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Effect of Sowing and Nitrogen Application Methods on Yield and Yield Components of Some Wheat Varieties

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Abstract

Two field experiments were conducted at the Experiment and Research Center, Fac. Agric., Moshtohor, Benha Univ., during 2014/15 and 2015/16 seasons. The aim of this study was response to investigate the effect of three wheat varieties (Misr 2, Sakha 94 ,and Sids 12)to four planting methods (prodcasting, rows, hills on ridges and rows on beds) and two application methods (prodcasting and drilling).

The results indicated that:

Misr 2 variety gave the highest values of plant height, spike length, No. tillers and spikes m^{-2}, No. spikelets $spike^{-1}$, weight of grains $spike^{-1}$, biological and grain yields fed^{-1} compared with the other varieties in the first and second seasons. planting by rows on bed method increased significantly plant height, spike length, No. otillers and spikes m^{-2}, No. spikelets $spike^{-1}$, weight of grains $spike^{-1}$, 1000-grain weight, biological and grain yields fed^{-1} compared with the other planting methods in the first and second seasons.

Plant height, spike length, No. tillers and spikes m^{-2}, No. spikelets $spike^{-1}$, weight of grains $spike^{-1}$, 1000-grain weight, biological and grain yields fed^{-1} increased significantly by prodcasting N application method in the first and second seasons.

Plant height, No. tillers and spikes m^{-2}, No. spikelets $spike^{-1}$, weight of grains $spike^{-1}$, 1000-grain weight, biological and grain yields fed^{-1} were affected by the interaction between wheat varieties and planting methods in the first and second seasons except 1000- grain weight in the second season.

Plant height, No. tillers and spikes m^{-2}, No. spikelets $spike^{-1}$, 1000- grain weight and biological yield fed^{-1} were affected by the interaction between varieties and nitrogen application methods in the first and second seasons except plant height and No. spikelets $spike^{-1}$ in the first season. Plant height, No. tillers and spikes m^{-2}, No. spikelets $spike^{-1}$, biological and grain yields fed^{-1} were affected by the interaction between planting methods and nitrogen application methods in the first and second seasons except plant height, No. tillers m^{-2}, No. spikelets $spike^{-1}$ and grain yield fed^{-1} in the first season. Also, plant height, No. tillers and spikes m^{-2}, weight of grains $spike^{-1}$, 1000-grain weight, biological and grain yields fed^{-1} responded significant to the interaction of the three involved factors (varieties x planting methods x N application methods).

It could be concluded that under the conditions of the experiment, planting Misr 2 var by rows on bed method under proadcasting N application is recommended.

Key Words: Spring wheat varieties, planting methods, N application methods, Yield and its components.

Introduction

Wheat is considered the main source of food in the world and in Egypt. Raising wheat production through increasing productivity and increasing the cultivated area is an important national target to minimize the gap between the Egyptian production and consumption. The total production of wheat reached at least 9,000,000 tons annually (FAO, 2016). Increasing wheat yield per unit area can be achieved by breeding high yielding varieties or improving the cultural treatments of the crop. Modern wheat varieties were developed to maximize grain yield under favorable environmental conditions (high input conditions especially planting methods to save water supply and seeding rate). In the light of the present national water policy concerning saving irrigation water expanding wheat area needs.

Several investigators showed that wheat cultivars differed in yield and its components as well as chemical properties (Mehasen, 1999; El-Hawary, 2000; Abd El-hameed, 2002; Ali *etal,* 2004; Mehasen and Mohamed, 2005; Abu-Grab *etal,* 2006; Omar, 2007; Hassan, 2008; Mehasen *etal,* 2009; Ashmawy *etal,* 2010; Abd El-Nour and Fateh, 2011; Mehasen *etal,* 2013; Mehasen *etal,* 2014 ; Mehasen *etal,* 2015).(Zenhom *etal,* (2018) reported that wheat cultivars were varied significantly in plant height, No. tillers m^{-2}, No. spikes m^{-2}, seed index and grain yield fed^{-1}.

