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INFLUENCE OF SOIL SALINITY ON NUTRIENTS UPTAKE , YIELD AND YIELD COMPONENT OF TWO WHEAT VARIETIES

El-Agrodi , M.W.M.*; G. Labeeb*; M. R. Abd El-Hadi and T.A.M. Abdou****

***Soils Dept. Fac. Of Agric. Mans. Univ.**

****Soils , Water & Environment Res. Institute**

ABSTRACT

In arid and semi arid regions with irrigated agriculture conditions ,excess soluble salts often occurs .Bread wheat is one of the primary crops used for human feeding .The response of salinity tolerant (Sakha 92) and salinity sensitive (Gemmiza 9) cultivars against salinity hazard is unclear . The effect of soil salinity levels (0.08 ,0.2, 0.4and 0.6 %) were assessed on yield and yield component as well as N,P and K content of the two type of wheat .

The obtained results can be summarized in

Increasing soil salinity level from (Control) to 0.2% increased seedling emergence percentage of the studied wheat varieties, whereas, raising the soil salinity level above 0.2% (0.4 and 0.6%) decreased seedling emergence mean of the studied wheat varieties to a large extend in the first (0 - 5 days after sowing) , and second (5 - 10 days after sowing) count only ,

0.2 % soil salinity enhanced tillering process of both cultivars (2.97 % and1.53 % increase for sakha92 and Gemmiza 9 ,respectively) . In the same order soil salinity level of 0.6 % caused 62.68 and 72.24 % decrease in the same respect .

Slight soil salinity (0.2 %) led to slight increase (1.4 %) in leaf area than that of control treatment, while the highest levels of soil salinity (0.4 and 0.6 %) caused 49.92 and 66.63.% reduction , respectively .

Increasing soil salinity levels from control (0.08%) to 0.2% increased shoot dry weight of the studied wheat varieties, and the salt sensitive variety (Gemmiza 9 cv.) is more excited than the salt tolerant one (Sakha 92) . 0.4 and 0.6% soil salinity levels had pronounced negative effects on shoot dry weight of Gemmiza 9 cv. too .

Sakha 92 cv. (salt tolerant cv.) accumulated higher Nitrogen (523.106 mg / pot) than that of Gemmiza 9 cv. (469.973 mg / pot) .

In spite of phosphorus concentration decreased with increasing soil salinity level above control , the phosphorus uptake by shoot was increased with increasing soil salinity level , from control to 0.2% , such increase was mainly due to higher increase in shoot dry weight , which compensate the decrease of phosphorus concentration , and increase phosphorus uptake by shoots .

Little increase in potassium uptake , at soil salinity level of 0.2% , was found, then sharply decreased due to raising soil salinity level above that . So, sakha 92 cultivar has a higher potassium uptake (971.279 mg/pot) than that of Gimmiza 9 (879.622 mg/pot) cultivar .

The average of 100 grains weight of varieties was increased by 6.46 %as soil salinity raised from control to 0.2 % . Raising soil salinity level above 0.2 % , sharply decreased 100 grain weight where, .0.4 and 0.6 % soil salinity caused 23.89 and 35.08 % decrease in this respect , respectively.

A lower increase in grain yield (5.08%) of Gemmiza 9 cultivar was observed , compared to that of Sakha 92 cultivar (6.31%) , due to soil salinity level increase from control to 0.2% , meanwhile , soil salinity level of 0.6% caused a severe reduction in grain yield of Gemmiza 9 cultivar (36.90%) than that of sakha 92 cultivar (29.00%) .

Grain yield of both varieties highly significantly positively correlated with shoot dry weight at any growth stage .Highest correlation coefficient values were obtained with sakha 92 cultivar . Grain yield of both varieties was also highly significantly positively correlated with each of N ,P and K uptake , by the above ground portion at flowering stage , and the higer correlation coefficient values were also obtained with sakha 92 cv.. So that shoot dry weight at any growth stage or N ,P and K uptake at flowering stage , is most reliable index for grain yield in salt tolerant cultivar than that in salt sensitive cultivars .

