Annals of Agricultural Science, Moshtohor (ASSJM)
https://assjm.journals.ekb.eg/
www.fagr.bu.edu.eg
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Original Article Vol. 62(2) (2024), 141 – 148 DOI:10.21608/assjm.2024.305440.1304

# Grain Yield and Attributes of Bread Wheat Varieties as Affected by Irrigation System and Deprivation of Some Irrigation in Sandy Soil

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## Abstract

Irrigation systems were significant effective on all characters except No. spikelets spike-1 in the second season only was insignificant. The highest values of all traits were gained by a drip irrigation system in both seasons. Sakha 95 variety gave the highest values and significance for height of plant, number spikes/m2, No. spikelets spike-1, weight spike and grain yield fed-1 in both seasons. Plant height, number spikes/m2, No. spikelets/spike, weight of spike and grain yield was highly significant affected by irrigation deprivation in both seasons. Significant impact of interaction between irrigation systems and wheat varieties was gained for height of plant in both seasons and spikes number/m2 and grain yield/fed in the second season only. Significant effect of interaction between irrigation systems and irrigation deprivation was obtained for plant height in the first season only and spikes number m-2 and grain yield/fed in both seasons. The interaction between wheat varieties and irrigation deprivation showed highly significant for plant height and spikes number m-2 in the first and second seasons, respectively and grain yield/fed in both seasons. Regarding the interaction effect, among irrigation systems, wheat varieties and irrigation deprivation were significant differences of plant height and spikes number m-2 in both seasons and grain yield/fed in the second season only. planting Sakha 95 variety under drip irrigation system and normal irrigation or deprivation at 125 DAS.

**Keywords:** *Flooding and drip irrigation, Bread wheat varieties, Irrigation deprivation, Yield and attributes.*

## Introduction

Wheat is deemed the major exporter of food in the world and Egypt. Increasing wheat output out of growing productivity and the cultivated area is a substantial national target to diminish the gap between the Egyptian output and consumption. Raising wheat area unit yield can be realized by breeding high yielding cultivars and enriching the cultural of dealings with crop by enhancement agricultural practices. Several investigators stated, that drip irrigation is more efficiency in water conserving, since there are reduced water losses through surface evaporation, less surface runoff, as well as minimal deep percolation. Flooding irrigation is the application of water in the form of a flood from the flow of water under through big strips. In the light of the present national water policy concerning saving irrigation water expanding wheat area needs more searching for varieties produce high yield under suitable water regime. But safe saving an irrigation, beside it closely dependence on plant growth stage, is greatly influenced by a number of factors especially cultivars.

In this connection, the use of modern irrigation systems in wheat yield and yield components as reported by **Abd El-Rahman (2009), Mansour *et al.*, (2019), Mansour *et al.*, (2020), El-Daly *et al.*, (2022) and Yuan *et al.*, (2022)**.

Sundry examiner showed that bread wheat varieties differed in yield and its attributes (**Mehasen *et al.*, 2013; Mehasen *et al.*, 2014; Mehasen *et al.*, 2015; Abdel-Lattif *et al.*, 2019 and El-Daly *et al.*, 2022**).

Many investigators has reported that deprivation at irrigation at any growth stages of wheat was affected on yield and its components (**Abd-AllaKotb 2005; Ramadan and Awaad 2008; El-Nady, 2009 and Mehasen *et al*, 2014**).

Therefore, the present investigation was designed to study the performance and productivity of three bread wheat varieties under two irrigation systems (flooding and drip irrigation) under four levels of irrigation deprivations in sandy soil.

## Materials and Methods

The present study was carried out during winter seasons 2021/2022 and 2022/2023 at Enchase, The National Service Projects Authority, El-Sharkia Governorate, Egypt, to study the effect of four irrigation deprivation {Normal, deprivation at 45 DAS

(at tillering and elongation stage), deprivation at 90 DAS (at heading stage) and deprivation at 125 DAS (at milk and filling stege)} on grain yield and attributes of three bread wheat varieties (Giza 171, Misr 3 and Sakha 95) under flooding and dripping irrigation systems in sandy soil.

The ground was sandy in texture, pH value (7.78), organic matter (0.60%), $CaCO_3$% (1.71%) and EC ($dSm^{-1}$) (1.69) as average of both seasons.

