as the irrigation was scheduled at 1.0 PEC which exceeded those resulted from irrigating at 0.8 and 0.6 PEC treatments. Data in Table (5) show that, the evaluated 4 wheat cultivars were differed significantly in their potentiality and Gemmeiza 7 was the leading one in both seasons. The differences in the productivity of wheat cultivars were also reported by **Shalaby *et al.* (1992), Abd El-Majeed *et al.* (1998), Abd El-All-Azza (1999), Hefnawy and Wahba (2003)** and **Moussa and Abdel-Maksoud (2004).** The results in Table (5) indicate that there is a significant effect for the interaction between irrigation regimes and wheat cultivars in both seasons to affect the grain yield, and Gemmeiza 7 cultivar which gave the highest grain yield as irrigated according 1.2 PEC treatment in both seasons.

Crop- water relations

1-Water Consumptive use (CU):

It is obvious that irrigation numbers were increased as the value of pan evaporation coefficient (PEC) increased since the wheat plants received 6, 5, 4 and 3 watering under 1.4, 1.2, 1.0 and 0.8 PEC treatments, respectively, besides sowing and Mohayah ones, and those finding were true in the two seasons of study (Table, 3). Data in Table (6) reveal that, regardless wheat cultivars, water consumptive use was increased as PEC value increased since the Cu value under 1.4 PEC in the first season was increased by 9.0, 23.03 and 45.59 % more than those under 1.2, 1.0 and 0.8 PEC treatments, respectively. In the second season, similar trend was observed with increases reached to 8.23, 19.07 and 41.69%, respectively in the same order. These results may be attributed to that the value of PEC increased to the number of irrigation increased and the soil moisture was more available for extraction by plant roots and soil surface evaporation as well. **Rayan *et al.* (1999), El-Marsakawy-Samia (2000)** and **Moussa and Abdel-Maksoud (2004)** came to the same results and justification. In connection, **Oweis *et al.* (2000)** found that evapotranspiration (ET) for wheat was increased as supplemental irrigation increased. Regarding wheat cultivars under investigation, data clear out that water consumptive use was differentially affected due to wheat cultivars and sids 1 cultivar consumed more water than the other tested cultivars and this trend was observed in the two seasons of study. **Moussa and Abdel-Maksoud (2004)** previously reported the variation among wheat cultivars to affect water consumptive use character.

Table (6). Water consumptive use (m^3/fed.) and Water use efficiency (kg/m^3) for wheat cultivars under different irrigation regimes in 2003/2004 and 2004/2005 seasons

Season	**2003/2004**					**2004/2005**				
Irrigation regime (PEC)	**Water consumptive use (m^3/fed.)**									
	Sids 1	Gemm-eiza 7	Sakha 93	Giza 168	Aver.	Sids 1	Gemm-eiza 7	Sakha 93	Giza 168	Aver.
1.4	1759	1734	1628	1612	1683	1818	1748	1693	1632	1723
1.2	1600	1546	1524	1504	1544	1684	1618	1541	1542	1592
1.0	1446	1398	1330	1296	1368	1537	1500	1404	1348	1447
0.8	1212	1200	1134	1078	1156	1264	1240	1207	1154	1216
Average	1504	1470	1404	1373	1438	1576	1527	1461	1415	1495
Water use efficiency (kg/m^3)										
1.4	1.54	1.78	1.52	1.38	1.56	1.23	1.32	1.28	1.18	1.25
1.2	1.54	2.17	1.65	1.53	1.72	1.34	1.35	1.46	1.46	1.40
1.0	1.60	2.28	1.60	1.33	1.70	1.30	1.47	1.42	1.33	1.35
0.8	1.71	1.89	1.68	1.57	1.71	1.39	1.45	1.39	1.27	1.38
Average	1.60	1.03	1.61	1.45	1.68	1.32	1.40	1.39	1.31	1.35

2-Water Use Efficiency (WUE):

