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THE EFFECT OF FARMYARD MANURE, NITROGEN APPLICATION ON YIELD AND YIELD COMPONENTS OF BARLEY VARIETIES (*Hordeum vulgare* L.) UNDER SALINE CONDITIONS AT WADI SUDR SOUTH SINAI

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ABSTRACT

Two Field experiments were carried out during 2002/2003 and 2003/2004 seasons under salinity conditions at Wadi Sudr, South Sinai Experimental Station, Desert Research Center. There experiments were to study the effect of three farmyard manure (compost) application, viz, 10, 20 and 30m^3/fed. and three rates of nitrogen fertilizer, 40,50 and 60 kg N/ fed. and barley varieties Giza 129 and Giza 131 on yield and its attributes of hull less. The experimental treatments were arranged in split-split design. The main results were as follows:

1- All studied characters except grain yield/plant, straw yield/fed. and harvest index were significantly differed from season to another
2- A significant increase in all studied characters was observed as farmyard manure, nitrogen fertilization and varieties barley, results indicated that increasing farmyard manure from 10 to 30m3/ fed. significantly and gradually increased barley growth, yield and its components. Farmyard manure of 30m3/fed. gave the best results for all studied character. Also, the results indicated that increasing nitrogen fertilization levels significantly increased barley growth, yield and its components. Nitrogen level of 60kg N/fed. gave the best results for all studied characters compared to the control (40 kg N/fed.). While, the results show that barley varieties markedly differed in their yield and its components, Giza 131 variety significantly surpassed Giza 129 for all studied characters, except harvest index.
3- The interaction between farmyard manure and nitrogen fertilizer was statistically significant for all characters on yield and yield components.
4- The interaction between farmyard manure and barley varieties was significant for plant height, grain weight/spike, biological yield/fed., carbohydrate %, and protein %.Results showed that grain yield of Giza 131 c. v. exhibit the highest response grain yield/fed. at the higher rates of farmyard manure compared to the other variety. The best results for all studied characters, were recorded for variety Giza 131 and 30m^3/fed. Farmyard manure.
5- The interaction between nitrogen fertilizer and varieties of barley was significant for spike length, biological yield/fed., carbohydrate %, and protein %. The best results for all studied character, recorded for variety Giza 131 were obtained by 60 kg N/fed.

6- The second order interaction of farmyard manure, nitrogen fertilizer and barley varieties were significant for No. of grains/spike, 1000 – grain weight, straw yield/fed., biological yield/fed., carbohydrate % and protein % . The best variety, Giza 131, with 30 m3 farmyard manure and 60 Kg N/fed. could be recommended as the best treatment for raising barley production under Wadi Sudr, South Sinai conditions.

Key words: Barley, Wadi Sudr-South Sinai-Egypt, Saline conditions, Farmyard manure, Nitrogen fertilizer, Varieties, Yield and its yield components.

INTRODUCTION

Barley (*Hordeum vulgare L.*) is one of the ancient and important crops that grown on large scale in arid and semi arid regions under salinity stress and marginal land with poor and low fertility status. Salinity has long been recognized as a problem in many parts of the world, especially in arid and semi–arid zones. Salinity became a problem for farmers under irrigated conditions. The soil salinity is a measure of the total amount of soluble salts in the soil. It is well known that climate and irrigation also influence salinity tolerance. In arid lands, the geological salt deposits are eroded; as a result, dissolved salts are spread over large areas. High rates of evaporation and low rates of leaching concentrate the salt in the upper soil and surface waters more rapidly than in regions of higher precipitation. The efforts of agronomists and farmers have been mostly directed to increase the production of barley (Hillel, 2000). This goal could be achieved by several factors such as developing high yielding varieties and the improvement of cultural practices; i.e. fertilization application farm by products, sowing date ... etc. Abdel-Salm and Sibaie. (1983)found that barley yield was decreased under saline water irrigation while improved by organic manure application. The highest yield was obtained on normal soil receiving organic manure at 25 ton/ha level and irrigated with saline water (3000ppm).Also, El-Sibaie *et al.*, (1983) found that barley yield was positively affected by organic manure treatment and negatively by salinity levels. They added that, good yield was obtained when normal soil was treated with organic manure of 25 ton/ ha and irrigated with 6000 ppm saline water. Similar results were obtained by Dahdoh and Hassanin (1994). Nitrogen as a constituent of plant protein, chlorophyll, nucleic acid and other plant substances, is considered the most important nutrient. Application of nitrogen fertilizer increased grain yield and yield components of barley plants Assey *et al*, (1990). Harris (1986) found that delaying N-application increased grain protein content and carbohydrate content. Hefni (1967) indicated that grain yield of barley increased significantly by increasing nitrogen rate to 50 kg/fed. in clay soil. Misra *et al.*, (1980) reported that increasing level of N to 60kg N/ha. significantly increased the straw yield production in barley . The response of barley plants to increase nitrogen application was studied by many workers. Also, El-Kholy and El-Bawab (1998) found that nitrogen increased plant height, number of spikes/ m^2, number of grains/ spike, weight of grains/ spike, 1000-grain weight and grain yield. Abdel – Hamid and Mohamed (2000) reported that nitrogen fertilizer significantly affected yield and yield attributes of barley. El-