Every experiment included twenty-four treatments which were the combination of two irrigation systems, three bread wheat varieties and four irrigation deprivations. The experimental design was a split split-plot with three replications. Two irrigation systems were arranged in the main plots, the sub plots were assigned random by to the three bread wheat varieties randomly and the four irrigation deprivations were arranged by in the sub sub-plots. The sub sub-plot area was 10.5 $m^2$ (3 ×3.5m). Varieties of wheat were sown on November 10$^{th}$ and 15$^{th}$ in the first and second seasons, respectively. P fertilizer with the a rat of 31 kg $P_2O_5$ $fed^{-1}$ added in one dose was applied as calcium super phosphate (15.5% $P_2O_5$) form before drilling pending seedbed preparation. The other common cultural practices were carried out like recommendations of the region.

- Collected data.

Random patterns of ten plants were taken from every sub-plot at maturing time to set the following traits: height of plant (cm), weight of spike (g) and number of spikelets $spike^{-1}$. For set number $spikes/m^{-2}$ a sample of one square meter from each sub sub-plot was taken. Grain yield (kg $fed^{-1}$) was predestined on total sub sub-plot basis.

- Statistical analysis.

Analysis of difference was done for the data of every season individually as stated by **Snedecor and Cochran (1980)** treatment means were compared using least significant difference test at 0.05 level of significance. Using the MSTAT-C Statistical Software package (**Michigan State University, 1983**)

## Results and Discussion

Analysis of differences for whole treatments in each season is exhibited in Tables (1). Irrigation systems mean squares were significant for all traits of study in first and second seasons except No. spikelets $spike^{-1}$ in the second season was not significant. Wheat varieties mean squares were highly significant for all characteristics in first and second seasons except spike weight in the second season was significant only. Irrigation deprivation treatments mean squares were highly significant for grain yield and attributes in both seasons.

**Table 1.** Mean square values and significance for yield and attributes of wheat under irrigation system & deprivation, varieties and their interactions in 2021/22, 2022/23 seasons

| SOV | df | Plant height (cm) | No. spikes $m^{-2}$ | No. spikelets $spike^{-1}$ | Spike weight (g) | Grain yield (kg $fed^{-1}$) |
|---|---|---|---|---|---|---|
| **2021/22 season** | | | | | | |
| **Rep** | **2** | 5.056 | 30.51 | 1.01$^{*}$ | 0.004 | **5771** |
| **IS.** | **1** | 813.38$^{**}$ | 2312.00$^{**}$ | 15.12$^{**}$ | 0.080$^{*}$ | **154012**$^{*}$ |
| **Err.(a)** | **2** | 0.389 | 10.29 | 0.04 | 0.002 | **4715** |
| **Var.** | **2** | 539.68$^{**}$ | 1882.34$^{**}$ | 15.93$^{**}$ | 0.129$^{**}$ | **393544**$^{**}$ |
| **ISxV** | **2** | 56.09$^{**}$ | 29.29 | 0.12 | 0.008 | **9116** |
| **Err.(b)** | **8** | 3.097 | 9.71 | 0.34 | 0.004 | **3803** |
| **De** | **3** | 567.94$^{**}$ | 5577.68$^{**}$ | 17.45$^{**}$ | 0.614$^{**}$ | **692557**$^{**}$ |
| **ISxDe** | **3** | 10.09$^{**}$ | 15.85$^{*}$ | 0.16 | 0.001 | **8082**$^{*}$ |
| **VarxDe** | **6** | 5.90$^{**}$ | 9.92 | 0.59 | 0.002 | **10581**$^{**}$ |
| **IxVxD** | **6** | 5.91$^{**}$ | 14.86$^{**}$ | 0.27 | 0.001 | **3153** |
| **Err.(c)** | **36** | 1.69 | 4.35 | 0.58 | 0.003 | **2533** |
| **2022/23 season** | | | | | | |
| **Rep** | **2** | 4.26 | 1.09 | 0.22 | 0.002 | **3922** |
| **IS.** | **1** | 338.00$^{**}$ | 696.88$^{**}$ | 10.12 | 0.161$^{*}$ | **102906**$^{**}$ |
| **Err.(a)** | **2** | 2.37 | 3.18 | 0.00 | 0.007 | **442** |
| **Var.** | **2** | 220.01$^{**}$ | 1975.05$^{**}$ | 23.72$^{**}$ | 0.061$^{*}$ | **347928**$^{**}$ |
| **ISxV** | **2** | 12.79$^{**}$ | 32.88$^{*}$ | 0.16 | 0.007 | **14960**$^{**}$ |
| **Err.(b)** | **8** | 0.44 | 7.11 | 0.19 | 0.008 | **1029** |
| **De** | **3** | 344.55$^{**}$ | 4489.50$^{**}$ | 14.01$^{**}$ | 0.420$^{**}$ | **1237137**$^{**}$ |
| **ISx De** | **3** | 3.14 | 80.25$^{**}$ | 0.01 | 0.001 | **11388**$^{**}$ |
| **VarxDe** | **6** | 1.79 | 20.61$^{**}$ | 0.72 | 0.002 | **4784**$^{**}$ |
| **IxVxD** | **6** | 3.38$^{*}$ | 19.92$^{**}$ | 0.05 | 0.006 | **3063**$^{**}$ |
| **Err.(c)** | **36** | **1.21** | **3.95** | **0.50** | **0.004** | **824** |

