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EVALUATION OF GROWTH AND YIELD OF SOME PROMISING WHEAT GENOTYPES UNDER SOIL SALINITY LEVELS

BY

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ABSTRACT

Soil salinity levels (1680, 3100 and 7900 ppm) and eight bread wheat genotypes were studied under Fayoum location during 2002/2003 and 2003/2004 seasons to determine growth response at heading; grain, straw and biological yields; correlation and path coefficient between growth characters and yield. Data obtained indicated significant difference between genotypes with superiority of line 5 in most of the growth characters as well as yield. As the soil salinity level increased, the growth characters and yield decreased. Highest yields were obtained by line 5 under the lesser soil salinity level of 1680 ppm.

Correlation and path coefficient analysis showed that grain yield was highly correlated with plant height and number of spikes with direct and indirect effect through spike dry weight and plant dry weight. Straw and biological yields were shown to be affected much by plant and stem dry weight as direct and indirect effects. It is advisable for plant breeders to select for more grain yield through tiller plants with more spikes /plant; straw and biological yield through heavier plants and stems dry weight.

Key words: Wheat, Genotypes, Soil salinity, Heading, Growth, Yield, Correlation and path coefficient.

INTRODUCTION

Wheat grain, straw and biological yields are considered as a net resultant of the growth behavior of characters during the growth stages of plants. Therefore, maximizing growth characters response at growth stages is considered as more effective in the improvement of wheat yield. Different factors could affect that growth response and its relationship with wheat yield. Wheat genotype acts as one of the more principle factors affecting yield. Several investigators showed that wheat growth characters were differ greatly due to the effect of genotypes whatever increase or decrease in the different wheat genotypes at heading stage (El-Haddad *et al.*, 1993; Ashour and Selim., 1994; Soliman *et al.*, 1997 and El-Beially., 2001). The magnitude of wheat yield was shown to be affected greatly by the different genotypes; great variations were obtained by several workers between the different genotypes (Sorour *et al.*, 1977; Ashour and Selim., 1994; Barakat and El-Haris., 1998; Omar., 1999; Hamed *et al.*, 1999; Nour El-Din *et al.*, 2000; El-Beially., 2001; Hassan *et al.*, 2002 and Abd Allah *et al.*, 2003). The response of growth characters as well as yield to the effect of salinity levels was studied by different investigators. They reported a degree of reduction or decrease in both of growth characters or grain, straw and biological yields under the effect of salinity. That trend was shown to differ from genotype to another (Sorour *et al.*, 1977; El-Haddad *et al.*, 1993; Soliman *et al.*, 1997; Barakat and El-Haris., 1998; Abd El-Salam and Sarhan., 1999; Hamed *et al.*, 1999; Omar., 1999; Nour El-Din *et al.*, 2000; El-Beially., 2001; Hassan *et al.*, 2002; Abd Allah *et al.*, 2003; Soliman *et al.*, 2004 and Khan *et al.*, 2008). On the contrary, François *et al.* (1986)

studied the effect of salinity on grain yield and quality of different wheat cultivars. Results obtained revealed no significant reduction in grain yield under soil salinity up to 10.8 ds/m.

The present investigation was carried out to evaluate six promising inbred lines of bread wheat as well as two check cvs. and their response to three soil salinity levels.

