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EFFECT OF SPLITTING RATES NITROGEN FERTILIZER ON YIELD DETERMINATIONS OF SOME WHEAT CULTIVARS GROWN IN SANDY SOIL

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ABSTRACT

Two field experiments were conducted during 2002/2003 and 2003/2004 winter growing seasons at El-Salhia, Sharkia Governorate Egypt. The aim of this investigation was study the response of four Egyptian wheat cultivars viz. Sids 1, Sakha 93, Gemmiza 9 and Giza 168 to three nitrogen levels (60, 80 and 100 kg N.fad) with three nitrogen split application (1/4 at sowing + 1/4 at tillering + 1/4 at Jointing + 1/4 at heading), (1/4 at sowing + 1/2 at tillering + 1/4 at Jointing) and (1/3 at sowing + 1/3 at tillering + 1/3 at Jointing) in newly cultivated sandy soils. A split-split plot design with three replicates was used in both seasons. The results revealed significant differences among studied wheat cultivars in all studied traits. Over the two studied seasons, grain yield/fad was significantly varied among cultivars. This was arranged in descending order as follows, Sakha 93, Giza 168, Sids 1 and Gemmiza 9.

Increasing nitrogen level from 60 to 100kg N/fad significantly increased all studied characters, except harvest index in the second season.

Splitting nitrogen rates into three equal doses (1/3 at sowing + 1/3 at tillering + 1/3 at Joining) caused an increase in all studied characters, except harvest index in both seasons and over them. Grain yield/fad was significantly and positively correlated with plant height, number of spikes/m^2 , spike length, number of spikelets/spike, umber of grains/spike, 1000 – grain weight and straw and biological yields/fad.

INTRODCTION

Wheat *(Triticum aestivum,L.)* is considered as an important cereal crops in the world and Egypt as well. Recently, the gab of wheat production and consumption become very wide, since the local production represents 20% of the consumption. The strategy of Egyptian Agriculture during nineties aimed to cover 65% self sufficiency from wheat (Gomaa, 1992).

Planting high yielding wheat cultivar is considered a way to increase the amount of production per unit area, especially, under sandy soils conditions. With respect to varietal differences, Hassanien *et al.* (1997), Mahfouz and Ghabour (1998), Hassan and Gaballah (2000), Abdul Galil *et al.* (2000), Gaballah and Bassiouny (2001). Also, Ali *et al.* (2004) found signifacant differences between wheat cultivars in almost, all characters. Where Sids 9 cv. recorded the highest weight of grains / spike, 1000 – grain weight, grain yield, biological yield and harvest index. However, Gemmiza 9 cv. gave the tallest plants , number of spikes / m^2 and straw yield.

Growing wheat in the desert should be preceded by accurate determination of optimum agronomic practices. Sandy soils are characterized by poor fertility level. Nitrogen is a key element in the nutrition of most crops especially, cereals. The availability of N in sandy soil is practically, absent. So, N requirements of wheat in sandy soils must be estimated . Several researchers have observed positive response of wheat crop to nitrogen fertilizer application. (Gaber, 1988; Mohamed, 1992; Darwich, 1994; Moselhy, 1995; Gomaa, 1997; Khattab, 1998; El-Bana, 1999; Hassan and Gaballah, 2000 and Saleh, 2003). Also, Ali *et al.* (2004), reported that application of N-fertilizer up to 120 Kg N/fad. caused a significant increase in plant height, number of spikes/m^2, grain weight/spike, 1000 grain weight, grain , straw and biological yields/fed.

On the other hand, some studies reported the advantages of nitrogen splittings on increasing yield components. grain, straw and protein yields of wheat (Sadek, 1990; Megahed, 1991; Darwich, 1994; Mohamed and Tammam, 1998, and El-Desoky and El-Far, 1999). Meantime, splitting of nitrogen was found to increase grain yield of wheat due to the increase in number of spikes/m^2 and grain weight/spike (Dawood, 1994 and Hanna and Abdel – Mottaleb, 1998).

