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EFFECT OF DIFFERENT DATES AND RATES OF POTASSIUM FETILIZER APPLICATION ON YIELD OF SAME RICE GENOTYPES UNDER SALINE SOIL CONDITION.

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ABSTRACT

Two field experiments were laid out at El-Sirw Agricultural Research Station, (ARC), Damietta Governorate, Egypt, during two successive seasons of 2008 and 2009 to study the effect of some rates, dates and methods of potassium application on growth (dry mater, leaf area index (LAI) and chlorophyll content) and tillers number/m^2, panicle numbers/m^2, plant height, panicle length, No. of filled grains /panicle, panicle weight and grain yield (t/fed) of some rice genotypes under saline soil conditions. The potassium treatments were; T_1 (Control), T_2 (12 kg K_2O as basal (B)) , T_3 (12kg K_2O as B + 12kg K_2Oas B at 60 days after transplanting(DAT)) , T_4 (24 kg K_2O as B), T_5 (24 kg K_2O asB+ 12 kg K_2O at 60 DAT), T_6 (2% as spray at 30DAT), T_7 (2% as spray at 60 DAT), T_8 (2% as spray at 30DAT + 2% as spray at 60DAT), T_9 (12kg K_2O as basal + 2% as spray at 30 DAT), T_{10} (12 kg K_2O as basal + 2% as spray at 60 DAT), T_{11} (24 kg K_2O as basal + 2% as spray at 30 DAT) and T_{12} (24 kg K_2O as basal + 2% as spray at 60 DAT). Two rice genotypes viz;(EHR1) hybrid and the local inbred Giza178 were used in the present study

The main obtained results could be summarized as following. Rice genotypes significantly varied in their growth traits, yield components and grain yield. Hybrid rice (EHR1) variety significantly surpassed Giza178 rice cultivar.

The potassium treatments significantly affected rice growth, yield and yield components in both seasons. Rice response to potassium fertilizer significantly was up to 24 kg K_2O as basal + 2% as spray at 60 DAT, which gave high values of all studied traits.

Egyptian hybrid one EHR1 with 24 kg K_2O as basal + 2% as foliar spray at 60 DAT gave high values of estimated growth parameters, yield components and grain yield under current study.

It could be concluded that the treatment of 24 kg K_2O/ fad applied as basal +2% as foliar spray at 60 DAT could be recommended under saline soils condition .

INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most important cereal crops of the world, grown in wide range of climatic zones. Improving rice grain yield per unit land area is the only way to achieve the increase of rice production because of the reduction in area devoted to rice production. Rice varieties with higher yield potential must be developed to enhance the average farm yields of irrigated rice to increase the worlds total rice production. Introduction of hybrid rice is an important step towards augmentation of rice yield in Egypt. Abou Khalifa (2005) indicated that couple hybrid rice of SK2034H and SK2058H performed better and surpassed the inbred ones regarding dry matter production and leaf area index as well as panicle length, panicles

