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GROWTH AND YIELD OF SOME WHEAT CULTIVARS IRRIGATED WITH SALINE WATER IN NEWLY CULTIVATED LAND AS AFFECTED BY NITROGEN FERTILIZATION

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ABSTRACT

Two field experiments were conducted during 2000/2001 and 2001/2002 seasons at Shandura, Kabrit, Seuz Governorate, Egypt, to study the response of some wheat cultivars to nitrogen levels in newly cultivated land.

The results could be summarized as follows :

1 Wheat cultivars, i.e. (Giza 164, Giza 165, Sakha 61, Sakha 69, Sakha 93, Sids 8 and Sids 9) significantly differed in all growth characters under study at 120 days from sowing.
2. Nitrogen fertilizer produced significant increments in some growth characters, i.e. (plant height, flag leaf area and dry weight of spikes/plant).
3. The effect of interaction between wheat cultivars and nitrogen levels showed a significant effect on all growth characters under study at 120 days after sowing (except dry weight of leaves/plant and dry weight of tillers/plant).
4 There were significant differences for yield and its components i.e. plant height, number of tillers/plant, number of spikes/plant, weight of spikes/plant, grain index, grain yield/plant, straw yield/plant, grain yield/feddan, straw yield/ feddan and biological yield/feddan owing to varietals differences.
5 The results showed that increasing nitrogen level up to 150 kg/feddan caused a significant increase in all characters under study (except number of tillers/plant, number of spikes/plant and grain index.
6 The effect of interaction between wheat cultivars and nitrogen levels showed a significant effect on plant height, number of tillers/plant, number of spikes/plant, weight of spikes/plant, grain yield/plant, straw yield/plant, grain yield/ feddan, straw yield/feddan and biological yield/feddan.

INTRODUCTION

Wheat is one of the most important cereal crop used in human food and animal feed in Egypt and over all the world. Recently, a great attention of several investigators has been directed to increase the productivity of wheat to minimize the gap between the Egyptian production and consumption by increasing wheat production through increasing unit land area productivity and increasing the cultivated area. Increasing wheat yield per unit area can be achieved by breeding high yielding varieties. Nitrogen is the most important nutrient in wheat plant

growth, i.e. a constituent of plant proteins, chlorophyll, nucleic acids and other plant substances (Hassanein, 2001). Poor plant yields are most often due to deficiency of nitrogen.

Increasing wheat yield per unit area can be achieved by breeding high yielding varieties. Wheat cultivars differed in growth characters (Abd Alla and Bassiouny (1994), Hassanein *et al.* (1997) and El-Habbasha (2001). Wheat cultivars differed in yield and its components (Fayed, 1992; Metwally, *et al.*, 1998 and Sultan *et al.*, 2000).

Wheat cultivars i.e. (Sids 6, Sids 7, Sids 8, Sakha 69, Giza 163 and Giza 158) significantly differed in growth characters at 120 days after sowing except dry weight of spikes/plant (Hassanein, *et al.*, 1997 and Hassanien 2001). Grain, straw and biological yields and its components were significantly differed owing to varietal differences (Fayed, 1992; Bassiouny, *et al.*, 1993b; El-Kalla *et al.*, 1994; El-Douby, 1997; Sultan *et al.*, 2000 and Hassanein, 2001).

Abd Alla and Bassiouny (1994) found that increasing nitrogen levels from 60 to 90 and 120 kg N/fed. significantly increased plant height, number of spikes/plant, number of tillers/plant and dry weight/plant.

El-Noemani (1996) showed that, raising nitrogen level from Zero to 46 or 92 kg N/fed., increased significantly plant height and number of both tillers and green leaves as well as dry matter of both leaves and the whole plant.

Plant height, number of plants/m^2, number of spikes/m^2, number of leaves/m^2, dry weight of different organs (leaves and spikes) and flag leaves area/m^2 increased with increasing nitrogen fertilizer up to 100 kg N/fed., for Sids 1 and Sakha 69 cultivars and up to 140 kg N/fed., for Sids 7 cultivar (El-Habbasha 2001).

El-Karamity and Salem (1993) and Abd-Alla and Bassiouny (1994) obtained response to 120 kg N/fed., for yield and yield components. It is worthy to mention that all studied characters were significantly affected by N level. The higher level of the latter investigator was recorded on sandy soils. Fayed (1992) in newly reclaimed sandy soil found that increasing nitrogen level up to 150 and 160 kg N/fed., significantly increased each of plant height, number of spikes/m^2, 1000-grain weight and grain and straw yields/feddan, respectively.