* and ** significant at 5% and 1% level of probability, respectively

The interaction between irrigation systems and wheat varieties mean squares was highly significant for plant height in both reasons and were significant for number spikes $m^{-2}$ & highly significant for grain yield fed in the second season. The interaction between irrigation systems and irrigation deprivation treatments mean squares was significant and highly significant for number spikes $m^{-2}$ and grain yield/fed

in the first and second seasons, respectively and highly significant for plant height in the first season only. The interaction between wheat varieties and irrigation deprivation treatments mean squares was not significant for all studied characters except grain yield/fed was highly significant in both seasons, plant height in first season and number spikes $m^{-2}$ in the second season were highly significant. The interaction among irrigation systems, wheat varieties and irrigation deprivation treatments mean squares were significant & highly significant for plant height in the first and second seasons, respectively and number spikes $m^{-2}$ was highly significant in both seasons as well as grain yield/fed which highly significant in the second season only.

**- Effect of irrigation systems.**

It was observed from **Table (2)** that plant height, No. spikes $m^{-2}$, No. spikelet's $spike^{-1}$, spike weight and grain yield fed were affected by irrigation systems. The obtained results showed that there were significant differences between irrigation systems, for all studied characters except No. spikelet's $spike^{-1}$ in the second season was no significant differences. According to the irrigation systems, the results indicated that drip irrigation was the best one which allowed the plant to take enough water and nutrients with high efficiency (**Abd El-Rahman, 2009; Mansour *et al.*, 2019; Mansour *et al.*, 2020; El-Daly *et al.*, 2022 and Yuan *et al.*, 2022)**.

**Table 2.** Grain yield and attributes of wheat as affected by irrigation system & deprivation and varieties in 2021/2022 (S1) and 2022/2023 (S2) seasons

| Treatments | Plant height (cm) | | No. spikes $m^{-2}$ | | No. spikelets $spike^{-1}$ | | Spike weight (g) | | Grain yield (kg $fed^{-1}$) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 |
| **Irrigation system** | | | | | | | | | | |
| **Flooding** | 100.5 | 95.6 | 323.4 | 312.1 | 20.3 | 19.5 | 2.07 | 1.89 | 2474 | **2288** |
| **Drip** | 107.2 | 99.9 | 334.8 | 318.4 | 21.3 | 20.3 | 2.14 | 1.99 | 2567 | **2364** |
| **Significance** | ** | ** | ** | ** | ** | NS | * | * | * | ** |
| **Varieties** | | | | | | | | | | |
| **Giza 171** | 104.8 | 98.2 | 331.1 | 318.8 | 20.9 | 20.3 | 2.12 | 1.95 | 2582 | **2347** |
| **Misr 3** | 98.7 | 94.5 | 319.4 | 305.0 | 20.0 | 18.7 | 2.03 | 1.89 | 2373 | **2197** |
| **Sakha 95** | 108.0 | 100.5 | 336.8 | 322.0 | 21.6 | 20.6 | 2.18 | 1.99 | 2606 | **2435** |
| **Significance** | ** | ** | ** | ** | ** | ** | ** | * | ** | ** |
| **LSD at 5%** | **1.1** | **0.4** | **2.0** | **1.7** | **0.3** | **0.2** | **0.04** | **0.06** | **41** | **21** |
| **Irrigation deprivation at** | | | | | | | | | | |
| **Normal** | 109.6 | 102.1 | 346.4 | 330.4 | 21.8 | 20.7 | 2.31 | 2.08 | 2738 | **2577** |
| **45 DAS** | 96.6 | 92.1 | 306.3 | 294.6 | 20.0 | 19.1 | 1.87 | 1.73 | 2319 | **1992** |
| **85 DAS** | 102.6 | 96.6 | 325.0 | 311.9 | 20.0 | 19.1 | 2.08 | 1.92 | 2396 | **2250** |
| **125 DAS** | 106.5 | 100.1 | 338.7 | 324.2 | 21.5 | 20.6 | 2.17 | 2.03 | 2630 | **2486** |
| **Significance** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| **LSD at 5%** | **0.8** | **0.7** | **1.4** | **1.3** | **0.5** | **0.4** | **0.03** | **0.04** | **34** | **19** |

