PERFORMANCE OF SOME BARLEY GENOTYPES GROWN IN TWO SALINE AFFECTED LOCATIONS

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Abstract

Sixty barley genotypes were evaluated for salt tolerance under salinity stress conditions in a field experiment carried out at El-Serw and Bahteem during 2009/2010 and 2010/2011 seasons. A randomized complete block design with four replications was used. The results revealed significant differences among genotypes in: plant height, spike length, No. of spikes/plant, No. of grains/spike, 1000-kernels weight, biological yield, grain yield and harvest index. Over all locations genotypes No. 6, 7 and 16 had the highest biological yield (4.00, 3.75 and 3.60 ton/fed.) and grain yield (1.66, 1.57 and 1.66 Ton/fed.). They had heaviest grains (35.0, 35.7 and 38.3 g) and high capacity of plants (16.0, 16.4 and 16.5 spikes/plant) and had high number of grains/spike (39.5, 40.5 and 39.5). Generally, promising lines No. 6, 7 and 16 were more salt tolerant than the other new selected lines. To improve selection efficiency against salt stress, one should select under high salt concentration levels in order to identify, with high confidence.

Key words: Barley, genotypes, salinity, tolerant, efficiency, spikes, grains, yield,...

INTRODUCTION

Barley (*Hordeum vulgare* L.) is considered one of the most adapted cereal crops where environmental conditions, especially salt and drought stress are not suitable for other cereal crops. Soil salinity is one of the most important problems in barley production areas and therefore threatens barley production, especially in the irrigated areas of arid and semi-arid regions in some newly reclaimed lands. Salinity adversely affects plant growth by decreasing the availability of soil moisture to the plant and also due to the toxicity effects of sodium ions at high concentrations to the plant (Munns and Termeet, 1986). Barley is considered the most salt tolerant cultivated cereals (Gorham and Chapman, 1992). Growth and grain yield in barley are reduced at salinity as compared to non- salinity (Aloy *et. al.*, 1992, Ashour and Selim 1994 and Katerji *et al.* 2006).

Soil salinity is a very serious problem in many regions worldwide. About one third of all irrigated areas are considered salt-affected (Epstien, *et. al.*, 1980), and without reclamation or suitable management practices salt concentrations will continue to increase in many areas. In Egypt, the main barley production areas are located in the

North Coast (Northwest and North Sinai) and in the new reclaimed lands which suffer from drought and salinity stresses (Abo El-Enein *et.al.*, 1981). Most studies of evaluating genetic variability in salt resistance in crop plants have been performed in controlled or semi-controlled environments and little emphasis has been placed on the performance of field grown plants or salt-affected soils. On the contrary, efforts to breed for salt tolerance are still meager, which may be due to: (1) Limited knowledge of the genetic and the mechanisms of salt tolerance, (2) inadequate screening technique, (3) low selection efficiency, and (4) a poor understanding of salinity and environmental condition interaction for genetic manipulation to improve plant response to salt stress (Assad et al., 1989).

The degree of salt tolerance varies, not only within plant species, but also to the different cultivars within the same species which may show differential behavior to salt stress because salt tolerance is a very complex character and highly influenced by environmental factors such as soil, temperature, light and type of salinity. Therefore, the objective of this study was to screen and evaluate different barley genotypes against salt stress naturally occurring under salt-affected fields.

MATERIALS AND METHODS

A field experiment including sixty barley genotypes with different genetic backgrounds (Table 2) were evaluated against salinity at El-Serw and Bahteem Agricultural Research Stations during 2009/2010 and 2010/2011 growing seasons. A randomized complete block design with four replications was used. Plot size was 4 rows each 3 m long and 20 cm apart. Standard analysis of variance using least significant differences (LSD) was employed to estimate the significant differences among treatments **(Steel et. al., 1997).**

RESULTS AND DISCUSSION

The results showed that Bahteem location had higher values than El-Serw. This is true because the soil was more saline in El-Serw than in Bahteem (Table 1). In this respect, Richards (*et. al.,* 1987) and Ahmed *et.al.* (1998 and 2001) reported that cultivars showing the most damage due to salinity stress tended to be sensitive or intermediate in their survival at extreme salt concentrations, whereas their biomass yields were quite variable.

Table1. Some physical and chemical properties of the soils.