Bassiouny *et al.*, (1993b) found that the increase in N level caused highly significant effects on yield and yield components.

The aim of this investigation was designed to study the effect of some wheat cultivars as well as nitrogen levels on growth, yield and yield components in newly cultivated land.

MATERIALS AND METHODS

Two field experiments were carried out in newly cultivated lands under sandy soil at Shandura, Kabrit, Seuz Governorate, during the two successive seasons 2000/2001 and 2001/2002 to study the response of growth, yield and yield components of some wheat cultivars to nitrogen levels. Soil and water analysis are presented in Table (1).

Table (1): Chemical analysis for soil and water.

Sample	pH	EC ppm	Soluble cations and anions meq/L.						
			Ca^{+}	Mg^{+}	Na^{+}	K^{+}	HCO_3^{-}	Cl^{-}	SO_4^{-}
Soil	7.5	2016.8	85.3	55.5	210.2	11.0	6.5	260.0	95.5
Water	7.1	2931.2	13.8	9.5	21.0	2.0	1.3	28.4	16.1

Mechanical analysis for soil

Sand	Silt	Clay	Texture	Organic matter O.M.	Total N	Available P
72.2 %	24.2 %	3.2 %	Sandy	0.23 %	0.04 %	6.8 ppm

Each experiment included 21 treatments which were the combinations between seven wheat cultivars (Giza 164, Giza 165, Sakha 61, Sakha 69, Sakha 93, Sids 8 and Sids 9) and three nitrogen levels (90, 120 and 150 kg N/fed.).

The experiments were laid in a split plot design with four replications, where, wheat cultivars occupied the main plots and nitrogen fertilizer levels were allocated at random in sub plots. Nitrogen as ammonium sulphate (20.5 % N) was applied in three equal doses. The first, one week after emergence, the second, at tillering stage and the third at booting stage. Plot size was 21 m^2 (1/200 feddan).

Wheat cultivars were planted on 15th and 10th December in 2000 and 2001 seasons, respectively. The normal agronomic practices of growing wheat were practiced till harvest as recommended by wheat research Dept., A.R.C

The following growth attributes at 120 days after sowing were recorded, i.e., Plant height (cm), number of tillers/plant, number of leaves/plant, number of spikes/plant, flag leaf area (cm^2), leaves dry weight/pant (g), tillers dry weight/plant (g) and spikes dry weight/plant (g).

At harvest, ten plants were taken randomly from each plot to determine plant height (cm), number of tillers/plant, number of spikes/plant, weight of spikes/plant (g), grain index (g), grain yield/plant (g) and straw yield/plant (g). To determine the grain yield (ton/fed.), straw yield (ton/fed.) and biological yield (ton/fed.) a sample of 1 sq.m from each plot was harvested and recorded.

Statistical analysis was performed according to Snedecor and Cochran (1990). Treatments mean were compared by L.S.D. test. Combined analysis was made from the two growing seasons hence the results of two seasons followed similar trend.

RESULTS AND DISCUSSION

Growth characters :

1. Effect of cultivars :

Data in Table (2) indicated that cultivars Giza 164, Giza 165, Sakha 61, Sakha 69, Sakha 93, Sids 8 and Sids 9 significantly differed in vegetative growth characters, i.e. plant height, number of tillers/plant, number of leaves/plant, number of spikes/plant, flag leaf area and dry weight of leaves, tillers and spikes per plant at 120 days from sowing.

It is clearly from the data that Giza 164 exceeded other cultivars in plant height, number of tillers/plant, number of leaves/plant, number of spikes/plant and flag leaf area, while Giza 165 surpassed other cultivars in dry weight of spikes/plant, in the combined analysis of the two seasons. Data indicated that cultivar Sids 9 exceeded other cultivars in dry weight of tillers/plant.

It could be concluded that varietal differences between wheat cultivars may be due to the genetical differences between cultivars and differences between genotypes concerning partition of dry matter, where wheat cultivars differed in carbon equivalent, yield energy per plant and per feddan (Abd El-Gawad, *et al.*, 1987).

The results of varietals differences in growth parameters in this study are in agreement with those obtained by Abd-Alla and Bassiouny (1994), Hassanein, *et al.* (1997), El-Habbasha (2001) and Hassanein (2001).

