MANAGEMENT OF SURFACE IRRIGATION ON WHEAT YIELD IN OLD VALLEY

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ABSTRACT

Two field experiments were carried out at Gemmeiza Agric. Res. Station during winter (2012/2013 and 2013/ 2014) seasons to study the effect of three irrigation intervals (every 30, 40 and 50 days), farmyard manure (with and without farmyard manure) and three nitrogen fertilizer levels (40, 60 and 80 kg N/ fed) on wheat yield, yield components and water use efficiency of wheat. A split – split plot design with three replication was used. The most important results could be summarized as followed. Due to irrigation every 30 days the plant height, straw yield (ton /fed), spike height .No. of grains /spike and grain yield (Mg /fed) were increased. the water use efficiency was decreased .Using farmyard manure increase the plant height, straw yield (ton/fed) ,spike height .No. of grains /spike , grain yield (Mg /fed) and water use efficiency compared to without farmyard manure .By increasing fertilization N levels increase both plant height, straw yield (ton/fed) ,spike height .No. of grains /spike , grain yield (Mg /fed) and water use efficiency were increased .Interactions between irrigation interval 30 days , with farmyard manure and fertilization level 80 kg N/fed. could be recommended to obtain the best results of wheat yield .

Keywords: ***irrigation intervals, farmyard manure, fertilization N levels and WUE.***

INTRODUCTION

Wheat is the world's second major staple crop behind rice, and its cultivation also consumes a great deal of the world's water. Around 20% of the global wheat crop is now irrigated, according to current estimates, reaching at least 75 to 80% in countries Irrigation management is about controlling the rate, amount, and when applied irrigation water in a planned and efficient manner.

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With good irrigation management, a winter wheat crop can have high yield and quality potential. Scarcity and growing competition for fresh water resource will reduce its availability for irrigation. At the same time, the need to meet the growing demand for food will require increased crop production using less water. Regulated deficit irrigation provides a means of reducing water consumption while minimizing adverse effects on yield. The reported study was undertaken to determine an efficient strategy for management of irrigated wheat under water stressed conditions, in a sub-tropical sub-humid region. At the same time, water is becoming scarcer worldwide, and in fact a lack of water is already limiting wheat growth and yield in several regions of the world.

Irrigating wheat crop based on the physiological stags is one of the most important recommended methods of scheduling irrigation. If the water available is adequate then irrigation should be given at all the stages. However, if water is in short supply then irrigations should be given at certain critical (crown root initiation and flowering) stages. Maximum reduction would occur if the irrigation at the critical growth stage is missed. Therefore, if the water is available for less than adequate number (5-6) of irrigations then crop should be irrigated as below.

Moussa and Abdel- Maksoud(2004) reported that , subjected wheat plants to drought- stress resulted in a significant reduction in grain yield , while the reduction in straw yield did not reach the significance level , regardless irrigation treatments , yield components i.e. number of spike /m^2 , number of grains /spike and1000- grain weight seemed to be increased as the irrigation regime were increased .

Abou-khadrah et. al (1999) stated that the increase in straw yield as amount irrigation water increased might be due to the increase of yield components such as number of productive tillers and growth attributes.

Hefnawy and Wahba(2003) reported that reducing the number irrigation , through skipping the late ones , resulted in higher WUEvalues for wheat crop .

Organic manures are recommended of soil properties mainly the physical ones and for increasing soil fertility. On the other land, mineral N fertilizers mainly nitrate N carriers, are costly and my lead to pollution of ground water. The consumption of N fertilizers is using year after due to

the reclamation of new area and/or using high yield varieties. One of the main ways to overcome the shortage in the production of N fertilization is using the organic manure such as farmyard manure.Ali et . al (2008) found that , the yield of grains , and straw were increased by application of farmyard manure(FYM) experiments. The 1000-grains weight increased by increasing nitrogen rate, using FYM and grain protein yield increased by 22.7% up on using FYM under sprinkler irrigation system and 37.5% under surface irrigation system

One the most important and practical practices to increase the efficiency of N fertilizers is the addition of the recommended amounts. It is quite known that nitrogen fertilization greatly affect wheat production. Hence, results of many researchers that achieved in Egypt revealed that nitrogen fertilizer. Levels significantly affected most of plant growth trails, yield and its components and the optimum nitrogen fertilizer level for wheat, vary widely in amounts ranged between 70 and 120 kg N/ fed. According to environmental conditions (Tammam and Tawfils, 2004)

Gehan et. al (2011) reported that ,all studied characters gradually increased by increasing nitrogen fertilizer levels from 35 to 105 kg N/ fed.