* and ** significant at 5% and 1% level of probability, respectively

**-Varietals differences.**

The outcomes indicated in Table (2) show clearly that, there were highly significant variances among varieties in all studied traits in both seasons. Sakha 95 variety surpassed other varieties where it gave the greatest values of height of plant (108.0 and 100.5 cm), No. spikes/$m^2$ (336.8 and 322.0 spike), No. spikelets/spike (21.6 and 20.6 spikelet), spike weight (2.18 and 1.99 g) and grain yield/fed (2606 and 2435 kg) in the first and second seasons, respectively. It could be complemented that varietal variation among wheat varieties may be because genetical make up. The superiority of Sakha 95 variety in grain yield (kg $fed^{-1}$) over other varieties might be due to the increase in the yield components. The results were obtained by **Mehasen *et al.*, (2013); Mehasen *et al.*, (2014); Mehasen *et al.*, (2015); Abdel-Lattif *et al.*, (2019) and El-Daly *et al.*, (2022)** indicated marked differences among wheat varieties in yield and yield components.

**-Effect of irrigations deprivation.**

The mean values of the traits studied as affected by irrigation treatments are presented in Table (2). Deprivation an irrigation at tillering and elongation stage (deprivation at 45 DAS), heading stage (deprivation at 90 DAS), milk and filling stage (deprivation at 125 DAS) stages treatments showed highly significant differences in all traits studied in both seasons. Deprivation one irrigation either at tillering & elongation or at heading stages decreased all traits studied in both seasons. Deprivation irrigation at 125 DAS led to the lowest loss percentages in plant height (2.83 and 1.96%), No. spikes/$m^2$ (2.22 and 1.88%), No. spikelets/spike (1.38 and 0.48%), spike weight (6.06 and 2.40%) and grain yield/fed (3.94 and 3.53%), while, the highest loss

percentages were plant height (11.86 and 9.79%), No. spikes/$m^2$ (11.58 and 10.84%), No. spikelets/spike (8.26 and 7.73%), spike weight (19.05 and 16.38%) and grain yield/fed (15.30 and 22.70%) were produced from deprivation irrigation at 45 DAS in the first and second seasons, respectively compared with normal irrigation. The negative effect of yield and its components caused by deprivation an irrigation could be explained on the basis of the loss of turgor which affects the rate of cell expansion and ultimate cell size. Loss of turgor is probably the most sensitive process to water stress, thus, decrement in growth rate, stem elongation and leaf expansion. In this connection, **Abd-AllaKotb (2005), Ramadan and Awaad (2008), El-Nady (2009), Mehasen *et al* (2014) and**, reached the same conclusion.

**-Interactions effect.**

Significant effect of interaction between irrigation systems and wheat varieties was obtained for plant height in both season, No. spikes $m^{-2}$ and grain yield/fed in the second season only **Table** 3 a&b. Moreover, data cleared that the highest mean values of plant height, No. spikes $m^{-2}$ and grain yield/fed were obtained by drip irrigation with Sakha 95 variety.

**Table 3a.** Effect of the interaction between irrigation system and wheat varieties on plant height (cm) in 2021/2022 and 2022/2023 seasons

| | First season 2021/22 | | | Second season2022/23 | | |
|---|---|---|---|---|---|---|
| | Varieties | | | Varieties | | |
| Irrigation system | Giza 171 | Misr 3 | Sakha 95 | Giza 171 | Misr 3 | Sakha 95 |
| Flooding | 102.41 | 96.16 | 102.91 | 96.83 | 92.33 | 97.66 |
| Drip | 107.25 | 101.25 | 113.16 | 99.66 | 96.75 | 103.41 |
| Significance | | ** | | | ** | |
| LSD at 5% | | 1.65 | | | 0.58 | |

