

CONTENTS

Subject	Page
INTRODUCTION	1
REVIEW OF LITERATURE.	2
I- Effect of sowing methods	2
II- Effect of seeding rates	7
III- Effect of wheat cultivars	15
MATERIALS AND METHODS	24
RESULTS AND DISCUSSION	28
I- Growth characteristics.	
1- Plant height (cm.)	28
2- Flag leaf area (cm ² .)	30
3- Number of days from planting till 50% heading	33
4- Number of days to physiological maturity	36
5- Total dry weight of plants at 60 days after sowing (g/m ² .)	38
6- Total dry weight of plants at 90 days after sowing (g/m ² .)	42
7- Total dry weight of plants at 120 days after sowing (g/m ² .)	45
II- Yield and Yield components.	
1- Spike length (cm.)... ..	48
2- Number of spikletes/spike	51
3- Spike weight (g.).....	53
4- Number of kernels/spike.....	56
5- Kernels weight/ spike (g.).....	59
6- Number of spikes/m ²	62
7- 1000-grain weight (g.)	65
8- Grain yield (ardab/fed.)	68
9- Straw yield (ton/fed.)	72
10- Harvest index (%).....	75
CONCLUSION	77
SUMMARY	78
LITERATURE CITED	88
ARABIC SUMMARY	--

SUMMARY

Two filed experiments were conducted at Mallawi Agricultural Research Station, Agricultural Research Center, Minia Governorate (Middle Egypt) in both successive growing winter seasons of 2009/2010 and 2010/2011. Each experiment aimed to find out the effect of some sowing Afir methods and seeding rates on yield and its components of some wheat cultivars. Wheat cultivars (Sids-12, Shandaweel-1 and Sakha-94) (*Triticum aestivum* L.) Was sown in both seasons. The preceding summer crop was maize (*Zea mays* L.) in both seasons.

The experimental design was used and the arrangement of treatments in a completely randomized blocks design with three replicates was used. The experimental split-split plot design, plot area was 10.5 m². (3 m. length and 3.5 m. width). With the main plot were allocated to sowing methods, seeding rates were allocated as sub-plot and wheat cultivars were allocated as sub-sub plots as follows: -

A-Main plots: Some sowing Afir methods:

1. Drilling with 20 cm. apart rows.
2. Broadcasting.
3. In furrows method with 60 cm. apart ridge. Planting on double row sloping bed and the top of the ridge.

B-Sub plots: Three seeding rates:

1. 40 kg /fed.
2. 60 kg /fed.
3. 80 kg /fed.

C –Sub- sub plots: Three bread wheat cultivars:

1. Sids-12.
2. Shandaweel-1.
3. Sakha-94.

I. Growth characteristics:-

1. Plant height (cm.) was insignificantly affected by sowing methods and seeding rates in both seasons. While, cultivars had significant effect. Sids-12 cultivar gave the shortest plants, while the tallest plants obtained from Sakha-94 in both seasons.

All the interactions between sowing methods, seeding rates and wheat cultivars were significant on plant height at harvest in first season only. Sowing Afir broadcast method × seeding rate 60 kg/fed. gave the tallest plants, while the shortest plants obtained from Afir drill method with 60 kg seed/fed. Sids-12 cultivar using Afir drill methods gave the shortest plants, while the tallest plants resulted from Afir broadcast method with Sakha-94. Sids-12 cultivar with seeding rate 40 kg/fed. gave the shortest plants, while the tallest plants obtained from Sakha-94 with 80 kg seed/fed.

Afir broadcast method, seeding rate 40 kg/fed. and Sids-12 cultivar gave the shortest plants.

2. Flag leaf area (cm².) were insignificantly affected by sowing methods, seeding rates and wheat cultivars, as well as, their interactions at 120 days age in both seasons. Afir drill method gave the highest value of flag leaf area, whereas, the lowest value obtained from Afir broadcast method. Seeding rate of 40 kg/fed. in first season and 60 kg/fed. in the second season, gave the highest values of this trait, meanwhile, 80 kg seed/fed. gave the lowest value. Shandawel-1 cultivar gave the highest value in flag leaf area, whereas Sakha-94 gave the lowest value.

Afir drill method × 40 kg seed/fed. in first season and the same method with 60 kg seed/fed. in the second season, gave the highest values of flag leaf area. Whereas, Afir broadcast method with 80 kg seed/fed. gave the lowest values in both seasons. Afir drill method with Shandawel-1 cultivar gave the highest value of flag leaf area, while Afir broadcast method with Sakha-94 cultivar gave the lowest values in both season.