Bawab *et al.*, (2003) showed that barley yield responded to nitrogen level up to 45- 75 kg/N/fed. through increasing the most of yield and yield attributes. Several investigators reported that barley varieties vary in plant height (Osman *et al.* 1991), number of grains/spike, weight of grains/spike, 1000 – grains weight, grain yield (Ghamen and Gomma 1985). Barley varieties differed greatly in their yield and its components under saline conditions as reported by Ahmed *et al.*, (1998).This study was conducted to investigate the response of some barley varieties to farmyard manure and nitrogen under saline conditions at Wadi Sudr, South Sinai.

MATERIALS AND METHODS

Two field experiments were carried out during two successive winter seasons of 2002/ 2003 and 2003/2004 at the experimental farm at Wadi Sudr, Desert Research Center, South Sinai to investigate the effect of application of farmyard manure and nitrogen levels on yield, yield components of hull-less, barley varieties. The experimental soil is characterized as highly calcareous (53.10%), saline (Ec 7.59 ds/m), slightly alkali (pH 7.86) sandy loam texture, and organic matter content of (0.46%) .The available N,P and K contents were 13.61, 8.32 and 54.21 ppm, respectively average over the two seasons for the upper layers 0-30 cm and 30-60 cm of soil depth. The chemical analysis of farmyard manure as compost consists of sheep dung manure and crop byproducts is given in (Table 1). Water analysis was carried out to evaluate the underground well water used for irrigation at Wadi Sudr (Table 2). Each experiment consisted of 18 treatments which were the combination of three rates of farmyard manure (10, 20 and 30 m^3/ fed), three levels of nitrogen fertilizer (40, 50, and 60 kg/N fed). and two hull–less barley varieties, (Giza 129 and Giza 131). The split split plot design with four replications was used, Farmyard manure was allocated in the main plots, N levels in the sub-plots and varieties of barley in the sub sub-plot. Each experimental sub-sub-plot consisted of 15 rows, 3 m long and 20 cm in width (plot area = 3 × 3 = 9 m^2), (Fed. = 42000 m^2).Barley grains were sown on 20 November, 2002 and 25 November, 2003 at a rate of 50 kg/fed. seeds. Grains of the two barley varieties were soaked with tap water for 12 hours before planting. Farmyard manure and calcium super phosphate (15.5%) fertilizer of (15.5 kg) P_2O_5/Fed. were mixed with the upper layer (30 cm depth) of the soil before sowing. Potassium sulphate (48%) was added at a rate of (24kg) K_2O/ fed. in two equal doses, after 30, and 45 days from planting, respectively. Nitrogen fertilizer in the form of ammonium nitrate (33%N) in the for mentioned levels was added at three equal doses, during soil preparation, at 30 and 45 days from sowing respectively. At harvest time (150 days from sowing), ten plants were chosen at random from each sub sub plot to measure plant height, No. of tillers/ plant, spike length (cm), No. of grains/spike, grain weight spike (g), 1000 – grain weight (g) and grain yield/plant (g). Meanwhile, grain yield kg/ fed. straw yield kg/fed., biological yield kg/ fed. and harvest index i.e. grain yield kg/fed./biological yield kg/fed. X100 were estimated from the central $3m^2$ of each experimental unit. Protein content % using micro-kjeldahl method was used to determine grain nitrogen content which was multiplied by factor 5.75 to obtain the percentage of crude protein according to A.O.A.C. (1980). Carbohydrate content % was determined

according to Dubois *et al.* (1956).The data were statistically analyzed combined analysis of variance for the two seasons was undertaken using the appropriate analysis of variance according to Snedecor and Cochran (1981). The combined analysis of the two seasons was done as the results exhibited similar trends. The least significant difference (LSD) at the level of 0.05 was used to compare the differences between treatment means.