**Table 3b.** Effect of the interaction between irrigation system and wheat varieties on No. spikes $m^{-2}$ and grain yield (kg $fed^{-1}$) in 2022/2023 season

| | No. spikes $m^{-2}$ | | | Grain yield (kg $fed^{-1}$) | | |
|---|---|---|---|---|---|---|
| | Varieties | | | Varieties | | |
| Irrigation system | Giza 171 | Misr 3 | Sakha 95 | Giza 171 | Misr 3 | Sakha 95 |
| Flooding | 315.83 | 303.00 | 317.75 | 2283 | 2161 | 2420 |
| Drip | 321.83 | 307.00 | 326.41 | 2411 | 2232 | 2449 |
| Significance | | * | | | ** | |
| LSD at 5% | | 1.60 | | | 30 | |

The interaction between irrigation systems and irrigation deprivation cleared that the significant effect occurred for No. spikes $m^{-2}$ and grain yield/fed in both seasons and plant height in the first season only **Table** 4 a&b. Data cleared that the highest mean values of plant height, No. spikes $m^{-2}$ and grain yield/fed were obtained by drip irrigation with normal irrigation.

**Table 4a.** Effect of the interaction between irrigation system and irrigation deprivation on No. spikes $m^{-2}$ and grain yield (kg $fed^{-1}$) in 2021/2022 and 2022/2023 seasons

| | First season 2021/22 | | | | Second season2022/23 | | | |
|---|---|---|---|---|---|---|---|---|
| | Irrigation deprivation at | | | | Irrigation deprivation at | | | |
| Irrigation system | Normal | 45 DAS | 85 DAS | 125 DAS | Normal | 45 DAS | 85 DAS | 125 DAS |
| | No. spikes $m^{-2}$ | | | | | | | |
| Flooding | 340.55 | 301.55 | 318.11 | 333.66 | 327.66 | 293.77 | 306.00 | 321.33 |
| Drip | 352.33 | 311.11 | 331.88 | 343.88 | 333.22 | 295.44 | 317.88 | 327.11 |
| Significance | | | * | | | | ** | |
| LSD at 5% | | | 1.99 | | | | 1.90 | |
| | Grain yield (kg $fed^{-1}$) | | | | | | | |
| Flooding | 2678 | 2277 | 2377 | 2564 | 2521 | 1966 | 2242 | 2425 |
| Drip | 2797 | 2360 | 2414 | 2695 | 2633 | 2017 | 2258 | 2547 |
| Significance | | | * | | | | ** | |
| LSD at 5% | | | 48 | | | | 27 | |

**Table 4b.** Effect of the interaction between irrigation system and irrigation deprivation on plant height (cm) in 2021/2022 season

| Irrigation system | Irrigation deprivation at | | | |
|---|---|---|---|---|
| | Normal | 45 DAS | 85 DAS | 125 DAS |
| Flooding | 105.55 | 93.00 | 100.33 | 103.11 |
| Drip | 113.77 | 100.22 | 105.00 | 109.88 |
| Significance | ** | | | |
| LSD at 5% | 1.24 | | | |

Significant effect of interaction between wheat varieties and irrigation deprivation was obtained for grain yield/fed in both seasons, plant height in the first season and No. spikes $m^{-2}$ in the second season **Table** 5 a&b. Moreover, data cleared that the highest mean values of plant height, No. spikes $m^{-2}$ and grain yield/fed were obtained by Sakha 95 variety with normal irrigation.

**Table 5 a.** Effect of the interaction between wheat varieties and irrigation deprivation on grain yield (kg $fed^{-1}$) in 2021/2022 and 2022/2023 seasons

| Varieties | First season 2021/22 | | | | Second season2022/23 | | | |
|---|---|---|---|---|---|---|---|---|
| | Irrigation deprivation at | | | | Irrigation deprivation at | | | |
| | Normal | 45 DAS | 85 DAS | 125 DAS | Normal | 45 DAS | 85 DAS | 125 DAS |
| Giza 171 | 2811 | 2381 | 2428 | 2706 | 2618 | 2014 | 2228 | 2530 |
| Misr 3 | 2558 | 2168 | 2318 | 2450 | 2431 | 1873 | 2148 | 2335 |
| Sakha 95 | 2845 | 2407 | 2441 | 2733 | 2681 | 2088 | 2375 | 2595 |
| Significance | ** | | | | ** | | | |
| LSD at 5% | 58 | | | | 33 | | | |