Wheat is planted with different sowing methods depending upon the available soil water, time of planting, amount of preceding crop residues in the field and availability of planting machinery (Sikander etal., 2003). The method of sowing is significant as it determines the proper crop stand establishment and the production of individual plant depends on balancing plant to plant competition (Sulieman, 2010). Results revealed that all yield and yield parameters were significantly affected by the

sowing method (Abd El-Lattief, 2011). Generally, planting on ridge and ridge with line achieved higher 1000-seed weight and grain yield for both seasons (Dagash *etal,* 2014). Better plant height was noted in drill planting with 17.5, 20 cm rows and 15:25 cm paired rows. However, number of spikelets spike^{-1} and number of grains spike^{-1} were statistically similar in drilling at 17.5, 20, and 15:25 cm paired apart rows. Similarly, 1000 grain weight was recorded in drill sowing at 20 cm and 15:25 cm paired rows. The maximum grain yield was obtained through 15:25 cm paired rows drill planting method and it was statistically at par with drill planting method ,where ,row spacing was 20 cm. Whereas, drill-planting techniques with row spacing 15 cm was inferior to broadcast method (Naresh *etal,* 2014). The maximum grain yield of 3.5 t ha^{-1} was obtained from row planting and the least 3.13 t ha^{-1} was recorded from broadcast method (Tadesse *etal,* 2017).

Appropriate fertilizer application methods enhance the nutrient use efficiency by reducing their losses. Significant effect of increased N applied as side dressing on the number of wheat yield per unit area has been reported by Teixeira- Filho *etal* (2007). Mohammed *et al,* (2013) reported that significantly higher grain yield (32.5 bu/ac) was recorded from the fall application of ESN than broadcast (RUBF) and with seed (RUSF). However, (Hassan *etal* ,2008) reported that nitrogen broadcast or side-dressing even at higher nitrogen rates (180 kg/ha) did not produce significantly higher values of crop growth parameters. Ullah *etal* (2013) reported that Days taken to heading showed non-significant effect of N fertilizer application methods (broadcast ,side-dressing) in both (seasons) .

The present investigation aimed to study the effect of four planting methods and two nitrogen application methods on yield and its components for three wheat varieties grown on a clay soil in Kalubia Governorate.

Materials and Methods

Two field experiments were carried out in the Experimental Field of the Faculty of Agriculture at Mashtohor, Benha Univ., during 2014/15 and 2015/16 seasons, to study the effect of three wheat varieties (Misr 2, Sakha 94, Sids 12), four different planting methods (prodcasting , rows , hills on ridges and rows on beds) and two application methods of nitrogen fertilizer (prodcasting ,drilling) on yield and yield components. The soil was clay in texture with a PH value of 7.80 and 7.82 and an organic matter content of 1.82 and 1.83% and available N of 53 and 54 ppm during the first and second seasons. Respectively.

Every experiment included twenty four treatments which were the combination of three wheat varieties, four planting methods and two nitrogen applying methods. The experimental design was a split split-plot with four replications. The three wheat varieties were arranged at random in the main plots, the sub- plots were assigned random by to the four different randomly planting methods and the two application methods of nitrogen were arranged random by in the sub sub-plots. The sub sub-plot area was 10.5 m^2 (3 ×3.5m). Wheat varieties were planted in November 19th and 18th in the first and second seasons. In the two seasons, the preceding crop was carrot. The normal cultural practices for growing wheat were followed as recommended for the region.

Random samples of 10 guarded plants were taken from sub sub-plots at harvesting time to determine the following characters: plant height (cm), spike length (cm), number of spikelets spike^{-1} and weight of grains spike^{-1} (g). For determining No. tillers and spikes m^{-2} and 1000-grain weight (g) a sample of one square meter from each sub sub-plot was taken. Grain and straw yields (kg fed^{-1}) were estimated on whole sub sub-plot basis.

Analysis of variance was done for the data of each season separately according to 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

Varietal differences

The results reported in Table (1) indicate clearly that, there were significant differences among wheat varieties in all studied traits in the first and second seasons. Misr 2 variety gave the highest values of plant height, spike length, No. tillers and spikes m^{-2}, number of spikelets spike^{-1}, weight of grains spike^{-1}, biological and grain yields fed^{-1} compared with the other varieties in the first and second seasons. Whereas, Sakha 94 variety gave the highest value and increased significantly 1000-grain weight compared with the other varieties in the first and second seasons.