Table (1): Chemical contents of farmyard manure (compost) .

pH	Organic carbon %	Total nitrogen %	C/N Ratio	Total phosphorus %	Total Potassium %	Total sulphate %
7.25	18.2	1.40	13.0	0.23	1.33	1.25

Table (2): Chemical properties of irrigation water:

EC	pH	Cations (meq/L)				Anions (meq/L)				
ds/m	Value	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	$CO_3^{=}$	HCO_3^{-}	Cl^{-}	$SO_4^{=}$	SAR
First season 2002/ 2003										
10.63	7.7	20.45	29.10	43.93	0.73	-	3.27	65.3	37.83	8.83
Second season 2003/ 2004										
11.25	7.9	38.82	27.6	46.1	1.26	-	4.2	64.8	45.60	7.99

RESULTS AND DISCUSSION

1. Effect of seasons.

Results in Table (3) represent averages of the two seasons, it is evident that yield and yield components were significantly affected by seasons except of grain yield/plant, straw yield/fed. and harvest index. Higher values for all characters were detected in the first season except of plant height. This may be due to increase the salt accumulation in the second year than the first one. It could be concluded that the increase in grain yield/fed. in the first season was due to the significant increase in No. of tillers/plant and 1000-grain weight. These findings are in harmony with those found by El-Hosary (2000).

2. Effect of farmyard manure .

Table (4) shows the effect of farmyard manure on yield and yield components. In all cases, increasing farmyard manure application significantly increased the yield of barley grain and straw. The highest biological yield kg/fed. (grain yield and straw yield) was obtained in response to 30^3/ fed., where the yield amounted to 794kg/fed. and 1493. kg/fed. for grains and straw, respectively. Application of farmyard manure increased No. of tillers/plant and 1000 – grain weight, this might be due to increasing soil fertility and better utilization of nutrients by barley. This caused to increase in yield attributing characters and ultimately yield of barley, our results agreed with findings of Singh and Agawal (2004).Application of farmyard manure (compost) at the rates of 10, 20, and 30M3/fed. yielded an average of 547.39, 694.42 and 794.12 kg/fed. grains respectively, representing an increases of 45.10% and 14.36% compared the high

Table (3): The average values of seasonal effect on yield and yield components of barley plants grown under saline conditions at Wadi Sudr (Combined data of 2002/2003 and 2003/2004 seasons).

Treat-ments / Seasons	Plant height (cm)	No. of tillers / plant	Spike length (cm)	No. of grains /spike	Grain weight / spike (g)	1000 – grain weight (g)	Grain yield/ plant (g)	Grain yield kg / fed.	Straw yield kg/ fed.	Biological yield kg/ fed.	Harvest Index %	Carbohy-drate %	Protein %
Season (1)	60.53	3.45	6.77	37.88	0.978	27.33	2.23	735.94	1401.51	2137.45	0.342	48.81	10.90
Season (2)	62.49	2.61	6.56	36.11	0.892	25.86	2.09	621.35	1331.91	1953.26	0.319	48.21	10.19
L.S.D. at 0.05	0.5318	0.0782	0.0190	0.3916	0.0134	0.3414	N.S.	30.9036	N.S	57.9739	N.S.	0.3043	0.3210

Table (4): Effect of farmyard manure, nitrogen fertilizer and barley varieties on yield and yield components of barley plants grown under saline conditions at Wadi Sudr (Combined data of 2002/2003 and 2003/2004 seasons)

Treatments	Plant height (cm)	No. of tillers / plant	Spike length (cm)	No. of grains /spike	Grain weight / spike (g)	1000 – grain weight (g)	Grain yield/ plant (g)	Grain yield kg / fed.	Straw yield kg/ fed.	Biological yield kg/ fed.	Harvest Index %	Carbohy-drate %	Protein %
Farmyard manure (compost) m^3/fed													
10 M^3/fed	58.69	2.66	6.14	33.76	0.746	23.46	1.72	547.39	1211.73	1759.12	0.311	46.74	9.12
20 M^3/fed	61.73	3.11	6.87	37.55	0.961	27.31	2.28	694.42	1395.35	2089.77	0.332	48.61	10.01
30 M^3/fed	64.10	3.32	6.97	39.66	0.973	29.02	2.48	794.12	1493.04	2287.16	0.347	50.18	11.52
L.S.D. at 0.05	0.6514	0.0958	0.0232	0.4796	0.0164	0.4182	0.3284	37.8490	28.8317	71.0033	0.0052	0.3727	0.3932
Nitrogen level kg/ fed													
40 kg */fed	60.13	2.88	6.50	35.35	0.842	25.21	1.97	615.33	1270.11	1885.44	0.326	47.30	9.86
50 kg */fed	62.05	3.07	6.81	37.65	0.976	27.26	2.25	690.65	1387.81	2078.46	0.332	48.52	10.70
60 kg */fed	62.33	3.14	6.68	37.97	0.987	27.31	2.27	729.95	1442.20	2172.15	0.336	49.71	11.08
L.S.D. at 0.05	0.2992	0.0264	0.0215	0.1932	0.0152	0.0403	0.0482	22.2257	26.7858	24.9090	0.0048	0.0746	0.0527
Barley varieties													
Giza 129	62.20	2.95	6.62	36.54	0.909	26.22	2.10	664.60	1339.50	2004.10	0.332	48.30	10.40
Giza 131	60.81	3.11	6.71	37.45	0.961	26.97	2.22	692.69	1393.91	2086.60	0.332	48.72	10.70
L.S.D. at 0.05	0.1483	0.0273	0.0122	0.1127	0.0039	0.0458	0.0245	12.1386	23.8639	9.5232	N.S.	0.0243	0.0487