**Table 5b.** Effect of the interaction between wheat varieties and irrigation deprivation on plant height (cm) and No. spikes $m^{-2}$ in 2021/2022 and 2022/2023 seasons, respectively

| Varieties | First season 2021/22 | | | | Second season2022/23 | | | |
|---|---|---|---|---|---|---|---|---|
| | Irrigation deprivation at | | | | Irrigation deprivation at | | | |
| | Normal | 45 DAS | 85 DAS | 125 DAS | Normal | 45 DAS | 85 DAS | 125 DAS |
| | Plant height (cm) | | | | No. spikes $m^{-2}$ | | | |
| Giza 171 | 110.00 | 96.33 | 104.83 | 108.16 | 332.16 | 299.66 | 314.66 | 328.83 |
| Misr 3 | 105.00 | 92.00 | 96.83 | 101.00 | 321.66 | 282.66 | 300.83 | 314.83 |
| Sakha 95 | 114.00 | 101.50 | 106.33 | 110.33 | 337.50 | 301.50 | 320.33 | 329.00 |
| Significance | ** | | | | ** | | | |
| LSD at 5% | 1.52 | | | | 2.33 | | | |

Data in **Table** 6 a&b emphasized that the interaction among the three factors, irrigation systems, wheat varieties and irrigation deprivation have significant effect on plant height and No. spikes $m^{-2}$ in both seasons and grain yield/fed in the second season. The highest value of plant height, No. spikes $m^{-2}$ and grain yield/fed found by drip irrigation with Sakha 95 variety with normal irrigation treatment followed by deprivation irrigation at 125 DAS.

**Table 6 a.** Effect of the interaction between irrigation system, wheat varieties and irrigation deprivation on plant height (cm) and No. spikes $m^{-2}$ in 2021/2022 and 2022/2023 seasons

| Irrigation system | Varieties | First season 2021/22 | | | | Second season2022/23 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Irrigation deprivation at | | | | Irrigation deprivation at | | | |
| | | Normal | 45 DAS | 85 DAS | 125 DAS | Normal | 45 DAS | 85 DAS | 125 DAS |
| | | Plant height (cm) | | | | | | | |
| Flooding | Giza 171 | 106.33 | 93.66 | 104.33 | 105.33 | 101.33 | 90.33 | 95.33 | 100.33 |
| | Misr 3 | 101.33 | 90.33 | 95.00 | 98.00 | 95.33 | 87.00 | 93.00 | 94.00 |
| | Sakha 95 | 109.00 | 95.00 | 101.66 | 106.00 | 102.00 | 92.00 | 96.66 | 100.00 |
| Drip | Giza 171 | 113.66 | 99.00 | 105.33 | 111.00 | 105.00 | 94.00 | 98.00 | 101.66 |
| | Misr 3 | 108.66 | 93.66 | 98.66 | 104.00 | 101.33 | 91.33 | 94.33 | 100.00 |
| | Sakha 95 | 119.00 | 108.00 | 111.00 | 114.66 | 108.00 | 98.33 | 102.66 | 104.66 |
| Significance | | ** | | | | * | | | |
| LSD at 5% | | 2.15 | | | | 1.82 | | | |
| | | No. spikes $m^{-2}$ | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Flooding | Giza 171 | 342.00 | 303.66 | 321.00 | 339.66 | 328.00 | 300.00 | 308.33 | 327.00 |
| | Misr 3 | 332.33 | 291.66 | 310.00 | 321.00 | 321.00 | 280.33 | 297.66 | 313.00 |
| | Sakha 95 | 347.33 | 309.33 | 323.33 | 340.33 | 334.00 | 301.00 | 312.00 | 324.00 |
| Drip | Giza 171 | 352.00 | 311.00 | 335.33 | 344.33 | 336.33 | 299.33 | 321.00 | 330.66 |
| | Misr 3 | 342.00 | 302.33 | 320.66 | 335.66 | 322.33 | 285.00 | 304.00 | 316.66 |
| | Sakha 95 | 363.00 | 320.00 | 339.66 | 351.66 | 341.00 | 302.00 | 328.66 | 334.00 |
| Significance | | | ** | | | | ** | | |
| LSD at 5% | | | 3.45 | | | | 3.29 | | |