Moselhy (1995), Abdel-Hakeem (1996) and Abdul-Galil *et al.* (2000) reported, under sandy soil conditions, that each increase in number of N splits from five to seven increased significantly plant height, number of tillers/plant, number of spikes/m^2 spike length, 1000-grain weight, straw yield / fad and grain yield/fad. Similar results were reported by AbdEl-Maksoud and Maha Abd Alla (2003) in barley. Also, Saleh (2003) found that application of nitrogen in four or five equal doses had favorable effect on number of grains/spikelet for all spikelet positions, grain yied and its attributes, except 1000 – grain weight.

Regarding to the interaction between nitrogen fertilizer rates and its splittings , in this respect, El-Hosary *et al.* (2000) and Saleh (2003) showed that the application of N levels in four equal doses up to 75 Kg N/fad and 100Kg N/fad gave significant values of protein and dry gluten% compared with addig N rate in three doses up to 75 Kg / fad. They added that application of nitrogen in four or five equal doses had favorable effect on number of grains / spike, grain yield and its attributes, except grain weight. Also, Abd El-Maksound and Maha Abd Alla (2005) reported that nitrogen splitting highly affected most characters. The third treatment (split into three equal doses) was favour than the other two treatments.

This investigation aimed to threw a light on the response of some local bread wheat cultivars to nitrogen fertilizers levels and its splittings for maximizing grain yield and yield components in newly reclaimed sandy soils areas as well as the interaction among them.

MATERIALS AND METHODS

Two field experiments were conducted in 2002/2003 and 2003/2004 winter growing seasons at an administrative field, El-Salhia, Sharkia Governorate, Egypt. This investigation is aimed to study the response of four Egyptian wheat cultivars viz. Sids 1, Sakha93, Gemaiza 9 and Giza 168 to three nitrogen ferlilization levels (60, 80 and 100Kg N/fad) and three nitrogen split applications i.e, S1, (1/4 at sowing + 1/4 at tillering (30 DAS) + 1/4 at Jointing (60 DAS) + 1/4 at heading (80 DAS), S2 (1/4 at sowing + 1/2 at tillering + 1/4 at Jointing) and S3 (1/3 at sowing + 1/3 at tillering + 1/3 at Jointing). Ammonium sulphate (20.6% N) was used in newly cultivated sandy soils.

The soil of experimentation site is sandy and the mechanical and chemical analyses of the soil are given in Table 1

Table 1: Physical and chemical properties of experimental site during 2002/2003 and 2003/2004 seasons.

Characters	2002/2003	2003/2004
Texture	**Sandy**	**Sandy**
Ph	8.18	8.09
Available N (ppm)	10.97	11.02
Available P (ppm)	3.72	3.80
Available K (ppm)	89.62	95.31

A split-split plot design with three replicates was used in both seasons. The main plots included wheat cultivars and the three nitrogen levels i.e 60, 80 and 100 kg N/fad. were distributed randomly in sub plots while the three splittings of nitrogen application were assigned randomly in the sub-sub plots. Plot size was 9 m^2 (3×3m) including 15 rows 20 cm apart and 3 meter length. Grain cultivars was sown on 10^{th} November in both seasons. Wheat grains were drilled in rows 20 cm apart at seeding rate of 105 Kg/ fad Surface irrigation was followed. Normal agronomic practices were adopted as usually done by Ministry of Agriculture .

At harvest time (last week of April), ten fertile tillers were randomly taken from the second inner row of each sub-sub plot to determine; plant height (cm), spike length (with awns in cm.), number of spikelets/ spike, number of grains / spike . Also, inner area of $2m^2$ was harvested from each plot to determine number of spikes/ m^2 , 1000-grain weight, grain, straw and biomass yields/fad. as well as harvest index.

Data of both seasons were statistically analyzed according to Snedecor and Cochran (1967). For the comparison between means, Duncan's multiple range test was followed (Duncan, 1955). The combined data, also, were subjected to simple correlation.