dose of farmyard manure 30M3/fed. The increment in yield and yield components with increasing rates of farmyard manure was reported by El-Sibaie, *et al.*, (1983), Dahdoh and El-Hassanin (1994), Alaga (2002) and Beheiry (2003).It could be concluded that addition of organic manure to barley plants induced more growth and yield. This may be due to the ability of organic manure to support the grown plants with some micro-nutrients and macro nutrients. Similar results were reported by Khalil *et al.* (1991), and El-Afandy (1995). The organic manure may also encourage the formation of soil aggregates and thus improve soil permeability, increasing soil permeability helps in increasing the leaching process and reduction of the salinity hazards effect of the poor quality irrigation water used.

3. Effect of Nitrogen fertilizer.

Results in Table (4) showed that all studied characters increased significantly in response to increasing the rate of nitrogen fertilizer up to 60 kg/fed. Furthermore, the increase in the yield with the increase in fertilizer supply might owe much to the increase in the dry weight of vegetative organs, which could be considered as a criterion for the photosynthetic efficiency of the plant . It could be observed that increasing N levels from 40, 50 and 60 Kg/N/fed. significantly and gradually increased plant height, No. of tillers/plant, spike length, No., of grains,/spike, grain weight/spike, 1000 – grain weight, grain yield/ plant, grain yield/fed. straw yield/fed. biological yield/fed., harvest index %. and carbohydrate %, protein %. Application of nitrogen at the rates of 40, 50 and 60 kg N/ fed. yielded an average of about 615.33, 690.65 and 729.95 Kg/fed. grains yield respectively, representing an increase of 18.63% and 5.69% compared the high dose of nitrogen (60 kg/fed.) respectively. These results are in harmony with those obtained by El-Kholy and El-Bawab (1998), El-Bawab *et al.*, (2003) Megahed, (2003) and Abd Alla (2004) found that the increase of nitrogen level up to 80 kg/ fed. produced significant increases in grain yield/fed. and gave the highest average values of yield and yield components .

4. Effect of barley varieties.

The data recorded in Table (4) showed significant differences among, the studied two varieties for yield and its components in the combined data. The data show that, plant height, No. of tillers/ plant, spike length, No. of grains/spike, grain weight/spike, 1000- grain weight, grain yield/plant, grain yield/ fed., straw yield/fed., biological yield/fed. and volume carbohydrate %, and protein % were significantly higher in Giza 131 than Giza 129 except harvest index. In this respect, Abd Alla (2004) reported that Giza 131 was superior to the other variety (Giza 129 and Giza 130) in grain yield/fed., biological yield/fed. and harvest index .The difference between barley varieties might be due to variation in translocation rate of photosynthesis from leaves to storing organs, (grains). Similar results were obtained by Suhayda *et al.* (1992), Saini and Thakur (1999) and Megahed and Gaafer (2003).

5. Effect of interaction between farmyard manure and nitrogen fertilizer.

Data represented in Table (5) indicate the effect of interaction between farmyard manure and nitrogen fertilizer on yield and yield components of barley. It was noticed that plant height, No. of tillers/plant, spike length, No. of grains/spike, grain weight/spike, 1000- grain weight, grain yield/plant, grain yield/fed., straw yield/ fed., biological yield, fed., harvest index, volume

carbohydrate %, and protein % were increased significantly and consistently with increasing rates of N fertilizer to 60 kg/N/fed. and farmyard manure to 30 m^3/fed. The grain yield of Barley was significantly higher at 60 kgN/fed. with FYM 30 M^3/ fed. if compared with FYM 10 m3/fed. with 40 kgN/fed. This can be attributed to the beneficial effect of farmyard manure in combination with N fertilizer on growth and yield attributing parameters, which ultimately resulted in higher grain yield of barley. Also Sardana *et al.*, (2002) reported improvement in grain yield of wheat owing to integration of organic manure and fertilizer. High grain yield and straw yield were obtained with the addition of 30M^3/fed. and 60 kg N/fed. where the yield amounted to 884.8 kg/fed. 1646.1 kg/fed. for grains and straw yields respectively. These results agreed with Heggy *et al.*, (1993) El-Afandy (1995) and Sushila and Gajendra (2000).The data show that the application of these conditioners increased the dry weight of barley grains and straw and its elements content . This was attributed to the effect of farmyard manure on the physical properties improvement as well to the nutrient presence and farmyard manure status in the soil (Asmus and Gorlitze, 1986).