**Table 6 b.** Effect of the interaction between irrigation system, wheat varieties and irrigation deprivation on grain yield (kg fed$^{-1}$) in 2022/2023 season

| Irrigation system | Varieties | Irrigation deprivation at | | | |
|---|---|---|---|---|---|
| | | Normal | 45 DAS | 85 DAS | 125 DAS |
| Flooding | Giza 171 | 2530 | 1968 | 2200 | 2436 |
| | Misr 3 | 2386 | 1870 | 2110 | 2280 |
| | Sakha 95 | 2646 | 2060 | 2416 | 2560 |
| Drip | Giza 171 | 2706 | 2060 | 2256 | 2623 |
| | Misr 3 | 2476 | 1876 | 2186 | 2390 |
| | Sakha 95 | 2716 | 2116 | 2333 | 2630 |
| Significance | | | | ** | |
| LSD at 5% | | | | 47 | |

It can be concluded that use drip irrigation system and Sakha 95 variety cultivation and use normal irrigation treatment followed by deprivation irrigation at 125 DAS under the conditions of the experiment.

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# تأثر محصول الحبوب ومكوناته لبعض أصناف قمح الخبز بنظم الري وحرمان بعض الريات في الأراضي الرملية

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نفذت تجربتان حقليتان خلال الموسمين الشتويين 2022/2021 و2023/2022م في مزرعة قطاع أنشاص التابعة لجهاز مشروعات الخدمة الوطنية، بمنطقة أنشاص، محافظة الشرقية، مصر. كان الهدف من هذه الدراسة هو تقييم المحصول وبعض مكوناته لثلاث أصناف من قمح الخبز (جيزة 171 ، مصر3 وسخا 95 ) تحت نظامي الرى بالغمر والرى بالتنقيط بإستخدام أربع معاملات لحرمان بعض الريات (ري عادي ، حرمان رية في مرحلتي التفريع والإستطالة ، حرمان رية في مرحلة الطرد ، حرمان رية في مرحلتي الطور اللبني وإمتلاء الحبوب. وتم إستخدام تصميم قطع منشقة مرتين حيث إحتوت القطع الرئيسية نظامي الري. ووزعت أصناف القمح في القطع الشقية الأولي. بينما وضعت معاملات حرمان بعض الريات في القطع الشقية الثانية. وكانت مساحة القطعة الشقية الثانية 3م x 3.5م (10.5 م$^2$).

كانت هناك معنوية فعالة بين نظامي الري على جميع الصفات المدروسة في كلا موسمي الزراعة باستثناء صفة عدد أبراج السنبلة في الموسم الثاني فقط كانت غير معنوية. أعطي نظام الري بالتنقيط أعلي القيم لكل الصفات تحت الدراسة في موسمي الزراعة الأول والثاني.

أظهرت النتائج تفوق عالي المعنوية وكذلك أعلي القياسات للصنف سخا 95 لجميع الصفات تحت الدراسة في كلا موسمي الزراعة.

أعطت معاملة الري العادي زيادة عالية معنوية وأعلي القراءات لكل الصفات تحت الدراسة تليها معاملة حرمان رية عند 125 يوم بعد الزراعة لكلا موسمي الزراعة.

أظهر التفاعل بين نظم الري وأصناف القمح فروق معنوية لصفة طول النبات في كلا موسمي الزراعة وصفتي عدد السنابل للمتر المربع ومحصول الحبوب للفدان في الموسم الثاني فقط. كما أعطي التفاعل بين نظم الري ومعاملات حرمان بعض الريات فروق معنوية لصفة طول النبات في الموسم الآول فقط وصفتي عدد السنابل للمتر المربع ومحصول الحبوب للفدان في كلا موسمي الزراعة. بينما أظهر التفاعل بين أصناف القمح ومعاملات حرمان بعض الريات فروق عالية المعنوية لصفة طول النبات في الموسم الآول وصفة عدد السنابل للمتر المربع في الموسم الثاني ومحصول الحبوب للفدان في كلا موسمي الزراعة. أظهر التفاعل الثلاثي بين نظم الري وأصناف القمح ومعاملات حرمان بعض الريات إختلافات معنوية لصفتي طول النبات و عدد السنابل للمتر المربع في كلا موسمي الزراعة وصفة محصول الحبوب للفدان في الموسم الثاني فقط.

**توصي هذه الدراسه بزراعة صنف سخا 95 مع الري العادي أو تحريم رية عند 125 يوم بعد الزراعة تحت نظام الري بالتنقيط تحت ظروف هذه التجربة.**