Mechanical analysis		Bahteem		El-Serw	
		2009/2010	2010/2011	2009/2010	2010/2011
Sand	%	14.00	18.00	10.00	16.00
Silt		36.40	37.10	39.20	35.90
Clay		49.60	45.40	50.80	55.00
Soil texture		Clay	Clay	Clay	Clay
Chemical analysis					
pH soil: water susp., 1:2.5		7.9	8.3	9.2	8.8
EC, Sdm-1		3.26	2.85	16.7	12.0
S.P	%	59	55	62	60
CaCO3		2.51	2.33	3.00	3.50
OM		1.24	1.19	2.10	2.00
Ca^{++}	Meq/L	8.21	9.32	12.50	14.30
Mg^{++}		5.51	4.46	7.00	6.50
K^{++}		0.3	0.3	0.7	0.6
Na^{++}		10.35	9.87	30.80	41.00
CO_3^{--}		0.00	0.00	1.00	0.50
HCO_3^-		4.53	3.92	6.00	4.00
Cl^-		7.0	6.5	4.5	4.0
SO_4^{--}		16.99	12.55	15.13	13.00
N	Available (ppm)	46	52	40	30
P		27.7	46.5	50.0	47.3
K		80	100	66	76

Table 2. Varieties, names and pedigree

No.	Cross name
1	Giza 123
2	Giza 2000
3	Giza 126
4	Giza 119/7/As46/Aths*2/5/Cr.115/Por//Bc/3/Api/Cm67/4/Giza 120/6/AwBlack/Aths//Arar/3/ 9Cr.279-07/Roho
5	Giza 119/7/As46/Aths*2/5/Cr.115/Por//Bc/3/Api/Cm67/4/Giza 120/6/AwBlack/Aths//Arar/3/9Cr.279-07/Roho
6	Alanda//Lignee527/Arar/5/Ager//Api/CM67/3/Cel/WI2269//Ore/4/Hamma-01/6/Alanda-01//Gerbel/ Hma/5/Chn-01/3/Arizona 5908/Aths//Bgs/4/Lignee640/Bgs//Cel
7	Alanda/Lignee527/Arar/5/Ager//Api/CM67/3/Cel/WI2269//Ore/4/Mamma-01/6/CLN-B/80.5138// Gloria-BARCodal/3/Robust/....
8	WC 46612//CEN-B/2*CAL 192/3/Quina/4/SIND 89 A-99/MINN DESC 1//Aloe/RUE
9	Giza 117/Karan
10	Giza 117/Karan
11	Giza 117/Dir Alla
12	Giza 121/Dir Alla
13	M64-76/Bon//Jo/York/3/M5/Galt//As46/4/Hj 34-80/Astrix/5/NK1272/6/Giza121
14	Lignee 527/NK1272//JLB 70-63/3/Arar/Rhn-03/5/Kabaa-03
15	Giza 124/AlgseiDz 21-56/3/Alanda//Lignee527/Arar
16	Alanda//Lignee527/Arar/3/Alanda-01
17	Alanda-01/4/Scoutial/3/Robust//Gloria'S'Copal'S'
18	MR25-84/Att/3/Mari/Aths//Bc/7/Aramir/Arabi Abiad/6/Man/Huiz//M69/3/Apm/RI//H272/4/CP/Bra/5/Joso"S'
19	M66-69-1/M65-94//70-22109/3/Apm/IB65/4/Glda'S'/5/CM67/Centeno//Cam/6/Api/CM67//Aths*3 /7/ Lignee527/NK 1272//Alanda
20	Carbo/Gustoe (Giza 133)
21	Alanda-01/4/WI2291/3/Api/CM67//L2966-69 (Giza 134)
22	Moroc9-75//WI2291/WI2269
23	ACSADI182/5/Arizona5908/Avt/Attiki/3/S.T.Barley/4/Aths/Lignee686

