APPLICATION OF THIDIAZURON AND KCL FOR INCREASING SALT RESISTANCE OF TWO TOMATO CULTIVARS

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ABSTRACT

Two field experiments were carried out under saline condition at Wadi Sudr, Agricultural Experimental Station, South Sinai Governorate during 1997 and 1998 seasons to evaluate the salt resistance of tow tomato cultivars (Edkawy and Castle Rock) . Furthermore, the possibility of increasing their salt resistance by application thidiazuron (TDZ) at 0.5, 1.0 ppb and/or KCl at 1.0 and 2.0 % were studied under saline condition. Generally, Castle Rock cultivars exhibited a vigorous growth characters, yield and yield components than those of Edkawy. Application of TDZ and/or KCl at any level significantly increased all growth parameters, yield and yield components of both cultivars as compared with the control. The best results of growth and yield were obtained by combination TDZ at 1.0 ppb with KCl at 2% either in Castle Rock or Edkawy cultivars.

As for chemical composition in tomato shoot, i.e. K, Na, Ca, Mg and K/Na ratio, Castle Rock cv. had the lowest contents of Na and the highest contents of K, Mg, Ca, and K/Na ratio as compared with Edkawy cultivar. TDZ application significantly decreased Na contents in both cultivars, whereas, K/Na ratio reached the highest value. Combined TDZ at 0.5 ppb with KCl at 1% gave the best result to decrease Na content in Castle Rock and Edkawy cultivars. However, its combination increased K/Na ratio that reached three fold in Castle Rock comparing with Edkawy cultivar.

In this respect, additional KCl at 1.0 &2.0% could positively affect K/Na ratio in Edkawy cultivar, meanwhile, such ratio in Castle Rock cv. was not affected.

The role of bioregulator (TDZ) or KCl for increasing salt resistance via altering K/Na ratio was discussed. Also, the effect of previous treatments on tomato yield was recorded.

Key Words: Tomato – Edkawy - Castle Rock - adaptation – salt tolerance – salt resistance - Thidiazuron – KCl – growth – Yield –Nutrient elements

INTRODUCTION

In Egypt, tomato crop has received great attention to increase its productivity parallel to market demand. This could be achieved by using arid and semi-arid land for cultivation. Soil salinization in arid regions represents one of the great challenges to agricultural and environmental researches. To compensate the lose of fertility under saline conditions and the use of saline water in irrigation on improving resistance of plant against salt stress under dry conditions is greatly desired. Instead of classical breeding, new technique has be employed to adapt plants to environmental conditions out side the range they were adapted by natural evolution.

Because phytohormones that regulate growth and development, hence by mediate the gene expression in plants, however their external application may serve as kind of gene substitution. However, in exploring how to counteract adverse environmental constrains, the synthetic plant growth bioregulator (plant bioregulator), proved to be of more value than the natural phytohormones (Dorffling, 1987 & Roth and Bergmann, 1988) like that cytokinin as an example of phytohormone which involved in phenotypic of salinity and drought resistance (Katz *et al,* 1978). Later on, Stark, 1991a reported similar effect of cytokinins under stress conditions. Application plant biochemical regulators (bioregulator) with cytokinin- like characters such as MCBUTTB and TDZ were found to be able to promote growth and yield of several salt-stress crop plant (Stark, 1993, Beckett and Van Staden, 1992). Furthermore, Thomas et al, 1992 found that application 6- benzyl amino purine, zeatin and Isopentyladinine mimics salt treatment for some specific bioregulator compounds.

Additional to cytokinin in increasing salt resistance, KCl application on tomato cultivars was recommended as effective agent for improving growth and chemical composition under saline condition (Satti and Lopez, 1994).

The present investigation aimed to determine the differences in salt tolerance between two tomato cultivars under saline conditions at Wadi Sudr in South Sinai Governrate. Furthermore, the physiological effects of synthetic cytokinin TDZ and/or KCl application for increasing salt adaptation for these cultivars were studied.