INTRODUCTION

Soil salinity is the main obstacle to produce high yields in arid and semi arid regions. Response of plants to salt stress is very complex , and not only varied within the species , but also within varieties. Varieties which are classified as salt tolerant may have a different response type to salinity hazard . Salinity tolerant plants may be related to the accumulation of Na^+ in old leaves with a continuous transport of K^+ to young leaves (Wolf *et al.*, 1991), Na exclusion through specific organs (Cramer *et al.*, 1994) , a higher relative growth rate of it's roots and shoots (Colmer, *et al.*, 1995), the compensatory uptake of water and ions from the more favorable region , where , the salt distribution is not constant with the soil depth , but are zonal in nature , (Yoav, 1972), thus, leading to improve the plant water and nutrient status.

MATERIALS AND METHODS

Two seasons of pot experiments were conducted at Plant nutrition Lab., Agriculture research center , Dakahlia Governorate, during 2002 /2003 and 2003 /2004 growing seasons .This work aimed to study the effect of soil salinity on wheat yield, yield components and nutrients uptake of two wheat varieties .

Surface soil (0 – 30 cm) samples were collected from EL-Gawashna village, EL- Sharkia governorate, representing non–saline clayey soils , having pH value of 7.6, EC. Value of paste extract 1.72 dSm^{-1} and field capacity of 40%. Air dry soils equal to 11 Kg oven dry soil , were placed in closed plastic pots . Cubic shaped pots were used (25 x 25 x 25 cm). These pots were divided into 4 groups, the first group is Control (0.08%) and the other groups were artificially salinized by adding appropriate amount of calcium chloride and sodium chloride (1:1 by weight) to form salinity levels of 0.2, 0.4, and 0.6.% .

Two wheat varieties (sakha 92, salinity tolerant and gemmiza 9, salinity sensitive) were used . Pots were arranged to form strip plot in a complete randomized block design .Each treatment was replicated nine times.

Five days later after soil salinization, twenty grains (2 hours water soaked) wheat were dipped up to 1.5 cm deep , in each pot .The pots were rewatered to reach the field capacity.

Soil water content were adjusted to 100% of field capacity , when soil moisture reached 70% F.C. , nearly every 4 days by weighing and water addition.

Wheat plants emergence were counted at 5, 10 and 15 days after sowing. Thereafter seedlings were thinned to seven plants in each pot.

All phosphorus and potassium recommended doses were added after thinning , as ordinary superphosphate (150 kg/fed or 2.232 g/pot) and potassium sulphate (50 kg/fed, 0.744 g / pot). Urea–N fertilizers (2.4 g urea /pot equal to 75 N/fed) was applied in two equal doses.

Plants of three replicates of each treatment were collected separately, at the end of tillering stage and flowering stage. At flowering stage , (70 days after sowing) the number of tillers per plant were counted , plant leaf length and width were measured. Then Leaf area was calculated, using Owen equation (1986) .

Remainder pots of each treatments were manually harvested , when spikes were completely yellowish in color , and the number of grains per each spike were counted.

Grain and straw yields were taken to determine their moisture content. Grain yield expressed as gm/pot (14% moisture), while the straw yield was dried at 70 $^{\circ}$C and expressed as gm/pot.

All Plant materials were dried at 70 $^{\circ}$C until the stable weight is reached. Portions of dry plant organs (oven dry basis,105 $^{\circ}$C) were wet digested with $H_2SO_4 - HCLO_4$ mixture as described by peterburgski (1964).

N, P and K were determined in the digestion product , their concentrations were calculated , on oven dry matter basis , as described by Cottenie *et al.* (1982) .

Collected data were subjected to the statistical analysis for a combined analysis between years according to Gomez and Gomez (1984), treatments means were compared , using the least significant difference .

RESULTS AND DISCUSSIONS

Data of Table (1) reveal that, increasing soil salinity level from (Control) to 0.2% , increased seedling emergence percentage of the studied wheat varieties, whereas, seedling emergence mean of wheat varieties was increased from 77.525 to 82.390 at the 5 th day from sowing , at the 10 th day, it was increased from 84.040 to 85.900% , at the latter count (15 days from sowing) it was increased from 92.375 to 96.140% .

Raising soil salinity level above 0.2% (0.4 and 0.6%) decreased seedling emergence mean , of the studied wheat varieties , to a large extent in the first and second counts, while a lesser decrease was found in the latest count .

The above mentioned results mean that the studied soil salinity levels, mainly delayed the seedling emergence of wheat cv. , as shown in Fig (1).