24	U.Sask.1766/Api//Cel/3/Weeah/4/Giza121/Pue
25	Giza 124
26	Giza 125
27	Giza 132
28	Giza 119/5/ROD 586 / Nopal `S` /3/ PmB / Aths // Bc /4/ F2 CC 33 MS / CI 07555 EgSk01/02no.885-2-1-2
29	Giza 119/5/ROD 586 / Nopal `S` /3/ PmB / Aths // Bc /4/ F2 CC 33 MS / CI 07555 EgSk01/02no.885-2-1-3
30	Giza 119/5/ROD 586 / Nopal `S` /3/ PmB / Aths // Bc /4/ F2 CC 33 MS / CI 07555 EgSk01/02no.885-5-1-2
31	Giza 119/4/ACSAD 1180/3/ Mari/ Aths*2 //M -Att-73-337-1 EgSk01/02no.889-1-3-1
32	Giza 121/5/ACSAD 1182/4/ Arr/ ESP // Alger/ Ceres 362-1-1/3/ WI EgSk01/02no.893-2-1-4
33	Giza 123/4/API / CM 67- B //ORE/3/ LBIRAN/UNA 80 // 1 EgSk01/02no.900-5-4-1
34	Giza 123/4/API / CM 67- B //ORE/3/ LBIRAN/UNA 80 // EgSk01/02no.900-5-4-2
35	Giza 126/6/M64 - 76 / Bon // Jo / York /3/ M5/Galt // As 46 /4/Hj 34 - 80 / Astrix /5/ NK 1272 EgSk01/02no.910-1-1-4
36	Giza 126/6/M64 - 76 / Bon // Jo / York /3/ M5/Galt // As 46 /4/Hj 34 - 80 / Astrix /5/ NK 1272 EgSk01/02no.910-1-1-5
37	C.C. 89/5/ACSAD 1182/4/ Arr/ ESP // Alger/ Ceres 362-1-1/3/ WI EgSk01/02no.922-2-3-2
38	C.C. 89/5/ACSAD 1182/4/ Arr/ ESP // Alger/ Ceres 362-1-1/3/ WI EgSk01/02no.922-2-3-3
39	C.C. 89/5/ACSAD 1182/4/ Arr/ ESP // Alger/ Ceres 362-1-1/3/ WI EgSk01/02no.922-2-3-4

Table 2. Cont.

No.	Cross Name
40	C.C. 89/5/ACSAD 1182/4/ Arr/ ESP // Alger/ Ceres 362-1-1/3/ WI EgSk01/02no.922-5-1-4
41	Pld10342// Cr .115/Por/3/Bahtim 9/4/Ds/Apro/5/WI 2291/6/Arar//2762/Bc - 2L-2Y/7/Zanbaka// Alger/ Ceres362-1-1/3/Arar/19-3//WI 2292 EgSk01/02no.944-6-2-2
42	NK 1272 // Manker / Arig 8/3/ Arar / Lignee 527/5/ F2CC 33MS/CI7555/4/Apm/HC1905//Robur /3/ Arar /5/ Heve 11965 EgSk01/02no.952-1-2-1
43	Alanda / Hamra -01 // Gloria 'S' / Copal 'S' /8/ Api/ CM67/3/ Emir/Nackta//Mgh6355/4/H251/3/Api/CM67// Ore/7/CN100/DC 23//Fun*3/3/Tra/4/10925-1/5/Bco.Mr/As/6/ Seed source72-Sal EgSk01/02no.963-3-1-1
44	Alanda / Hamra -01 // Gloria 'S' / Copal 'S' /8/ Api/ CM67/3/ Emir/Nackta//Mgh6355/4/H251/3/Api/CM67// Ore/7/CN100/DC 23//Fun*3/3/Tra/4/10925-1/5/Bco.Mr/As/6/ Seed source72-Sal EgSk01/02no.963-3-1-2
45	Alanda / Hamra -01 // Gloria 'S' / Copal 'S' /8/ Api/ CM67/3/ Emir/Nackta//Mgh6355/4/H251/3/Api/CM67// Ore/7/CN100/DC 23//Fun*3/3/Tra/4/10925-1/5/Bco.Mr/As/6/ Seed source72-Sal EgSk01/02no.963-3-1-3
46	Alanda / Hamra -01 // Gloria 'S' / Copal 'S' /8/ Api/ CM67/3/ Emir/Nackta//Mgh6355/4/H251/3/Api/CM67// Ore/7/CN100/DC 23//Fun*3/3/Tra/4/10925-1/5/Bco.Mr/As/6/ Seed source72-Sal EgSk01/02no.963-3-2-1
47	Alanda / Hamra -01 // Gloria 'S' / Copal 'S' /8/ Api/ CM67/3/ Emir/Nackta//Mgh6355/4/H251/3/Api/CM67// Ore/7/CN100/DC 23//Fun*3/3/Tra/4/10925-1/5/Bco.Mr/As/6/ Seed source72-Sal EgSk01/02no.963-3-2-2
48	ACSAD1180/3/ Mari/Aths*2//M-Att-73-337-1/5/ ACSAD1182/4/Arr/ ESP// Alger/ Ceres 362-1-1/3/ WI EgSk01/02no.994-7-2-1
49	ACSAD1180/3/ Mari/Aths*2//M-Att-73-337-1/5/ ACSAD1182/4/Arr/ ESP// Alger/ Ceres 362-1-1/3/ WI