MATERIALS AND METHODS

Effective TDZ concentrations were chosen from preliminary experiment at greenhouse. TDZ at (0.0, 0.5 and 1.0ppb) was applied in irrigation water, whereas, KCl at (0.0, 1.0 and 2.0 %) was applied as foliar application on two tomato cultivars (Edkawy and Castle Rock). The study was conducted to investigate the effect of TDZ treatments with the irrigation water as well as the foliar application of KCl and its effect on plant growth characters, yield and yield components of two tomato cultivars namely, Edkawy and Castle Rock. The experiment included 18 treatments, which were the combination of three foliar applications X three different concentrations of thidiazuron X two cultivars of tomato plant. Treatments were arranged in split–split plot design with three replications. Tomato cvs. occupied in main plots TDZ treatments were in the sub plots and KCl in sub- sub plots.

The experimental unit included three ridges 60 cm in width and 3.5m long (i.e. 10.5 m^2 = 1/400 fed.). Homogenous plants were transplanted in hills distanced 30cm apart at DRC Experimental farm, Wadi Sudr, south Sinai on 7^{th} and 1^{st} May 1997 and 1998 seasons respectively.

Organic manure and inorganic fertilizers were added as recommended for saline soil (10.0 mmhos/cm). Plants were irrigated every 5 days using saline well water (3400ppm). Two doses of thidiazuron were used with the irrigation well water at three times (i.e. during transplanting of seedlings and after 30 and 60 days from transplanting of seedlings). Supplemental KCl foliar spray treatments were applied twice after 30 and 60 days from transplanting using Tween 20 as wetting agent. Two samples were randomly taken at 60 and 90 days after transplanting to determine Plant height (cm), Number of leaves/plant, Number of branches/plant, Stem diameter (cm), Shoot fresh and dry weights/plant (g), Fruit number/plant, Fruit volume/plant (cm^3), Fruit fresh weight/plant (g), Fruit fresh yield (ton/fed.). Shoot samples were dried in an oven at 75 C^o. The dried materials for the 1st and 2nd samples during 1st season were ground to a fine powder and kept for mineral analysis. Plant materials were exposed to acid digestion using the wet aching procedure as described by Johnson and Ulrich (1959) to determine sodium, Potassium and Calcium content by flame photometer according to the method of Brown and Lilleland (1946) using Jenway PFP7 flame Photometer model. On the other hand, Mg content was estimated using atomic absorption spectrophotometer Pye Unicium Sp 1900. Proline content was determined in fresh leaves according to the method outlined by Bates , (1973). Crude protein content was calculated by multiplying the total nitrogen by 6.25 (Pregl 1945).

Data were subjected to statistical analysis according to Steel and Torrie (1960) L S D was used to detect significant differences at 0.5 level.

RESULTS

1- Growth characters

Data in Table (1) shows the effect of cultivars performance on some growth traits at 60 DAT during the two successive seasons of 1997 and 1998. Castle Rock cv. exhibited significant high values of number of leaves /plant, number of branches/plant, shoot fresh and dry weights/plant as compared with Edkawy in both seasons.

Concerning the effect of thidiazuron on growth parameters, data presented in Table (1) reveals that 1.0ppb TDZ level gave the highest mean values of plant height, stem diameter, fresh and dry weights/plant as compared with the control during the 1st season.. Similar trend was observed with the leaf number in the first season. Meanwhile, 0.5ppb TDZ level ranked next in this regard. On the other hand, the maximum significant values of number of branches was achieved by 0.5ppb TDZ in the first season. Also, during the second season 0.5ppb TDZ showed the highest significant mean values of leaf number, number of branches and fresh and dry weights/plant followed by 1.0ppb TDZ respectively. In this respect, 1.0ppb TDZ surpassed 0.5ppb and 0.0ppb(control) TDZ treatments in case of stem diameter and plant height for both samples. Generally, 1.0ppb TDZ treatment gave the highest mean values for growth parameters in the first season, whereas 0.5ppb TDZ treatment was the best in the second one.

As for the effect of KCl on growth parameters, table (1) showed a significant difference between all foliar application levels of KCl treatments. Moreover, 2% KCl application gave the maximum mean values of all growth parameters in terms of plant height, number of leaves/plant, number of branches/plant, stem diameter, shoot fresh and dry weights/plant followed by 1% KCl application during the 1st season. The same trend was observed during the second season except for the number of branches /plant which showed a non- significant increase with increasing the concentration of KCl application.