Table (1): Effect of soil salinity on seedling emergence (%) of the studied wheat varieties

Soil salinity level	Seedling emergence up to 5 th day				Seedling emergence up to 10 th day				Seedling emergence up to 15 th day			
	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD
	Sa 92	Ge 9			Sa 92	Ge 9			Sa 92	Ge 9		
Cont	82.525	72.525	77.525	1.350 2.045	84.450	83.625	84.40	2.095 3.175	91.950	91.800	91.375	2.290 3.475
0.2%	86.975	77.800	82.390		87.800	84.00	85.90		96.425	95.850	96.140	
0.4%	66.975	62.250	64.615		77.800	70.300	74.050		92.250	91.150	91.700	
0.6%	37.225	31.125	34.325		56.400	35.00	45.070		84.475	83.650	84.065	
Mean	68.500	60.925			76.615	67.230			91.275	90.865		
LSD	0.765	1.115			1.060	1.545			NS			
Int.LSD	5.650	8.220			19.900	28.955			NS			

Sa.92 = Sakha 92 Ge.9 = Gemmiza 9

Data of the same Fig reveal that the first cultivar of wheat (sakha 92) was able to emerge in saline conditions more than that of the second one (Gemmiza 9) , thus, the seedling emergence percent of the second one was the lowest at all salinity levels ,i.e. (0.2 , 0.4 and 0.6%) , especially at 0.6% with the second count, 5 – 10 days from sowing . These results are in agreement with that of Mass and Poss (1989) . They outlined that the salt stress ψ = - 0.65 Mpa delayed seed germination by 4 days for both wheat varieties , but the full emergence occurred.

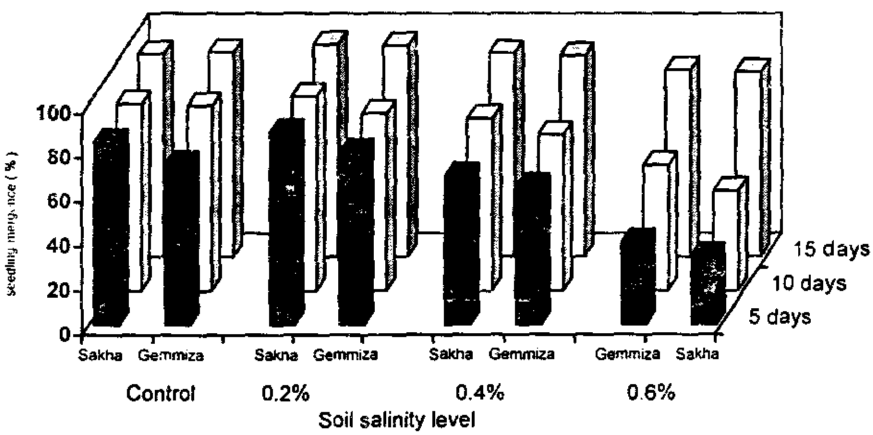

Fig (1): Effect of soil salinity on seedling emergence (%) of the studied wheat varieties

Data of Table (2) reveal that 0.2 % soil salinity enhanced tillering process of both cultivars , where , the average of tiller numbers of Sakha 92 cv. was increased by 2.97 % and a lesser enhancement was observed with

Gemmiza 9 cv. (1.53 % increase). The highest levels of soil salinity (0.4 and 0.6 %) caused great depression in tiller numbers of both used varieties, where , 0.4 % soil salinity treatment decreased the tiller number of both varieties , by 26.86 and 40.91 % respectively . In the same order , soil salinity level of 0.6 % caused 62.68 and 72.24 % decrease , in the same respect . These results are in agreement with those of El Kady *et al.*, (1981) .They mentioned that tiller number of wheat increased with increasing salinity of sand culture up to 4000 ppm , then decreased progressively up to the highest studied level (10000 ppm).

The above mentioned discussion pointed out that Sakha 92 cv. exhibited higher synergistic response with lower soil salinity level (0.2%) and lower inhibition effect with higher soil salinity level (0.6%) and a contrary trend was shown with Gemmiza 9 cv. in this respect .

Table (2): Effect of soil salinity on number of tillers, plant height and leaf area of the studied wheat varieties at flowering stage.