	EgSk01/02no.994-8-3-3
50	Ager//Api/CM67/3/Cel/WI2269//Ore/4/Alanda/5/CompCr229//As46/Pro/3/Srs
51	Arar//Hr/Nopal/3/Alanda -01/Alanda-01
52	Alanda-01/3/Alanda//Lignee527 / Arar
53	Giza 125/4/NK 1272/Moroc 9-75/3/Arimar/Aths//Orge 905/Lignee 686 EgSk99/00 No758 -1-3-1
54	Giza 125/4/NK 1272/Moroc 9-75/3/Arimar/Aths//Orge 905/Lignee 686 EgSk99/00 No758 -4-1-2
55	Baca's'/3/AC253//CI 08887/CI 05761/4/Deir Alla106/Cel/3/BonMr/Mzq//Api/5106/5/ Chamico//Gloria-BAR/Come-B/3/Quina EgSk99/00 No790 -1-1-1
56	Alanda//Lignee527//Arar/5/Ager//Api/CM67/3/Cel/WI2269/Ore/4/Harma-01/6/Alanda-01// Gerbel/Hma/5/Chn-01/3/Arizona 5908/Aths//Bgs/4/Lignee640/Bgs//Cel EgSk99/00 No812-1-3-3
57	EGYPT 4/TERAN 78//P-STO/3/Quina 1m Quinn/Aloe//CARDO EgSk99/00 No837-5-2-1
58	Giza 129
59	Giza 130
60	Giza 131

The results in Table (3) show significant difference among genotypes in all plant characteristics for the 60 genotypes at Bahteem and El-Serw during 2009/2010 and 2010/2011 growing seasons. Plant height ranged from 80 -105 cm in Bahteem and 55-80 cm in El-Serw. Genotypes No. 15, 28, 40 and 56 had the tallest plants significantly to the old (Giza 123, Giza 2000 and Giza 126) and new checks (Giza 132, Giza 133 and Giza 134).

For spike length, the data revealed that in Bahteem genotypes No. 11, 54 and 55 , while in El-Serw genotypes No. 11, 19, 23, 24, 37, 39 , 41, 43, 45, 47 and 54 had the tallest spikes. As well as, in the combined data genotypes No. 11 and 54 had the tallest spikes significantly. These findings are similar to those was obtained by (Ahmed *et al.* 1998 and Asaad *et. al.* 1989).

Regarding No. of spikes/plant, the results showed the mean No. of spikes/plant ranged between 10 to 23 in Bahteem and between 4 to 13 in El-Serw, while in the combined data, the highest capacity of plant came from genotypes No. 16, 6 and 7

(16.5 spikes/plant) followed by genotypes No. 25, 58 and 45 (15 spikes/plant). Similar results were obtained from (Ahmed *et.al.* 1993).

Generally, the highest No. of grains/spike were obtained from genotype No. 8 (48 grains/spike) in Bahteem, while in El-Serw, it came from genotype 28 (38 grains/spike). The data in the combined analysis showed that genotypes No. 8 and 28 had the first order in No. of grains/spike (42.5). This result is also in agreement with that obtained by Assad et. al. (1989) who found that the inhibitory effect of salinity was a consequence of high sodium chloride level.

On the average over all genotypes and locations, the data revealed that genotype No. 16 had the heaviest grains (38.3 g) followed by genotypes No. 7 (36.7 gm) and genotype No. 6 (35 g). This may be due to the increase of soil salinity at El-Serw than in Bahteem (Table 1).

As shown in Table (3) significant effects were recorded for locations and genotypes in biological (BY) and grain yields(GY). Indicating the effect of salinity on BY and GY of barley. It was found that in Bahteem three genotypes No. 6, 7, and 16 (19.2 ardab/fed.) and one genotype No. 6 at El-Serw (8.5 ardab/fed.) outyielded the check (Giza 123), significantly. On the other hand, over all locations genotypes No. 6, 7 and 16 (3.9 ton/fed. for BY and 13.5 ardab/fed. for GY) had the highest biological and grain yields, significantly. This is true because they had heaviest grains and high capacity of plants. This result is similar to that obtained by Ahmed *et.al.* (2001) and Katerji *et al.* (2006), who found that, high level of sodium chloride was more harmful to barley biological and grain yields, as well as, No. of spikes/plant, No. of grains/plant, plant height and 1000-kernels weight.

Comparing the sixty genotypes in harvest index, it was found that, eight genotypes having significantly the highest values in the combined data, seven genotypes in Bahteem and six genotypes in El-Serw.

It was concluded from this study that the promising lines no. 6, 7 and 16 were more salt tolerant than the other new selected lines. To improve selection efficiency against salt stress, should select under high salt concentration levels in order to identify with high confidence, those genotypes that carry tolerance factors and can survive under high level of salinity when occurrence.