MATERIALS AND METHODES

Three field experiments were carried out at Demo Research Station, Faculty of Agriculture, Fayoum University during 2002/ 2003 and 2003/2004 seasons to investigate the effect of different wheat genotypes and soil salinity levels on growth and yield. Each experiment represents one of the soil salinity levels of 1600, 3100 and 7900 ppm, including 8 wheat genotypes. Two of them were the cultivars namely; Sakha 93 and Giza 168 and six promising wheat lines derived by EL-Marakby *et al.* (1994) from crosses between Giza 160, Giza 157 and three Mexican varieties i.e. (MD 689/B/ chere "S", Bow "S"//YD "S"/ZZ "S" and KvZ // con/pj bg62. Genotypes were arranged in every experiment in a randomized complete block design with three replicates. The experimental plot was consisted of 3 rows, two meters in length and 20 cm apart. The plants were individually spaced at 10 cm within every row. All ordinary cultural practices of growing wheat in the experimental location were followed as recommended. Wheat grains were sown on 21st and 22nd of November in first and second growing seasons, respectively. Phosphorus fertilizer was added at a rate of 100 kg P_2O_5/ fed. as calcium super phosphate (15.5% P_2O_5). Potassium sulphate (48% K_2) was applied at a rate of 50 kg K_2O/fed. and spreaded during land preparation. Nitrogen fertilizer was applied to plants as ammonium nitrate (33.5% N) at a rate of 75 kg N/fed. in three portions of 15, 30 and 30 kg N/fed. at planting, before second and third irrigations, respectively. In this respect, irrigation schedule of the location was every two weeks. At heading which occurred in the first week of March, 5 garded plants were chosen from each experimental plot to determine the effect of soil salinity levels and wheat genotypes on the following growth characters: plant height (cm), number of tillers/plant, number of spikes/plant, stem dry weight/plant (g), leaves dry weight/plant (g), spikes dry weight/plant (g), plant dry weight (g), main spike dry weight (g), flag leaf dry weight (g) and flag leaf area (cm^2): measured as described by Palamisway and Gomez (1974).

At harvesting which occurred on the third week of May, in first and second season, respectively, 10 guarded plants from every experimental plot were chosen at random and grain, straw and biological yield were recorded.

Statistical procedures:

In each season, combined analysis of variance between the three experiments was done according to Snedecor and Cochran (1992) for all the studied traits. The differences among means were tested using least significant difference (LSD). Simple phenoltypic correlation for all possible pairs of characters was determined and partitioning the highly correlated phenotypic correlation coefficients to direct and indirect and its relative importance effects were made by determining path coefficient analysis using the method explained and utilized by Dewey and Lu (1959).

RESULTS AND DISCUSSION

I- Effect of wheat genotypes on growth and yield characters:

Data presented in Table (1) show that the wheat genotypes exerted significant effects on plant height, flag leaf area, grain yield, straw yield and biological yield in the two seasons of investigation, while the growth characters; no. of tillers/plant, stem dry weight and leaves dry weight exhibited significance between genotypes in the 1st season only, where line 4 followed by 1 proved to be superior than other genotypes in no. of tillers/plant, line 1 followed by 2 in stem dry weight and line 4 followed by 2 in leaves dry weight. With regard to grain yield, straw yield and biological yield, the promising line 5 followed by 1 out-yielded the other lines or the two control cvs.; Sakha 93 and Giza 168 and seemed to be prospective lines in regions similar to the experimental site of high levels of soil salinity. Similar trend was obtained by Nour El-Din *et al.* (2000); El-Beially (2001), Hassan *et al.* (2002), and Abd Allah *et al.* (2003) who found that the magnitude of wheat yield was greatly affected by different genotypes.

Table (1): Performance of some wheat genotypes on growth and grain, straw and biological yields during 2002/2003 (S 1) and 2003/2004 (S 2) seasons.