El-Sayed et.al (2013) found that , wheat crop genotypes responded differently to the three factors for various characters . plant height , number of tillers /m2 , biological yield and straw yield produced the highest values at sowing 25 November as well as at 100 kg N/fed. , The lowest values at 50 kg N/ fed.

Qi Wang et. al (2012) who found that the largest straw yield per unit area was obtained by application of 100-150 Kg N/fad

The current study was carried out to investigate the effect of nitrogen fertilizers levels, with and without adding farmyard manure under three irrigation intervals on wheat yield and yield components, straw and water use efficiency .

MATERIALS AND METHODS

Two field experiments were executed during winter 2012/2013 and 2013/2014seasons at Gemmeiza Agricultural Research Station, ARS Gharbia Governorate, to study the effect of irrigation intervals

,farmyard manure and nitrogen fertilizer levels on growth, yield and water utilization as well. The experimental soil is clay in texture as shown in Table (1)

Table (1) : Mechanical analysis and some soil moisture contents of the studied soil experimental.

Depth cm	Fine sand%	Coarse Sand%	Silt%	Clay%	Soil texture	FC.%	W.P.%
0-15	3.90	19.80	27.00	49.30	clay	42.60	23.50
15-30	3.85	20.65	26.00	49.50	clay	41.10	22.60
30-45	3.95	20.40	29.30	46.35	clay	40.70	21.10
45-60	4.75	20.85	29.29	45.20	clay	40.00	20.50

The experiments were carried out in a split split – plot design with three replications. The main plots were irrigation intervals (every 30 days I_1 , every 40 days I_2 and evey50 days I_3) , the sub –plots were farmyard manure FYM(with and without FYM) and sub –sub plots were devoted to N-fertilizer levels (40 , 60 and 80 kg N/ fed.) .The sub-sub plot area was 20 m^2 (4X 5 m)

Sowing date on 21 th November in the 1st and2nd seasons .The common agricultural practices for growing wheat according to recommendations of Ministry of Agricultural were followed except the factors under study.

At harvesting time, ten guarded plants of one square meter were randomly selected from each sub- sub plot to estimate the following characters.

1-Number of grains / spike

2-1000-grain weight (gm)

3 -Grain yield (Mg /fed.) calculated by harvesting plants in one square meter taken from each sub- sub plot and were left to dry and grains were weighted .

4- Straw yield (ton /fed.) . the straw yield resulted from the previous sample was weighted in kg /plot, then it was converted to ton / fed.

Water calculation:

The irrigation water was supplied to plots through a circular orifice of 10 cm diameter and its discharge rate was measured by using the equation of immersed orifice according to James (1988) as follows :

$$Q = 0.61\ KAH^{1/2} \qquad 1$$

Where,

Q = orifice discharge (l/s)

A = the area of orifice opening (cm^2)

H = head, over the orifice center (m) .

K= Unit constant (K=0.443 for Q in L/sec, A in cm^2, and H in m)

Water Use Efficiency (WUE):

Water use efficiency for crop is the weight of grain yield produced per volume unit of applied water expressed as cubic meters of water (Michael, 1978).

RESULTS AND DISCUSSIONS

Plant height:

Plant height affected by irrigation intervals, farmyard manure fertilization levels and their interaction. Table (2) show that the tallest plant height(109.83 and 110.56 cm) under irrigation every 30 days (I_1) in 1st and 2nd season respectively . While shortest plant height (100.07 and 100.61 cm) under irrigation every 50 days (I_3) in 1st and 2nd season respectively , this data may be found suitable interval of plant during growing season under irrigation every 30 days(I_1), but when exposed to water deficit under irrigation every 40 days (I_2) and 50days (I_3) decrease plant height .

Plant height increased by application of farmyard manure (FYM) compared with the without FYM treatment .It increased by about 3.66 and 3.55 % in 1st and 2nd season respectively .