Table3. Mean performance for yield and yield components for (60) genotypes during (2009/2010 and 2010/2011) seasons under Bahteem and El-Serw locations.

Genotype	Plant height (cm)			Spike length (cm)			No. of spikes/ plant			No. of grains/ spike		
	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean
1	90.00	76.00	83.00	6.00	4.00	5.00	13.00	7.00	10.0	40.00	30.00	35.00
2	90.00	70.00	80.00	6.00	5.00	5.50	13.00	9.00	11.0	38.00	30.00	34.00
3	90.00	70.00	80.00	5.00	6.00	5.50	13.00	6.33	9.7	40.00	30.00	36.00
4	85.00	65.00	75.00	7.00	4.00	5.50	10.00	6.00	8.0	41.33	28.00	34.67
5	100.00	60.00	80.00	7.00	4.00	5.50	10.00	7.00	8.5	44.00	27.00	35.50
6	90.00	75.00	82.50	8.00	5.00	6.50	22.00	10.00	16.0	44.00	35.00	39.50
7	90.00	81.67	85.83	8.00	5.00	6.50	20.00	12.00	16.0	45.00	36.00	40.50
8	90.00	75.00	85.50	8.00	5.00	6.50	13.00	7.00	10.0	48.00	37.00	42.50
9	90.00	60.00	75.00	7.00	4.00	5.50	10.00	7.00	8.5	46.00	30.00	38.00
10	90.00	70.00	80.00	7.00	5.00	6.00	13.00	9.00	11.0	41.00	35.00	38.00
11	90.00	70.00	80.00	9.00	6.00	7.50	15.00	10.00	12.5	43.00	34.00	38.50
12	85.00	65.00	75.00	7.00	5.00	6.00	12.00	7.67	9.8	40.00	3.00	38.00
13	90.00	70.00	80.00	8.00	4.00	6.00	12.00	7.00	9.5	43.00	33.00	38.00
14	80.00	73.33	76.67	7.00	5.00	6.00	12.33	6.00	9.2	41.00	36.00	38.50
15	100.00	80.00	90.00	8.00	5.00	6.50	15.00	10.00	12.5	42.67	34.00	38.33
16	95.00	70.00	82.50	8.00	5.00	6.50	20.00	13.00	16.5	44.00	35.00	39.50
17	100.00	70.00	85.00	7.00	5.00	6.00	15.00	7.00	11.0	43.67	30.00	36.83
18	95.00	65.00	80.00	8.00	5.00	6.50	18.00	7.00	12.5	34.00	29.00	31.50
19	90.00	70.00	80.00	7.00	6.00	6.50	15.00	10.00	12.5	37.00	20.00	28.50
20	105.00	65.00	85.00	7.00	3.00	5.00	15.00	8.00	11.5	36.00	26.67	31.33
21	95.00	70.00	82.50	8.00	5.00	6.50	14.00	10.00	12.0	40.00	28.00	34.00
22	95.00	70.00	82.50	8.00	5.00	6.50	15.00	9.00	12.0	42.00	32.00	37.00
23	85.00	70.00	77.50	7.00	6.00	6.50	13.00	8.00	10.5	39.00	30.00	34.50
24	90.00	73.33	81.67	7.00	6.00	6.50	14.00	7.00	10.5	44.00	30.00	37.00
25	95.00	70.00	82.50	8.00	4.00	6.00	22.00	9.00	15.5	44.00	36.00	40.00
26	105.00	70.00	87.50	8.00	5.00	6.50	17.00	9.00	13.0	45.00	37.3300	41.17
27	95.00	70.00	82.50	8.00	4.00	6.00	23.00	8.00	15.5	43.00	30.00	36.50
28	100.00	80.00	90.00	8.00	5.00	6.50	15.00	9.00	12.0	46.00	38.00	42.00
29	90.00	70.00	80.00	6.33	5.00	5.67	15.00	8.00	11.5	42.33	34.00	38.17
30	100.00	65.00	82.50	7.00	3.00	5.00	12.33	6.00	9.2	42.33	29.00	35.67

Table 3. Cont.