RESULTS AND DISCUSSION

A. Cultivars differences:

The results presented in Tables 2, 3 and 4 indicated significant differences among four studied cultivars, in the plant height, number of spikes/m^2, spike length (cm), number of spikelets and grains/spike, 1000-grain weight, grain, straw and biomass yields (ton/fad) as well as harvest index in the two seasons and combined analysis. Over the two seasons, the results showed that mature plants of tested cultivars significantly differed in their heights. The combined analysis revealed that the tallest plants were recorded for Sakha 93 followed by Giza 168, and Sids 1, then by Gemmiza 9.

Table 2 : Means of plant height, n0. of spikes / m^2 and spike length as effected by cultivars, nitrogen fertilizer levels and its splittings during 2002/2003 and 2003/2004 seasons and combined analysis.

Main effect and interactions	Plant height (cm)			N0. of spikes / m^2			Spike length (cm)		
	2002/2003	2003/2004	Comb.	2002/2003	2003/2004	Comb.	2002/2003	2003/2004	Comb.
Cultivars (C):									
Sids 1	88.1 b	86.1 c	87.1 c	336.0 b	325.1 c	330.5 c	16.2 b	16.4 b	16.3 b
Sakha 93	90.9 a	89.5 a	90.2 a	351.8 a	347.4 a	349.6 a	16.9 a	17.2 a	17.1 a
Gemmiza 9	83.0 c	81.8 d	82.4 d	293.6 c	285.2 d	289.4 d	14.4 d	14.9 c	14.7 d
Giza 168	88.4 b	87.6 b	88.0 b	339.7 b	336.3 b	338.0 b	14.8 c	15.1 c	15.0 c
F. test	* *	* *	* *	* *	* *	* *	* *	* *	* *
N levels (N):									
60 Kg / fad.	85.6 c	84.4 c	85.0 c	322.3 c	317.1 c	319.7 c	15.0 c	15.3 c	15.1 c
80 Kg / fad.	87.5 b	86.3 b	86.9 b	330.0 b	324.3 b	327.2 b	15.6 b	15.9 b	15.7 b
100 Kg / fad.	89.7 a	88.1 a	88.9 a	338.6 a	329.1 a	333.8 a	16.2 a	16.6 a	16.4 a
F. test	* *	* *	* *	* *	* *	* *	* *	* *	* *
N splitting (S):									
S1	86.1 c	85.3 b	85.7 c	328.1 b	319.6 b	323.8 b	15.4 b	15.8 b	15.6 b
S2	87.2 b	85.9 b	86.6 b	329.4 b	323.1 ab	326.3 ab	15.5 b	15.9 b	15.7 b
S3	89.5 a	87.5 a	88.5 a	333.3 a	327.9 a	330.6 a	15.9 a	16.2 a	16.0 a
F. test	* *	* *	* *	* *	* *	* *	* *	* *	* *
Intertactions:									
C × N	N.S	N.S	N.S	N.S	N.S	* *	N.S	N.S	N.S
C × S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
N × S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S

Table 3 : Means of no. of spikelets / spike, no. of grains / spike and 1000 – grain weight as effected by cultivars, nitrogen fertilizer levels and its splittings during 2002/2003 and 2003/2004 seasons and combined analysis .