Soil salinity level	Tiller numbers				Plant height				Leaf area(cm^2)			
	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD
	Sa. 92	Ge 9			Sa. 92	Ge 9			Sa. 92	Ge 9		
Cont	5.584	5.500	5.542	0.535	58.917	53.500	56.209	1.528	36.621	6.622	36.622	0.296
0.2%	5.750	5.584	5.667		63.167	57.917	60.542		37.250	37.053	37.152	
0.4%	4.084	3.250	3.667		53.917	48.833	51.375		19.490	17.309	18.340	
0.6%	2.084	1.717	1.751	0.353	43.584	40.000	41.792	1.008	13.160	12.011	12.586	0.195
Mean	4.376	3.938			54.896	50.063			26.630	25.749		
LSD	0.152		0.221		0.749		1.090		0.161		0.235	
Int.LSD	0.851		1.238		NS				2.207		3.211	

Sa.92 = Sakha 92 **Ge.9 = Gemmiza 9**

Plant height (70 days after sowing) , as affected by soil salinity levels and varieties, are shown also in Table (2).The data illustrate that slight soil salinity (0.2 %) had positive effect on wheat plant height, (7.71% increase), whereas highest levels of soil salinity (0.4 and 0.6 %) had negative effect (8.6 and 25.65 % decrease) on the same parameter. This trend of results are in coincidence with that of Hathout (1996), who reported that, water salinity above 800 (1600 to 3200) ppm NaCl , reduced the height of wheat plant, but significant increases in these criteria was found at salinity level of 800 ppm, in a deviate trend with that of Nour *et al.*, (1989) , they stated that plant height of wheat cv., Giza 157 , was decreased with increasing the soil salt content from control , to 0.2 and 0.4%.

Data presented in Table (2) outlined that slight soil salinity (0.2 %), led to slight increase (1.4 %) in leaf area, than that of control treatment, while the highest levels of soil salinity (0.4 and 0.6 %) caused 49.92 and 66.63.% reduction , respectively.

Differences between variety means in leaf area , are highly significant, where salinity tolerant cv. had a higher value (26.630 Cm^2) than that of salt sensitive cv., (*Gemmiza 9*).

Highly significant effect on leaf area was found , due to soil salinity-variety interaction, where , the highest (37.250 Cm^2) and the lowest (12.011 Cm^2) values were obtained with 0.2% soil salinity + Sakha 92 cv. and 0.6% soil salinity + Gemmiza 9 cv.

Table (3) show highly significant effect of soil salinity, varieties and salinity – variety interactions on shoot dry weight at any growth stage .

Increasing soil salinity levels from control (0.08%) to 0.2% , increased shoot dry weight by 18.4% at tillering stage, 8.83% at flowering stage , and by 5.89% at maturity stage .

Raising soil salinity level from 0.2 to 0.4% decreased shoot dry weight by 22.85% , and 22.23% and 21.70% at tillering , flowering and maturity stages , respectively, the highest level of soil salinity , (0.6%) caused higher decrease in this respect (30.66, 36.18 and 35.67% at tillering, flowering and maturity, respectively.).

Table (3): Effect of soil salinity on shoot dry weight (gm/pot) of the studied wheat varieties at different physiological stages of growth .

Soil Salinity level	Tillering stage				Flowering stage				Maturity stage			
	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD
	Sa.92	Ge.9			Sa.92	Ge.9			Sa.92	Ge.9		
cont	37.44	35.46	36.45	0.20	53.73	49.71	51.72	0.31	60.45	58.68	59.57	0.193
0.2%	44.29	42.05	43.17		57.58	54.99	56.29		63.60	60.55	62.08	
0.4%	34.58	32.03	33.31		44.95	41.47	43.21		50.78	48.0	49.39	
0.6%	26.27	24.28	25.28	0.14	34.83	31.19	33.01	0.21	40.03	36.61	38.32	0.142
Mean	35.65	33.46			47.77	44.34			53.72	50.96		
LSD	0.09		0.13		0.20		0.29		0.157		0.261	
Int.LSD	0.60		0.88		1.83		2.66		1.531		2.228	

Sa.92 = Sakha 92 **Ge.9 = Gemmiza 9**

Data of Fig (2) clearly show , that the salt sensitive variety (Gemmiza 9 cv.) was more excited than the salt tolerant one (Sakha 92) under 0.2% soil salinity at any growth stage , 8.58% compared with 8.29% at tillering stage, 10.62% compared with 7.17% at flowering and 6.06% compared with 5.21% at maturity stage .