It could be concluded that varietal differences among wheat varieties may be due to genetical make up. The superiority of Misr 2 variety in grain yield fed^{-1} over other varieties might be due to the increase in yield components, namely, spike length, No.tillers and spikes m^{-2}, number of spikelets spike^{-1}, weight of grains spike^{-1}. The results obtained by Mehasen (1999); El-Hawary (2000); Abd El-hameed (2002); Ali *etal,* (2004); Mehasen and Mohamed (2005); Abu-Grab *et al,* (2006); Omar (2007); Hassan (2008); Mehasen *et al,* (2009); Ashmawy *etal,* (2010); Abd El-Nour and Fateh (2011); Mehasen *etal,* (2013); Mehasen *etal,* (2014); Mehasen *etal,* (2015); Abo-Remaila and Abou El-Enim (2017) and Zenhom *etal,* (2018) indicated marked differences among wheat varieties in yield and yield components .

Table 1. Varietal differences in yield and yield components at 2014/15 and2015/16 seasons.

Characters	2014/15 season			LSD at 5%	2015/16 season			LSD at 5%
	Misr 2	Sakha 94	Sids 12		Misr 2	Sakha 94	Sids 12	
Plant height (cm)	114.1	107.0	110.0	**0.36**	114.2	107.0	110.21	**0.15**
Spike length (cm)	10.62	9.50	9.75	**0.16**	10.71	9.62	9.83	**0.19**
Number of tillers m^{-2}	248.0	184.33	207.12	**2.37**	248.8	185.2	208.1	**1.91**
Number of spikes m^{-2}	245.5	182.04	204.33	**2.4**	246.1	182.9	205.8	**1.2**
Number of spikelets spike	23.00	21.92	22.54	**0.19**	23.17	22.04	22.04	**0.15**
Weight of grains spike (g)	2.25	2.00	1.96	**0.09**	2.42	2.04	2.00	**0.09**
1000-grain weight (g)	45.21	50.62	46.33	**0.54**	45.54	50.58	46.58	**0.29**
Biological yield (kg fed^{-1})	7359	6911	6801	**80.15**	7362	7182	6799	**8.1**
Grain yield (kg fed^{-1})	1849	1657	1794	**3.2**	1852	1660	1795	**3.2**

-Effect of different planting methods.

Results in Table (2) indicate that grain yield and its components were affected by different planting methods. Plant height, spike length, No.tillers and spikes m^{-2}, number of spikelets $spike^{-1}$, weight of grains $spike^{-1}$, 1000-grain weight, biological and grain yields fed^{-1} increased significantly by planting methods in the first and second seasons. Rows on beds method increased significantly plant height, spike length, No. tillers and spikes m^{-2}, number of spikelets $spike^{-1}$, weight of grains $spike^{-1}$, 1000-grain weight, biological and grain yields fed^{-1} compared other planting methods in the first and second seasons. Amongst many factors crop production the patter of planting greater significance, as it is not only determined the proper crop stand establishment but also the production of individual plant through balancing the plant to plant competition and facilitating the conversion of light energy to harvest yield of crop. Similar results were reported by Sikander etal, (2003); Sulieman (2010); Abd El-Lattief (2011); Dagash *etal,* (2014); Naresh *etal,* (2014); Abdul Majeed *etal,* (2015) and Tadesse *etal,* (2017).

Table 2. Wheat yield and its components as affected by planting methods in 2014/15 and2015/16 seasons