Studied characters	Season	Sakha 93	Giza 168	Lines						
				1	2	3	4	5	6	LSD 5%
Plant height (cm)	S1	82.09	87.36	103.00	90.04	87.16	84.40	88.27	86.80	5.09
	S2	67.67	72.44	83.40	76.51	77.20	75.40	75.50	76.11	4.27
Number of tillers/plant	S1	7.04	7.42	9.47	9.89	8.58	11.30	8.96	7.84	1.93
	S2	6.91	6.96	7.76	9.18	9.42	8.11	8.56	7.81	-
Number of spikes/plant	S1	5.53	6.27	7.22	7.71	6.89	6.56	7.13	5.69	-
	S2	5.37	4.80	4.42	5.58	6.11	5.09	5.27	4.89	-
Plant dry weight (g)	S1	29.49	31.16	37.20	38.13	35.94	36.00	35.43	29.87	-
	S2	21.42	21.44	23.10	29.22	29.55	22.40	25.32	23.13	-
Stems dry weight/plant (g)	S1	15.04	15.96	22.20	20.07	19.58	19.00	18.76	15.80	4.06
	S2	13.17	12.73	14.30	18.21	18.46	13.60	14.80	14.36	-
Leaves dry weight/plant (g)	S1	5.96	6.33	6.78	8.04	6.00	8.19	7.67	6.51	1.26
	S2	4.98	5.28	5.30	6.79	6.67	5.43	6.54	5.38	-
Spikes dry weight/plant (g)	S1	8.49	8.87	8.18	10.02	10.36	8.80	9.00	7.56	-
	S2	3.27	3.43	3.48	4.22	4.42	3.32	3.98	3.39	-
Main spike dry weight (g)	S1	1.57	1.51	1.29	1.48	1.74	1.63	1.54	1.46	-
	S2	0.65	0.64	0.62	0.63	0.72	0.69	0.65	0.61	-
Flag leaf dry weight (g)	S1	0.19	0.19	0.27	0.21	0.19	0.20	0.22	0.20	-
	S2	0.15	0.15	0.13	0.25	0.16	0.17	0.18	0.17	-
Flag leaf area (cm^2)	S1	23.40	24.67	16.1	27.76	24.91	22.70	29.90	27.44	4.33
	S2	27.21	25.09	20.8	34.87	30.45	28.10	34.79	33.18	5.46
Grain yield/plant (g)	S1	12.45	14.84	21.02	18.49	17.86	17.20	24.37	18.20	4.18
	S2	7.44	8.03	9.74	9.53	8.78	8.75	10.37	8.36	1.73
Straw yield/plant (g)	S1	28.25	29.71	38.99	38.54	28.12	34.10	44.76	38.25	6.48
	S2	19.50	16.93	21.13	20.23	16.58	18.53	21.94	18.64	2.89
Biological yield/plant (g)	S1	40.70	44.55	60.01	57.03	45.98	51.29	69.12	56.44	9.50
	S2	26.93	24.97	30.87	29.77	25.36	27.28	32.31	27.00	3.89

2- Effect of soil salinity levels on growth and yield.

The response of wheat growth characters of some genotypes to the different soil salinity levels (1600, 3100 and 7900 ppm) shows general trend of a significant decrease in all studied characters as the salinity levels increased. This was true in both seasons as shown in Table (2), except that of main spike dry weight in the first season.

This result indicates that higher soil salinity level had harmful effect on the growth response of wheat which could reflect on the reduction of the produced yield. This may be due to the inhibition effect of salinity on water absorption, assimilation, cell division and enlargement and organs differentiation (El-Henawy *et al.*, 2006; Barakat and El-Haris., 1998; Hamed *et al.*, 1999; Omar, 1999; Hassan *et al.*, 2002; Soliman *et al.*, 2004 and Khan *et al.*, 2008) came to similar conclusion, whilst, François *et al* (1986) obtained no significant reduction in grain yield under soil salinity up to 10.8 ds/m.

3- Effect the interaction between genotypes X soil salinity levels:-

The response of the interaction between wheat genotypes and soil salinity levels were insignificant for all studied growth characters. Then its data were expelled. This indicates that both of wheat genotypes and soil salinity levels acts individually, in the case of growth characters.

Table (2): Effect of soil salinity levels on growth characters and grain, straw and biological yields of some wheat genotypes during 2002/2003 and 2003/2004 seasons.