Table 1

Regarding the effect of interaction among cultivars, Thidiazuron and KCl treatments on growth parameters, data in Table (2) reveal that the highest mean values for shoot fresh and dry weights/plant were achieved by Edkawy cv. X TDZ 0.5ppb X KCl 2% interaction which reached (387.53 and 74.65 g/plant respectively) during 1st season. The same characters were significantly response with Edkawy cv. X TDZ 1.0ppb X KCl 2% interaction during 2nd season.

Table (2): Effect of interaction among cultivars, thidiazuron and KCl levels on growth parameters of tomato plant at 60 D.A.T. under saline conditions in 1997 and 1998 growing seasons.

Cultivars	TDZ level (ppb)	KCl level (%)	Plant Height (cm)	No. of leaves	No. of branches/ plant	Stem diameter (cm)	Shoot fresh wt. (g/plant)	Shoot dry wt. (g/plant)
					1997			
Castle Rock	0.0	0.0	46.30	76.67	11.00	0.822	94.03	17.49
		1.0	41.47	41.00	6.00	0.650	44.31	8.36
		2.0	47.40	60.67	7.67	0.785	88.52	16.85
	0.5	0.0	49.40	81.67	16.67	0.745	134.37	26.61
		1.0	52.27	84.67	14.00	0.760	115.72	21.88
		2.0	53.70	116.67	15.00	0.800	148.09	28.96
	1.0	0.0	58.90	133.67	16.00	0.875	186.42	35.41
		1.0	56.50	143.00	19.67	0.825	204.60	39.08
		2.0	61.77	176.67	23.00	0.902	353.94	67.33
Edkawy	0.0	0.0	40.37	126.67	25.00	0.788	244.32	45.89
		1.0	38.40	148.67	27.67	0.612	259.73	53.52
		2.0	33.17	193.00	37.00	0.752	239.97	42.77
	0.5	0.0	30.27	126.67	25.33	0.588	167.58	32.37
		1.0	38.20	150.00	26.67	0.802	202.45	43.53
		2.0	45.77	173.00	38.67	0.820	387.53	74.65
	1.0	0.0	39.47	65.00	16.00	0.670	109.72	24.44
		1.0	42.00	76.00	14.67	0.758	146.78	30.16
		2.0	39.90	169.67	33.00	0.802	284.80	51.94
L.S.D. at 0.05			N.S.	N.S.	N.S.	N.S.	63.30	11.24
					1998			
Castle Rock	0.0	0.0	28.00	22.67	5.67	0.635	30.46	4.76
		1.0	34.73	45.00	6.67	0.700	60.00	10.43
		2.0	38.00	52.00	8.00	0.770	87.86	14.35
	0.5	0.0	42.50	48.00	9.67	0.780	144.13	24.25
		1.0	38.17	45.00	9.00	0.680	60.88	18.28
		2.0	44.27	63.00	8.67	0.700	83.58	14.53
	1.0	0.0	38.00	62.00	9.00	0.800	82.63	12.31
		1.0	33.27	43.67	7.00	0.650	43.40	9.94
		2.0	30.33	41.00	6.67	0.678	36.65	6.10
Edkawy	0.0	0.0	28.83	36.67	8.00	0.672	52.97	8.21
		1.0	35.00	60.67	12.00	0.740	81.21	13.94
		2.0	38.50	49.67	9.67	0.823	117.53	20.28
	0.5	0.0	32.33	55.00	11.00	0.718	83.67	11.42
		1.0	35.80	53.00	8.67	0.805	113.41	17.23
		2.0	39.50	67.67	9.67	0.770	154.87	22.07
	1.0	0.0	35.33	40.00	7.67	0.740	76.54	12.75
		1.0	29.50	45.67	7.67	0.788	88.67	8.93
		2.0	36.27	54.00	12.00	1.035	155.31	23.41
LSD (0.05)			Ns	9.01	1.55	3.58	12.46	3.43

2- Yield and yield components

The differences among cultivars performance on yield and yield components are presented in fig. (1, a). It is obvious that Castle Rock cultivar surpassed Edkawy cv. in yield and its components during 1997 and 1998 growing seasons. Moreover, the percentage of increments in fruit fresh yield/fed. of Castle Rock cultivar was 94.43% as compared to Edkawy cv. during the first season but it was not significant in the second one.