2. Effect of nitrogen levels :

Effect of nitrogen levels on wheat growth characters are presented in Table (2).

It is clear that increasing nitrogen level increased significantly plant height, flag leaf area and dry weight of spikes/plant at 120 days after sowing.

The increase in growth parameter due to the increase in nitrogen fertilization level from 90 to 120 and from 120 to 150 kg N/feddan reached 3.20% and 3.35 % in plant height, 26.42 % and 46.63 % in dry weight of spikes/plant and 4.82 % from 90 kg N/feddan to 150 kg N/feddan in flag leaf area.

The increase in plant height due to increasing nitrogen level may be attributed to that nitrogen application stimulated stem elongation through the increment in the number and size of cells (Markovic, 1983). It is noteworthy to mention that nitrogen is essential for plant growth as it is a constituent of all proteins and nucleic acids and hence of all protoplasm. As the level of nitrogen supply increases compared with other nutrients, the extra protein produced allows the plant leaves to grow larger and hence to have a larger surface available for photosynthesis proportional to the amount of nitrogen supply (Russel, 1973).

Table (2): Effect of cultivars and nitrogen levels on growth characters of wheat plant at 120 days after sowing (combined analysis of 2000/2001 and 2001/2002 seasons).

Characters / Treatments	Plant height (cm)	No. of tillers/ plant	No. of leaves/ plant	No. of spikes/ plant	Flag leaf area (cm)	Dry weight (g)		
						Leaves	Tillers	Spikes
Cultivars:								
Giza 164	82.87	4.16	15.40	4.76	35.18	2.20	6.50	4.58
Giza 165	79.17	4.31	13.82	3.95	30.50	2.69	5.57	5.33
Sakha 61	73.10	4.29	10.30	4.90	23.84	1.83	6.25	4.74
Sakha 69	75.30	3.78	11.60	3.60	28.11	2.03	6.35	3.90
Sakha 93	79.20	3.99	12.91	3.77	35.17	2.39	7.44	4.02
Sids 8	81.30	3.29	6.44	3.70	34.43	2.22	7.42	4.85
Sids 9	69.63	3.43	7.90	3.25	25.25	1.96	7.84	4.80
L.S.D.at 5%	2.75	0.39	3.05	0.28	4.53	0.19	0.97	0.99
Nitrogen level (kg/fed.):								
90	74.8	3.50	10.9	3.32	29.86	2.15	6.43	3.71
120	77.2	4.32	11.17	4.03	29.43	2.17	6.79	4.69
150.	79.5	3.84	11.35	3.70	31.78	2.24	7.07	5.44
L.S.D.at 5%	2.03	N.S	N.S	N.S	1.03	N.S	N.S	0.74

Similar finding were found by Abd El-Gawad *et al.* (1993), El-Habbasha (2001) and Hassanein (2001).

3. Effect of the interaction between wheat cultivars and nitrogen levels :

The effect of interaction between wheat cultivars and nitrogen levels on plant height, number of tillers/plant, number of leaves/plant, number of spikes/plant, flag leaf area and dry weight/spikes were significant. The results reported in Table (3) showed that the effective treatments for plant height and number of leaves/plant were obtained from Giza 164 cultivar with adding 150 kg N/feddan, as well as for number of spikes/plant was Giza 165 and 150 kg N/feddan. The highest value of flag leaf area was obtained from Sids 8 cultivar with application 150 kg N/feddan.

These results are contradict with that obtained by Bassiouny *et al.* (1993a), who reported that, the interaction between wheat cultivars and nitrogen fertilization affected significantly in plant height, number of tillers/plant at 75 days from sowing and flag leaf area in combined analysis.

Yield and its components :

1. Effect of cultivars :

Data in Table (4) indicated that there were significant differences between wheat cultivars in all characters under this study, i.e. plant height, number of tillers/plant number of spikes/plant, weight of spikes/plant, grain index, grain yield/plant, straw yield/plant, grain yield/feddan, straw yield/feddan and biological yield/feddan.

Table (3) : Effect of the interaction between cultivars and nitrogen levels on growth characters of wheat plant at 120 days after sowing (combined analysis of 2000/2001 and 2001/2002 seasons).