6. Effect of the interaction between farmyard manure and varieties .

Data in Table (6) show the effect of interaction between farmyard manure and varieties on the barley. The results showed that, plant height, grain weight/ spike, biological yield/fed., volume carbohydrate %, and protein % of Giza 131 barley significantly increased in variety by increasing farmyard manure on 30m^3/fed. On the other hand, the effect of this interaction was not significant for No. of tillers/plant, spike length, No. of grains/spike, 1000-grain weight, grain yield/plant, grain yield/fed., straw yield/fed., and harvest index. Similar results were obtained by El-Afandy (1995). Application of farmyard manure up to the level of 30m^3/fed. increased the plant height/grain weight/spike and biological yield/ fed. of Giza 129 and Giza 131 by about 9.9%, 45.5%., 29.9% and 8.9%, 45.7% and 31.9 % compared to the control (10m3/fed.). farmyard manure. All the yield and yield attributes were increased in both varieties Giza 129 and Giza 131 by increasing the rate of farmyard manure from 10, 20 and 30m^3/fed. Farmyard manure which may be attributed to the improvement of soil properties, nutrients availability and organic matter status in the soil, In addition to, it was the activation of micro flora of the plant roots rhizophere. Similar results were reported by Yakout *et al.*, (1998) and Sing and Agarwal (2001).

7. Effect of interaction between Nitrogen fertilizer and varieties.

Data presented in Table (7) show the significant interaction effect between barley varieties and nitrogen levels on spike length, biological yield/fed., carbohydrate %, and protein %. The data showed that increasing nitrogen level tended to produce higher values. While, plant height, No. of tillers/plant, No. of grains/spike, grain yield/plant, 1000- grain weight, grain yield/plant, grain yield/fed., straw yield/fed. and harvest index the effect of this interaction was not significant. Increasing nitrogen level tended to produce the higher values of carbohydrate % and protein %. Increasing nitrogen level tended to produce high values of yield components and grain yield/fed. in the two barley varieties which agreed with the main effects throughout the combined analysis. Increasing N application up to 60 kg/ fed. was mainly due to the role of N in synthesis of different nitrogenous compound important for plant cells, tissues, organs

Table (5): Effect of interaction between farmyard manure and nitrogen fertilizer on yield and yield components of barley plants grown under saline conditions at Wadi Sudr (Combined data of 2002/2003 and 2003/2004 seasons).

Treatments		Plant height (cm)	No. of tillers / plant	Spike length (cm)	No. of grains /spike	Grain weight / spike (g)	1000 – grain weight (g)	Grain yield/ plant (g)	Grain yield kg / fed.	Straw yield kg/ fed.	Biological yield kg/ fed.	Harvest Index %	Carbohy-drate %	Protein %
Farmyard manure (compost) m^3/fed	Nitrogen level kg/fed													
10 M^3/fed	40 kg /f	58.71	2.65	6.04	33.66	0.740	23.33	1.73	547.70	1212.50	1760.20	0.311	45.65	8.54
	50 kg /f	59.57	2.73	6.52	34.71	0.797	24.45	1.83	556.98	1231.68	1788.66	0.311	46.73	9.08
	60 kg /f	57.78	2.61	5.88	32.92	0.702	22.58	1.59	537.48	1191.01	1728.49	0.311	47.84	9.72
20 M^3/fed	40 kg /f	60.11	2.96	6.70	35.55	0.859	25.67	2.03	632.12	1290.95	1923.07	0.329	47.97	10.17
	50 kg /f	62.01	3.12	6.92	37.84	0.996	27.68	2.30	683.60	1405.56	2089.16	0.327	48.67	11.23
	60 kg /f	63.07	3.23	6.99	39.26	1.064	28.59	2.51	767.52	1489.55	2257.07	0.340	49.18	11.64
30 M^3/fed	40 kg /f	61.58	3.02	6.77	36.84	0.928	26.66	2.14	666.17	1306.87	1973.04	0.338	48.28	10.88
	50 kg /f	64.57	3.37	6.99	40.40	1.135	29.66	2.61	831.37	1526.19	2357.56	0.353	50.15	11.78
	60 kg /f	66.15	3.56	7.16	41.74	1.196	30.76	2.70	884.83	1646.06	2530.89	0.350	52.11	11.89
L.S.D. at 0.05		0.5182	0.0457	0.0373	0.3347	0.0264	0.0698	0.0834	38.4960	46.3943	43.1437	0.0083	0.1292	0.0914

Table (6): Effect of interaction between Farmyard manure and varieties on yield and yield components of barley plants grown under saline conditions at Wadi Sudr (Combined data of 2002/2003 and 2003/2004 seasons).