Data of the Fig clearly show also that 0.4 and 0.6% soil salinity levels , have pronounced negative effects on shoot dry weight of Gemmiza 9 cv. (salt sensitive variety) , than that of Sakha 92 cv. (salt tolerant variety) at any growth stage. At tillering stage , 0.6% soil salinity , reduced shoot dry weight of Gemmiza 9 cv by 31.52% of that at control ,while such value was 29.83 % of Sakha 92 cv., at flowering , 37.26 and 35.18% reduction in shoot dry weight of Gemmiza 9 cv. and Sakha 9 cv. were found , respectively, at maturity , 37.61 and 33.78 reduction in shoot dry weight were found for Gemmiza 9 cv. and Sakha 92 cv., respectively.

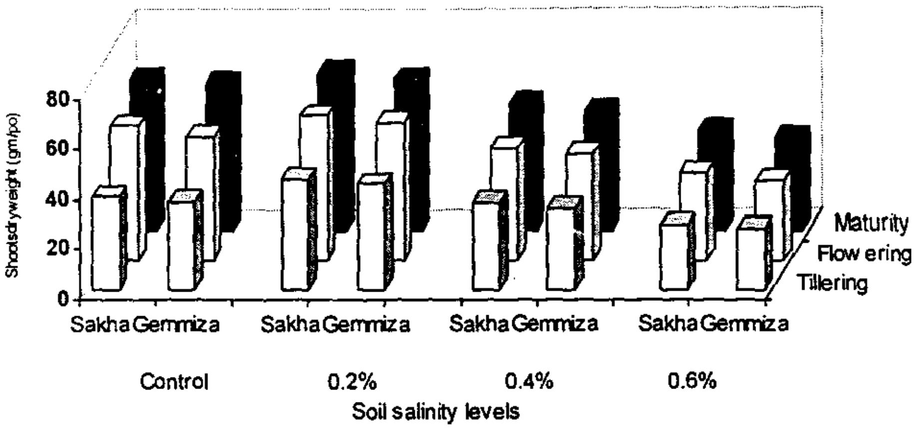

Fig (2): Effect of soil salinity on shoot dry weight (gm / pot) , of the studied wheat varieties at different physiological stages

The highest value of shoot dry weight at any stage was found with the treatment of 0.2% soil salinity + Sakha 92 cv. and the lowest one at any stage was achieved with the treatment of 0.6% soil salinity + Gemmiza 9 cv.

Data illustrated in Table (4) , show that nitrogen uptake by wheat shoots , significantly differed as a result of soil salinity levels effect, variety effect, and soil salinity – variety interaction . Soil salinity levels of 0.2% had highest mean of nitrogen uptake , at flowering stage , due to highest values of shoot dry weight , in spite of nitrogen concentration decrease , compared with that of control .

Table (4): Effect of soil salinity on Nitrogen , phosphorus and potassium uptake(mg/pot) by the studied wheat varieties at flowering stage.

Soil salinity level	Nitrogen uptake(mg / pot)				Phosphorus uptake (mg / pot)				Potassium uptake (mg / pot)			
	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD
	Sa.92	Ge.9			Sa.92	Ge.9			Sa.92	Ge.9		
cont	611.5	547.5	579.5	8.632 13.078	219.0	200.3	209.7	2.057 3.116	1217.1	1093.2	1155.1	3.819 5.787
0.2%	632.4	588.3	610.3		231.5	219.1	225.3		1209.8	1104.5	1157.2	
0.4%	486.9	441.5	464.2		178.7	166.9	172.8		847.8	773.4	810.6	
0.6%	361.5	308.3	334.9		135.5	120.6	128.0		610.2	547.26	578.7	
Mean	523.1	471.4			191.2	176.7			971.2	879.6		
LSD	5.05	7.35			0.98	1.42			4.15	6.04		
Int.LSD	21.03				7.26	10.57			64.55	93.91		

Sa.92 = Sakha 92 Ge.9 = Gemmiza 9

Soil salinity levels above 0.2% decrease nitrogen uptake by shoot due to associated effect of nitrogen concentration and shoot dry weight decrease, where ,soil salinity levels of 0.4%and 0.6% led to decrease shoot nitrogen. uptake by 24.0 and 45.1% compared with that of soil salinity level of 0.2% . These results are confirmed by that of Rabie *et al* ., (1985), they stated that N uptake by wheat cv. Sakha 92 , was increased with increasing soil salinity , from 0.18 to 0.3% , then decreased after that up to the highest soil salinity studied level (0.9%).

Sakha 92 cv. (salt tolerant cv.) accumulate higher Nitrogen than that of Gemmiza 9 cv. (salt sensitive cv), where the nitrogen uptake by shoots of Sakha 92 variety was 523.1 mg / pot, the value of Gemmiza 9 was 471.4 mg/ pot.