Characters	2014/15 season				L.S.D at 5%	2015/16 season				L.S.D at 5%
	Prod-casting	Rows	Hills on ridges	Rows on beds		Prod-casting	Rows	Hills on ridges	Rows on beds	
Plant height (cm)	108.6	110.9	109.6	112.3	**0.261**	108.8	110.9	109.8	112.4	**0.223**
Spike length (cm)	9.39	10.28	9.83	10.33	**0.223**	9.50	10.33	10.06	10.33	**0.126**
No. of tillers m^{-2}	196.1	220.3	206.0	230.2	**1.094**	196.4	221.6	207.3	230.9	**0.826**
No. of spikes m^{-2}	193.7	217.3	203.8	227.6	**1.241**	194.7	218.1	205.3	228.3	**0.915**
No. of spikelets spike	22.17	22.16	22.44	22.72	**0.208**	22.28	22.72	22.50	22.94	**0.151**
Wt. of grains spike (g)	1.94	2.00	2.00	2.33	**0.083**	2.00	2.11	2.11	2.39	**0.223**
1000-grain weight (g)	46.33	47.61	46.56	49.06	**0.777**	46.39	47.67	46.94	49.28	**0.722**
Biological yield (kg fed^{-1})	6725	7096	7089	7184	**5.202**	7080	7099	7090	7187	**4.882**
Grain yield (kg fed^{-1})	1758	1765	1766	1777	**4.287**	1759	1767	1770	1778	**3.186**

-Effect of nitrogen application methods.

Results in Table (3) show in general that nearly all wheat characters were significantly affected by N application methods (prodcasting and drilling) in both seasons except No. spikelets $spike^{-1}$ in both seasons, weight of grains spike and grain yield fed^{-1} in the first season, spike length and 1000-grain weight in the second one. However, prodcasting N application method increased significantly in plant height, No. tillers m^{-2}, No. spikes m^{-2} and biological yield fed^{-1} in the two seasons, spike length and 1000-grain weight in the first season, weight of grains spike and grain yield fed^{-1} in the second season.

The effectiveness of these inhibitors in increasing yield and improving yield components is affected by several soil and environmental factors. Moreover, the optimal application method and timing of nitrogen fertilizer was not well defined for farmers. Therefore, we evaluated the effect of inhibitors, timing and method of nitrogen fertilizer application on grain yield, yield components and residual soil mineral nitrogen content. Nitrogen fertilizer application caused a significant increase in grain yield, yield components of wheat in both seasons.

Table 3. Wheat yield and its components as affected by nitrogen applying methods in 2014/15 and 2015/16 seasons

Characters	2014/15 season		Signif-cance	2015/16 season		Signifi-cance
	Prodcasting	Drilling		Prodcasting	Drilling	
Plant height (cm)	110.5	110.2	**	110.6	110.3	**
Spike length (cm)	10.03	9.89	**	10.11	10.00	NS
No. of tillers m^{-2}	215.9	210.4	**	216.6	211.5	**
No. of spikes m^{-2}	213.0	208.2	**	214.1	209.1	**
No. of spikelets spike	22.56	22.42	NS	22.64	22.58	NS
Wt. of grains spike (g)	2.083	2.056	NS	2.194	2.111	*
1000-grain weight (g)	47.58	47.19	**	47.72	47.42	NS
Biological yield (kg fed^{-1})	7109	6938	**	7119	7109	**
Grain yield (kg fed^{-1})	1767	1766	NS	1770	1767	*

* and ** indicates significant at $P<0.05$ and 0.01, NS=No significance

Similar results were also obtained by Teixeira-Filho *et al* (2007) and Mohammed *et al*, (2013)

D- Effect of the interactions:

The significant interactions among wheat varieties, planting methods and nitrogen applying methods on the studied traits are shown in Tables (4a, 4b, 4c and 5)

The combination of wheat varieties with planting methods indicated that the highest values were obtained by Misr 2 variety + rows on beds method for plant height, No. tillers and spikes m^{-2}, No.spikelets $spike^{-1}$, weight of grains $spike^{-1}$, biological and grain yields fed^{-1}, whereas by Sakha 94 variety + rows on beds method gave the heaviest value for 1000-grain weight in the first and second seasons (Table 4A).

On the other hand, the lowest values in plant height, No. tillers and spikes m^{-2}, No. spikelets $spike^{-1}$ and grain yield fed^{-1} were obtained by Sakha 94 variety + prodcasting planting method, in 1000-grain weight was obtained by Misr 2 variety + prodcasting planting method and in biological yield fed^{-1} was obtained by Sids 12 variety+ prodcasting planting method in the first and second seasons.