Genotype	Plant height (cm)			Spike length (cm)			No. of spikes/ plant			No. of grains/ spike		
	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean
31	100.00	60.00	80.00	6.00	4.00	5.00	13.00	5.00	9.0	47.00	31.00	38.50
32	95.00	65.00	80.00	7.00	4.00	5.50	17.00	5.00	11.0	44.00	25.00	34.50
33	90.00	55.00	72.50.	7.00	4.00	5.50	18.00	6.00	12.0	47.00	26.00	36.50
34	100.00	65.00	82.50	7.00	4.00	5.50	17.00	7.00	12.0	45.00	23.33	34.17
35	100.00	60.00	80.00	7.00	5.00	6.00	16.00	5.00	10.5	44.00	21.00	32.50
36	90.00	70.00	80.00	6.00	5..00	5.50	17.00	6.00	11.5	44.00	25.33	34.67
37	100.00	65.00	82.50	7.00	6.00	6.50	16.00	4.00	10.0	45.00	26.00	35.50
38	80.00	65.00	72.50	7.00	5.00	6.00	17.00	5.00	11.0	44.00	29.00	36.50
39	100.00	70.00	85.00	7.00	6.00	6.50	17.00	4.00	10.5	45.00	27.00	36.00
40	80.00	60.00	87.50	8.00	5.00	6.50	17.00	4.00	10.5	42.00	26.00	34.00
41	100.00	75.00	77.50	8.00	6.00	7.00	15.00	6.00	10.5	44.00	35.00	39.50
42	90.00	65.00	87.50	8.00	4.00	6.00	17.33	7.00	12.2	43.00	24.00	33.50
43	100.00	75.00	87.50	8.00	6.00	7.00	17.00	7.00	12.0	45.00	34.00	39.50
44	85.00	60.00	72.50	8.00	4.00	6.00	15.00	6.00	10.5	46.00	35.00	40.50
45	100.00	75.00	87.50	7.00	6.00	6.50	19.00	9.00	14.0	43.00	34.00	38.50
46	85.00	60.00	72.50	7.00	2.00	4.50	14.00	7.00	10.5	44.00	27.00	35.50
47	100.00	75.00	87.50	6.00	6.00	6.00	15.00	7.00	11.0	43.00	33.00	38.00
48	85.00	60.00	72.50	8.00	4.00	6.00	14.00	6.00	10.0	44.00	29.00	36.50
49	90.00	70.00	80.00	7.00	5.00	6.00	20.00	7.00	13.5	42.33	28.00	35.17
50	95.00	65.00	80.00	8.00	5.00	6.50	16.00	6.00	11.0	44.00	26.00	35.00
51	100.00	70.00	85.00	7.00	5.00	6.00	19.00	7.00	13.0	45.00	27.00	36.00
52	95.00	75.00	85.00	7.00	3.00	5.00	13.00	7.00	10.0	46.00	35.00	40.50
53	90.00	70.00	80.00	8.00	5.00	6.50	13.00	7.00	10.0	43.00	35.00	39.00
54	90.00	80.00	85.00	9.00	6.00	7.50	13.00	7.00	10.0	41.00	36.00	38.50
55	90.00	70.00	80.00	9.00	5.00	7.00	14.00	7.00	10.5	45.00	27.00	36.00
56	100.00	75.00	87.50	8.00	4.00	6.00	15.00	8.00	11.5	46.00	29.00	37.50
57	85.00	70.00	77.50	7.00	5.00	6.00	12.00	6.00	9.0	41.00	35.00	38.00
58	100.00	80.00	90.00	9.00	6.00.	7.50	20.00	9.00	14.5	44.00	35.00	39.50
59	80.00	70.00	75.00	8.00	4.00	6.00	14.00	7.00	10.5	37.00	26.00	31.50
60	95.00	65.00	80.00	8.00	3.00	5.50	12.33	5.00	8.7	40.00	27.00	33.50
Mean	93.67	69.31	81.49	7.54	4.78	6.16	15.37	6.82	11.09	43.11	30.73	36.92
L.S.D at 0.05	8.40	5.45	4.90	1.00	1.29	0.89	3.84	2.78	3.84	4.20	2.46	3.50
CV%	18.5	25.3	23.5	10.6	15.4	12.5	8.5	11.8	10.5	13.0	15.6	14.5

Table 3. Cont.