Highest and the lowest values of nitrogen uptake by shoot , were obtained with the treatment of soil salinity level of 0.2% + Sakha 92 cv. and soil salinity level of 0.6% + Gemmiza 9 cv., respectively.

As regard to phosphorus uptake (mg/pot) by shoots , results in Table (4) show that, in spite of phosphorus concentration decreased with increasing soil salinity levels above control , phosphorus uptake by shoot increased with increasing soil salinity level , from control to 0.2% ,such increase was mainly due to higher increase in shoot dry weight , which compensate the decrease of phosphorus concentration , and increase phosphorus uptake by shoots .

The difference between variety means in phosphorus uptake by shoots are highly significant, Sakha 92 cultivar had highest phosphorus uptake by shoots than that of Gemmiza 9 cultivar . Similar results were found by Poustini and Aboutalebian (2001) , they outlined that , phosphorus uptake by shoots of salt resistant cultivar was higher than that of susceptible one.

Soil salinity – variety interaction significantly affected phosphorus uptake by shoot

Data of Table (4) indicate also that , little increase in potassium uptake at soil salinity level of 0.2%, then sharply decreased due to raising soil salinity level above that . Potassium uptake mean values were 1155.1, 1157.2 , 810.6 and 578.7 mg / pot , at soil salinity levels of control , 0.2 , 0.4 and 0.6 % , respectively.

Potassium uptake mean of varieties show that Sakha 92 cultivar have higher potassium uptake (971.2) value than that of Gimmiza 9 (879.6) cultivar .

The highest value of potassium uptake was taken by shoot with the treatment of (0.08) soil salinity + Sakha 92 cultivar .

Data presented in Table (5) show the stimulation effect of 0.2% soil salinity , on plant growth (shoots dry weight) resulted in highest grain number per spike, highest 100 grain weight consequently gives highest grain yield.

Soil salinity levels above 0.2% , have marked decreases in each number of grain per spike and 100 grain weight then grain yield. The differences between salinity treatment means in each grain number per spike, 100 grain weight and grain yield are highly significant.

At any soil salinity level , Sakha 92 (salt tolerant variety) had highest grain number / spike than that of salt sensitive one (Gemmiza9 cv).

Table (5): Effect of soil salinity on grain number / spike ,100 grain weight , grain yield and nitrogen uptake by grains of the studied wheat varieties .

Soil salinity level	Grain number / spike				100Grain weight(gm)				Grain yield (gm/pot)				Nitrogen uptake by grains(gm/ pot)			
	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD	Wheat varieties		Mean	LSD
	sakha	gemmiza			sakha	gemmiza			sakha	gemmiza			sakha	gemmiza		
Cont	53.17	49.830	51.500	2.166	5.735	5.550	5.643	0.045	32.775	31.605	32.190	0.110	626.972	547.748	587.360	6.092
0.2%	56.665	52.830	54.748		6.120	5.895	6.008		34.845	33.210	34.028		710.015	618.126	664.071	
0.4%	47.330	40.853	44.083		4.530	4.060	4.295		29.390	28.600	28.995		543.463	476.540	510.002	
0.6%	39.500	34.005	36.753		3.765	3.560	3.663		23.270	19.940	21.605		351.806	294.617	323.212	
Mean	49.166	44.375		1.430	8.038	4.766		0.030	30.070	28.339		0.073	558.064	484.258		4.021
LSD	0.600		0.873		0.006		0.009		0.043		0.062		1.725		2.510	
Int.LSD	3.452		5.022		0.230		0.436		2.650		3.855		34.751		50.506	

Data in Table (5) also reveal that 100 grain weight was increased from 5.643 gm to 6.008 gm , as soil salinity increased from control to 0.2 % . Raising soil salinity level above 0.2 % , sharply decreased 100 grain weight, where, .0.4 and 0.6 % soil salinity caused 23.89 and 35.08 % decrease in 100 gm weight, respectively. These results are in coincidence with those of AL-Uqaili (2003), who postulated that irrigation with saline water of 2 and 3.0 dS/m have a high yield potential compared with canal water (1.0 dS/m), but raising the irrigation water salinity up to 12.0 dS/m reduced 100 grain weight by 35 %.

Across soil salinity treatments , Gemmiza 9 cultivar is the inferior variety concerning with 100 grain weight .