Nitrogen fertilization has a pronounced effect on plant height in both seasons. By increasing fertilizer level the plant height increased, tallest plants (106.46and 107.05 cm) at 80 kg N/fed. , at 60 kg N/fed plant height (104.84 and 105.78 cm).While shortest plants (103.49 and 103 .95 cm) at 40 kg N/fed . in 1st and 2nd season respectively .These results may be due to the stimulation effect on interned elongation JavaidIqbal et. al (2012) report that .

Data in table (2) show effect of interactions between irrigation interval(I) , farmyard manure (FYM) and fertilization N levels on plant height , the tallest plants (112.63 cm and 113.12 cm) were observed at irrigation

every 30 day (I_1) , farmyard manure and fertilization level at 80 kg N/ fed. In 1st and 2nd seasons receptively. While the shortest (96.06 and 96.11 cm) with irrigation every 50 day (I_3) ,without farmyard manure (FMY) and fertilization level 40 kg N/fed. In 1st and 2nd seasons of study.

Table (2): Plant height (cm) and straw yield (ton/ fed.) affected by irrigation intervals, farmyard, fertilization N levels and interaction in two seasons of study.

seasons .	Organic manure	Irr.Inter. . Fer.Levels	Plant height(cm)				Straw yield (ton / fed)			
			I1	I2	I3	Mean	I1	I2	I3	Mean
1st season	With FYM	40kgN/fed	109.65	105.26	101.80	105.57	4.122	3.957	3.710	3.936
		60kgN/fed	111.51	107.05	102.31	106.96	4.331	4.158	3.898	4.129
		80kgN/fed	112.63	108.12	103.62	108.12	4.550	4.368	4.095	4.338
		Mean	111.26	106.81	102.58	106.88	4.334	4.161	3.901	4.134
	Without FYM	40kgN/fed	106.73	101.40	96.06	101.40	3.943	3.707	3.431	3.693
		60kgN/fed	108.12	102.71	97.31	102.71	4.101	3.855	3.568	3.841
		80kgN/fed	110.32	104.80	99.29	104.71	4.259	4.003	3.705	3.989
		Mean	108.39	102.97	97.55	102.94	4.101	3.855	3.568	3.841
2nd season	With FYM	40kgN/fed	110.81	106.38	101.95	106.38	4.241	4.071	3.817	4.071
		60kgN/fed	112.00	107.52	103.04	107.52	4.463	4.285	4.017	4.285
		80kgN/fed	113.12	108.60	104.07	108.60	4.671	4.484	4.204	4.484
		Mean	111.98	107.50	103.02	107.50	4.458	4.280	4.013	4.280
	Without FYM	40kgN/fed	106.89	101.55	96.11	101.52	4.031	3.829	3.507	3.789
		60kgN/fed	109.51	104.04	98.56	104.04	4.229	3.967	3.671	3.953
		80kgN/fed	111.01	105.56	99.91	105.50	4.450	4.183	3.872	4.168
		Mean	109.14	103.72	98.19	103.69	4.237	3.993	3.683	3.970

Straw Yield :

Straw yield affected by irrigation intervals, farmyard manure fertilization levels and their interaction . Table (2) show that ,highest values (4.218 and 4.348 ton/ fed) at irrigation every 30 day (I_1) in 1st and 2nd season respectively these results may be due to increase plant height . While the lowest values (3.734 and 3.848 ton / fed.) in 1st and 2nd seasons

respectively, by using irrigation every 50 day (I_3) . These results may be due to available water all plant stages. Abou-khadrah et al (1999) stated that the increase in straw yield as amount irrigation water increased may be due to the increase of yield components such as number of productive tillers and growth attributes.

Straw yield affected by farmyard manure,with farmyard increased by7.0 4 and 6.59 % in 1st and 2nd seasons, respectively, compared to without farmyard manure, these results due to increase plant height .These results agreement with Ali et. al (2008) .