The combination of wheat varieties with N application methods showed that the highest values were obtained by Misr 2 variety + prodcasting N application method for plant height, No. tillers and spikes m^{-2}, No.spikelets $spike^{-1}$ and biological yields fed^{-1}, while by Sakha 94 variety + prodcasting N application method gave the heaviest values for 1000-grain weight in both seasons are shown Table (4b). On the other hand, Sakha 94 variety + drilling N application method gave the lowest values in plant height, No.tillers and spikes m^{-2}, No.spikelets $spike^{-1}$ and biological yield fed^{-1} and Misr 2 variety + drilling N application method gave the lowest value for 1000-grain weight in both seasons.

The data presented in Table (4c) demonstrated that maximum values were gained in plant height, No. of tillers and spikes m^{-2}, No. of spikelets $spike^{-1}$, biological and grain yields fed^{-1} by rows on beds method + prodcasting N application method, whereas the lowest values in these traits were exhibited by prodcasting planting method + drilling N application method in the first and second seasons.

Misr 2 variety + rows on beds method + prodcasting N application method gave the highest values of plant height, No tillers and spikes m^{-2}, No.spikelets $spike^{-1}$, weight of grains $spike^{-1}$, biological and grain yields fed^{-1}, whereas by Sakha 94 variety + rows on beds method+ prodcasting N application method gave the heaviest value for 1000-grain weight in the first and second seasons (Table 5). On the other hand, Sakha 94 variety + prodcasting planting method + drilling N application method gave the lowest values in plant height, No. tillers and spikes m^{-2}, No.spikelets $spike^{-1}$ and grain yield fed^{-1}, Misr 2 variety + prodcasting planting method + drilling N application method gave the lowest value in 1000-grain weight and the biological yield fed^{-1} was exhibited by Sids 12 variety+ prodcasting planting method + drilling N application method in both seasons.

Table 4 A. Effect of the interaction between wheat varieties and planting methods on yield and yield components in 2014/15 (First) and2015/16 (Second) seasons

Characters	Varieties	Misr 2				Sakha 94				Sids 12				LSD at 5%
	Planting methods	P	R	HR	RB	P	R	HR	RB	P	R	HR	RB	
Plant height (cm)	First	111.8	115.0	112.8	116.8	105.2	107.5	106.5	108.7	108.8	110.2	109.5	111.3	**0.18**
	Second	112.0	115.0	112.8	117.0	105.2	107.7	106.5	108.7	109.2	110.2	110.0	111.5	**0.387**
No. of tillers m^{-2}	First	229.2	257.7	237.0	268.2	172.5	189.0	181.0	194.8	186.5	214.3	200.0	227.7	**1.893**
	Second	229.2	258.7	238.0	269.5	173.0	190.2	182.0	195.7	187.0	215.8	201.8	227.7	**1.431**
No. of spikes m^{-2}	First	226.2	256.5	234.8	264.3	171.5	185.2	179.3	192.2	183.3	210.3	197.3	226.3	**2.149**
	Second	226.5	257.2	235.0	265.7	171.7	185.5	181.7	192.8	185.8	211.7	199.3	226.3	**1.585**
No. of spikelets $spike^{-1}$	First	22.67	23.00	23.00	23.33	21.83	22.00	22.00	21.83	22.00	22.83	22.33	23.00	**0.359**
	Second	22.83	23.00	23.00	23.83	22.00	22.17	22.00	22.00	22.00	23.00	22.50	23.00	**0.261**
Wt. of grains spike (g)	First	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	1.83	2.00	2.00	2.00	**0.143**
	Second	2.00	2.33	2.33	3.00	2.00	2.00	2.17	2.00	2.00	2.00	2.00	2.00	**0.387**
1000-grain weight (g)	First	44.83	45.33	43.83	46.83	47.67	51.50	50.50	52.83	46.50	46.00	45.33	47.50	**1.45**
	Second	45.50	45.50	44.33	46.83	47.67	51.17	50.50	53.00	46.00	46.33	46.00	48.00	**NS**
Biological yield (kg fed^{-1})	First	7333	7404	7370	7328	6084	7229	7165	7166	6757	6919	6755	6773	**NS**
	Second	7330	7411	7370	7334	7160	7228	7174	7166	6750	6920	6753	6771	**8.456**
Grain yield (kg fed^{-1})	First	1847	1844	1846	1860	1648	1652	1659	1667	1779	1799	1794	1804	**7.426**
	Second	1850	1846	1850	1861	1650	1658	1664	1668	1779	1798	1797	1805	**5.52**