Regarding the effect of thidiazuron on yield and yield components, fig. (1,b) show the different significant effects of TDZ on yield and yield components. Application of TDZ at 0.5ppb exerted the highest mean values of all yield parameters, in the first season. Whereas, in the second season TDZ application at 1.0ppb gave the maximum values of yield and its components. Nevertheless, no significant differences were found between 0.5 and 1.0ppb TDZ application.

Concerning the effect of KCl on yield and yield components, data presented in fig. (1, c) revealed that a significant decrease was noticed in yield and yield components by KCl application as a foliar spray particularly in the second season. Control plants gave the highest mean values of yield followed by 2% and 1% KCl respectively. Similar trend was observed during the first season without any significant effects.

As for the interaction effect among cultivars, Thidiazuron and KCl treatments on yield and yield components of tomato plant. Table (3) shows The highest values of fruit volume/plant and yield/fed were obtained during 2^{nd} season (202.00 and 4.18 ton/fed respectively) by the interaction among Castle Rock cv., TDZ 1.0ppb X KCl 2% followed by the combination of Castle Rock cv. X TDZ 0.5ppb with KCl 2% during 2^{nd} season. On the other hand, Castle Rock cv. under TDZ as a control with KCl 1% surpassed the other treatments for fruit number/plant (15.33) during 1^{st} seasons followed by the combination of Castle Rock cv. under TDZ 0.5 ppb with KCl 2% which reached (10.67) during the same season .

3-Chemical composition

The differences between the two cultivars performance on chemical composition are presented in Table (4). Na^+ content was increased in Edkawy cv. over that of Castle Rock. On the other hand, there was a decrement in K, Ca, Mg contents and K/Na ratio in Edkawy plants as compared with Castle Rock.

Concerning, Proline content of tomato leaves, a higher value characterized in Edkawy cv. than Castle Rock at both sampling dates under salination. Meanwhile, the reverse was true for protein content.

As for thidiazuron effect on chemical composition, Table (4) reveals that 0.5 ppb TDZ gave the lowest mean value of Na content and the highest value of K and K/Na ratio followed by 1.0 ppb TDZ. The highest value of Mg content was gained by 0.5 ppb TDZ application. On the other hand , Ca content recorded the highest mean value with 1.0 ppb TDZ followed by 0.5 ppb TDZ.

FIG

Concerning the effect of KCl on chemical composition, Data in Table (4) refer to a gradual decrease in Na content with the increasing KCl level. On the other hand, as KCl level increased, a corresponding increase in K content and K/Na ratio was obtained. Similar trend was noticed in Ca and Mg contents. However, KCl 2% gave the highest values of Ca and Mg followed by control or 1%. Moreover, The lowest value of Proline was gained by KCl 1% foliar application followed by control then 2%. On the contrary, 1% KCl application gave the highest content of protein content.

Table (3): Effect of interaction among cultivars, thidiazuron and KCl levels on yield and yield components of tomato plant at 90 D.A.T. under saline conditions in 1997 and 1998 growing seasons.

Cvs.	TDZ level (ppb)	KCl level (%)	Fruit No./ plant	Fruit Volume (cm^3)	Fruit fresh wt. (g/pl.)	Fruit fresh yield (ton/fed.)	Fruit No./ plant	Fruit Volume (cm^3)	Fruit fresh wt. (g/pl.)	Fruit fresh yield (ton/fed.)
			1997				1998			
Edkawy	0.0	0.0	0.00	0.00	0.00	0.000	3.33	141.7	143.0	3.15
		1.0	0.00	0.00	0.00	0.000	2.00	41.0	54.0	1.19
		2.0	0.00	0.00	0.00	0.000	1.00	17.0	19.7	0.43
	0.5	0.0	1.33	16.67	16.47	0.362	2.33	124.7	125.0	2.91
		1.0	0.00	0.00	0.00	0.000	1.33	57.0	57.3	1.26
		2.0	0.00	0.00	0.00	0.000	1.00	41.3	38.3	0.84
	1.0	0.0	0.33	3.33	3.27	0.072	1.33	67.0	64.7	1.42
		1.0	0.33	1.67	1.03	0.023	1.00	52.3	49.7	1.09
		2.0	0.00	0.00	0.00	0.000	1.33	80.7	82.0	1.80
Castle Rock	0.0	0.0	1.67	10.00	2.27	0.050	2.67	52.0	57.7	1.27
		1.0	15.33	75.00	74.30	1.635	2.00	53.0	55.3	1.22
		2.0	6.00	35.00	33.67	0.741	2.00	32.7	37.7	0.83
	0.5	0.0	12.67	120.00	114.10	2.510	3.00	148.7	124.7	2.73
		1.0	6.67	50.00	43.57	0.959	2.33	55.7	58.0	1.28
		2.0	10.67	80.00	75.90	1.670	3.67	194.7	175.6	3.83
	1.0	0.0	6.67	33.33	21.43	0.471	2.67	156.0	146.0	2.21
		1.0	3.00	11.33	7.30	0.160	4.67	179.0	166.0	3.65
		2.0	2.67	5.20	2.10	0.046	2.67	202.0	190.0	4.18
LSD (0.05)			3.63	21.24	21.49	0.500	Ns	59.4	Ns	1.36