Straw yield increased by (8.45 , 4.28 and 9.15 ,4.79 %) by using 80 kg N/fed. Compared to 40 and 60 kg N/fed .in 1st and 2nd seasons respectively.Theseresults agreement with Nitrogen fertilizer levels had effect on straw yield 80 Kg N/fad produced highest straw yield. These results are in harmony with Seiling et. al (2005)

Data in table (2) show interaction between treatments , the highest values were (4.550 and 4.671 ton/fed) in 1st and 2nd seasons respectively observed by applied irrigation every 30 day (I_1) , with farmyard manure and 80 kg N/fed. While lowest values were (3.431 and 3.507 ton / fed) observed in irrigation every 50 day (I_3) ,without farmyard manure and 40 kg N/fed. These results my be due to deficit irrigation water, farmyard manure and N level. This might be due to the well utilization of nitrogen fertilizer in metabolism and meristic activity which improved growth characters such as plant highly.These results are in agreement with those obtained by anureekaurpannu and buttar (2010) and Qi Wang et al. (2012) who found that the largest straw yield per unit area was obtained by application of 100-150 Kg N/fed.

Spike length :

Spike length affected by irrigation intervals, farmyard manure, fertilization N levels and their interaction. Table(3) show that, when intervals decreased spike length increased .Due to use irrigation every30 day(I_1) spike length increased by (4.36, 8.89 and 4.49 , 8.97 %) compared to interval 40 and 50 day in 1st and 2nd seasons respectively. Moreover ,the spike length with farmyard manure increased by 6.45 and 7.05 %) compared to without farmyard manure in 1st and 2nd ,respectively.

Data in Table (3) show, also, that ,spike length increased by increasing N level, in 1st and 2nd seasons, the treatment of 80 kg N/ fed. spike length increased by 9.82 ,5.57 and 9.67, 5.21 %compared to 40and60 kg N/fed in 1st and 2nd seasons, respectively

Table (3): Spike length(cm)and No. of grains / spike affected by irrigation intervals, farmyard, fertilization N levels and interaction in two seasons of study.

seasons	Organic manure	Irr.Inter. / Fer.Levels	Spike length (cm)				No.of grains / Spike			
			I1	I2	I3	Mean	I1	I2	I3	Mean
1st season	With FYM	40kgN/fed	11.66	11.19	10.78	11.19	63.07	60.54	58.02	60.54
		60kgN/fed	12.22	11.73	11.00	11.65	65.89	58.45	60.62	61.65
		80kgN/fed	13.01	12.49	11.97	12.49	68.55	65.81	63.07	65.81
		Mean	12.30	11.80	11.25	11.78	65.84	61.60	60.57	62.67
	Without FYM	40kgN/fed	11.00	10.45	10.01	10.49	59.46	57.08	53.51	56.68
		60kgN/fed	11,56	11.04	10.51	11,04	63.43	60.26	57.09	60.26
		80kgN/fed	12.10	11.55	11.0	11.55	66.07	62.77	59.45	62.77
		Mean	11.55	11.01	10.51	11.03	62.99	60.04	56.68	59.90
2nd season	With FYM	40kgN/fed	11.78	11.31	10.84	11.31	61.80	58.67	55.62	58.70
		60kgN/fed	12.35	11.86	11.36	11.86	64.44	61.22	58.00	61.22
		80kgN/fed	13.10	12.58	12.05	12.58	67.13	63.77	60.42	63.77
		Mean	12.41	11.92	11.42	11.92	64.46	61.22	58.01	61.23
	Without FYM	40kgN/fed	11.11	19.55	10.00	10.55	64.15	61.59	59.02	61.59
		60kgN/fed	11.66	11.08	10.50	11.08	66.94	64.26	61.58	64.26
		80kgN/fed	12.22	11.61	11.00	11.61	69.73	66.94	64.15	66.94
		Mean	11.66	14.08	10.50	11.08	66.94	64.26	61.58	64.26

Number of grains / spike:

Number of grain /spike affected by irrigation intervals, farmyard manure, fertilization N levels and their interaction.

Data in Table (3) show that the number of grains /spike increase by decrease irrigation intervals in all treatment of study, highest values by using I_1. Number of grains /spike increase by 5.59 , 8.99 and 8.06 , 11.99 % compared to I_2 and I_3 in 1st and 2nd seasons, respectively these results may be suitable interval in I_1 these agreement with Ali (1997) who

found that , the kernels number / spike were increased when irrigation increased from 3-4 irrigations.

The number of grains /spike with farmyard manure increases by 4.36 and 4,72 % compared to without farmyard manure in 1st and 2nd seasons, respectively.