Characters / Treatments		Plant height (cm)	No. of tillers/ plant	No. of leaves/ plant	No. of spikes/ plant	Flag leaf area (cm)	Dry weight (g)		
N level (kg/fed)	Cultivars						Leaves	Tillers	Spikes
90	Giza 164	80.6	3.55	14.34	3.41	38.29	2.11	6.50	3.91
120		83.4	4.92	15.15	4.82	36.13	2.15	6.48	4.52
150		84.6	4.01	15.64	4.00	31.14	2.35	6.51	5.30
90	Giza 165	77.3	4.00	13.68	3.78	34.36	2.81	5.21	4.00
120		79.5	4.71	14.00	4.08	27.05	2.51	5.51	5.83
150		80.7	4.21	13.79	4.00	30.13	2.75	6.00	6.17
90	Sakha 61	70.3	3.73	10.91	3.54	22.19	1.72	6.11	3.90
120		73.7	4.81	10.00	4.61	27.13	1.91	6.11	4.97
150		75.3	4.33	10.00	4.13	22.21	1.85	6.53	5.34
90	Sakha 69	70.4	3.55	11.33	3.33	29.41	2.00	6.30	3.19
120		75.6	4.00	11.63	3.81	22.20	2.00	6.75	3.98
150		79.9	3.79	11.85	3.65	32.73	2.09	6.00	4.53
90	Sakha 93	78.3	3.61	12.51	3.40	31.00	2.31	6.75	3.31
120		79.0	4.36	13.21	4.15	38.19	2.51	7.57	3.91
150		80.3	4.00	13.00	3.77	36.32	2.35	8.00	4.85
90	Sids 8	79.9	3.00	6.00	2.75	34.63	2.21	7.01	3.92
120		80.5	3.82	6.33	3.46	30.18	2.23	7.31	4.71
150		83.4	3.06	7.00	3.01	38.50	2.33	7.95	5.93
90	Sids 9	67.3	3.11	7.55	3.03	19.15	1.95	7.15	3.76
120		69.3	3.68	7.91	3.32	25.15	1.91	7.83	4.65
150		72.3	3.51	8.23	3.40	31.47	2.01	8.55	6.00
L.S.D. at 5 %		5.10	0.75	2.65	0.73	10.15	N.S	N.S	0.94

Giza 165 cultivar surpassed other six cultivars in plant height, Sakha 61 exceeded the others in number of tillers/plant, number of spikes/plant, straw yield/plant and per feddan. While Sids 8 cultivar surpassed other six cultivars in weight of spikes/plant, grain yield/plant, grain yield/feddan and biological yield/feddan.

It could be concluded that varietal differences between wheat cultivars may be due to genetical differences between cultivars, as well as, the range of cultivar response.

The differences in yield potential of wheat depend undoubtely on the part of photosynthetic partioned into grain yield. However, this depends on source size and the translocation.

Abd El-Gawad *et al.* (1987) found that wheat cultivars differed in partitioning and migration of the total available photosynthate to economic yields. Also, wheat cultivars differed in carbon equivalent for vegetative components and grain and in production value of vegetative matter, grains per plant and per

feddan and coefficient energy of crop and harvest index. Moreover, varietal differences were realized in partition of dry matter in eight maize genotypes, where, maize hybrids differed in glucose required for synthesis, carbon equivalents, yield energy per plant and per feddan and above ground biomass (biological yield), also coefficient of energy of crop index (El-Sherbieny *et al.*, 1994).

These results were in harmony with the results obtained by Fayed (1992), El-Karamity and Salem (1993), El-Douby (1997), Hassanein *et al.* (1997), Sultan *et al.*, (2000), El-Habbasha (2001) and Hassanein (2001).

2. Effect of nitrogen levels :

Effect of nitrogen fertilizer on yield and its components of wheat are presented in Table (4). It is clear from the data that increased nitrogen had significant effect on all characters under study except number of tillers/plant, number of spikes/plant and grain index. 150 kg N/feddan gave the highest plant height, grain yield and straw yield, while the differences between 120 kg N/feddan and 150 kg N/feddan was insignificant in straw yield and biological yield.

Table (4): Effect of cultivars and nitrogen levels on yield and its components of wheat (combined analysis of 2000/2001 and 2001/2002 seasons).