Table (4): Response of chemicals composition of tomato Cultivars to different levels of Thidiazuron and KCl treatments at 60 DAT under saline Condition.

Treatment s	Na^+ mg/g dry wt.	K^+ ratio	K^+/Na^+	Ca^{++}	Mg^{++} %	Proline	Protein
			mg/g fresh wt.			%	
Effect of Cultivars:							
Edkawy	9.08	4.91	0.54	25.78	21.13	0.090	27.36
Castle Rock	7.16	7.31	1.02	30.33	26.35	0.075	35.41
Effect of thidiazuron:							
0.0 ppb	8.72	5.86	0.67	24.40	23.86	0.080	35.76
0.5 ppb	7.40	6.42	0.87	26.01	26.93	0.092	25.93
1.0 ppb	8.23	6.06	0.74	33.76	20.45	0.076	36.39
Effect of KCl :							
0.0%	8.92	5.38	0.68	28.50	22.59	0.085	29.14
1%	8.53	6.04	0.71	26.14	22.42	0.074	38.18
2%	7.91	6.92	0.87	29.40	26.23	0.089	26.85

Regarding the interaction effect of thidiazuron, KCl and their combination on chemical composition of cultivars, data presented in Table (5) shows that, the lowest mean values of Na content were obtained by Castle Rock X TDZ 0.5ppb X KCl 1% interaction. On the other hand, the same treatment gave highest values of K content, K/Na ratio and Ca. In addition, the highest protein content was gained by Castle Rock X TDZ 0.0 ppb X KCl 1% interaction followed by Edkawy with the same interaction. The both cultivars X TDZ 1.0 ppb X KCl 1% interaction recorded the lowest mean values for proline content.

Table (5): Effect of interaction among cultivars , thidiazuron and KCl on Chemical composition of tomato plant at 60 DAT under saline condition in 1997.

Treatments			Na^+	K^+	K^+/Na^+ ratio	Ca^{++}	Mg^{++}	Proline Mg/g fresh wt.	Protein %
Cvs.	TDZ level PPb	KCl Level (%)	Mg/g dry wt.			Mg/g dry wt.			
Edkawy	**0.0**	**0.0**	9.74	4.62	0.47	21.38	18.76	0.096	19.06
		1	11.28	5.06	0.45	22.38	14.88	0.079	48.63
		2	8.61	5.81	0.67	36.63	24.74	0.075	33.63
	0.5	**0.0**	8.10	3.77	0.47	22.02	15.75	0.106	12.38
		1	9.74	5.06	0.52	19.13	30.01	0.097	16.19
		2	7.90	5.92	0.75	19.19	14.29	0.105	26.63
	1.0	**0.0**	9.13	4.63	0.51	35.50	15.98	0.098	41.13
		1	8.41	3.98	0.47	20.32	11.91	0.058	28.13
		2	8.82	5.38	0.61	35.50	43.87	0.095	20.50
Castle Rock	**0.0**	**0.0**	6.87	6.78	0.99	20.50	29.03	0.065	27.06
		1	8.00	5.59	0.70	21.75	29.14	0.071	58.13
		2	7.80	7.31	0.94	23.75	26.59	0.095	28.06
	0.5	**0.0**	6.77	6.67	0.99	34.88	40.13	0.075	34.25
		1	5.64	8.50	1.51	37.00	29.37	0.082	44.38
		2	6.26	8.61	1.38	23.88	32.01	0.083	21.75
	1.0	**0.0**	6.87	5.81	0.85	36.75	15.85	0.066	40.94
		1	8.10	8.06	1.00	36.25	19.23	0.058	33.63
		2	8.10	8.50	1.05	38.25	15.85	0.081	30.50