Shandawel-1 cultivar with 40 kg seed/fed. recorded the highest value in flag leaf area in both seasons.

Seeding rate 40 kg/fed. × Shandawel-1 cultivar with sown by Afir drill method produced the highest values of flag leaf area in both seasons.

3. Number of days from planting till 50% heading: Afir drill method gave the earlier heading, but Afir broadcast method delayed heading in both seasons. Increasing seeding rates from 40 to 80 kg/fed. led to decrease the No. of days to heading in first season only. Sids-12 cultivar gave the shortest period to heading, while Sakha-94 cultivar produced the longest period to heading in second season only.

All the interactions gave a significant increment on No. of days from planting till 50% heading in second season only except, sowing methods and seeding rates was insignificant in both seasons. Afir drill method × Sids-12 Cultivar produced the shortest period to heading, while Afir broadcast method × Sakha-94 cultivar gave the longest period in second season only. Seeding rate 60 kg/fed. and cultivar Sids-12 gave the shortest period to heading, while the longest period obtained from adding 80 kg seed/fed. with Sakha-94 cultivar in second season only.

Sowing Afir drill method, 40 kg seed/fed and Sids-12 cultivar gave the shortest period to heading, while Afir broadcast method, Sakha-94 and 80 kg seed/fed. produced the longest period in second season only.

4. Number of days to physiological maturity: Sowing Afir drill method recorded the shortest period to maturity, while the longest period was resulted from Afir broadcast method in both seasons. Seeding rate 40 kg/fed. gave the shortest period to maturity, while the longest period obtained from adding 80 kg seed/fed. in first season only. Sids-12 cultivar recorded the shortest period to maturity, while the longest period was obtained by Sakha-94 cultivar in both seasons.

Sowing Afir drill method × 40 kg seed/fed. produced the shortest period to maturity. Whereas, the longest period obtained from Afir broadcast method with 80 kg seed/fed. in first season only. Seeding rate of 40 kg/fed × Sids-12 cultivar in first season and Shandawel-1 in second season recorded the shortest period to maturity, while the longest period obtained from adding 80 kg seed/fed. with Sakha-94 in both seasons.

Sowing Shandawel-1 cultivar by Afir in furrows method using 40 kg seed/fed. gave the shortest period to maturity, while Sids-12 cultivar by Afir broadcast method using 80 kg seed/fed. recorded the longest period to maturity in the first season only.

5. Total dry weight of plants (g/m².) was significantly affected by sowing methods at 60, 90 and 120 DAS in both seasons. Afir drill method surpassed with other methods on their effects in this trait in both season. Increasing seeding rates 40 to 80 kg/fed. caused decrease on this trait at 60, 90 and 120 days after sowing in both seasons. Shandawel-1 cultivar gave the highest value in this character at 60, 90 and 120 days in both seasons.

All interactions gave a significant increment on total dry weight of plants (g/m²) at 60, 90, and 120 days in both seasons except, seeding rates × wheat cultivars at 60 days it was in-significant in first season only. Sowing by Afir drill method with 40kg seed/fed gave the highest value in this trait at 60, 90, and 120 days in both seasons. Shandawel-1 cultivar × 40 kg seed/fed recorded the highest values in the three ages in both seasons. Afir drill method with Shandawel-1 cultivar gave the highest values in the three ages in this character in both seasons.

The best values in this trait recorded when wheat was sown by Afir drill method, seeding rates 40 to 60 kg seed/fed. and Shandawel-1 cultivar in both seasons.

II. Yield and yield components.

1. Spike length (cm.) was insignificant effect by sowing methods in both seasons. Increasing seeding rates caused decrease in this trait in the first season only. Shandawel-1 cultivar gave the tallest spikes, while the shortest spikes obtained from Sakha-94 in second season only.

The interaction between Afir drill method with 40 kg seed/fed. recorded the tallest spikes, while the shortest spikes was resulted from Afir broadcast method with 80 kg seed/fed. in first season only. Afir in furrows method with Sids-12 cultivar in first season and the same method with Shandawel-1 in the second season, gave the tallest spikes. Meanwhile, the shortest spikes resulted from Sakha-94 cultivar with Afir broadcast method in first season and the same cultivar with Afir in furrows method in the second season. Seeding rate 40 kg/fed. × Shandawel-1 cultivar recorded the tallest spikes, while the shortest spikes were obtained from Sakha-94 cultivar with adding 80 kg seed/fed. in first season only.