Characters / Treatments	Plant height (cm)	No. of tillers/ plant	No. of spikes/ plant	Wt. of spikes/ plant	Grain index (g)	Grain yield plant (g)	Straw yield plant (g)	Grain yield (ton/ fed)	Straw yield (ton/ fed)	Biological yield (ton/fed.)
Cultivars :										
Giza 164	84.78	4.30	4.21	7.81	2.95	5.90	9.95	1.138	3.830	4.970
Giza 165	94.40	4.17	4.03	8.06	3.02	5.94	12.09	1.137	4.162	5.308
Sakha 61	82.05	5.45	5.22	8.00	3.04	6.02	13.66	1.265	4.553	5.818
Sakha 69	93.35	4.30	4.15	8.04	3.59	6.46	13.43	1.417	4.460	5.877
Sakha 93	82.51	4.57	4.23	8.90	3.09	6.82	9.92	1.511	3.744	5.255
Sids 8	86.45	3.21	3.09	9.06	3.05	6.87	11.85	1.512	4.350	5.862
Sids 9	77.08	3.93	3.55	8.41	2.76	6.58	9.41	1.461	3.851	5.312
L.S.D.at 5%	2.5	0.12	0.11	0.85	0.38	0.78	1.12	0.970	0.510	0.450
Nitrogen level (kg/fed.):										
90	84.6	4.15	4.03	7.85	3.00	5.79	11.10	1.159	3.931	5.090
120	84.9	4.27	4.02	8.50	2.90	6.50	11.90	1.384	4.202	5.586
150	87.7	4.41	4.14	8.36	2.99	6.79	11.43	1.504	4.134	5.638
L.S.D.at 5%	2.0	N.S	N.S	0.50	N.S	0.61	0.15	0.150	0.100	0.125

The increase in yield due to the increase of nitrogen level from 90 to 120 and from 120 to 150 kg N/feddan reached 19.41% and 29.77 % in grain yield/feddan, 6.89 % and 5.16 % in straw yield/feddan, respectively.

The results of nitrogen fertilization revealed that in newly cultivated sandy soil the grain yield of wheat could be enhanced by increasing nitrogen levels up to 150kg N/feddan.

The response of grain yield to increasing N levels could be due to the increase in nitrogen uptake by wheat plants which increased all yield attributes and the low available N in newly cultivated sandy soil.

Similar results were obtained by El-Karamity and Salem (1993), Abd-Alla and Bassiouny (1994), El-Noemani (1996), Gomaa (1997) and El-Habbasha (2001).

3. Effect of the interaction between wheat cultivars and nitrogen levels :

The effect of the interaction between wheat cultivars and nitrogen levels on plant height, number of tillers/plant, number of spikes/plant, weight of spikes/plant, grain yield/plant, straw yield/plant, grain yield/feddan, straw yield/ feddan and biological yield/feddan were significant (Table 5).

The highest values of plant height was obtained from Giza 165 cultivar with application of 150 kg N/feddan.

Table (5): Effect of interaction between cultivars and nitrogen levels on yield and its components of wheat (combined analysis of 2000/2001 and 2001/2002 seasons).

Characters / Treatments		Plant height (cm)	No. of tillers/ plant	No. of leaves/ plant	Weight of spikes /plant	Grain index (g)	Grain yield g/plant	Straw yield/ plant (g)	Grain yield (ton/ fed)	Straw yield (ton/ fed.)	Biological yield (ton/Fed.)
N level (kg/fed)	Cultivars										
90	Giza 164	83.85	4.21	4.14	7.29	2.95	5.33	9.40	1.011	3.700	4.711
120		84.07	4.29	4.20	8.13	2.99	6.15	9.99	1.200	3.810	5.010
150		86.42	4.39	4.29	8.00	2.91	6.22	10.45	1.213	3.990	5.203
90	Giza 165	93.20	4.00	3.92	7.45	3.01	5.50	11.51	1.000	4.000	5.000
120		93.00	4.19	3.99	8.49	3.09	6.00	12.05	1.200	4.185	5.385
150		97.00	4.33	4.11	8.25	2.96	6.31	12.92	1.216	4.310	5.526
90	Sakha 61	80.85	5.33	5.21	7.68	2.98	4.85	13.90	0.976	4.270	5.246
120		81.30	5.39	5.05	8.19	3.03	6.51	14.00	1.323	4.700	6.023
150		84.0	5.68	5.40	8.14	3.12	6.71	13.09	1.495	4.690	6.185
90	Sakha 69	92.30	4.20	4.03	7.00	2.98	6.32	13.00	1.091	4.157	5.248
120		92.40	4.31	4.20	8.99	3.18	5.92	14.30	1.310	4.810	6.120
150		95.10	4.39	4.21	8.13	3.00	7.15	13.00	1.850	4.415	6.265
90	Sakha 93	81.15	4.40	4.29	8.82	3.05	6.59	9.45	1.417	3.613	5.030
120		82.25	4.65	4.15	8.99	3.10	6.98	10.31	1.550	3.850	5.400
150		84.13	4.67	4.25	8.90	3.12	6.91	10.00	1.567	3.770	5.337
90	Sids 8	85.45	3.10	3.00	9.08	3.01	5.84	11.78	1.410	4.000	5.410
120		84.99	3.21	3.11	9.11	3.05	7.59	12.43	1.616	4.100	5.716
150		88.91	3.33	3.17	9.00	3.09	7.19	11.35	1.510	3.950	5.460
90	Sids 9	75.81	3.81	3.65	7.66	3.05	6.16	9.310	1.213	3.777	4.990
120		76.50	3.89	3.41	8.05	2.51	6.51	10.50	1.492	3.963	5.455
150		78.93	4.09	3.61	8.11	2.73	7.09	9.41	1.680	3.815	5.495
L.S.D.at 5%		4.13	0.11	0.15	0.99	N.S	1.05	2.18	0.110	0.180	0.380