number, panicle weight. Zayed *et al.* (2006) revealed that Giza 177 gave the heaviest value of 1000-grain weight and earlier heading date. SK2034H surpassed inbred rice varieties in growth traits, dry matter production, leaf area index as well as panicles number, plant height panicle length , panicle weight, filled grains /panicle and grain yield. Zayed *et al.* (2007) under saline soil, indicated that couple hybrid rice of SK2034H, SK2046H and SK2058H performed better and surpassed the inbred ones regarding dry matter production and leaf area index as well as panicle length, panicles number, panicle weight, filled grains/ panicle and grain yield. Abou-Khalifa (2009) found that Sk2034H surpassed Sk2046H hybrid rice variety in plant height and chlorophyll content at maximum tillering, panicle initiation and complete heading stages, as wll as , number of tillers and panicles/m^2 Hagras *et al*. (2011) found that hybrid rice i.e. (Sk2046H), (SK2034H) and inbred i.e. Giza178 significantly varied in their growth traits , yield components and grain yield as well as harvest index. SK2034H hybrid rice variety significantly surpassed other tow tested genotypes. Manzoor *et al*. (2008) studied the effect of. In this investigation a recommended dose of potash fertilizer (62 kg/ha) at six different treatments i.e. T_1 (all potash applied as basal), T_2 (all potash applied at 25 DAT), T_3 (all potash applied at 45 DAT), T_4 (½ potash applied as basal and remaining ½ at 25 DAT), T_5 (½ potassium applied at 25 DAT and remaining at 45 DAT) and T_6 (1/3 potash applied as basal, 1/3 at 25 DAT and remaining 1/3 at 45 DAT) They found that T6 yield and yield components of hybrid rice gave of LAI, dry matter production, chlorophyll content, plant height, panicles number, tiller numbers, filled grains panicle, panicle weight, panicle length and grain yield. Dewedar (2010) **under saline soil**, studied the respons of some rice varieties, Giza178, sakha101 and sakha103, to different potassium treatments i.e. T1(spraying water without potassium application), T2(spraying potassium solution 2% at 25 DAT) , T3 (spraying potassium solution 2% at 25 and 45 day DAT), T4 (spraying of potassium solution at 25 , 45 and 65 DAT). He found that T4 gave the highest yield and yield components. Mashmann *et al*. (2010) in Japan, concluded that adding potassium fertilizer between panicle differentiation and late booting stage significantly increased rice grain yield. Hagras *et al*. (2011) in Egypt, under saline soils , studied the effect of three potassium rates (0. 24 , 48 Kg K_2O/fad) on growth , yield and yield components of some rice genotypes. They found that the potassium fertilizer significantly increased rice growth, yield components, and grain yield. Rice response to potassium fertilizer was significantly up to higher potassium level of 48 Kg K_2O/fad. Zayed *et al*. (2011) studied the effect of foliar sprays application with 2% K_2O once, twice or three at growth stages along with root media application of potassium as basal with (24kgK_2O/ fad.) and control on yield, yield components and some physiochemical properties of Egyptian hybrid Rice one(EHR1).They reported that the previous treatments significantly produced the highest value of LAI, dry matter production, chlorophyll content, plant height, panicles number, tiller numbers, filled grains panicle, panicle weight, panicle length and grain yield .

The main objective of this attempt is to find out the response of two rice varieties to various potassium treatments i.e. dates, rates and methods of application under newly reclaimed saline soil conditions.

MATERIALS AND METHODS

Field experiments were conducted during 2008 and 2009 seasons at El–Sirw Agricultural Research Station, Damietta, Egypt. The treatments comprised the response of Giza 178 and Egyptian hybrid one (EHR1) to various potassium treatments: T_1 (Control), T_2 (12 kg K_2O as basal (B)) , T_3 (12kg K_2OasB + 12kg K_2O as B at 60 days after transplanting(DAT)) , T_4 (24 kg K_2O as B), T_5 (24 kg K_2O asB+ 12 kg K_2O at 60 DAT), T_6 (2% as spray at 30DAT), T_7 (2% as spray at 60 DAT), T_8 (2% as spray at 30DAT+ 2% as spray at 60DAT), T_9 (12kg K_2O as basal + 2% as spray at 30 DAT), T_{10} (12 kg K_2Oas basal + 2% as spray at 60 DAT), T_{11} (24 kg K_2O as basal + 2% as spray at 30 DAT) and T12 (24 kg K2O as basal + 2% as spray at 60 DAT). The experimental soil was clay and the chemical analysis is presented in Table(1).

Table(1): Chemical analysis of experimental soil during 2008 and 2009 seasons.

Season	ECe(dS m^{-1}	pH	Na^{+1}	Ca^{+2} + Mg^{+2}	K^{+1}	HCo^{-}	Cl	So_4^{-2}	N (%)	Available ppm	
			meg l^{-1}							P	K
2008	7.33	8.10	48	31	0.32	8.0	43	23.5	0.028	12	250
2009	7.00	8.00	45	29	0.31	6.7	33	25.6	0.026	11	240

The experiment was laid out in split plot design, with four replications, keeping rice varieties in the main plots and potassium treatments in the sub-plots. Seedling (30 days old) of rice varieties were transplanted in 20 x 20 cm with three seedlings $hill^{-1}$ on May, 30, whereas the sowing was done on April, 30. Nitrogen fertilizer in the rate of 70 kg /fad were imposed in 4 equal portions at 15 days after transplanting (DAT), mid-tillering, panicle initiation and late booting stages as recommended under saline soil. All plots were given, 26 kg P_2O_5 /fad as basal application in the form of calcium super phosphate. The plot area was 10 m^2 (5 x 2 m)as recommended under saline soil. At 50% heading, ten hills from each sub plot were taken to estimate the dry matter and leaf area index (LAI) as well as chlorophyll content (it was recorded using chlorophyll meter 5 SPAD-502 Minolta Camera Co. Ltd., Japan). At harvest, ten hills for each plot was counted to determine the plant height, panicles number/m^{-2}. Panicle length, number of filled grains /panicle and panicles weight . The plants of the six inner rows of each sub-plot were harvested, dried, threshed and then grains yield (g)/fad were The data of each season were imposed to the statistical analysis of variance and differences among treatments means of the studied traits were judged by LSD at P ≤ 0.05% level of significance according to Gomez and Gomez (1984).