Studied characters	Soil salinity levels (ppm)							
	2002/2003 season				2003/2004 season			
	Low	Medium	High	LSD 5%	Low	Medium	High	LSD 5%
Plant height (cm)	97.67	90.04	78.20	3.12	86.04	83.81	56.73	2.62
Number of tillers/plant	11.36	8.36	6.72	1.18	9.91	8.74	5.61	1.22
Number of spikes/plant	8.81	5.72	5.35	0.95	5.86	5.64	4.07	0.97
Plant dry weight (g)	46.52	29.70	26.23	4.22	36.46	30.17	6.70	4.42
Stem dry weight/plant (g)	25.37	15.67	13.88	2.48	22.61	18.07	4.19	2.86
Leaves dry weight/plant (g)	9.55	6.10	5.16	0.77	8.43	7.72	1.24	1.25
Spikes dry weight/plant (g)	11.60	7.93	7.19	1.40	5.42	4.38	1.27	0.86
Main spike dry weight (g)	1.58	1.51	1.50	-	0.79	0.74	0.42	0.06
Flag leaf dry weight (g)	0.33	0.15	0.14	0.07	0.22	0.18	0.11	0.04
Flag leaf area (cm^2)	36.76	20.05	17.01	2.65	39.98	31.90	16.05	3.34
Grain yield/plant (g)	31.13	16.16	6.87	10.58	10.84	10.16	5.62	4.12
Straw yield/plant (g)	56.26	34.14	14.86	4.52	22.42	24.17	10.96	2.03
Biological yield/plant (g)	87.39	50.30	21.73	6.32	33.26	34.33	16.59	2.64

The yield response of wheat studied genotypes under the effect of soil salinity levels investigated is shown in Table (3). Gained yields i.e. grain, straw and biological one showed an increase in genotype no. 5 followed by no. 1 comparable with the other genotypes under the different levels of salinity; and both lines showed a decrease as the salinity levels were increased. This was true and significant under both seasons, except grain yield in the second season. Highest production i.e. grain, straw and biological was obtained in wheat line 5 under low soil salinity level. Nour El-Din *et al.* (2000) and El-Beially (2001) came to similar response for grain, straw and biological yields, whilst Barakat and El-Haris (1998) and Abd Allah *et al.*, (2003) reported that the effect of interaction between salinity stress and genotypes was not significant for grain yield.

4- Correlation and path coefficient studies:-

a- Correlation among traits: -

Data in Table (4) show the phenoltypic correlation between wheat growth characters and each of grain, straw and biological yields for the studied wheat genotypes under soil salinity levels. Positive and highly significant correlation coefficients were found among all possible pairs of growth traits as well as between growth traits and each of grain, straw and biological yields, with different magnitudes of "r" values from one.

b- Path coefficient analysis: -

The analysis of path coefficient has been made to identify the important grain, straw and biological yield attributes by estimating the direct effect of the contributing growth characters to yield and separating the direct from the indirect effects through other related characters by partitioning the "r" value and finding out the relative importance of different growth characters as selection criteria.

The direct and indirect path coefficients are illustrated in Table (5). The relative importance of each growth trait to grain, straw and biological yields are given in Table (6). The data display the percentage of variation determined by each growth trait and its interactions with other traits.

For grain yield/plant, data in Table (5) show that plant height had positive and strong direct effect on grain yield (0.457) followed by no. of spikes/plant (0.326).The indirect effect of the other traits through plant height and no. of spikes/plant was of considerable magnitude.

Table (3): Response of some wheat genotypes at various soil salinity levels on grain, straw and biological yields during 2002/2003 and/or 2003/2004 seasons.

Genotype	Sakha 93	Giza 168	Lines 1	2	3	4	5	6	LSD 5%
Soil salinity levels	Grain yield/plant (g) 2002/ 2003 season								
Low	17.96	18.75	33.02	25.81	24.84	23.03	33.49	27.44	
Moderate	10.79	13.02	15.23	15.59	15.69	14.41	16.14	12.77	3.44
High	4.91	4.77	6.57	5.31	4.91	5.60	7.75	6.71	
	Straw yield/plant (g) 2002/2003 season								
Low	39.41	34.60	60.15	50.41	40.99	47.98	62.62	49.79	
Moderate	25.14	30.77	34.66	32.31	28.50	30.00	33.75	32.86	5.66
High	13.07	12.62	14.10	11.58	10.52	12.50	16.94	13.60	
	Straw yield/plant (g) 003/2004 season								
Low	23.75	19.39	24.30	21.95	21.08	20.68	23.93	21.82	
Moderate	18.89	18.89	22.81	21.89	19.96	20.45	21.36	20.82	2.52
High	10.19	9.95	10.94	8.26	7.51	8.96	12.69	9.94	
	Biological yield/plant (g) 2002/2003 season								
Low	57.37	53.34	93.17	76.22	65.83	71.00	96.11	77.23	
Moderate	35.93	43.79	49.89	47.89	44.20	44.44	49.89	45.63	8.07
High	18.99	17.39	20.67	16.89	15.43	18.41	24.67	20.31	
	Biological yield/plant (g) 2003/2004 season								
Low	32.46	28.57	34.43	32.13	31.56	30.29	33.77	32.00	
Moderate	27.09	27.50	33.55	32.09	29.87	29.49	32.91	30.16	3.59
High	17.99	13.63	15.85	12.93	10.80	13.67	19.01	14.53	