The tallest spikes obtained from Afir drill method under 40 kg seed/fed. with Sids-12 cultivar in first season. In the second season the tallest spikes resulted by Afir in furrows method, 40 kg seed/fed. and Shandawel-1 cultivar. Meanwhile, the shortest spike resulted from Afir broadcast method and used 80 kg seed/fed. with Shandawel-1 cultivar.

2. Number of spikletes/spike was significantly affected by sowing methods in both seasons. Afir drill methods surpassed Afir broadcast method in their effect on this trait. Increasing seeding rates up to 60 kg/fed. was decreased remarkably the No. of spikletes/spike. Sids-12 cultivar in first season and Shandawel-1 cultivars in the second season recorded the highest No. of spikletes/spike, while the lowest number obtained from Sakha-94 cultivar in both seasons.

All interactions gave a significant increment on No. of spikletes/spike in both seasons except, sowing methods × seeding rates and sowing

methods × wheat cultivars. Seeding rate 60 kg/fed. × Sids-12 cultivar gave the highest number of spikletes/spike, while the lowest value obtained from adding 80 kg seed/fed. with Sakha-94 cultivar in first season only.

The best treatment was sowing Shandawel-1 cultivar by Afir in furrows method using 40kg seed/fed, meanwhile the lowest value obtained from Afir broadcast method and adding 80 kg seed/fed. with Sakha-94.

3. Spike weight (g.)The heaviest spike obtained from Afir drill method, while the lowest value recorded from Afir in furrows method in first season only. Seeding rate 40 kg /fed. gave the heaviest spike, while the lowest value obtained with 80 kg seed/fed. in both seasons. Sids-12 cultivar recorded the heaviest spike, while the lowest value obtained from Sakha-94 cultivar in both seasons.

Afir drill method × seeding rate 40 kg/fed. produced the heaviest spike, while the lowest value obtained from Afir broadcast method with 80 kg seed/fed. in both seasons. Afir drill method with Sids-12 cultivar gave the highest spike in both seasons. The highest values of spike weight recorded when wheat sown by 40 kg seed/fed. with Sids-12 cultivar in both seasons.

The best treatment was sowing Shandawel-1 cultivar by Afir drill method using 40kg seed/fed, meanwhile the lowest value obtained from Afir broadcast method, 80 kg seed/fed. and Sakha-94 in first season only.

4. Number of kernels/spike was significantly increased by Afir drill method as compared with other methods. Increasing seeding rates 40 to 80 kg/fed. decreased the No. of kernels/spike in both seasons. Sids-12 cultivar gave the highest No. of kernels/spike, while Sakha-94 gave the lowest No. of this trait in second season only.

All the interactions between sowing methods, seeding rates and wheat cultivars on No. of kernels/spike were significant in both seasons. Afir drill method × 40 kg seed/fed. gave the highest No. of kernels/spike.

Afir drill method × Shandawel-1 cultivar recorded the highest No. of kernels/spike, while Afir broadcast method with Sakha-94 gave the lowest No. Seed rate 40 kg/fed. × Sids-12 cultivar recorded the highest number of this trait.

The highest No. of kernels/spike obtained from Afir drill method under 40 kg seed/fed. with Shandawel-1 cultivar.

5. Kernels weight/spike (g.) was insignificantly affected by sowing methods and seeding rates in both seasons. The heaviest weight was obtained from Sids-12 cultivar, whereas the lowest weight was obtained from Sakha-94 in second season only.

All the interactions between sowing methods, seeding rates and wheat cultivars on kernels weight/spike were significant in both seasons except, seeding rates × wheat cultivars. The heaviest weight obtained when wheat was sown by Afir in furrows method with 40kg seed/fed. in first season and the same seeding rate with Afir drill method in second season. Afir drill method × Sdis-12 cultivar recorded the highest kernels weight/spike.

The heaviest weight obtained from Afir drill method under 40kg seed/fed. with Sdis-12 cultivar.

6. Number of spikes/m². was significant affected by Afir drill method as compared with the other methods in both seasons. Seeding rate 60 kg/fed. gave the highest No. of spikes/m². as compared with 40 kg/fed. The highest No. of spikes/m². produced from planting by Sids-12 cultivar, while the lowest No. obtained from Sakha-94.

The interaction between sowing methods and seeding rates was significant in both seasons. The greatest number of this character recorded from Afir in furrows method with used 60 kg seed/fed. Afir drill method gave the highest No. of spikes/m². with Sids-12 cultivar in first season and Shandawel-1 in the second season. Seeding rate 60 kg/fed. × Sids-12

cultivar gave the highest No. of spikes/m²., while used 40 kg seed/fed. × Sakha-94 cultivar gave the lowest values in second season only.