RESULTS AND DISCUSSION

A- Genotype performance:-

Results in Tables 2,3 and4 show that the tested rice genotypes, (hybrid; EHR1, and Giza 178 inbred) significantly varied in the measured

traits; dry matter/m^2, leaf area index, chlorophyll content, panicle numbers/m^2, plant height, panicle length, filled grains /panicle, panicle weight and grain yield /fed. EHR1 hybrid rice variety showed its superiority in the above-mentioned traits in both seasons. The superiority of hybrid rice variety was mainly due to their higher heterosis than that inbred one. The combined analysis of variance was significant for all tested traits and confirmed the superiority of EHR1 against inbred rice variety Giza 178 . Similar findings had been reported by Abou Khalifa (2005), Zayed *et al*. (2006 and2007), Abou Khalifa (2009), and Hagras *et al*. (2011)**.**

B. Potassium treatments effect:

Results in Tables 2,3 and 4 clarified that the tested potassium treatments involving rates, times of application and methods of application significantly affected rice growth, yield and yield components in both seasons. Leaf area index, dry matter, chlorophyll content, plant height, panicles number/m^2, panicle length,No.of filled grains /panicle, panicle weight and grain yield /fad were significantly improved by various potassium treatments in both season.

Table(2): Leaf area index, chlorophyll content and dry matter /m^2 (g) of some rice genotypes as affected by potassium treatments under saline soil in 2008 and 2009 seasons.

Treatments Genotypes	Leaf area index			Chlorophyll content			Dry matter m^2 (g)		
	2008	**2009**	**Comb**	**2008**	**2009**	**Comb**	**2008**	**2009**	**Comb**
Giz187	5.18	5.00	5.09	37.66	37.42	37.54	886.12	875.49	880.81
EHR1	5.81	5.82	5.82	39.03	38.96	38.99	950.82	938.78	944.80
F test	**	**	**	**	**	**	**	**	**
Potassium treatments	2008	2009	**Comb**	2008	2009	**Comb**	2008	2009	**Comb**
1- Control	5.08	4.71	4.89	36.25	34.69	35.47	844.65	831.57	838.11
2- 12 kg K_2O as B*	5.35	5.30	5.32	38.13	37.91	38.02	894.81	884.66	889.74
3- 12kg as B+12Kg B at 60DA T**	5.46	5.49	5.47	38.98	38.90	38.94	948.25	938.44	943.35
4- 24Kg as B	5.55	5.65	5.60	39.13	39.16	39.15	953.55	947.65	950.60
5- 24kg as B+12kg at 60DAT	5.67	5.66	5.66	39.29	39.36	39.33	958.22	957.31	957.77
6- 2% K_2O at 30 DAT	5.12	4.84	4.98	36.72	36.97	36.84	853.16	842.68	847.92
7- 2% K_2O at 60 DAT	5.34	5.10	5.22	37.59	37.43	37.52	869.70	843.09	856.40
8- 2% K_2O at30 +2%at 60 DAT	5.36	5.29	5.32	37.69	37.67	37.68	884.02	865.00	874.51
9- 12kgB + 2% at 30DAT	5.43	5.43	5.43	38.37	38.31	38.34	915.16	904.96	910.06
10- 12kg as B + 2% at 60DAT	5.61	5.50	5.55	38.76	38.67	38.72	935.18	927.81	931.49
11- 24Kg as B+2% at 30DAT	5.81	5.80	5.81	39.45	39.42	39.44	975.61	964.02	969.82
12- 24kg as B+2% at 60DAT	6.10	6.12	6.10	39.88	39.80	39.84	989.36	978.50	983.93
LSD at 0.05	0.20	0.31	0.24	0.20	0.19	0.20	12.51	8.54	9.75
Interaction	NS	NS	NS	**	**	**	**	**	**

*** B = Basal** *** *D A T = Days after transplanting**

The rice plants significantly responded to potassium application up to 24 kg K_2O /fad as basal application. Furthermore, the combination of basal application + K spray at 30 or 60 days after transplanting was found to be

more effective to increase the above-mentioned traits than obtained by root medium application alone or foliar application alone. By the way, potassium applied as a basal at the rate of 24 kg K_2O /fad + 2% spray at 60 days after transplanting (approximately at booting stage) gave the highest values of the most previous mentioned characteristics(LAI, Dry matter production , chlorophyll content, panicle characteristics and grain yield) in both seasons. The analysis variance related to combined analysis showed the significance of potassium effect on all studied traits. Furthermore, the high potassium level significantly gave high values of all studied traits, except, panicle number according to combined analysis.