Table (4): Phenotypic correlation between some wheat growth characters under genotypes and soil salinity levels (combined analysis of 2002/2003 and 2003 /2004 seasons) and grain, straw and biological yield.

Studied characters		(x1)	(x2)	(x3)	(x4)	(x5)	(x6)
Plant height	(x1)						
Number of spikes/plant	(x2)	0.523**					
Plant dry weight	(x3)	0.784**	0.776**				
Stems dry weight/plant	(x4)	0.751**	0.727**	0.975**			
Leaves dry weight/plant	(x5)	0.720**	0.647**	0.908**	0.877**		
Spikes dry weight/plant	(x6)	0.669**	0.751**	0.825**	0.706**	0.622**	
Grain yield/plant	(y1)	0.640**	0.595**	0.619**	0.561**	0.530**	0.629**
Straw yield/plant	(y2)	0.684**	0.567**	0.632**	0.563**	0.593**	0.620**
Biological yield/plant	(y3)	0.679**	0.587**	0.637**	0.571**	0.579**	0.634**

** denote significance at 0.01 level of probability.

As for straw yield/plant (Table 5), plant height, spikes/plant and plant dry weight had positive and strong effect on straw yield. The indirect effects plant height, spikes/plant, stems dry weight, leaves dry weight and spikes dry weight showed positive and very strong effects on straw yield/plant. The direct and indirect effect of traits on biological yield seemed to follow the same trend as straw yield.

Table (5): Partitioning of the simple correlation coefficients between some growth characters and grain, straw and biological yields in wheat (combined of 2002/2003 and 2003/2004 seasons).

Source of variation	Grain yield/ plant	Straw yield/ plant	Biological yield/plant
1- Plant height (cm) *vs:*			
Direct effect	0.457	0.520	0.505
Indirect effect via Number of spikes/plant	0.171	0.140	0.154
Indirect effect via Plant dry weight (g)	0.005	0.795	0.579
Indirect effect via Stems dry weight/plant (g)	-0.137	-0.739	-0.564
Indirect effect via Leaves dry weight/plant (g)	0.022	0.036	0.019
Indirect effect via Spikes dry weight/plant (g)	0.121	-0.067	-0.013
Total correlation	**0.640**	**0.684**	**0.679**
2- Number of spikes/plant *vs:*			
Direct effect	0.326	0.268	0.295
Indirect effect via Plant height (cm)	0.239	0.272	0.264
Indirect effect via Plant dry weight (g)	0.005	0.787	0.573
Indirect effect via Stems dry weight/plant (g)	-0.132	-0.716	-0.547
Indirect effect via Leaves dry weight/plant (g)	0.020	0.032	0.017
Indirect effect via Spikes dry weight/plant (g)	0.136	-0.076	-0.015
Total correlation	**0.595**	**0.567**	**0.587**
3- dry weight/plant (g) *vs:*			
Direct effect	0.007	1.015	0.739
Indirect effect via Plant height (cm)	0.358	0.407	0.395
Indirect effect via Number of spikes/plant	0.253	0.208	0.229
Indirect effect via Stems dry weight/plant (g)	-0.177	-0.960	-0.733
Indirect effect via Leaves dry weight/plant (g)	0.028	0.045	0.024
Indirect effect via Spikes dry weight/plant (g)	0.150	-0.083	-0.017
Total correlation	**0.619**	**0.632**	**0.637**
4- Stems dry weight/plant (g) *vs:*			
Direct effect	-0.182	-0.984	-0.752
Indirect effect via Plant height (cm)	0.343	0.390	0.379
Indirect effect via Number of spikes/plant	0.237	0.195	0.214
Indirect effect via dry weight/plant (g)	0.007	0.990	0.721
Indirect effect via Leaves dry weight/plant (g)	0.027	0.043	0.023
Indirect effect via Spikes dry weight/plant (g)	0.128	-0.071	-0.014
Total correlation	**0.561**	**0.563**	**0.571**
5- Leaves dry weight/plant (g)*vs:*			
Direct effect	0.031	0.049	0.027
Indirect effect via Plant height (cm)	0.329	0.374	0.363
Indirect effect via Number of spikes/plant	0.211	0.173	0.191
Indirect effect via dry weight/plant (g)	0.006	0.922	0.671
Indirect effect via Stems dry weight/plant (g)	-0.159	-0.863	-0.659
Indirect effect via Spikes dry weight/plant (g)	0.113	-0.063	-0.013
Total correlation	**0.530**	**0.593**	**0.579**
6- Spikes dry weight/plant (g) *vs:*			
Direct effect	0.181	-0.101	-0.020
Indirect effect via Plant height (cm)	0.306	0.347	0.337
Indirect effect via Number of spikes/plant	0.245	0.201	0.221
Indirect effect via dry weight/plant (g)	0.006	0.837	0.610
Indirect effect via Stems dry weight/plant (g)	-0.128	-0.695	-0.531
Indirect effect via Leaves dry weight/plant (g)	0.019	0.031	0.016
Total correlation	**0.629**	**0.620**	**0.634**

