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SUMMARY

The present investigation was conducted at under new land conditions , during the two successive growing seasons 2004 /2005 and 2005 /2206.
The aim of this investigation was to study the response of eighteen wheat genotypes (*T. aestivum L.*) for water deficit.
The irrigation treatments used in this study were as follows: 7, 10, 13 and 16 irrigations

The experiment was laid out in a split plot design with four replications. The irrigation treatments were assigned to the main plots. The genotypes were devoted to sub-plots. The obtained results can be summarized as follows:

A - Plant characteristics:

1- Number of days to heading: Increasing number of irrigations from seven to sixteen irrigations significantly delayed heading date in both season. The differences among genotypes in heading date were significant in both seasons. In 2004 /2005 season, genotypes no.2, 6 and 12 was the earliest genotypes, respectively . The highest value was obtained from genotypes no. 11, 14 and 5 respectively. In 2005 /2006 season, genotype no. 6 was the earliest genotype, followed by genotype no.2. While the latest heading date was genotype no. 7 In both season.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines 4, 8 and 10 were significantly reduced in number of days to heading with the treatment of 7irrigations, respectively. In 2005/ 2006 season, genotype no.6 and 2 were significantly reduced in number of days to heading with the treatment of 7 irrigations, followed by genotype no.6 with the treatment of 10 irrigations. While the earliest heading date was genotypes no. 3, 2 and 6 with the treatment of 7 irrigations, respectively , In both season.

<u>2- Flag leaf area</u>: Increasing number of irrigations from seven to sixteen irrigations significantly increased flag leaf area in both season. There were significant differences among genotypes in both seasons. In 2004 /2005 season, the highest value of flag leaf area was obtained from genotype no.9. While the lowest value of flag leaf area was obtained from genotype no. 6 . In 2005 /2006 season the highest value was obtained from Sids1 cultivar. while the highest value was obtained from genotype no.9, in both season.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines 2 and 6 were significantly reduced in flag leaf area with the treatment of 7irrigations, respectively. In 2005/ 2006 season, genotype no.5, 14 and line6 were significantly reduced in flag leaf area with the treatment of 7 irrigations. While the lowest value was genotype no. 1, 6 and 5 with the treatment of 7 irrigations in both season., respectively .

<u>3-Number of days to maturity</u>: Increasing number of irrigations from seven to sixteen irrigations significantly delayed heading date in both season. The differences among genotypes in maturity date were significant in both seasons. In 2004 /2005 season, genotypes no.2, 6 and 4, was the earliest in maturity, respectively. In 2005/ 2006 season , the earliest in maturity was from genotype no.6. The latest genotype in maturity was from Giza168 cultivar, in both seasons.

Irrigation treatment x genotype interactions were highly significant in 2005/2006 season, only. In 2005/ 2006 season, genotype no.2, 5, 6, 12 and Sakha93 were significantly reduced in number of days to maturity with the treatment of 7 irrigations. While the highest value was Sids1, Giza168 cultivars and line9 with the treatment of 16 irrigations, respectively , followed by genotype no.7 with the treatment of 7 irrigations. While the earliest maturity dates were of genotype no. 2, 5and 12 with the treatment of 7 irrigations in both season, respectively.

4- Plant height (cm): Irrigation treatments significantly affected plant height. The shortest plants were obtained from the application of seven irrigations, while the tallest plants were obtained from the application of sixteen irrigations in both seasons. There were significant differences among the studied genotypes in plant height in both seasons. In 2004 /2005 season ,. The tallest plants were obtained from genotypes no.9, Sids1 and line8, respectively. In 2005 /2006 season , Sids1 cultivar, genotypes no.15 and 1 gave the tallest plants. The tallest plants were obtained from Sids1 cultivar, in both seasons.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines2, 6 and 10 were significantly reduced in plant height with the treatment of 7irrigations, respectively. In 2005/ 2006 season, genotypes no.10, 8, 4 and Sakha93 were significantly reduced in plant height with the treatment of 7 irrigations. While the shortest plant was genotype no. 4and Sakha93 cultivar with the treatment of 7 irrigations in both season., respectively.

5- spike length (cm) : Irrigation treatments significantly affected spike length The shortest spike were obtained from the application of seven irrigations, while the tallest spike were obtained from the application of sixteen irrigations in both seasons. There were significant differences among the studied genotypes in spike length in both seasons. In 2004 /2005 season ,. The tallest spikes were obtained from genotype no.4 and 10, respectively. In 2005 /2006 season , the tallest spikes were obtained from genotypes no.7, 4, 3 and line12, respectively. While the tallest spike was genotype no.7, In both season.

Irrigation treatment x genotype interactions were, only highly significant in 2004/2005 season. In 2004/2005 season, Sids1 cultivar and line7 were significantly increased in spike length with the treatment of sixteen irrigations, respectively, followed by Sids1 with the treatments of thirteen irrigations. While the shortest spike was genotype no.4 with the treatment of ten and seven irrigations, respectively. While the shortest spike was genotype no. 5 with the treatment of seven irrigations, In both season.