Moreover, increasing the fertilization N levels increase number of grains / spike .The treatment of 80 kg N/ fed increases number of grains /spike by 8.83 , 5.18 and 7.21 , 4.01 % compared by fertilization of40 and60 kgN/fed.in 1stand2nd seasons respectively.

Number of grains /spike affected by interaction of all treatments. The highest values were 68.55 and 69.73grains/spikein two seasons under I_1, with farmyard manure and fertilization Level 80 kgN/fed

1000 -grain Weight (gm):

1000 weight (gm) affected by irrigation intervals , farmyard manure, fertilization N levels and their interaction .

Data in Table(4)show that,1000 weight (gm)increase by decrease intervals between irrigation , highest values observed by using I_1. Weight of 1000 grain (gm) increase by 4.29 , 8.97 and 4,51, 8.99 % compared to I_2 and I_3 in 1st and 2nd seasons, respectively.

Increase 1000 weight with farmyard manure compered to without farmyard manure, the increase were 5.64 and 4.84 %in 1st and 2nd seasons respectively.

Increase 1000 grain weight (gm) by increase fertilization N levels from 40 to 60and 80 kg N/ fed. Highest values were 52.00 and 52.38 (gm)by using 80 kg N/ fed in the 1st and 2nd seasons respectively . Nitrogen fertilizer had a significant effect on 1000-grain weight 80 Kg N/fad caused the heaviest grains. These results are in harmony with Allam (2005) .

1000 grain weight affected by interaction between treatments . The highest values were 55,63 and 55.99 (gm) due to interaction between irrigation every 30 day (I_1) , FYM and fertilization level 80 kg N/fed.While lowest values were 45.31 and 45.91 (gm) due interaction irrigation every 50 day, without FYM and 40 kgN /fed

Table (4): 1000– grain weigh (gm) and grain yield (Mg fed^{-1}) affected by Irrigation intervals, farmyard, fertilization N levels and interaction in Two seasons of study.

seasons .	Organic manure	Irr.Inter. . Fer.Levels	1000 - grain weight (gm)				Grain yield Mg fed^{-1}			
			I1	I2	I3	Mean	I1	I2	I3	Mean
1st season	With FYM	40kgN/fed	52.93	50.81	48,69	51.14	3.320	3.120	2.822	3.087
		60kgN/fed	53.87	51.72	49.56	51.72	3.488	3.314	2.965	3.255
		80kgN/fed	55.63	53.40	51.18	53.40	3.676	3.492	3.124	3.431
		Mean	54.14	51.98	49.81	52.09	3.428	3.309	2.970	3.257
	Without FYM	40kgN/fed	50.34	47.82	45.31	47.82	3.140	2.983	2.669	2.930
		60kgN/fed	51.63	49.05	46.47	49.05	3.265	3.102	2.775	3.048
		80kgN/fed	53.25	50.59	47.93	50.59	3.454	3.281	2.936	3.223
		Mean	51.74	49.15	46.57	49.15	3.286	3.122	2.793	3.067
2nd season	With FYM	40kgN/fed	53,00	50.88	48,76	50.88	3.390	3.255	2.916	3.187
		60kgN/fed	54.62	52.43	50.25	52.43	3.56	3.421	3.064	3.349
		80kgN/fed	55.99	53.75	51.51	53.64	3.745	3.595	3.220	5.20
		Mean	54.54	52.35	50.17	52.32	3.565	3.424	3.067	3.912
	Without FYM	40kgN/fed	51.01	48.46	45.91	48.46	3.200	3.072	2.720	2.997
		60kgN/fed	52.41	49.79	47.17	49.79	3.310	3.177	2.813	3.100
		80kgN/fed	53.80	51.11	48.42	51.11	3.501	3.361	2.976	3.280
		Mean	52.41	49.79	47.17	49.79	3.337	3.203	2.836	3.126

Grain yield(Mg fed^{-1}) :

Data in Table (4) show, grain yield affected by irrigation intervals , farmyard manure , fertilization levels N and their interaction .Grain yield decreases by increasing intervals , the percentage of decreasing were 5.16, 14 .99 and 4.00, 14.48 % compared to I2 and I3 in 1st and 2ndseasons, respectively. Increasing grain yield with increasing irrigation due to increase yield component such as number of grains /spike and 1000- grain weight. These results agreement with Moussa and Abdel-Maksoud(2004) .