Treatments		Plant height (cm)	No. of tillers / plant	Spike length (cm)	No. of grains /spike	Grain weight / spike (g)	1000 – grain weight (g)	Grain yield/ plant (g)	Grain yield kg / fed.	Straw yield kg/ fed.	Biological yield kg/ fed.	Harvest Index %	Carbohy-drate %	Protein %
Farmyard manure (compost) m^3/fed	Varieties													
10 M^3/fed	Giza 129	59.09	2.59	6.10	33.36	0.726	23.12	1.66	542.36	1203.62	1745.98	0.311	46.70	8.95
	Giza 131	58.09	2.74	6.19	34.17	0.766	23.79	1.77	552.47	1219.84	1772.31	0.312	46.78	9.28
20 M^3/fed	Giza 129	62.35	3.02	6.81	37.08	0.944	26.93	2.21	705.90	1358.34	2064.24	0.342	48.44	10.80
	Giza 131	61.11	3.19	6.93	38.02	1.002	27.69	2.35	720.78	1432.37	2153.15	0.335	48.78	11.23
30 M^3/fed	Giza 129	64.96	3.25	6.93	39.17	1.056	28.61	2.44	811.19	1456.56	2267.75	0.358	49.77	11.44
	Giza 131	63.24	3.40	7.02	40.15	1.116	29.43	2.53	808.68	1529.52	2338.20	0.346	50.59	11.59
L.S.D. at 0.05		0.2568	N.S.	N.S.	N.S.	0.0067	N.S.	N.S.	N.S.	N.S.	16.4946	N.S.	0.0422	0.0843

formation and consequently on yield. At each level of nitrogen, mean grain yield of barley was the maximum in Giza 131, the mean grain and straw/yields of Giza 131 was significantly higher than Giza 129 at each level of nitrogen. Grain and straw, yields of the studied varieties increased up to 60 kg N/fed. The lowest grain and straw yields was registered in Giza 129 at all levels of N. The data also show that the increase in mean grain and straw yield with application of 60 over 40 Kg. N/fed. was significant for the varieties; Giza 131 and Giza 129. These results are in agreement with those obtained by Saini and Thakur (1999) and Abdel-Hamid, *et al.*, (2000), Ahmed *et al.* (2002) and Abd Alla, Maha (2004).

Table (7): Effect of interaction nitrogen fertilizer and varieties on yield an yield components of barley plants grown under saline conditions at Wadi Sudr (Combined data of 2002/2003 and 2003/2004 seasons).

Treatments		Plant height (cm)	No. of tillers /plant	Spike length (cm)	No. of grains /spike	Grain weight / spike (g)	1000 – grain weight (g)	Grain yield/ plant (g)	Grain yield kg / fed.	Straw yield kg/ fed.	Biological yield kg/ fed.	Harvest Index %	Carboby-drate %	Protein %
Nitrogen level kg/ fed	Varieties													
40 kg /f	Giza 129	60.76	2.81	6.45	34.87	0.814	24.86	1.91	614.05	1259.23	1873.28	0.328	47.19	9.69
	Giza 131	59.51	2.95	6.55	35.83	0.871	25.57	2.03	624.04	1280.98	1905.02	0.327	47.40	10.04
50 kg/f	Giza 129	62.83	2.99	6.78	37.27	0.950	26.86	2.18	714.62	1355.64	2070.26	0.345	48.32	10.45
	Giza 131	61.28	3.16	6.84	38.03	1.002	27.67	2.31	711.14	1419.98	2131.12	0.334	48.72	10.95
60 kg/f	Giza 129	63.01	3.05	6.61	37.47	0.962	26.94	2.22	730.79	1403.64	2134.43	0.342	49.39	11.05
	Giza 131	61.66	3.22	6.74	38.48	1.012	27.68	2.31	744.66	1480.77	2225.43	0.335	50.03	11.12
L.S.D. at 0.05		N.S	N.S	0.0212	N.S	N.S	N.S	N.S	N.S	N.S	16.4946	N.S	0.0422	0.0843

8. Effect of interaction between farmyard manure, nitrogen and varieties.

Data presented in Table (8) showed that in the combined over both seasons, No. of grains/spike, 1000- grain weight, straw yield/fed. biological yield/fed. and carbohydrate %, protein % were increased significantly in both cultivars by increasing N rates under different farmyard manure application. While, plant height, No. of tillers/ plant, spike length, grain weight/spike, grain yield/plant grain yield/fed. and harvest index were insignificantly affected by this interaction. The maximum yield of straw and biological of both varieties were attained under fertilization with 30 m^3 farmyard manure and 60 Kg N for the prevailing conditions of Wadi Sudr. Giza 131 grown under 30 m^3 farmyard manure with 60 Kg N/fed. gave the higher straw yield (1999.5 Kg./fed.) and biological yield (2563.0 Kg./fed.) as compared to Giza 129 (1625.6 Kg/fed and 2498.8 Kg./fed.)