B – Yield and its components :

1- Number of spikes per square meter : significant increase in number of spikes per square meter was obtained by increasing number of irrigations from seven to sixteen irrigations in both season. The application of sixteen irrigations gave the highest value of number of spikes /m^2. The application of seven irrigations gave the lowest value in both season. The differences among genotypes were significant. In 2004 /2005 season , the highest value of number of spikes /m^2 was obtained from genotypes no.3, 14, sakha93, no.4, 13 and Sids1, respectively.. In 2005 /2006 season, genotype no.3, 14, 4, Giza168 and sakha93 gave the highest value, respectively. In both seasons, the highest value of number of spikes /m^2 was obtained from genotype no.3.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines7, 15 and line1were significantly reduced in number of spike/m^2 with the treatment of 7irrigations, respectively. While the highest values were of genotypes no.14, 3 and Giza168 with the treatments of sixteen irrigations. In 2005/ 2006 season, genotypes no.7 and line15 were significantly reduced in number of spikes/m^2 with the treatment of seven irrigations, followed by genotype no.9 and 11 with the treatment of ten irrigations. While the lowest value of number of spikes/m^2 from genotype no. 7 and line15 with the treatments of seven irrigations in both season, respectively.

<u>2- number of grains per spike</u> : Irrigation treatments significantly affected number of grains per spike in both seasons. The application of sixteen irrigations gave the highest value of number of grains per spike, while the application of seven irrigation gave the lowest value. Wheat genotypes differed significantly in both season in number of grains per spike . In 2004 /2005 season , genotypes no. 14, 9 and line5 gave the highest value of number of grains per spike.. In 2005 /2006 season, Giza168 cultivar, line14, Sids1 and line5 gave the highest values. Genotype no.14, Sakha93, line9 and line5 gave the highest values in both seasons respectively.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines12, Sids1 and Giza168 were significantly reduced in number of grains/spike with the treatment of 7irrigations, respectively. While the highest values were of genotypes no.9, 14 and line5 with the treatment of sixteen irrigations, followed by genotype no.14 with the treatment of thirteen irrigations. In 2005/ 2006 season, genotype no.12, 7 and line1 were significantly reduced in number of grains/spike with the treatment of 7 irrigations. While the lowest value of number of grains/spike from genotype no. 12, Sids1and line7 with the treatment of seven irrigations In both season, respectively.

<u>3- Number of spikelets per spike :</u> Increasing number of irrigations from seven to sixteen irrigations increased significantly the number of spikelets per spike in both season . The differences among genotypes were significant in both season. In 2004 /2005 season, genotypes no.9, 7 and line10 gave the highest value of number of spikelets per spike. In 2005 /2006 season, the highest value was obtained from genotypes no.9, 7 and line14. The highest value was obtained from genotype no.9, in both seasons.

Irrigation treatment x genotype interactions were not significant in both seasons.

4- Grain weight per spike : Increasing number of irrigations from seven to sixteen irrigations increased significantly the grain weight per spike in both seasons, the highest value for grain weight per spike was obtained from the application of sixteen irrigations ,while the lowest value was obtained from the application of seven irrigations. Wheat genotypes differed significantly in grain weight per spike in both season . In 2004 /2005 season , the highest values of grain weight per spike was obtained from genotypes no.3 , 2, 6 and line1 . In 2005 /2006 season , genotypes no.14, 2 and line1 gave the highest values of grain weight per spike. The highest value was obtained from genotype no .2, in both seasons .

Irrigation treatment x genotype interactions were, only highly significant in 2005/2006 season. In 2005/ 2006 season, genotypes no.7, 12, Sakha93 and line 4 were significantly reduced in grain weight /spike with the treatment of 7 irrigations. While the lowest value of grain weight/spike from genotypes no. 12, 7, 8 and line15with the treatment of 7 irrigations in both season., respectively.

5- 1000-grain weight : Increasing number of irrigations from seven to sixteen irrigations significantly increase average of 1000- grain weight. in both seasons, The heaviest kernels were obtained from the application of sixteen irrigations ,while the lighter kernels were obtained from the application of seven irrigations in both season. The differences among studied genotypes were significant in both season. In 2004 /2005 season , genotypes no.3, 2, 14 and line13 recorded the heaviest kernels.. In 2005 /2006 season , the heaviest kernels were obtained from genotypes no.1, 2, 5 and line4, respectively . genotype no.3 gave the heaviest kernels, in both seasons.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines3, Giza168 and Sids1were significantly increased in 1000-grain weight with the treatment of 16 irrigations, respectively. While the lowest values were of genotype no.12 with the treatment of seven and ten irrigations, respectively.. In 2005/ 2006 season, genotype no.12 were significantly reduced in 1000-grain weight with the treatment of seven irrigations. While the lowest value for 1000-grain weight from genotype no. 12 and line7 with the treatment of seven irrigations In both season., respectively.