The components of grain yield, straw yield and biological yield variation determined directly and jointly are presented in Table (6). It is clear that, the six growth traits and their interactions as sources of grain, straw and biological yields variations, were responsible for 100%, 99.98 % and 79.52%, respectively. The main sources of grain yield variations arranged according to their importance were: direct effect of plant height (19.73%),,joint effect of plant height with spikes/plant (14.73%), joint effect of plant height with stems dry weight (11.78%), joint effect of plant height with spikes dry weight (10.46%), direct effect of spikes/plant (10.06%) and join effect of spikes/ plant with each of spikes dry weight (8.38%) and with stems dry weight (8.15%), direct effect of stems dry weight (3.12%) and spikes dry weight (3.10%) and their joint effect (4.39%). These main sources are responsible for about (93.90%) of the variation.

Table (6): Percentage of relative importance (RI %) for grain, straw and biological yield variations and some growth characters in wheat (combined of 2002/2003 and 2003/2004 seasons)

Source of variation	Grain yield/plant	Straw yield/plant	Biological yield/plant
Plant height X1	19.73	3.60	4.98
Number of spikes/plant X2	10.06	0.96	1.70
Plant dry weight X3	0.01	13.73	10.68
Stems dry weight/plant X4	3.12	12.91	11.04
Leaves dry weight/plant X5	0.09	0.03	0.01
Spikes dry weight/plant X6	3.10	0.14	0.01
X1*X2	14.73	1.94	3.04
X1*X3	0.47	11.01	11.42
X1*X4	11.78	10.23	11.13
X1*X5	1.92	0.49	0.38
X1*X6	10.46	0.93	0.27
X2*X3	0.33	5.63	0.66
X2*X4	8.15	5.12	0.36
X2*X5	1.23	0.23	0.20
X2*X6	8.38	0.54	0.17
X3*X4	0.23	25.96	21.18
X3*X5	0.04	1.21	0.70
X3*X6	0.19	2.25	0.48
X4*X5	0.93	1.13	0.68
X4*X6	4.39	1.86	0.42
X5*X6	0.66	0.08	0.01
Residual	0.00	0.02	20.48
Total	**100.00**	**100.00**	**100.00**