Water use Efficiency, in the present work, means kgs of wheat grains produced due to the unit of consumed water. On this basis, data in Table (6) reveal that regardless wheat cultivars, WUE value was lesser as irrigation was practiced according to 1.4 PEC than the other tested PEC treatments. The WUE value was the highest under 1.2 PEC treatment in the two seasons of study. The WUE values under irrigating at 1.2, 1.0 and 0.8 PEC were similar in the first season, while in the second season, decreasing the PEC value resulted in lower WUE values. In connection, **El-Marsafawy-Samia (2000)** found that the highest WUE value for wheat was achieved as irrigation practiced according to 1.0 PEC. Nevertheless, **Khater *et al.* (1997)** and **Moussa and Abdel-Maksoud (2004)** reported that WUE tended to increase as irrigation was applied after higher soil moisture depletion. Furthermore, **Hefnawy and Wahba (2003)** stated that WUE for wheat cultivars seemed to increase due to reducing number of irrigation. Regarding wheat cultivars, WUE was differently influenced due to the cultivars under study and Gemmeiza 7 proved to be superior to produce the highest grain yield per the unit of consumed water, and this finding was true in the two seasons of study. Similar results concerning WUE character as affected by wheat cultivars were recorded by **Moussa and Abdel-Maksoud (2004).** Gemmeiza 7 cultivar exhibited higher WUE values with irrigating at 1.0 PEC treatment in the two seasons of study.

On conclusion, under Giza area condition, it is advisable to sow Gemmeiza 7 wheat cultivar and scheduling the irrigation according to 1.2 PEC since most of growth, yield and yield components traits and water use efficiency were enhanced with such interaction.

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جدولة الرى لبعض اصناف القمح باستخدام بيانات وعاء البخر القياسى وتأثيرة على النمو والمحصول وكفاءة استخدام مياة الرى

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أقيمت تجربة حقلية بمحطة البحوث الزراعية بالجيزة خلال موسمى ٢٠٠٣/٢٠٠٤ و ٢٠٠٤/٢٠٠٥ لدراسة تأثير جدولة الرى باستخدام معامل لبيانات وعاء البخر (١.٤- ١.٢ -١.٠ - ٠.٨) على النمو والمحصول وكفاءة استخدام مياه الرى لأصناف القمح سدس ١، جميزة ٧، سخا ٩٣، جيزة ١٦٨. وكانت أهم النتائج كما يلى:

١- ازدادت قيم صفات النمو (طول النبات– معامل مساحة الورقة) معنويا مع زيادة قيمة معامل بيانات وعاء البخر. تفوق الصنف جميزة ٧ فى هاتين الصفتين مقارنة بالأصناف تحت الدراسة.

٢- جدولة الرى بمعامل ١.٢ أعطي أعلي قيم لصفتي عدد الحبوب/السنبلة ووزن الـ ١٠٠٠ حبة. اظهر الصنف جميزة ٧ تفوقا فى هاتين الصفتين.

٣- أعلي قيمة لصفة عدد السنابل/ م٢ كانت مع الري بمعامل ١.٠ و ١.٢ في موسمي ٢٠٠٣/٢٠٠٤ و ٢٠٠٤/٢٠٠٥ علي التوالي. وأظهر الصنف سدس ١ أعلي قيمة لهذه الصفة في الموسم الأول بينما اخذ الصنف جميزة ٧ نفس الاتجاة في الموسم الثاني .

٤- الرى بمعامل البخر ١.٢ أعطي أعلي محصول للحبوب، ومازال الصنف جميزة ٧ متفوقا في هذه الصفة علي جميع الأصناف تحت الدراسة.

٥- صفات النمو والمحصول وكذا مكوناته تأثرت معنويا بتفاعل مستويات الرى وأصناف القمح تحت الدراسة.

٦- زاد عدد الريات و كذا الاستهلاك المائي لأصناف القمح تحت الدراسة بزيادة قيمة معامل بيانات وعاء البخر. اختلفت قيمة الاستهلاك المائى لأصناف القمح تحت الدراسة وأظهرت النتائج أن الصنف سدس ١ هو أعلي الأصناف استهلاكا لمياه الري.

٧- انخفضت قيمة كفاءة استخدام مياه الرى عند الجدولة بمعامل بخر ١.٤ واتجهت للزيادة بقيم متساوية بنقص قيمة المعا مل فى الموسم الأول، ولكن في الموسم الثاني تدرجت الزيادة بنقص قيمة المعامل. أظهر الصنف جميزة ٧ أعلى قيمة لكفاءة استخدام مياه الري.

تحت ظروف منطقة الجيزة، ينصح بزراعة صنف القمح جميزة ٧ مع جدولة الري من خلال البيانات اليومية لوعاء البخر القياسي بمعامل قيمتة ١.٢ وذلك لزيادة المحصول وتحسين كفاءة استخدام مياه الري.