Table(3): Plant height(c m), panicle number/ m^2 and panicle weight (g) of some rice genotypes as affected by potassium treatments under saline soil in 2008 and 2009 seasons.

Treatments	Plant height(cm)			Panicle number/ m^2			Panicle weight (g)		
Genotypes	**2008**	**2009**	**Comb**	**2008**	**2009**	**Comb**	**2008**	**2009**	**Comb**
Giz187	88.23	88.7	88.47	416.062	415.877	415.969	1.96	1.92	1.94
EHR1	90.75	90.14	90.45	483.492	472.648	478.070	2.19	2.12	2.16
F test	**	**	**	**	**	**	**	**	**
Potassium treatments	2008	2009	**Comb**	2008	2009	**Comb**	2008	2009	**Comb**
1- Control	85.85	84.15	85.00	342.002	339.988	340.995	1.85	1.80	1.83
2- 12 kg K_2O as B*	88.00	86.77	87.39	433.844	432.997	433.421	2.02	1.95	1.99
3- 12kg as B+12Kg B at 60DA T**	90.82	91.33	91.08	473.491	463.529	468.510	2.06	2.02	2.04
4- 24Kg as B	90.28	90.87	90.58	483.637	481.289	482.463	2.13	2.03	2.08
5- 24kg as B+12kg at 60DAT	91.01	92.03	91.52	504.217	497.908	501.062	2.21	2.10	2.15
6- 2% K_2O at 30 DAT	86.78	85.19	85.99	381.142	385.901	383.522	1.91	1.87	1.89
7- 2% K_2O at 60 DAT	87.72	86.08	86.90	387.988	372.805	380.397	1.96	1.93	1.95
8- 2% K_2O at30 +2%at 60 DAT	88.47	87.17	87.82	437.373	435.356	436.365	1.98	1.96	1.97
9- 12kgB + 2% at 30DAT	89.41	89.35	89.38	454.351	449.063	451.707	2.08	2.06	2.07
10- 12kg as B + 2% at 60DAT	90.16	90.91	90.54	461.875	457.650	459.763	2.16	2.09	2.13
11- 24Kg as B+2% at 30DAT	91.91	94.26	93.09	524.794	510.545	517.669	2.22	2.18	2.20
12- 24kg as B+2% at 60DAT	93.47	94.94	94.21	512.613	504.120	508.367	2.32	2.28	2.30
LSD at 0.05	1.85	1.73	1.75	14.122	20.031	15.654	0.10	0.09	0.09
Interaction	**	**	**	**	**	**	**	**	**

***B = Basal**

*** *D A T = Days after transplanting**

Interestingly, couple treatments of 24 kg K_2O /fad + 2% spray at 60 days after transplanting (approximately at booting stage) and 24 kg K_2O /fad + 2% spray at 30 days after transplanting (approximately at maximum tillering stage) were at a par regarding all estimated traits in both seasons.The treatment of 24 kg K_2O /fad + 2% spray at 30 days after transplanting (approximately at maximum tillering stage) gave the highest values of panicle numbers in both seasons. Applying potassium at the beginning of season as a basal might be improved root and shoot growth, increased dry matter production by improving photosynthesis before heading and boosted carbohydrate translocation to rice grain during grain filling stage.

Table(4): Panicle length (c m), number of filled grains / panicle and Grain yield (ton / fad) of some rice genotypes as affected by potassium treatments under saline soil in 2008 and 2009 seasons.