Main effect and interactions	No. of spikelets / spike			No. of grains / spike			1000 – Grain weight (g)		
	2002/2003	2003/2004	Comb.	2002/2003	2003/2004	Comb.	2002/2003	2003/2004	Comb.
Cultivars (C):									
Sids 1	18.7 b	19.3 a	19.0 b	44.9 b	46.4 b	45.7 b	45.27 b	45.83 b	45.55 b
Sakha 93	19.4 a	19.5 a	19.5 a	46.7 a	47.7 a	47.2 a	46.37 a	47.45 a	46.91 a
Gemmiza 9	17.8 d	18.0 c	17.9 d	40.6 d	43.0 d	41.8 d	41.56 c	42.38 d	41.97 d
Giza 168	18.3 b	18.5 b	18.4 c	42.0 b	44.9 c	43.4 c	41.91 c	43.48 c	42.69 c
F. test	**	**	**	**	**	**	**	**	**
N levels (N):									
60 Kg / fad.	17.6 c	17.9 c	17.7 c	41.8 c	43.7 c	42.7 c	42.42 c	43.33 c	42.87 c
80 Kg / fad.	18.5 b	18.9 b	18.7 b	43.6 b	45.6 b	44.6 b	43.84 b	44.78 b	44.31 b
100 Kg / fad.	19.5 a	19.8 a	19.6 a	45.3 a	47.4 a	46.3 a	45.07 a	46.24 a	45.66 a
F. test	**	**	**	**	**	**	**	**	**
N splitting (S):									
S1	18.3 b	18.6 b	18.4 b	43.0 b	45.0 b	44.0 b	43.37 b	44.38 b	43.88 b
S2	18.3 b	18.7 b	18.5 b	43.1 b	45.0 b	44.1 b	43.45 b	44.47 b	43.96 b
S3	19.0 a	19.3 a	19.2 a	44.5 a	46.6 a	45.6 a	44.51 a	45.50 a	45.00 a
F. test	**	**	**	**	**	**	**	**	**
Interactions:									
C × N	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
C × S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
N × S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S

Table 4 : Means of grain , straw and biomass yields/fad and harvest index as effected by cultivars, nitrogen fertilizer levels and its splittings during 2002/2003 and 2003/2004 seasons and combined analysis .

Main effect and interactions	Grain yield (ton / fad.)			Straw yield (ton / fad.)			biomass yield (ton / fad.)			Harvest index		
	2002/ 2003	2003/ 2004	Comb.	2002/ 2003	2003/ 2004	Comb.	2002/ 2003	2003/ 2004	Comb.	2002/ 2003	2003/ 2004	Comb.
Cultivars (C):												
Sids 1	2.156 c	2.303 b	2.229 c	2.974 c	3.117 c	3.046 c	5.130 c	5.419 c	5.275 c	0.420 a	0.425 a	0.423 a
Sakha 93	2.339 a	2.473 a	2.406 a	3.302 a	3.454 a	3.378 a	5.641 a	5.927 a	5.784 a	0.415 ab	0.417 b	0.416 b
Gemmiza 9	2.052 d	2.193 c	2.122 d	2.986 c	3.049 d	3.017 d	5.038 d	5.242 d	5.140 d	0.408 c	0.418 ab	0.413 b
Giza 168	2.209 b	2.313 b	2.261 b	3.174 b	3.259 b	3.216 b	5.383 b	5.572 b	5.477 b	0.411 bc	0.415 b	0.413 b
F. test	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *
N levels (N):												
60 Kg / fad.	2.097 c	2.177 c	2.137 c	2.909 c	3.038 c	2.974 c	5.006 c	5.215 c	5.111 c	0.419 a	0.417	0.418 a
80 Kg / fad.	2.197 b	2.321 b	2.259 b	3.112 b	3.209 b	3.161 b	5.310 b	5.531 b	5.420 b	0.414 b	0.420	0.417 ab
100 Kg / fad.	2.273 a	2.463 a	2.368 a	3.305 a	3.412 a	3.358 a	5.578 a	5.875 a	5.726 a	0.407 c	0.419	0.413 b
F. test	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	N.S	* *
N splitting (S):												
S1	2.166 b	2.286 b	2.226 b	3.064 b	3.184 b	3.124 b	5.230 b	5.470 b	5.350 b	0.414	0.418	0.416
S2	2.169 b	2.291 b	2.230 b	3.079 b	3.194 b	3.136 b	5.247 b	5.485 b	5.366 b	0.413	0.418	0.416
S3	2.232 a	2.384 a	2.308 a	3.185 a	3.281 a	3.233 a	5.417 a	5.665 a	5.541 a	0.412	0.421	0.417
F. test	* *	* *	* *	* *	* *	* *	* *	* *	* *	N.S	N.S	N.S
Interactions:												
C × N	N.S	*	*	*	N.S	* *	N.S	N.S	*	* *	N.S	* *
C × S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
N × S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S

However, harvest index was not significantly affected by nitrogen fertilization levels in second season only.