Genotype	1000-kernal weight (g)			Biological yield (ton/fed.)			Grain yield (ardab/fed.)			Harvest index (%)		
	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean
1	30.0	25.0	27.5	4.000	2.500	3.250	16.2	7.7	12.3	35	23	29
2	35.0	20.0	27.5	4.500	2.000	3.250	16.2	7.7	11.5	29	23	26
3	30.0	18.3	24.2	4.000	2.000	3.000	12.3	4.6	8.5	24	18	21
4	35.0	18.3	26.7	3.000	1.500	2.250	12.3	3.8	7.7	33	18	26
5	35.0	18.3	26.7	4.000	1.600	2.800	15.4	3.1	9.2	30	17	23
6	40.0	30.0	35.0	5.000	3.000	4.000	19.2	8.5	13.8	30	23	27
7	40.0	33.3	36.7	4.500	3.000	3.750	19.2	7.7	13.1	33	19	26
8	40.0	25.0	32.5	4.000	2.500	3.250	15.4	6.2	10.8	33	19	26
9	40.0	18.3	29.2	4.000	2.500	3.250	12.3	4.6	8.5	24	15	20
10	40.0	26.7	33.3	4.000	2.500	3.250	15.4	6.2	10.8	30	19	24
11	40.0	26.7	33.3	3.800	2.670	3.230	15.4	6.2	10.8	31	18	25
12	40.0	20.0	30.0	3.500	2.000	2.750	13.8	6.2	10.0	31	24	28
13	40.0	28.0	34.0	4.000	2.300	3.150	15.4	6.2	10.8	30	30	20
14	40.0	20.0	30.0	4.000	2.100	3.005	13.8	6.2	10.0	28	23	25
15	45.0	26.7	35.8	4.000	2.200	3.100	13.8	6.2	10.0	28	20	24
16	40.0	36.7	38.3	4.500	2.700	3.600	19.2	7.7	13.8	31	21	26
17	35.0	16.7	25.8	4.000	2.500	3.250	13.8	7.7	10.8	27	23	25
18	35.0	16.7	25.8	4.000	1.900	2.950	12.3	4.6	8.5	23	19	21
19	40.0	20.0	30.0	4.200	2.400	3.300	16.2	6.2	11.5	34	19	27
20	37.0	18.3	27.7	3.600	1.500	2.550	12.3	3.8	7.7	28	18	23
21	40.0	25.0	32.5	4.000	2.600	3.300	16.2	7.7	11.5	32	23	28
22	40.0	25.0	32.5	4.200	2.400	3.300	16.2	7.7	11.5	30	24	27
23	30.0	15.0	22.57	4.000	2.500	3.250	15.4	6.2	10.8	30	20	25
24	35.0	20.0	27.5	3.700	2.200	2.950	15.4	6.2	10.8	32	22	27
25	35.0	23.3	29.2	4.000	2.300	3.150	15.4	4.6	10.0	29	17	23
26	40.0	23.3	31.7	4.000	2.300	3.150	16.2	6.2	7.7	32	32	20
27	33.3	15.0	24.2	4.000	1.500	2.750	12.3	3.8	11.5	24	24	18
28	40.0	25.0	32.5	4.000	2.800	3.200	16.2	6.2	11.5	33	20	27
29	35.0	20.0	27.5	4.000	2.400	3.200	16.2	6.2	6.9	33	20	26
30	30.0	10.0	20.0	3.000	1.400	2.200	10.0	3.8	7.7	26	20	23

Table 3. Cont.