Treatments	Panicle length			filled grains / panicle			Grain yield / fad		
Genotypes	2008	2009	Comb	2008	2009	Comb	2008	2009	Comb
Giz187	19.04	20.14	19.59	107.56	111.27	109.42	2.608	2.451	2.530
EHR1	21.37	22.53	21.95	123.54	130.90	127.22	2.907	2.832	2.870
F test	**	**	**	**	**	**	**	**	**
Potassium treatments	2008	2009	**Comb**	2008	2009	**Comb**	2008	2009	**Comb**
1- Control	19.12	20.22	19.67	98.13	100.00	99.07	2.272	2.068	2.170
2- 12 kg K_2O as B*	20.26	20.97	20.62	105.63	107.25	106.44	2.538	2.670	2.604
3- 12kg as B+12Kg B at 60DA T**	20.15	21.65	20.90	109.13	116.50	112.82	2.779	2.541	2.660
4- 24Kg as B	20.10	21.78	20.94	103.63	105.50	104.57	2.951	2.554	2.752
5- 24kg as B+12kg at 60DAT	20.15	21.82	20.99	105.00	109.13	107.07	3.204	2.764	2.984
6- 2% K_2O at 30 DAT	19.78	20.59	20.19	122.00	127.50	124.75	2.328	2.251	2.290
7- 2% K_2O at 60 DAT	20.44	21.19	20.82	127.00	129.75	128.38	2.424	2.505	2.465
8- 2% K_2O at30 +2%at 60 DAT	20.02	20.85	20.44	108.63	115.63	112.13	2.563	2.722	2.643
9- 12kgB + 2% at 30DAT	20.33	21.20	20.77	115.75	117.75	116.75	2.603	2.707	2.655
10- 12kg as B + 2% at 60DAT	20.14	21.59	20.87	119.75	122.88	121.32	2.646	2.632	2.639
11- 24Kg as B+2% at 30DAT	20.97	22.07	21.52	131.38	145.25	138.32	3.319	3.061	3.190
12- 24kg as B+2% at 60DAT	21.02	22.11	21.57	140.63	155.88	148.25	3.465	3.228	3.347
LSD at 0.05	0.63	0.61	0.57	5.81	4.93	4.91	0.105	0.092	0.099
Interaction	**	**	**	**	**	**	**	**	**

***B = Basal**
*** *D A T = Days after transplanting**

In addition, foliar spray at certain rice growth might enhance current photosynthesis by keeping proper leaf area index, health flag leaf and other active leaves during heading and active filling stages resulted in high grain fertility leading to high grain yield. Under salt stress, potassium is playing a great role in controlling and organizing stomata closure and opining make balance between catabolism and anabolism and increased the net assimilation rate. Applying potassium at late growth stage might increased the potassium concentration in plant tissue resulted in increasing assimilate translocation form store organs to rice grain and remove the blocking effect of ABA on carbohydrate resulted heavy panicle and number of filled grains/ panicle resulted in high grain yield. All previous mentioned possibilities related to the role of potassium under saline soil contributed to high grain yield of rice under such conditions. Similar results related to the role of potassium and current findings had been reported by Manzoor *et al*. (2008), Dewedar (2010), Mashmann *et al*. (2010) Hagras *et al*.(2011), and Zayed *et al*. (2011)

C- interaction effects:-

The interaction between rice varieties and potassium treatments had significant effect on chlorophyll content, dry matter / m^2**,** panicle numbers/ m^2**,**

panicle weight, panicle length, number of filled grains /panicle and grain yield in both seasons. high values of above-mentioned traits were obtained by EHR1 genotypes when it received 24 kg K_2O /fad as B + spray 2% of K_2O at 60 days after transplanting in both seasons (Table5,6,7, 9,10,11 and12)except for panicle numbers/ m^2 was obtained by the application of 24 kg K_2O g /fad + 2% spray at 30 DAT in both seasons (Table8). The obtained results of interaction confirmed that the Egyptian hybrid one was more response to potassium application than inbred rice variety Giza178.. The combined analysis indicated and confirmed the significance of the effect of the interaction on the previous mentioned characteristics in this chapter.

Table(5): Chlorophyll content of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	35.43	37.07	32.36	37.01	33.90	37.04
2- 12 kg K_2O as B*	37.28	38.97	37.32	38.49	37.30	38.73
3- 12kg as B+12Kg B at 60DA T**	38.14	39.82	38.09	39.70	38.12	39.76
4- 24Kg as B	38.42	39.83	38.50	39.82	38.46	39.83
5- 24kg as B+12kg at 60DAT	38.80	39.78	38.80	39.91	38.80	39.85
6- 2% K_2O at 30 DAT	35.84	37.59	36.35	37.59	36.10	37.59
7- 2% K_2O at 60 DAT	37.19	37.99	36.84	38.02	37.02	38.01
8- 2% K_2O at30 +2%at 60 DAT	37.20	38.17	37.18	38.15	37.19	38.16
9- 12kgB + 2% at 30DAT	37.60	39.13	37.59	39.03	37.59	39.08
10- 12kg as B + 2% at 60DAT	37.90	39.62	37.88	39.48	37.89	39.55
11- 24Kg as B+2% at 30DAT	38.84	40.06	38.83	40.01	38.84	40.04
12- 24kg as B+2% at 60DAT	39.47	40.28	39.24	40.35	39.36	40.32
LSD at 0.05	0.28		0.27		0.28	