C. Nitrogen splittings effect:

The results presented in Tables 2,3 and 4 indicated that splitting of nitrogen had highly significant effects on plant height, number of spikes / m^2, spike length, number of spikelets/spike, number of grains/spike, 1000-grain weight, grain, straw and biomass yields/ fad. Applying nitrogen in three equal doses (S3), 1/3 at sowing + 1/3 at tillering + 1/3 at joining exceeded those obtained from the other two systems of nitrogen application in plant height, number of spikes/m^2, spike length, number of spikelets/spike, number of grains/spike, 1000-grain weight, grain, straw and biomass yields/fad. Moreover, there was no significant differences between S1 and S2 in yield and its components, except plant height in the first season and combined. Similar results were obtained by Basha and El-Bana, (1994) on barley plants and Abd El-Maksoud and Maha Abd Alla, (2005) of wheat. On the other hand, Abdul Galil *et al.*, (2000) found that the increase in the no. of N split to seven produced longer plants with greater number of spikes/m^2 and increased also spike length, number of grains/spike, 1000-grain weight and grain weight / spike and thus grain and straw yields/fad.

D. Interaction effects:

As seen from Table 5 the statistical analysis showed few significant interaction effects among the three studied factors yet most of them did not add more information than the main effects. Therefore, the following interactions will be discussed only. The significant effect of the interaction between cultivars and nitrogen level on number of spikes/m^2 reveal that Sakha 93 cultivar produced the highest number of spikes/ m^2 by using 100 Kg/N. Similarly, the interaction effect between cultivars and nitrogen levels on grain yield / fad showed that Sakha 93 cv. gave the higher grain yield / fad when it was fertilized with 100 Kg N/fad. Also the interaction effect between cultivars and N levels on straw yield revealed that Sakha 93 cultivar gave the higher straw yield / fad by using 100 Kg N /fad. But the interaction effect between cultivars and nitrogen levels on harvest index showed that the Sids 1 cv. gave the highest value of harvest index yet the differences between nitrogen levels was not significant on harvest index.

E. Correlation Study:

The interrelationships among grain yield / fad of wheat and yield characters measured as simple correlation coefficient are shown in Table 6. It is clear from the data that grain yield / fad was positively and significantly correlated with plant height, number of spikes/ m2, spike length, number of spikelets/ spike, number of grains / spike, 1000-grain weight, straw and biomass yields / fad. However, the correlation coefficient between grain yield and harvest index did not reach the level of significant indicating that these characters could be used as selection criteria for improving wheat grain yield. Similar results were reported by El. Bana and Aly, (1993) Gomaa, (1997) Hassan and Gaballah, (2000) Maha Abd Alla, (2004) and Abd El-Maksoud and Maha Abd Alla, (2005).