Due to using farmyard manure grain yield increase by5.85 and 6.76 % compared to without farmyard manure in 1st and 2nd seasons respectively.These results agreement with Aliet. al (2008)

Grain yield affected by fertilization levels, grain yield increases by increasing fertilization levels from 40 to 60 and 80 kg N/fed. With 80 kg N /fed. grain yield increase by9.56 , 3.28 and 9.05 , 5.15 % compared to fertilization levels 40 and 60 kg N/fed. In 1st and 2nd seasons, respectively,

Data in Table (4) show that the highest values of the grain yield were 3.676 and 3.745 Mg fed^{-1}due to interaction between irrigation every 30 day (I1) , with farmyard fertilization level 80 kg N/ fed. Lowest values (2.669 and 2.916 Mg fed^{-1}) due to interaction between irrigation every 50 day ,without farmyard manure and fertilization level 40 kg N/fed. .

Irrigation water :

Irrigation water affected by irrigation intervals, farmyard manure and fertilization N levels . Data in Table (5) show that. Irrigation water decrease by increasing intervals , the percentage of decreasing were 11.02 , 19.92 and 10.42,19.17 % by using I2 and I3 compared to I1 in 1st and 2ndseasons respectively. These data due to decrease irrigation number in I2 and I3.

Due to using farmyard manure irrigation water decrease by 6.84 and 7.33 % compared to without farmyard manure in 1st and 2nd seasons, respectively

Irrigation water affected by fertilization levels, irrigation water increase by increasing fertilization levels from 40 to 60 and 80 kg N/fed. With 80 kg N /fed. Irrigation water increase with 80 kg N/fed. by 7.30 , 3.54 and 6.31 , 3.64 % compared to fertilization levels 40 and 60 kg N/fed. In 1st and 2nd seasons respectively,

Data in Table (5) show that the highest values of water applied were 60.95 and 60.71 cm . due to interaction between irrigation every 30 day (I1) , without farmyard manure and Fertilization level 80 kg N/ fed. Lowest values (42.62 and 43.81 cm) due to interaction between irrigation every 50 day, with farmyard manure and fertilization level 40 kg N/fed.

Table (5): Irrigation water (cm) and water use efficiency of grain yield WUE (kg cm^{-1}) affected by irrigation intervals and farmyard fertilization N levels and their interaction in two seasons of study.

Seasons	Organic manure	Fertilization. levels	Irrigation water (cm)				(WUE) kg cm^{-1}			
			Irrigation intervals				Irrigation intervals			
			I1	I2	I3	Mean	I1	I2	I3	Mean
1st season	With Farmyard manure	40kgN/ fed	52.74	45.24	42.62	46.87	62.95	66.76	66.92	65.54
		60kgN/fed	53.93	47.62	44.52	48.69	64.69	67.20	67.27	66.87
		80 kgN/fed	55.36	50.00	45.48	50.27	66.41	67.84	68.69	67.64
		Mean	54.01	47.62	44.21	48.61	64.68	67.27	67.63	66.68
	Without Farmyard manure	40 kg N/fed	56.31	50.00	44.29	50.20	55.77	59.66	60.26	58.56
		60 kg N/fed	57.86	52.38	45.60	51.94	56.43	59.76	60.86	59.02
		80 kg N/fed	60.95	54.76	47.50	54.40	56.67	59.92	61.81	59.47
		Mean	58.37	52.38	45.80	52.18	56.29	59.78	60.98	59.02
2nd season	With Farmyard manure	40 kg N/fed	52.86	46.43	43.81	47.70	64.13	65.80	66.56	65.50
		60 kgN/fed	55.00	48.81	45.71	49.84	64.78	65.99	67.03	65.93
		80 kg N/fed	56.66	50.00	46.67	51.11	66.10	67.90	68.99	67.77
		Mean	54.84	48.41	45.40	49.55	65.00	66.56	67.53	66.42
	Without Farmyard manure	40 kg N/fed	57.62	52.38	45.48	51.83	55.54	58.65	59.81	58.00
		60 kg N/fed	60.00	53.57	46.79	53.45	55.66	59.31	60.13	58.37
		80 kg N/fed	60.71	55.95	48.69	54.12	57.67	60.10	61.13	59.63
		Mean	59.44	53.97	46.99	53.13	56.29	59.35	60.36	58.66

Water use efficiency:

Water use efficiency affected by irrigation intervals , farmyard manure and fertilization N levels . Data in Table (5) show that the water use efficiency increases by decreasing water irrigation .The highest value were 64.31 and 63.94 kg/cm under irrigation intervals 50 day in 1st and 2nd seasons , followed by 63.53 and 62.96 kg/ cm under irrigation every 40 day and the lowest value under interval 30 day. These agreement with Hefnawy and Wahba(2003).