Table(6): Dry matter m^2 (g) of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	**2008**		**2009**		**Combined**	
	Giza178	**EHR1**	**Giza178**	**EHR1**	**Giza178**	**EHR1**
1- Control	824.89	864.41	809.57	853.56	817.23	858.99
2- 12 kg K_2O as B*	866.69	922.92	856.82	912.50	861.76	917.71
3- 12kg as B+12Kg B at 60DA T**	909.28	987.22	899.91	976.97	904.60	982.10
4- 24Kg as B	912.22	994.87	904.36	990.94	908.29	992.91
5- 24kg as B+12kg at 60DAT	917.35	999.08	920.66	993.95	919.01	996.52
6- 2% K_2O at 30 DAT	825.26	881.06	814.76	870.59	820.01	875.83
7- 2% K_2O at 60 DAT	847.21	892.18	838.02	848.16	842.62	870.17
8- 2% K_2O at30 +2%at 60 DAT	863.17	904.87	835.43	894.57	849.30	899.72
9- 12kgB + 2% at 30DAT	880.53	949.79	869.37	940.55	874.95	945.17
10- 12kg as B + 2% at 60DAT	895.40	974.95	889.94	965.67	892.67	970.31
11- 24Kg as B+2% at 30DAT	938.83	1012.38	926.80	1001.23	932.82	1006.81
12- 24kg as B+2% at 60DAT	952.60	1026.12	940.28	1016.71	946.44	1021.42
LSD at 0.05	17.70		12.08		13.79	

Table(7): Plant height(cm) of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	83.56	88.13	82.69	85.61	83.13	86.87
2- 12 kg K_2O as B*	86.06	89.94	85.16	88.38	85.61	89.16
3- 12kg as B+12Kg B at 60DA T**	89.69	91.94	91.53	91.13	90.61	91.54
4- 24Kg as B	89.25	91.31	91.05	90.69	90.15	91.00
5- 24kg as B+12kg at 60DAT	90.63	91.38	92.38	91.67	91.51	91.53
6- 2% K_2O at 30 DAT	85.00	88.56	82.81	87.56	83.91	88.06
7- 2% K_2O at 60 DAT	86.56	88.88	85.13	87.02	85.85	87.95
8- 2% K_2O at30 +2%at 60 DAT	87.25	89.69	85.93	88.41	86.59	89.05
9- 12kgB + 2% at 30DAT	88.13	90.69	88.20	90.50	88.17	90.60
10- 12kg as B + 2% at 60DAT	88.63	91.69	90.94	90.88	89.79	91.29
11- 24Kg as B+2% at 30DAT	90.94	92.88	93.69	94.82	92.32	93.85
12- 24kg as B+2% at 60DAT	93.00	93.94	94.83	95.04	93.92	94.49
LSD at 0.05	2.58		2.46		2.48	

Table(8): Panicles number /m^2 of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	316.725	367.278	313.453	366.522	315.089	366.900
2- 12 kg K_2O as B*	408.212	459.475	403.163	462.830	405.688	461.153
3- 12kg as B+12Kg B at 60DA T**	451.663	495.318	432.155	494.903	441.909	495.111
4- 24Kg as B	431.850	535.423	424.579	537.999	428.215	536.711
5- 24kg as B+12kg at 60DAT	454.333	554.100	445.254	550.562	449.794	552.331
6- 2% K_2O at 30 DAT	353.138	409.145	392.876	378.926	373.007	394.036
7- 2% K_2O at 60 DAT	374.125	401.850	398.007	347.603	386.066	374.727
8- 2% K_2O at30 +2%at 60 DAT	429.170	445.575	425.458	445.254	427.314	445.415
9- 12kgB + 2% at 30DAT	431.688	477.013	427.564	470.562	429.626	473.788
10- 12kg as B + 2% at 60DAT	434.400	489.350	429.860	485.439	432.130	487.395
11- 24Kg as B+2% at 30DAT	456.713	592.875	451.511	569.578	454.112	581.227
12- 24kg as B+2% at 60DAT	450.725	574.500	446.646	561.595	448.686	568.048
LSD at 0.05	18.15		29.53		22.14	