The highest value of 100 grain weight (6.120 gm) was recorded with the treatment of 0.2 % soil salinity + Sakha 92 cultivar .

Effect of soil salinity on grain yield results from soil salinity effect on yield component such as , tiller number (Table 1) , number of grain per spike and 100 grain weight (Table 5) directly and salinity effect on shoot weight (Fig 2) indirectly.

Data presented in Table (5) reveal that grain yield significantly, varied due to soil salinity levels effect. These results are in agreement with those of Cullu (2003), who emphasized that raising soil salinity up to13.4dS/m decreased wheat grain yield by 35.4 %.

Regarding grain yield of the studied varieties , as influenced by soil salinity levels , data of Table (5) stated lower increase in grain yield (5.08%) with Gemmiza 9 cultivar , compared to that of Sakha 92 cultivar (6.31%)due to increase soil salinity level , from control to 0.2%. Soil salinity level of 0.6% caused more reduction in grain yield of Gemmiza 9 cultivar (36.90%) than that occurred with sakha 92 cultivar (29.00%) .

Grain yield of both varieties was highly significantly positively correlated with shoot dry weight at any growth stage , but higest correlation coefficient values (0.9538 at tillering , 0.9905 at flowering and 0.9554 at maturity) , were obtained with sakha 92 cultivar (salt tolerant) , than that (0.9083 at tillering , 0.9447 at flowering and 0.9554 at maturity) of gemmiza 9 (salt sensitive) cultivar . Grain yield of both varieties was also highly significantly positively correlated with each of N ,P and K uptake , by the above ground portion at flowering stage . Higher correlation coefficient values 0.9798 ,0.9871 and 0.9339)were obtained with sakha 92 cv. Than that (0.969 ,0.9628 and 0.9074) of gemmiza 9 cv.

The previous discussion mean that , shoot dry weight at any growth stage or N ,P and K uptake at flowering stage is most reliable index for grain yield in salt tolerant cultivars than that in salt sensitive cultivars .

Regarding to nitrogen uptake by wheat grains , data in Table (5) show that, 0.2% soil salinity level increased grain nitrogen uptake by 13.06% compared with control. On the other hand , 0.4 and 0.6% soil salinity decreased grain nitrogen uptake by 13.17 and 44.79% , respectively . The nitrogen uptake was decreased mainly due to the decrease in grain yield .

At any soil salinity level, the difference between grain nitrogen uptake mean values of variety , are highly significant and the highest values were obtained with Sakha 92 cultivar .

Soil salinity – variety interaction, highly significantly affect nitrogen uptake by grains (mg / pot), where , the lowest value (294.617 mg / pot) was obtained with the treatment of 0.6% soil salinity + Gemmiza 9 cultivar and the highest value (710.15 mg / pot) was obtained with the treatment of 0.2% . soil salinity + Sakha 92 cultivar .

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تأثير ملوحة التربه على إمتصاص العناصر والمحصول ومكوناته لصنفين من القمح

محمد وجدى العجرودى*- جمعه لبيب*- محمد رضا عبد الهادى- طه أحمد محمد عبده****
*** قسم الأراضى- كلية الزراعة- جامعة المنصورة - **معهد بحوث الأراضى والمياه والبيئة**

في المناطق الجافة والشبه جافه تحت ظروف الزراعة المروية تتواجد كميات كبيرة من الأمـلاح الذائبة فى القطاع الأرضي و الأقماح الطرية واحدة من أهم المحاصيل التي تستخدم لتغذيه الإنسان . حـديثا تم تقسيم هذه الأقماح إلى مقاومة للملوحة وغير مقاومه للملوحة . أما ما يتعلق باستجابة الأصناف المقومـه والغير مقاومه للملوحة فغير واضح .ففي هذه التجربة تم اختبار أربع مستويات من ملوحة التربة (كنترول و٠,٢ و ٠,٤ و ٠,٦%) حضرت صناعيا باستخدام كلوريد صوديوم وكلوريد كالسيوم بنسبة ١:١ على المحصول ومكوناته لصنفين من القمح هما سخا ٩٢ (متحمل للملوحة) وجميـزة ٩ (حـساس للملوحـة) وعلاقة ذلك بإنتاج المادة الجافة وتركيزات العناصر (N P K) والممتص منها في أشطاء النبات

تمت الزراعة و عمليات الخدمة كما توصي وزارة الزراعة وكان ملخص النتائج كالتالي :