As for straw yield, the main sources in order of importance are : joint effect of plant dry weight with stems dry weight (25.96%), direct effect of plant dry weight (13.73%) and stems dry weight (12.91%), joint effect of plant height with each of plant dry weight (11.01%) and with stems dry weight (10.23%), joint effect of spikes/plant with each of plant dry weight (5.63%) and with stems dry weight (5.12%) and the direct effect of plant height (3.60%).These main sources are responsible for about (88.19%). With regard to biological yield, the main sources in order of importance were nearly the same as those influencing straw yield, since the main sources were : the joint effect of plant dry weight with stems dry weight (21.18%), joint effects of plant height with each of plant dry weight (11.42%), with stems dry weight (11.13%) and with spikes/plant

(3.04%), the direct effects of stems dry weight (11.04%), plant dry weight (10.68%) and plant height (4.98%).

It could be concluded that in the case of selection for grain yield, plant height and no. of spikes/plant and their interactions as well as the joint effect of plant height with both stems dry weight and spikes dry weight, have the greatest effect upon grain yield. As for straw and biological yields, the major sources were plant dry weight and stems dry weight and their interactions with each other and with plant height. Similar trends were obtained by Abd El-Moneim (1999) and El-Sabbagh (2002).Therefore wheat breeders should take the above mentioned traits into account when selection for high performance of grain yield or for straw and biological yields.

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تقييم النمو والمحصول لبعض تراكيب القمح الوراثية الواعدة تحت تاثير مستويات مختلفة من ملوحة التربة

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** قسم بحوث الأصول الوراثية- معهد بحوث المحاصيل الحقلية- مركز البحوث الزراعية- الجيزة القاهرة .

أقيمت هذا البحث في موسمي ٢٠٠٢/٢٠٠٣ ، ٢٠٠٣ /٢٠٠٤ تحت ظروف منطقة الفيوم لدراسة تاثير مستويات ملوحة التربة (١٦٨٠ ، ٣١٠٠ ، ٧٩٠٠ جزء فى المليون) علي النمو عند طرد السنابل ومحصول الحبوب والقش والمحصول البيولوجي لبعض التراكيب الوراثية من القمح شملت ٩سلالات واعدة وأثنين من الأصناف التجارية كمقارنة ؛ وكذلك دراسة الارتباط ومعامل المرور بين صفات النمو تحت الدراسة والمحصول .

أوضحت الدراسة وجود فروق معنوية في صفات النمو عند طرد السنابل والمحصول بين التراكيب الوراثية تحت الدراسة.

حدث نقص في صفات النمو والمحصول بزيادة درجة ملوحة التربة. كما أظهر التفاعل بين التراكيب الوراثية ومستويات ملوحة التربة عن وجود اختلاف في محصول الحبوب والقش والمحصول البيولوجي وكانت أعلي قيم تم الحصول عليها من السلالة رقم ٥ سواء من محصول الحبوب والقش والمحصول البيولوجى تحت جميع مستويات الملوحة سواء المنخفضة (١٦٠٠) أو المتوسطة (٣١٠٠) أو المرتفعة (٧٩٠٠) جزء فى المليون وهذة السلالة واعدة ويمكن الإستفادة بها فى الزراعة حيث تفوقت أيضاً على أصناف المقارنة الجارى زراعتها على نطاق تجارى.

أظهرت دراسات الإرتباط ومعامل المرور ارتباط محصول الحبوب معنوياً وبدرجة كبيرة بأرتفاع النبات وعدد السنابل للنبات وكان ذلك واضحا كتأثير مباشر بينما كان التأثير غير المباشر عالياً لارتفاع النبات مع كلاً من الوزن الجاف للسنابل والوزن الجاف للنبات .

تأثر محصول القش و المحصول البيولوجي بدرجة كبيرة بكل من الوزن الجاف للنبات والوزن الجاف للسيقان كتأثير مباشر وكتأثير غير مباشر مع ارتفاع النبات. لذا ينصح مربي النبات عند الإنتخاب لصفة محصول الحبوب عند مرحلة الطرد أن يتم أختيار النباتات الطويلة ذات الأعداد الكبيرة من السنابل بينما يمارس الإنتخاب للنباتات والسيقان ذات الأوزان المرتفعة لزيادة محصول القش والمحصول البيولوجي.