Genotype	1000-kernal weight (g)			Biological yield (ton/fed.)			Grain yield (ardab/fed.)			Harvest index (%)		
	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean	Bahteem	El-Serw	Mean
31	35.0	18.3	26.7	3.500	1.700	2.600	11.5	3.8	7.7	29	20	23
32	30.0	13.3	21.7	4.000	1.690	2.800	12.3	3.8	8.5	29	17	23
33	35.0	21.7	28.3	4.000	1.700	2.850	15.4	3.1	9.2	30	15	22
34	35.0	21.7	28.3	4.000	2.000	3.000	12.3	3.8	9.6	27	17	22
35	35.0	15.0	25.0	4.500	2.000	3.250	16.2	5.4	10.8	29	17	23
36	35.0	15.0	25.0	4.000	1.630	2.820	11.5	3.8	7.7	27	17	22
37	35.0	15.0	25.0	4.000	2.000	3.000	15.4	4.6	10.0	30	18	24
38	30.0	15.0	22.5	4.000	1.700	2.850	13.8	3.8	8.5	27	16	21
39	30.0	15.0	22.5	4.500	2.200	3.350	16.2	5.4	10.8	29	16	23
40	30.0	16.7	23.3	4.000	1.600	2.800	13.8	3.8	8.5	27	17	22
41	35.0	20.0	27.5	4.500	2.400	3.450	17.7	6.2	11.5	31	24	27
42	30.0	15.0	22.5	4.000	2.000	3.000	15.4	4.6	10.0	29	18	23
43	35.0	20.0	27.5	4.500	2.500	3.500	17.7	6.2	12.3	31	19	25
44	35.0	20.0	27.5	4.000	2.200	3.100	15.4	4.6	10.0	30	17	24
45	31.7	26.3	29.0	4.000	2.300	3.150	16.2	6.9	11.5	32	21	27
46	30.0	15.0	22.5	3.500	1.701	2.600	11.5	3.8	7.7	26	17	22
47	35.0	20.0	27.5	4.000	2.400	3.200	15.4	6.2	10.8	30	19	25
48	35.0	15.0	25.0	4.000	2.000	3.000	15.4	4.6	10.0	30	18	24
49	30.0	15.0	22.5	3.500	1.900	2.700	15.4	4.6	10.0	33	19	26
50	30.0	15.0	22.5	4.000	1.400	2.700	15.4	3.8	9.6	30	18	24
51	35.0	15.3	25.2	4.000	1.800	2.900	12.3	4.6	8.5	24	18	21
52	35.0	25.0	30.0	4.000	2.200	3.100	15.4	6.2	10.8	30	21	26
53	35.0	26.7	30.8	4.000	2.300	3.150	15.4	6.2	10.8	29	21	25
54	35.0	25.0	30.0	4.000	2.200	3.100	13.8	6.2	10.0	27	22	24
55	30.0	15.0	22.5	4.000	2.200	3.100	15.4	6.2	10.8	30	22	26
56	25.0	10.0	17.5	3.830	1.600	2.720	13.8	3.8	9.2	28	18	23
57	35.0	25.0	30.0	4.000	2.400	3.200	15.4	6.2	10.8	29	20	25
58	35.0	25.0	30.0	4.000	2.600	3.300	16.2	6.9	11.5	32	18	25
59	30.0	15.0	22.5	4.000	1.700	2.850	13.8	3.8	9.2	27	16	22
60	30.0	15.0	22.5	3.500	1.000	2.250	13.1	2.3	7.7	28	15	22
Mean	35.6	20.0	27.8	4.000	2.100	3.060	14.6	5.4	7.7	29	19	24
L.S.D at 0.05	4.5	3.2	3.6	0.80	0.65	0.60	1.50	2.00	1.80	3.00	4.00	3.00
CV%	12.5	18.5	15.5	10.8	12.0	10.8	8.8	11.0	9.5	16.4	20.0	19.0

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أداء بعض التراكيب الوراثية من الشعير في موقعين متأثرين بالملوحة

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معهد بحوث المحاصيل الحقلية-مركز البحوث الزراعية- الجيزة- مصر

تم تقييم ٦٠ سلالة وصنف من الشعير للتحمل للملوحة في تجربة حقلية أقيمت في موقعين (بهتيم والسرو) خلال موسمى ٢٠٠٩/٢٠١٠، ٢٠١٠/٢٠١١ وكان التصميم الإحصائي المستخدم هو قطاعات كاملة العشوائية في أربع مكررات. وقد تبين من جدول تحليل التربة (جدول ١) أن ملوحة التربة في السرو أعلى من بهتيم. و أظهرت النتائج وجود فروق معنوية بين السلالات في صفات : طول النبات، طول السنبلة، عدد السنابل للنبات، عدد حبوب السنبلة، وزن الألف حبه، المحصول البيولوجي، محصول الحبوب ودليل الحصاد. كذلك أشارت النتائج إلى أن جميع الصفات الخاصة بالنبات بالإضافة إلى المحصول البيولوجي والحبوب قد تأثرت تأثيراً كبيراً بالملوحة حيث أعطت السلالات المنزرعة بمحطة بحوث السرو أقل قيم في الصفات سالفة الذكر بالمقارنة بمحطة بحوث بهتيم. كما بينت الدراسة أن أفضل السلالات تحملاً للملوحة بالمقارنة بالأصناف القديمة والحديثة هي أرقام ٦، ٧، ١٦ حيث أعطت هذه السلالات أعلى محصول بيولوجي (٤،٠٠، ٣،٧٥ ، ٣،٦٠ طن/للفدان على التوالى) وأعلى محصول لحبوب (١٣،٨، ١٣،١ ، ١٣،٨ أردب/فدان على التوالى) كذلك أعطت هذه السلالات أعلى وزن للألف حبه (٣٥،٠، ٣٥،٧، ٣٨،٣ جم)، وأعلى عدد للسنابل في النبات (١٦،٠ ، ١٦،٤ ، ١٦،٥ سنبلة/نبات) وأيضاً أعطت اعلى عدد حبوب في السنبلة (٣٩،٥، ٤٠،٥ ، ٣٩،٥ حبة في السنبلة). وبذلك يمكن القول انه لتحسين الانتخاب في الأراضي الملحية يجب أن يتم تحت مستويات عالية من الملوحة.