Table(9): Panicle weight (g) of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	1.74	1.96	1.68	1.91	1.71	1.94
2- 12 kg K_2O as B*	1.92	2.12	1.90	2.00	1.91	2.06
3- 12kg as B+12Kg B at 60DA T**	2.01	2.10	1.99	2.04	2.00	2.07
4- 24Kg as B	2.02	2.23	1.93	2.13	1.98	2.18
5- 24kg as B+12kg at 60DAT	2.03	2.38	1.97	2.22	2.00	2.30
6- 2% K_2O at 30 DAT	1.82	1.99	1.81	1.93	1.82	1.96
7- 2% K_2O at 60 DAT	1.87	2.05	1.85	2.01	1.86	2.03
8- 2% K_2O at30 +2%at 60 DAT	1.90	2.06	1.89	2.02	1.90	2.04
9- 12kgB + 2% at 30DAT	1.99	2.17	1.96	2.16	1.98	2.17
10- 12kg as B + 2% at 60DAT	2.12	2.20	1.98	2.19	2.05	2.20
11- 24Kg as B+2% at 30DAT	2.03	2.41	2.01	2.35	2.02	2.38
12- 24kg as B+2% at 60DAT	2.07	2.57	2.06	2.49	2.07	2.53
LSD at 0.05	0.14		0.12		0.12	

Table(10): Panicle length (cm) of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	18.22	20.02	19.33	21.11	18.78	20.57
2- 12 kg K_2O as B*	19.47	21.05	19.78	22.15	19.63	21.60
3- 12kg as B+12Kg B at 60DA T**	18.32	21.97	20.46	22.83	19.39	22.40
4- 24Kg as B	18.92	21.27	20.48	23.08	19.70	22.18
5- 24kg as B+12kg at 60DAT	18.57	21.72	20.56	23.08	19.57	22.40
6- 2% K_2O at 30 DAT	18.67	20.89	19.39	21.78	19.03	21.34
7- 2% K_2O at 60 DAT	19.25	21.62	19.68	22.70	19.47	22.16
8- 2% K_2O at30 +2%at 60 DAT	19.37	20.67	19.69	22.00	19.53	21.34
9- 12kgB + 2% at 30DAT	19.39	21.27	20.03	22.36	19.71	21.82
10- 12kg as B + 2% at 60DAT	18.62	21.65	20.43	22.75	19.53	22.20
11- 24Kg as B+2% at 30DAT	19.82	22.12	20.91	23.23	20.37	22.68
12- 24kg as B+2% at 60DAT	19.87	22.17	20.96	23.26	20.42	22.72
LSD at 0.05	0.90		0.86		0.80	

Table(11): Number of filled grains /panicle of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	89.00	107.25	91.00	109.00	90.00	108.13
2- 12 kg K_2O as B*	101.50	109.75	103.00	111.50	102.25	110.63
3- 12kg as B+12Kg B at 60DA T**	105.75	112.50	113.50	119.50	109.63	116.00
4- 24Kg as B	92.75	114.50	94.75	116.25	93.75	115.38
5- 24kg as B+12kg at 60DAT	96.50	113.50	97.00	121.25	96.75	117.38
6- 2% K_2O at 30 DAT	111.00	133.00	114.75	140.25	112.88	136.63
7- 2% K_2O at 60 DAT	118.25	135.75	122.00	137.50	120.13	136.63
8- 2% K_2O at30 +2%at 60 DAT	104.00	113.25	105.00	126.25	104.50	119.75
9- 12kgB + 2% at 30DAT	108.25	123.25	109.00	126.50	108.63	124.88
10- 12kg as B + 2% at 60DAT	113.25	126.25	115.75	130.00	114.50	128.13
11- 24Kg as B+2% at 30DAT	123.75	139.00	127.75	162.75	125.75	150.88
12- 24kg as B+2% at 60DAT	126.75	154.50	141.75	170.00	134.25	162.25
LSD at 0.05	7.85		6.97		6.94	

Table(12): Grains yield/fad (ton) of some rice genotypes as affected by the interaction between genotypes and potassium treatments under saline soil in 2008 and 2009 seasons.

K treatments	2008		2009		Combined	
	Giza178	EHR1	Giza178	EHR1	Giza178	EHR1
1- Control	2.195	2.348	1.988	2.147	2.092	2.248
2- 12 kg K_2O as B*	2.357	2.720	2.520	2.820	2.439	2.770
3- 12kg as B+12Kg B at 60DA T**	2.534	3.023	2.403	2.678	2.469	2.851
4- 24Kg as B	2.697	3.204	2.343	2.764	2.520	2.984
5- 24kg as B+12kg at 60DAT	3.099	3.309	2.592	2.936	2.846	3.123
6- 2% K_2O at 30 DAT	2.233	2.424	2.080	2.422	2.157	2.423
7- 2% K_2O at 60 DAT	2.300	2.548	2.433	2.577	2.367	2.563
8- 2% K_2O at30 +2%at 60 DAT	2.472	2.654	2.445	2.998	2.459	2.826
9- 12kgB + 2% at 30DAT	2.417	2.788	2.386	3.027	2.402	2.908
10- 12kg as B + 2% at 60DAT	2.459	2.832	2.410	2.854	2.435	2.843
11- 24Kg as B+2% at 30DAT	3.252	3.386	2.783	3.338	3.018	3.362
12- 24kg as B+2% at 60DAT	3.280	3.650	3.032	3.424	3.156	3.537
LSD at 0.05	0.145		0.127		0.130	