P= Prodcasting method R=Rows method HR=Hill on ridges method RB= Rows on bed method NS=No significance

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Table 4 B. Effect of the interaction between wheat varieties and nitrogen applying methods on yield and yield components in 2014/15 (First) and 2015/16 (Second) seasons

Characters	Varieties	Misr 2		Sakha 94		Sids 12		LSD at 5%
	N. applying methods	P	D	P	D	P	D	
Plant height (cm)	First	114.2	114.1	107.2	106.8	110.2	109.7	NS
	Second	114.2	114.3	107.3	106.7	110.4	110.0	0.243
No. of tillers m^{-2}	First	250.58	245.42	185.92	182.75	211.25	203.00	1.805
	Second	251.42	246.25	186.25	184.17	212.08	204.08	1.088
No. of spikes m^{-2}	First	248.0	242.9	183.3	180.7	207.7	201.0	0.855
	Second	248.5	243.7	184.2	181.6	209.5	202.1	1.253
No. of spikelets $spike^{-1}$	First	23.08	22.92	22.92	22.92	22.67	22.42	NS
	Second	23.17	23.17	22.00	22.08	22.75	22.50	0.172
1000-grain weight(g)	First	45.42	45.00	51.08	50.17	46.25	46.42	0.421
	Second	45.83	45.25	51.08	50.08	46.25	46.92	0.795
Biological yield (ton fed^{-1})	First	7366	7352	6640	7182	6809	6794	NS
	Second	7370	7353	7179	7184	6807	6790	5.573

P= Prodcasting method D=drilling method NS=No significance

Table 4C. Effect of the interaction between planting methods and nitrogen applying methods on yield and yield components in 2014/15 (First) and 2015/16 (Second) seasons

Characters	Planting methods	Prodcasting method		Rows method		Hill on ridges method		Rows on bed method		LSD at 5%
	N. applying methods	P	D	P	D	P	D	P	D	
Plant height (cm)	First	108.7	108.5	111.1	110.7	109.8	109.4	112.4	112.1	NS
	Second	108.8	108.8	111.2	110.7	109.9	109.7	112.7	112.1	0.281
No. of tillers m^{-2}	First	199.8	192.3	223.0	217.7	208.9	203.1	232.0	228.4	NS
	Second	200.1	192.7	224.1	219.0	209.8	204.8	232.3	229.6	1.256
No. of spikes m^{-2}	First	196.1	191.2	219.3	215.3	207.5	200.1	229.0	226.2	0.987
	Second	197.3	192.0	219.8	216.4	210.0	200.7	229.2	227.3	1.446
No. of spikelets $spike^{-1}$	First	22.22	22.11	22.67	22.56	22.56	22.33	22.78	22.67	NS
	Second	22.22	22.33	22.67	22.78	22.67	22.33	23.00	22.89	0.199
Biological yield (ton fed^{-1})	First	6381	7069	7097	7097	7089	7089	7186	7183	NS
	Second	7096	7065	7101	7097	7091	7090	7187	7187	6.435
Grain yield (ton fed^{-1})	First	1657	1656	1795	1793	1796	1793	1850	1848	NS
	Second	1763	1756	1769	1766	1773	1768	1780	1775	4.376

P= Prodcasting method D=drilling method NS=No significance

Table 5. Effect of the interaction among wheat varieties, planting methods and nitrogen applying methods on yield and yield components in 2014/15 (F) and 2015/16 (S) seasons