Sakha 61 cultivar with 150 kg N/feddan gave the highest value of number of tillers/plant and number of spikes/plant.

However, the effective treatment for weight of spikes/plant, grain yield/plant and grain yield/feddan was Sids 8 cultivar and 120 kg N/feddan, while for straw yield/plant, straw yield/feddan and biological yield/feddan was Sakha 69 cultivar with 120 kg N/feddan.

These results were similar to that reported by Bassiouny *et al.* (1993b), El-Karamity and Salem (1993) and Metwally *et al.* (1998).

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النمووالمحصول لبعض اصناف القمح المروية بالماء المالح بالاراضى حديثة الاستزراع تحت تأثير التسميدالنتروجينى

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اجريت تجربتان حقليتان خلال موسمى ٢٠٠٠/٢٠٠١، ٢٠٠١/٢٠٠٢ فى منطقة شندورة – كبريت – محافظة السويس لدراسة استجابة بعض اصناف القمح لمستويات التسميد النيتروجينى فى الاراضى حديثة الاستزراع. ويمكن تلخيص النتائج على النحوالتالى :

١- وجدت اختلافات صنفية بين اصناف القمح (جيزة ١٦٤، جيزة ١٦٥، سخا ٦١، سخا ٦٩، سخا ٩٣، سدس ٨، سدس ٩) وذلك فى كل صفات النموتحت الدراسة عند عمر ١٢٠ يوم من الزراعة .

٢- أحدثت زيادة التسميد النيتروجينى زيادة معنوية فى بعض صفات النمو(طول النبات، مساحة ورقة العلم، الوزن الجاف لسنابل النبات).

٣- وجد تأثير معنوى للتفاعل بين الاصناف ومستويات التسميد النيتروجينى فى كل الصفات تحت الدراسة عند عمر ١٢٠ يوم من الزراعة (فيماعدا الوزن الجاف لاوراق النبات، الوزن الجاف لاشطاء النبات).

٤- وجدت اختلافات معنوية بين الاصناف فى المحصول ومكوناته (طول النبات، عدد الاشطاء للنبات، عدد السنابل للنبات، وزن سنابل النبات، وزن الالف حبه، محصول الحبوب للنبات، محصول القش للنبات،محصول الحبوب للفدان، محصول القش للفدان، المحصول البيولوجى للفدان) .

٥- ادى زيادة التسميد النيتروجينى حتى ١٥٠ كجم/فدان الى زيادة معنوية فى كل صفات المحصول تحت الدراسة ماعدا (عدد الاشطاء للنبات، عدد السنابل للنبات ووزن الالف حبه).

٦- كان هناك تأثير معنوى للتفاعل بين الاصناف ومستويات التسميد النيتروجينى على طول النبات – عدد الاشطاء للنبات، عدد سنابل النبات، وزن السنابل للنبات، محصول الحبوب للنبات، محصول القش للنبات، محصول الحبوب للفدان، محصول القش للفدان والمحصول البيولوجى للفدان.