Afir in furrows method × 60 kg seed/fed. × Shandawel-1 cultivar in first season and Afir drill method with the same seeding rate and cultivar in the second season recorded the highest No. of spikes/m²., while the lowest No. obtained from Afir broadcast method × 40 kg seed/fed. × Sakha-94.

7. 1000- grain weight (g.) The heaviest weight resulted from Afir drill method, while the lowest weight obtained from Afir broadcast method. In second season only, 1000-grain weight was decreased remarkably with increasing seeding rates up to 40 kg/fed. Sids-12 cultivar produced the heaviest weight as compared with Sakha-94 in second season only.

All the interactions between sowing methods, seeding rates and wheat cultivars were significant on 1000- grain weight in both seasons. The maximum weight were obtained from Afir drill method with 40 kg seed/fed, while the minimum weight were recorded in Afir broadcast method with 60 in first season and 80 kg seed/fed. in second season. Afir in furrows method × Shandawel-1 cultivar in first season and Afir drill method × Sids-12 cultivar in the second season recorded the highest values, while the lowest value resulted from Afir broadcast method with Sakha-94. Shandawel-1 cultivar × 40 kg seed/fed. in first season and Sids-12 cultivar × 60 kg seed/fed in the second season gave the highest values.

The best treatment was resulted when wheat was sown by Afir drill method under 40kg seed/fed.with Sids-12 cultivar in first season and Shandawel-1 in the second season.

8. Grain yield ard./fed. was highly significant affected by sowing Afir drill method, while Afir broadcast method gave the lowest yield. The heaviest grain yield obtained from sowing wheat by 60 kg seed/fed. Sdis-12 cultivar gave the highest yield, while Sakha-94 produced the lowest yield.

All the interactions between sowing methods, seeding rates and wheat cultivars were significant on Grain yield ard./fed. in both seasons. Drilling method × 60 kg seed/fed. gave the highest yield, while Afir broadcast method × 40 kg seed/fed. produced the lowest yield. Shandawel-1 cultivar resulted from Afir in furrows method in first season and Afir drill method in second season gave the highest yield. Shandawel-1 cultivar seeding by 60 kg/fed. produced the highest grain yield in second season only, while Sakha-94 cultivar seeding by 40 kg/fed. gave the lowest yield.

The greatest value of grain yield obtained from Afir drill method × 60 kg seed/fed. with Shandawel-1 cultivar in first season and with Sids-12 in the second season gave the highest values of grain yield.

9. Straw yield (ton/fed.) was highly significant affected by sowing Afir drill method in both seasons. Increasing seeding rates up to 80 kg/fed. led to increase straw yield. Shandawel-1 cultivar produced the maximum of straw yields, while the lowest values obtained from Sakha-94.

Sowing Afir drill method × 80 kg seed/fed recorded the highest values of straw yield, while the lowest value recorded from Afir broadcast method × 40 kg seed/fed. Afir drill method × Sids-12 cultivar gave the highest value of straw yield, while Afir in furrows method × Sakha-94 gave the lowest value. Seeding by 80 kg/fed. × Shandawel-1 cultivar gave the greatest straw yield, while seeding by 40 kg/fed. × Sakha-94 gave the lowest value.

The highest value obtained from sowing wheat by Afir drill method × 80 kg seed/fed. × Sids-12 cultivar in first season and Afir drill method × 80 kg seed/fed. × Shandawel-1 cultivar in the second season, while the lowest value recorded from sowing by Afir in furrows × 40 kg seed/fed. × Sakha-94 cultivar in both seasons.

10. Harvest index (%) was insignificantly affected by sowing methods in both seasons. Seeding by 60 kg/fed. gave the highest value, while the

lowest value resulted from adding 40 kg seed/fed. Sids-12 cultivar recorded the highest value, while the lowest value produced from Sakha-94 cultivar.

Sowing Afir drill method × seeding rate 60 kg/fed. recorded the highest value, while Afir broadcast method × 40 kg seed/fed. gave the lowest value. Sowing Afir drill method × Sids-12 cultivar obtained the highest value, while Afir broadcast method × Sakha-94 gave the lowest value. Under level 60 kg seed/fed with Shandawel-1 cultivar in first season and the same level with Sids-12 in the second season gave the highest values.

Sowing methods × seeding rates × wheat cultivars were significant in first season only. The greatest value of harvest index obtained from two methods Afir in furrows and Afir drill under seed rate 60 kg /fed. with two wheat cultivars Sids-12 and Shandawel-1, meanwhile the lowest value resulted from Afir broadcast method × 40 kg seed/fed. × Sakha-94 cultivar.