Varieties	PM	NAM	Plant height (cm)		No. of tillers m^{-2}		No. of spikes m^{-2}		Wt. of grains spike (g)		1000-grain weight (g)		Biological yield (ton fed^{-1})		Grain yield (ton fed^{-1})	
			F	S	F	S	F	S	F	S	F	S	F	S	F	S
	P	P	112.0	112.0	232.3	231.3	227.7	227.3	2.00	2.00	45.33	46.00	7350	7350	1848	1852
		D	111.7	112.0	226.0	227.0	224.7	225.7	2.00	2.00	44.33	45.00	7316	7311	1847	1848
	R	P	115.0	115.0	262.0	262.7	260.0	260.3	2.00	2.33	45.33	46.00	7374	7378	1858	1856
Misr 2		D	115.0	115.0	253.3	254.7	253.0	254.0	2.00	2.33	45.33	45.00	7367	7363	1862	1865
	HR	P	113.0	112.7	240.0	241.0	239.0	240.0	2.00	2.67	44.00	44.33	7337	7343	1844	1848
		D	112.7	113.0	234.0	235.0	230.7	230.0	2.00	2.00	43.67	44.33	7319	7325	1848	1852
	RB	P	116.7	117.0	268.0	270.7	265.3	266.3	3.00	3.00	47.00	47.00	7403	7407	1844	1848
		D	117.0	117.0	268.3	268.3	263.3	265.0	3.00	3.00	46.67	46.67	7406	7416	1844	1844
	P	P	105.0	105.0	174.3	175.0	172.3	172.0	2.00	2.00	48.00	48.00	7171	7148	1645	1644
		D	105.3	105.3	170.7	171.0	170.7	171.3	2.00	2.00	47.33	47.33	7168	7172	1652	1656
	R	P	108.0	108.3	189.7	190.0	186.0	186.0	1.83	2.00	52.00	51.33	7234	7231	1669	1667
Sakha 94		D	107.0	107.0	188.3	190.3	184.3	185.0	2.00	2.00	51.00	51.00	7224	7225	1666	1669
	HR	P	106.7	107.0	184.0	184.0	181.0	184.0	2.00	2.00	50.67	51.00	7164	7174	1659	1664
		D	106.3	106.0	178.0	180.0	177.7	179.3	2.00	2.00	50.33	50.00	7167	7174	1659	1663
	RB	P	109.0	109.0	195.7	196.0	194.0	195.0	2.00	2.33	53.67	54.00	7163	7165	1653	1659
		D	108.3	108.3	194.0	195.3	190.3	190.7	2.00	2.00	52.00	52.00	7169	7167	1651	1658
	P	P	109.0	109.3	192.7	194.0	188.3	192.7	2.00	2.00	47.00	46.00	6793	6789	1775	1772
		D	108.7	109.0	180.3	180.0	178.3	179.0	1.67	2.00	46.00	46.00	6721	6712	1784	1785
	R	P	110.3	110.3	217.3	219.7	212.0	213.0	2.00	2.00	46.00	47.00	6768	6766	1802	1802
Sids 12		D	110.0	110.0	211.3	212.0	208.7	210.3	2.00	2.00	46.00	45.67	6779	6777	1806	1807
	HR	P	109.7	110.0	202.7	204.3	202.7	206.0	2.00	2.00	45.00	45.00	6754	6752	1803	1807
		D	109.3	110.0	197.3	199.3	192.0	192.7	2.00	2.00	45.67	47.00	6756	6754	1785	1788
	RB	P	111.7	112.0	232.3	230.3	227.7	226.3	2.00	2.00	47.00	47.00	6920	6921	1792	1790
		D	111.0	111.0	223.0	225.0	225.0	226.3	2.00	2.00	48.00	49.00	6919	6919	1806	1806
LSD at 5%			**NS**	**0.487**	**3.609**	**2.177**	**1.709**	**2.505**	**NS**	**0.281**	**0.843**	**NS**	**NS**	11.146	**9.748**	**7.579**

PM=Planting methods NAM=N. applying methods P= Prodcasting method D=drilling method R=Rows method HR=Hill on ridges method RB= Rows on bed method

It could be concluded that under the conditions of the experiment planting Misr 2 variety by rows on bed method with prodcasting N application method is recommended.