This might be attributed to the genetic constitution of each variety (Hassan and Gaballah, 2000). Moreover, the average of both seasons data demonstrated that Sakha 93 cultivar gave the highest number of spike/m^2. In this respect, cultivars could be arranged in a descending order as follows: Sakha 93, Giza 168, Sids 1 and Gemmiza 9. These variations were significantly in the two seasons and combined data. In addition, Sakha 93 surpassed the others in the spike characteristics i.e. spike length, number of spikelets and grains / spike as well as, 1000 – grain weight. The spike of cultivars differed significantly from each other in their grain number. Sakha 93 cv. had the greatest number of grains/spike (47.2) followed by Sids 1 cv. (45.67) and Giza 168 (43.44) and then Gemmiza 9 (41.81). Also, thousand grain weight revealed significant differences among the studied wheat cultivares and could be arranged in a descending order as follows: Sakha 93, Sids 1, Giza 168 and Gemmiza 9. In addation, the four Egyptian local wheat cultivars differed significantly in grain, straw and biomass yields in both seasons and their combined. Moreover, Sids 1 recorded highest values in harvest index, while, Sakha 93 cultivar gave highest grain, straw and biomass yields / fad. This was true because it had the highest values of yield componets i.e number of spike/m^2, number of grains/spike, 1000-grain weight. So, Sakha 93 cv. gave the highest grain yield / fad, (number of spikes/m^2, number of grains/ spike and 1000-grain weight). While Giza 168 cv. followed by Sids 1 in number of spikes /m^2 and grain yield / fad. But, the Gemmiza 9 cv. recorded the lowest values in this respect. The varietal differences among wheat cultivars could be attributed to its genetical differences. This agree with the results obtained by Abdel – Gawad *et al.*, (1990) Essa, (1990) Taha *et al.,* (1990) El-sayed *et al.,* (1992) Darwich, (1994) Abd El – Hakeem and Teama, (1995) Makhloof, (1996) Hassanein *et al.,* (1997) El-Karamity, (1998) Mwaffy, (1999) Hassan and Gaballah, (2000) and Ali *et al.,* (2004).

B. Nitrogen fertilizer levels effect:

It is observed from Tables 2,3 and 4 that nitrogen fertilization had highly significant effect on most studied traits. Increasing nitrogen fertilization level from 60 to 80 and to 100Kg N/fad caused significant increase in plant height, number of spikes/m^2, spike length, number of spikelets/ spike, number of grains / spike, 1000 – grain weight, grain, straw and biomass yields / fad as well as harvest index. These hold true in both growing seasons and over them, except harvest index in the second season. Grain yield respond significantly to increasing nitrogen levels up to 100 Kg N/fad and each increment of 20 kg caused significant increase in grain yield. The first N increment produced a significant increase which amounted 5.71% in combined data. The second N increment produced an increase of 4.83%. This positive response to N application was expected, since the experiment was conducted in poor fertile sandy soil (Table 1). These results are in harmony with those of Salem, (1984) Gaber, (1988) Mohamed, (1992) Darwich, (1994) Moselhy, (1995) Gomaa, (1997) Khattab, (1998) El-Bana, (1999) Hassan and Gaballah, (2000) Saleh, (2003) and Ali *et al.*, (2004).

Table 5: Means of no. of spikes / m^2, grain, and straw yields (ton / fad) and harvest index as affected by the interaction between cultivars and nitrogen levels (combined data).

Cultivars	No. of spikes / m^2			Grain yield (ton / fad.)			Straw yield (ton / fad.)			Harvest index		
	60	80	100	60	80	100	60	80	100	60	80	100
	Kg N / fad			Kg N / fad.			Kg N / fad.			Kg N / fad.		
Sids 1	C 321.8 b	B 330.3 c	A 339.6 b	C 2.090 c	B 2.231 c	A 2.367 b	C 2.876 c	B 3.041 c	A 3.219 d	A 0.421 a	A 0.423 a	A 0.424 a
Sakha 93	C 337.8 ab	B 351.4 a	A 359.6 a	C 2.297 a	B 2.423 a	A 2.497 a	C 3.200 a	B 3.377 a	A 3.558 a	A 0.418 ab	A 0.418 b	B 0.412 b
Gemmiza 9	A 289.7 c	A 288.7 d	A 289.9 c	C 2.001 d	B 2.123 d	A 2.243 d	C 2.781 d	B 3.019 d	A 3.252 c	A 0.418 ab	B 0.413 c	C 0.408 c
Giza 168	C 329.6 a	B 338.3 b	A 346.3 b	C 2.159b	B 2.261 b	A 2.364 c	C 3.038 b	B 3.206 b	A 3.404 b	A 0.415 b	A 0.414 c	B 0.410 c

Table 6: Simple correlation coefficients between grain yield (ton/fad) and its components of wheat (combined data).