- الملوحة الخفيفة (٠,٢%) شجعت الظهور المبكر لبادرات كلا الصنفين والمستويات الاعلى مـن ذلـك (٠,٤ ، ٠,٦%) أخرت ظهور البادرات بدرجة كبيرة
- المستوى الأول من الملوحة بعد الكنترول (٠,٢%) يشجع بدرجة بسيطة عمليات التفريع لكلا الصنفين (٢,٩٧% للصنف سخا ٩٢ و ١,٥٣ % للصنف جميزة ٩) وبنفس الترتيب وجد أن مستوى الملوحـة ٦و% تسبب في نقص التفريع بما يعادل ٦٢,٦٧ % و ٧٢,٢٤% للصنفين.
- الملوحة الخفيفة أدت إلى زيادة طفيفة (١,٤ %) فى متوسط مساحة الورقة لكلا الصنفين ولكن المـستويات الأعلى من الملوحه (٠,٤ و ٠,٦ %) تسببت في نقص مساحة الأوراق لكلا الصنفين بما يعـادل ٤٩,٩٢ و٦٦,٦٣ % .
- زيادة مستوى الملوحة من ٠,٠٨% (كنترول) إلى ٠,٢% أدت إلى زيـادة الـوزن الجـاف للمجمـوع الخضري لكلا الصنفين ولكن الزيادة كانت أكبر في الصنف الحساس للملوحة و المستويات الأعلـى مـن ملوحة التربة (٠,٤% و ٠,٦%)كان لها تأثير سلبي على الوزن الجاف للمجموع الخضري لكل الصنفين و التأثير الأكبر كان على ذات الصنف.
- الصنف المقاوم للملوحة إمتص كميه أكبر من النيتروجين داخل أشطائه (٥٢٣,١ ملليجرام / إصيص) عن الصنف الأخر(٤٧١,٤ ملليجرام / إصيص) .
- بالرغم من نقص تركيز الفوسفور في المجموع الخضري بزيادة الملوحة عن الكنتـرول إلا أن الممـتص منه زاد بزيادة الملوحة عنه إلى ٠,٢ % وهذه الزيادة في الممتص ترجع إلى الزيادة الكبيرة في المجمـوع الخضري والتي لم تعوض نقص الممتص منه بسبب نقص التركيز فحسب بل أيـضا أدت إلـى زيـادة الممتص
- ظهرت زيادة طفيفة في البوتاسيوم الممتص عند مستوى ملوحة ٠,٢ %عن الكنترول ولكن نقصا حادا فيه قد ظهر عند مستويات الملوحة الأعلى من ذلك وحقق الصنف المقاوم للملوحة قيما أعلى في البوتاسـيوم الممتص .
- زاد متوسط وزن ال ١٠٠ حبه (متوسط الصنفين) بما يعادل ٦,٤٦ %نتيجة زيادة ملوحة التربـة مـن ٠,٠٨ إلى ٠,٢ %ومستويات الملوحة الأعلى من ذلك (٠,٤ و ٠,٦ %) تـسببت فـي نقـص وزن ال١٠٠ حبه بما يعادل ٢٣,٨٩ و ٣٥,٠٨ %على التوالي
- محصول الحبوب زاد بما يعادل ٥,٠٨ للصنف جميزة ٩ مقارنة ب٦,٣١% للصنف سـخا ٩٢ نتيجـة زيادة مستوى ملوحة التربة من الكنترول إلى ٠,٢% والملوحة العالية للتربة (٠,٦%) تسببت في نقـص كبير نسبيا في محصول الحبوب للصنف جميزة ٩ (٣٦,٩%) عن النقص الحادث في محصول حبـوب الصنف سخا ٩٢ (٢٩,٠%) .
- محصول الحبوب لكلا الصنفين إرتبط إرتباط معنوي وموجـب بـالوزن الجـاف للمجمـوع الخـضري ومعاملات الارتباط كانت أعلى للصنف سخا ٩٢ كما ارتبط أيضا محصول الحبوب لكل صـنف إرتبـاط معنوي وموجب بالممتص من العناصر الغذائية (ن . فو. بو) كل على حده وكانت معـاملات الارتبـاط أعلى للصنف سخا ٩٢ أيضا مما يدل على أن إستخدام المجموع الخضري أو محتواه من ن . فـو. بـو كدليل على المحصول المتوقع يكون أكثر مصداقية في الصنف المقاوم للملوحة .