Table (8): Effect of interaction among farmyard manure, nitrogen fertilizer and barley varieties on yield and yield components of barley plants grown under saline conditions at Wadi Sudr (Combined data of 2002/2003 and 2003/2004 seasons).

Treatments: Farmyard manure (compost) m^3/fed	Treatments: Nitrogen level kg/fed	Treatments: Varieties	Plant height (cm)	No. of tillers / plant	Spike length (cm)	No. of grains /spike	Grain weight / spike (g)	1000 – grain weight (g)	Grain yield/ plant (g)	Grain yield kg / fed.	Straw yield kg/ fed.	Biological yield kg/ fed.	Harvest Index %	Carbohy-drate %	Protein %
10 M^3/fed	40 kg /f	Giza 129	59.28	2.57	5.98	33.23	0.725	23.08	1.65	544.08	1212.20	1756.28	0.311	45.58	5.50
		Giza 131	58.13	2.72	6.09	34.08	0.755	23.58	1.81	551.32	1212.80	1764.12	0.312	45.71	8.57
	50 kg/f	Giza 129	60.18	2.65	6.50	34.43	0.772	23.98	1.79	550.20	1224.10	1774.30	0.310	46.69	8.66
		Giza 131	58.97	2.81	6.53	34.98	0.821	24.92	1.88	563.77	1239.27	1803.04	0.313	46.77	9.51
	60 kg/f	Giza 129	58.40	2.53	5.81	32.40	0.683	22.28	1.55	532.82	1174.56	1707.38	0.312	47.81	9.69
		Giza 131	57.17	2.69	5.94	33.45	0.721	22.88	1.63	542.15	1207.45	1749.60	0.310	47.87	9.76
20 M^3/fed	40 kg /f	Giza 129	60.48	3.90	6.64	35.20	0.826	25.25	1.97	633.80	1273.15	1906.95	0.332	47.93	9.85
		Giza 131	59.73	3.03	6.75	35.90	0.893	26.08	2.10	630.45	1308.75	1939.20	0.325	48.01	10.49
	50 kg/f	Giza 129	62.77	3.04	6.88	37.30	0.965	27.27	2.20	647.48	1391.15	2038.63	0.318	48.61	10.95
		Giza 131	61.25	3.19	6.96	38.38	1.027	28.10	2.39	719.72	1419.97	2139.69	0.336	48.73	11.51
	60 kg/f	Giza 129	63.80	3.12	6.93	38.75	1.040	28.28	2.45	739.42	1410.72	2150.14	0.344	48.77	11.60
		Giza 131	62.33	2.34	6.06	39.77	1.087	28.90	2.56	795.63	1568.38	2364.01	0.336	49.58	11.68
30 M^3/fed	40 kg /f	Giza 129	62.52	3.96	6.73	36.18	0.891	26.25	2.11	647.58	1292.35	1939.93	0.334	48.07	10.71
		Giza 131	60.65	3.08	6.80	37.50	0.964	27.03	2.18	684.75	1321.38	2006.13	0.341	48.48	11.05
	50 kg/f	Giza 129	65.53	3.27	6.97	40.07	1.114	29.33	2.54	812.87	1451.67	2264.54	0.359	49.66	11.75
		Giza 131	63.62	3.47	7.02	40.73	1.157	29.98	2.67	849.88	1600.72	2450.60	0.347	50.65	11.81
	60 kg/f	Giza 129	66.83	3.50	7.10	41.27	1.164	30.25	2.66	873.15	1625.65	2498.80	0.349	51.57	11.86
		Giza 131	65.47	3.63	7.22	42.22	1.228	31.27	2.75	896.52	1666.47	2562.99	0.350	52.64	11.91
L.S.D. at 0.05			N.S	N.S	N.S	0.3383	N.S	0.137	N.S	N.S	71.5917	28.5695	N.S.	0.0730	0.1461

RECOMMENDATION

The treatment combination new hull-less barley CV. Giza 131, fertilized with 60 kg/N/fed. as ammonium nitrate and 30 m^3/ fed. farmyard manure are recommended for obtaining a maximum yield of barley grown under saline conditions at Wadi Sudr, South Sinai.