Character	1	2	3	4	5	6	7	8	9
Y-Grain yield (ton/fad.)	0.829**	0.726**	0.749**	0.750**	0.790**	0.728**	0.888**	0.955**	-0.100
1- Plant height		0.759**	0.730**	0.716**	0.756**	0.702**	0.717**	0.780**	-0.039
2- No. of spikes / m^2			0.678**	0.597**	0.702**	0.637**	0.551**	0.633**	0.140
3- Spike length				0.779**	0.889**	0.909**	0.562**	0.649**	0.153
4- No. of spikelets / spike					0.851**	0.826**	0.713**	0.747**	-0.172
5- No. of grains / spike						0.934**	0.636**	0.713**	0.069
6- 1000-grain weight							0.566**	0.644**	0.105
7- Straw yield (ton / fad.)								0.984**	-0.546**
8- Biological yield (ton / fad.)									-0.390**
9- Harvest index									---

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تأثير تجزئة إضافة مستويات مختلفة من النيتروجين على تقديرات المحصول فى بعض أصناف القمح المنزرع فى أرض رملية

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أقيمت تجربتان حقليتان فى موسمى ٢٠٠٢/٢٠٠٣ و ٢٠٠٣/٢٠٠٤ بمنطقة الصالحية محافظة الشرقية لدراسة استجابة بعض أصناف القمح المصرية وهى سدس ١ ، سخا ٩٣ ، جميزه ٩ وجيزة ١٦٨ وذلك لثلاثة معدلات من التسميد النيتروجينى (٦٠ ، ٨٠ ، ١٠٠كجم ن/فدان) وثلاثة معاملات لتجزئة معدل النتروجين كالتالى: (١/٤ عند الزراعة + ١/٤عند التشطى + ١/٤ عند الاستطالة + ١/٤عند الطرد) ، (١/٤ عند الزراعة + ١/٢ عند التشطى + ١/٤ عند الاستطالـة) ، (١/٣ عند الزراعة + ١/٣ عنـد التـشطى + ١/٣ عند الاستطالة) وذلك تحت ظروف الأراضى الرملية حديثة الاستصلاح ويمكن تلخيص أهم النتائج فيما يلى:

١-إختلفت الأصناف معنويا فى جميع الصفات المدروسة وفى محصول الحبوب للفدان فـى تحليـل التبـاين التجميعى وكان ترتيب الأصناف حسب كمية محصول الحبوب للفدان كالتالى سـخا ٩٣ ، جيـزة ١٦٨ ، سدس ١ ثم جميزة ٩.

٢-أدت زيادة معدلات إضافة النتروجين من ٦٠ حتى ١٠٠كجم ن/فدان إلى زيادة معنوية فى كل الـصفات المدروسة فيما عدا دليل الحصاد فى الموسم الثانى.

٣-أدت تجزئة معدلات النتروجين إلى ثلاث إضافات متساوية (١/٣ عند الزراعة + ١/٣ عنـد التـشطى + ١/٣ عند الاستطالة) إلى زيادة معنوية فى جميع الصفات فيما عدا دليل الحصاد فى كلا الموسمين وفـى تحليل التباين التجميعى.

٤-إرتبط محصول الفدان من الحبوب معنويا بكل من ارتفاع النبات ، عدد السنابل /م٢ ، طول السنبله ، عدد السنيبلات / سنبله ، عدد الحبوب / سنبله ، وزن ١٠٠٠حبه ، محصول القش والمحصول البيولـوجى / فدان . مما يشير إلى إمكانية تحسين كمية محصول الحبوب من خلال هذه الصفات.

توصى هذه الدراسة بزراعة صنف القمح سخا ٩٣ مع التسميد بـ ١٠٠كجم ن/فدان على ثلاثـة دفعات متساوية ١/٣ عند الزراعة ، ١/٣ عند التفريع و ١/٣ عند الاستطالة فى بداية الطرد للحصول علـى أعلى إنتاجية من محصول الحبوب للقمح تحت ظروف الأراضى الرملية .