6- Grain yield (ardab/fed.) : Increasing number of irrigations from seven to sixteen irrigations significantly increase grain yield. in both seasons, The application of sixteen irrigations gave the highest value of grain yield. The application of seven irrigations gave the lowest value in both seasons. The differences among studied genotypes were significant. In 2004 /2005 season , the highest value of grain yield was obtained from genotypes no.3, 14 Giza168.. In 2005 /2006 season , genotypes no. 14 , 3, 5 and line4 gave the highest value. The highest value of grain yield was obtained from genotype no.14, in both seasons.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines12 and line7 were significantly reduced in grain yield with the treatment of 7irrigations, respectively. While the highest values were of genotypes no.3, 14 and Giza168 with the treatment of 16 irrigations, followed by genotype no.14 with the treatment of 13 irrigations. In 2005/ 2006 season, genotype no.9 was significantly reduced in grain yield with the treatment of 7 irrigations, followed by genotype no.12 with the treatment of ten irrigations. While the lowest value for grain yield from genotype no. 12 and line9 with the treatment of seven irrigation In both season s, respectively.

7- Straw yield (ton /fed.): Irrigation treatments significantly affected straw yield in both seasons. Increasing number of irrigations from seven to sixteen irrigations significantly increased straw yield. The highest value of straw yield was obtained from the application of sixteen irrigations, the lowest value was obtained from the application of seven irrigation in both seasons. Wheat genotypes differed significantly in straw yield in 2004 /2005 season where Sakha93 cultivar, Sids1, line3, 14 and Giza168 gave the highest values of straw yield. In 2005 /2006 season , Sids1 cultivar, line7, 4 and Sakha93 gave the highest value, respectively. The highest value was obtained from Sids1, in both seasons .

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines12 and line9 were significantly reduced in straw yield with the treatment of seven irrigations, respectively. While the highest values were of obtained from Giza168 cultivar, Sakha93, line14 and line3 with the treatment of sixteen irrigations. In 2005/ 2006 season, genotypes no.10 and 12were significantly reduced in straw yield with the treatment of seven irrigations. While the lowest value of straw yield from genotype no.12 with the treatment of seven and ten irrigations In both season., respectively.

8- Harvest index : Irrigation treatments significantly affected harvest index in both seasons. Increasing number of irrigations from seven to sixteen irrigations significantly increased harvest index. The highest value of harvest index was obtained from the application of sixteen irrigations, the lowest values were of obtained from the application of seven irrigations in both seasons. Wheat genotypes differed significantly in harvest index in 2004 /2005 season where genotypes no.3, 13, Giza168, 14, and line11 gave the highest value for harvest index. In 2005/2006 season, the highest values were of obtained from genotype no.3, 10, 5, 14 and line6, respectively. The highest values were from genotypes no.3, in the both seasons.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines 9, 8 and line7 were significantly reduced in harvest index the treatment of ten irrigations, respectively, followed by genotype no.7 with the treatment of seven irrigations. While the highest values were of obtained from genotypes no.14 and13 with the treatment of ten irrigations, followed by genotypes no.9 and 10 with the treatment of thirteen irrigations, followed by line 3 with the treatment sixteen irrigations. In 2005/ 2006 season, genotypes no.9 and Giza168 were significantly reduced in harvest index with the treatment of seven irrigations. While the lowest value of harvest index from genotype no.7 with the treatment of seven irrigations, followed by lines 7, Sids1 and line9 with the treatment ten irrigations in both season, respectively.

9- Biological yield (to /fed.) : Increasing number of irrigations from seven to sixteen irrigations significantly increased biological yield. in both seasons, The application of sixteen irrigations gave the highest value of biological yield. The application of seven irrigations gave the lowest value in both season. The differences among studied genotypes were significant. In 2004 /2005 season , the highest value of biological yield were obtained from genotypes no.4, 3, Giza168, Sakha93 and Sids1.. In 2005 /2006 season , Sids1, line4 and line7 gave the highest value. The highest value of biological yield was obtained from Sids1, in both seasons.

Irrigation treatment x genotype interactions were highly significant in both seasons. In 2004/2005 season, lines12 and line9 were significantly reduced in biological yield the treatment of seven irrigations, respectively. While the highest values were of obtained from Giza168 ,Sakha 93, line14 and line3 with the treatment of sixteen irrigations. In 2005/ 2006 season, genotype no.12 were significantly reduced in biological yield with the treatment of ten and seven irrigations, respectively. In both seasons, genotype no.12 were significantly reduced in biological yield with the treatment of seven and ten irrigations, respectively, followed by lines 9 and line11 with the treatment seven irrigations.

Conclusion

The results demonstrated that wheat grain yield was decreased under decreasing number of irrigations from sixteen to seven irrigations in both seasons, the highest value of grain yield was obtained from genotypes number 3 and 14 which were slightly affected by water stress . These two genotypes had higher grain yield and almost yield components than the other studied genotypes.