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تأثير مواعيد ومعدلات اضافة السماد البوتاسى على ناتج بعض التراكيب الوراثية تحت ظروف الاراضى الملحية .

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أقيمت تجربتان حقليتان بمزرعة محطة البحوث الزراعية بالسرو بمحافظة دمياط في موسمي ٢٠٠٨، ٢٠٠٩ بهدف دراسة تأثير مواعيد ومعدلات اضافة مختلفة من السماد البوتاسي وهى :

١- صفر ارضى + صفر رش (كنترول) بدون اضافة السماد البوتاسى للارض + بدون رش السماد البوتاسى

٢- ١٢ كجم ارضى قبل الشتل على الشراقى ،

٣- ١٢ كجم ارضى قبل الشتل على الشراقى + ١٢ كجم ارضى بعد ٦٠ يوم من الشتل ،

٤- ٢٤ كجم قبل الشتل على الشراقى ،

٥ - ٢٤ كجم ارضى قبل الشتل على الشراقى +١٢ كجم ارضى بعد ٦٠ يوم من الشتل ،

٦ - ٢% رش بعد ٣٠ يوم من الشتل ، ٧ - ٢% رش بعد ٦٠ يوم من الشتل ،

٨ - ٢% رش بعد ٣٠ يوم من الشتل + ٢% رش بعد ٦٠ يوم من الشتل ،

٩ - ١٢ كجم ارضى قبل الشتل على الشراقى + ٢% رش بعد ٣٠ يوم من الشتل ،

١٠ - ١٢ كجم ارضى قبل الشتل على الشراقى + ٢% رش بعد ٦٠ يوم من الشتل ،

١١ - ٢٤ كجم ارضى قبل الشتل على الشراقى + ٢% رش بعد ٣٠ يوم من الشتل ،

١٢ - ٢٤ كجم ارضى قبل الشتل على الشراقى + ٢% رش بعد ٦٠ يوم من الشتل

وكذلك التفاعل بينهم على الناتج ومكوناته لبعض التراكيب الوراثية للأرز (الهجين EHR1 ، جيزة ١٧٨) تحت ظروف الأراضي الطينية الملحية (متوسط تركيز الملوحة ٤٥٨٥ جزء / مليون) . وقد تم دراسة كل من دليل مساحة الورقة ؛ محتوى الكلوروفيل ؛ وزن المادة الجافة ؛ طول النبات ؛ عدد السنابل في المتر المربع ؛ وزن السنبلة ؛ وطول السنبلة ؛ ناتج الحبوب / فدان وكان من اهم النتائج المتحصل عليها وجود تباين بين الصنفين المستخدمين في معظم الصفات المدروسة ؛ حيث تفوق الهجين (EHR1) على الصنف العادي جيزة ١٧٨. ووجد ان لإضافة السماد البوتاسى بمعدل ٢٤ كجم ارضى قبل الشتل على الشراقى + ٢% رش بعد ٦٠ يوم من الشتل اثر معنويا في صفات النمو والناتج ومكوناته . وكان تأثير التفاعل بين معاملات البوتاسيوم والاصناف غير معنوي في صفات دليل مساحة الورقة وطول النبات ووزن وطول وعدد الحبوب الممتلئة في الدالية وكان التاثير معنوي في محتوى الورقة من الكلوروفيل ووزن المادة الجافة / م^{٢} وناتج الحبوب / فدان في كلا موسمي الدراسة . وكان تأثير التفاعل على عدد السنابل / م^{٢} غير معنوي في الموسم الاول ومعنوي في الموسم الثاني.

ويمكن التوصية بزراعة الهجين (EHR1) مع التسميد بمعدل ٢٤ كجم بو٢ أ ارضى قبل الشتل على الشراقى + ٢ %رش بعد ٦٠ يوم من الشتل تحت ظروف الاراضى الملحية .

قام بتحكيم البحث

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