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تأثير طرق الزراعة وإضافة النيتروجين علي المحصول ومكوناتة لبعض اصناف القمح

صديق عبد العزيز صديق محيسن ، ناصر خميس بركات الجيزاوي ، محمد السيد رياض جمعة و عائشة محمد عبدالرحمن حلاوة ،

قسم المحاصيل – كلية الزراعة بمشتهر– جامعة بنها

اجريت تجربتان حقليتان بمركز البحوث والتجارب بكلية الزراعة بمشتهر – جامعة بنها خلال موسمى 2015/2014 و 2016/2015 م لدراسة استجابة ثلاثة أصناف من القمح (مصر2 ، سخا94 ، –سدس12) وأربع طرق للزراعة (زراعة بدار ، زراعة تسطير ، زراعة جور علي خطوط ، زراعة تسطير علي مصاطب) وطريقتين لإضافة السماد الأزوتي (بدار ، سرسبة) علي المحصول وبعض مكوناتة.

–ويمكن تلخيص أهم نتائج الموسمين فيما يلى .

- سجل صنف القمح مصر2 أعلى متوسطات لكل من طول النبات ، طول السنبلة ،عدد الأشطاء والسنابل للمتر المربع ، عدد سنيبلات السنبلة ، وزن حبوب السنبلة ، المحصول البيولوجى و محصول الحبوب للفدان. بينما أعطي صنف سخا 94 أعلي متوسط لوزن الـ 1000 حبة مقارنه بالأصناف الأخرى لكلا الموسمين.
- ازداد كل من طول النبات ، طول السنبلة ،عدد الأشطاء والسنابل للمتر المربع ، عدد سنيبلات السنبلة ، وزن حبوب السنبلة ، وزن الـ 1000 حبة ، المحصول البيولوجى و محصول الحبوب للفدان زيادة معنوية بطريقة الزراعة سطور علي مصاطب مقارنة بطرق الزراعة الأخري في كل من موسمي الزراعة الأول والثاني.
- أعطت إضافة السماد النيتروجيني بالطريقة البدار إلى زيادة معنوية فى كل من طول النبات ، طول السنبلة ،عدد الأشطاء والسنابل للمتر المربع ، عدد سنيبلات السنبلة ، وزن حبوب السنبلة ، وزن الـ 1000 حبة ، المحصول البيولوجى و محصول الحبوب للفدان لكلا موسمي الزراعة.
- تأثر معنويا كل من طول النبات ، عدد الأشطاء والسنابل للمتر المربع ، عدد سنيبلات السنبلة ، وزن حبوب السنبلة ، وزن الـ 1000 حبة ، المحصول البيولوجى و محصول الحبوب للفدان بالتفاعل بين الأصناف و طرق الزراعة ماعدا وزن الـ 1000 حبة في الموسم الثاني فقط. بينما تأثر معنويا كل من طول النبات ، عدد الأشطاء والسنابل للمتر المربع ، عدد سنيبلات السنبلة ، وزن الـ 1000 حبة والمحصول البيولوجى للفدان بالتفاعل بين الأصناف وطرق إضافة السماد النيتروجين ماعدا طول النبات وعدد سنيبلات السنبلة في الموسم الأول فقط. وكذلك أثر التفاعل بين طرق الزراعة وطرق إضافة السماد النيتروجين تأثير معنويا علي كل من عدد السنابل للمتر المربع والمحصول البيولوجى للفدان في كلا موسمي الزراعة وطول النبات ، عدد الأشطاء للمتر المربع ، عدد سنيبلات السنبلة ومحصول الحبوب للفدان في الموسم الثاني فقط.
- أثر التفاعل بين الأصناف وطرق الزراعة وطرق إضافة السماد النيتروجين تأثيرا معنويا علي كل من عدد الأشطاء والسنابل للمتر المربع ، المحصول البيولوجى و محصول الحبوب للفدان في كل من موسمي الزراعة بينما تأثير معنويا وزن الـ 1000 حبة في الموسم الأول فقط و كل من طول النبات و وزن حبوب السنبلة في الموسم الثاني فقط.
- توصي هذه الدراسة تحت ظروف تلك التجربة بزراعة صنف القمح مصر2 بطريقة التسطير علي مصاطب وإضافة السماد النيتروجين نثرا.