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تأثير إضافة مخلفات المزرعة ومعدلات التسميد الآزوتي على المحصول ومكوناته لأصناف الشعير تحت ظروف الملوحة فى وادي سدر بجنوب سيناء

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أقيمت تجربتان حقليتان فى محطة بحوث رأس سدر – محافظة جنوب سيناء التابعة لمركز بحوث الصحراء خلال موسم (٢٠٠٢/٢٠٠٣) و (٢٠٠٣/٢٠٠٤) لدراسة أثر إضافة مخلفات المزرعة (مكمورة) والأستفادة منها (١٠ – ٢٠ – ٣٠م٣/فدان)، ومعدلات التسميد الآزوتي (٤٠ – ٥٠ – ٦٠كجم نيتروجين/فدان) على المحصول ومكوناته فى محصول الشعير العاري صنفي جيزة ١٢٩، جيزة ١٣١، تحت ظروف الرى بالماء المالح الناتج من الآبار الموجودة فى المحطة البحثية وقد تضمنت الدراسة صفات المحصول ومكوناته وهى: طول النبات، عدد فروع النبات، طول السنبلة، عدد الحبوب فى السنبلة، وزن ال-١٠٠٠حبة، محصول الحبوب للنبات، محصول الحبوب للفدان، محصول القش للفدان، المحصول البيولوجي للفدان، دليل الحصاد، نسبة الكربوهيدرات%، نسبة البروتين% .وقد تم تنفيذ التجربة فى تصميم القطع المنشقة مرتين وقد أشتملت القطع الرئيسية على مخلفات المزرعة والتسميد النيتروجيني فى القطع الشقية الأولى وأصناف الشعير العاري فى المنشقة الثانية وقد أظهرت النتائج المتحصل عليها مايلى:

١ – أختلفت صفات المحصول ومكوناته معنويا من موسم لاخر فيما عدا صفة محصول الحبوب للنبات ومحصول القش للفدان ودليل الحصاد.

٢– توجد زيادة معنوية فى المحصول ومكوناته بإضافة مخلفات المزرعة ومعدلات التسميد الآزوتي على صنفي الشعير العاري جيزة ١٢٩، جيزة ١٣١ فقد تفوق المعدل السمادى العضوي ٣٠م٣/فدان من مخلفات المزرعة مقارنة بالمعاملات الأخرى، كذلك أظهر أختلاف معنوي فى كل الصفات كما تفوق معدل التسميد الآزوتي ٦٠كجم/فدان عن باقي المعدلات الأخرى فى تأثيرة على كل صفات المحصول ومكوناته وأظهر أختلاف معنوي بينما تفوق الصنف الشعير العاري

جيزة ١٣١ عن الصنف جيزة ١٢٩ في صفات المحصول ومكوناته واظهر تأثير معنوي في ماعدا صفة دليل الحصاد فقد أظهرت عدم معنوية.

٣- أظهر التفاعل الناتج عن إضافة مخلفات المزرعة والتسميد الآزوتي تأثير معنوي في كل صفات المحصول ومكوناته وقد تبين أن أفضل النتائج إضافة ٣٠م٣/فدان من مخلفات المزرعة بالإضافة إلى ٦٠ كجم نيتروجين/فدان.

٤- أوضح تأثير التفاعل بين إضافة مخلفات المزرعة والأصناف تأثير معنوي في بعض صفات المحصول ومكوناته على طول النبات ووزن حبوب السنبلة، المحصول البيولوجي/فدان، نسبة الكربوهيدرات%، البروتين%، بينما اظهر تأثير غير معنوي في باقي الصفات الأخرى.

٥- أدى التفاعل بين معدلات التسميد الآزوتي والأصناف إلي حدوث تأثير معنوي في طول السنبلة، المحصول البيولوجي، ونسبة الكربوهيدرات%، نسبة البروتين %، بينما أظهرت باقي الصفات عدم وجود معنوية.

٦- اظهر التفاعل الثلاثي بين إضافة مخلفات المزرعة ومستويات التسميد الآزوتي والأصناف تأثير معنوي في عدد الحبوب السنبلة، وزن الألف حبة، محصول القش/فدان، المحصول البيولوجي/فدان، نسبة الكربوهيدرات%، البروتين%، بينما أظهرت باقي الصفات عدم وجود معنوية.

٧- لتنمية المنطقة الخاصة بالدراسة يوصي بنشر أصناف جديدة من الشعير العاري خاصة صنف جيزة ١٣١ لسد الفجوة الناتجة عن نقص القمح مع الأستفادة من مخلفات المزرعة (المكمورة) بإضافة ٣٠م٣/فدان مع إضافة ٦٠ كجم نيتروجين/فدان للحصول على أعلى إنتاجية تحت ظروف الرى بالماء المالح حيث يتم الرى في تلك المنطقة والمناطق المشابهة لها في جنوب سيناء من خلال أستخدام الآبار.