Farmyard manure effected on water use efficiency , with farmyard manure ,water use efficiency increased by 11.49 and 11.59 %

compared to without farmyard manure in 1st and 2nd seasons, respectively.

Water use efficiency affected by fertilization N levels , by increase N levels water use efficiency increase ,highest values were 63.56 and 63.65 kg /cm under 80 kg N/ fed. followed by 62.95 and 62.55 kg /cm under 60 kg N/ fed. and 62.06 and 61.75 Mag /fed. 40 kg N/fed in 1st and 2nd seasons respectively.

Data in Table (5) show highest values were 68.69 and 68.99 kg / cm . due to interaction between irrigation every 50 day (I3) , with farmyard manure and Fertilization level 80 kg N/ fed. Lowest values (55.76 and 55.54 kg / cm) due to interaction between irrigation every 30 day ,without farmyard manure and fertilization level 40 kg N/fed. .

CONCLUSION

The objective of this research study the effect of nitrogen fertilizers levels, with and without adding farmyard manure under three irrigation intervals on wheat yield and yield components, straw and water use efficiency. The results showed that :

The treatment of irrigation every 30 days , the plant height, straw yield (ton /fed) ,spike height .No. of grains /spike and grain yield (Mg /fed) were increased . the water use efficiency was decreased .

Using farmyard manure increase the plant height, straw yield (ton/fed) ,spike height .No. of grains /spike , grain yield (Mg /fed) and water use efficiency compared to without farmyard manure .

Increasing fertilization N levels increase both plant height, straw yield (ton/fed) ,spike height .No. of grains /spike , grain yield (Mg /fed) and water use efficiency were increased .

In order to maximize wheat yield and its components and to use the irrigation water efficiently , under Gemmeiza area conditions , it is recommended to irrigation interval 30 days , with farmyard manure and fertilization level 80 kg N/fed.

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الملخص العربى

ادارة مياة الرى السطحى على محصول القمح فى الوادى القديم

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اقيمت تجربتان حقليتان بمزرعة محطة البحوث بالجميزة – محافظة الغربية ، لدراسة تأثير ثلاث فترات رى (رى كل ٣٠ و ٤٠ و ٥٠ يوم) ومعاملتان للسماد البلدى (اضافة وعدم اضافة السماد) وثلاث مستويات للتسميد النيتروجينى (٤٠و ٦٠ و٨٠ كجم /فدان) على محصول القمح و مكونات المحصول وكفاءة استخدام مياه الرى وقد استخدم تصميم القطع المنشقة مرتين فى ثلاث مكررات ويمكن تلخيص اهم النتائج المتحصل عليها فيما يلى :

أدى الرى كل ٣٠ يوم الى زيادة كل من طول النبات(سم) و وزن القش(طن /فدان) وطول السنبلة (سم) وعدد ا لحبوب / السنبلة وكذلك الناتج الكلى للحبوب (طن / فدان) مقارنة بالرى كل ٤٠ و ٥٠ يوم .

كما أدى استخدام السماد البلدى الى زيادة كلا من طول النبات ووزن القش وطول السنبلة وعدد ا لحبوب / السنبلة واالناتج الكلى من الحبوب وكدلك كفاءة استخدام المياه مقارنة بعدم استخدام السماد العضوي.

وأدى زيادة مستوى التسميد النيتروجين الى زيادة كلا من طول النبات و وزن القش وطول السنبلة وعدد الحبوب/ السنبلة و االناتج الكلى من الحبوب وكدلك كفاءة استخدم المياه .

ولذلك نوصى تحت ظروف التجربة ، للحصول على اعلى انتاجية للقمح الرى كل ٣٠ يوم مع التسميد العضوى والتسميد النيتروجينى بمعدل ٨٠ كجم / فدان .

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