DISCUSSION

Both tomato cultivars differ in salt resistance in terms of growth parameters (Satti *et al 1994 b,* Sorial and Malash *1997*). These differences could be due to the ability of cultivars to reduce Na Cl accumulation in their cells that enables the cultivar to thrive well under saline conditions(Sorial and Malash *1997*). Their finding were found to be agree with the present results that Castle Rock cultivar had lower Na content than Edkawy cultivar. Consequently, Castle Rock surpassed Edkawy in all growth characters and yield. This also confirms the inhibitory effect of the high Na content on the growth characters and yield. On the contrary, several reports indicated that Edkawy cultivar salt resistant (Mahmoud *et al* 1986 and Caro *et al 1991*) they reported that the most tolerant genotypes of tomato were those with the highest Cl and Na values, suggesting that the dominant salt-tolerance mechanism is ion accumulation, but there were cases in which salt tolerance not related to Cl and Na.Their finding lead us to propose that Castle Rock is salt resistant by avoiding Na accumulation. In the same concern, Lewis and Christians (*1981*) pointed out that sugar beet varieties differed in taking or avoiding Na from the soil or from irrigation water leading to more variability in the performance of their cultivar. However, reliable identification of crop responses under salinity stress is difficult. Numerous criteria have been used to rank salinity tolerance of members of cultivated tomato (Hassan and Desouki *1982*, Shannon *et al 1987*). In addition, environmental interference can mask important traits (Epstein *1983*, McCue and Hanson (*1990*). Results from different test environments or different genotypes therefore are generally not directly comparable. So the present experiment under Wadi Sudr condition revealed that, unless Edkawy cultivar was classified under salt resistant tomato cultivar, Castle Rock surpassed Edkawy cultivar in all growth and yield. The abovementioned reasons could be elucidated this conflict.

Application bioregulator (TDZ) synthetic cytokinin increased salt resistance in both tomato cultivar by increasing growth and yield, furthermore, TDZ modified the intake and distribution of Na of sodium and potassium and consequently K/Na ratio was also increased (Fig.3). These results were found to agree with Beckett and Van Staden (1992), that TDZ application improved yield of wheat plant under salinization. In same concern Stark (1993) reported that plant biochemical regulator with cytokinin like character (MCBUTTB) was found to be able to promote growth and yield of several salt stressed crop plants. He suggested that MCBuTTBtriggers physiological mainpulation in the osmotic status of plants which suffer both physical drought and salinity-mediated physiological drought. Moreover, the maintenace of leaf turgor is considered as very important characteristic for the resistance against salinity (Nonami and Boyer, 1989). Generally, cytokinins are considered antagonist (Blackman and Davies,1984). Cytokinin levels may also be affected by salt stress, roots are the first tissues exposed to salt they are the primary sites of cytokinin synthesis (Chen *et al, 1985).* Drought and salt stress could also affect the transport of cytokinins from the root to the leaf (Singh *et al, 1988*),which directly influencing cytokinin-induced gene expression. The mode of action of cytokinin for increasing salt resistance was postulated by

Thomas *et al,* 1992, that applied exogenously cytokinin (6-benzulaminopurine,2 isopentyl adinine) could induce accumulation of salt stress markers. These markers were found to be accumulated under saline condition or NaCl application. Therefor, cytokinin mimics the effect of Na Cl stress.So these markers could be avoided the plant or increased their salt resistance of plants. Obtained data revealed also that TDZ application increased K/Na ratio.this was true in Castle Roch cultivar. Groham et al (1990) reported that an efficient K/Na exchang system at the the plasmalemma increase crop tolerance. It could be proposed that K/Na ratio may be a marker or indicator for salt resistance plant. However, additional treatment of KCl faild to increase K/Na in Edkawy cultivar as compared with Castle Rock. In this respect, the domestic tomato plants could not substitute Na for K(Rush and Epstein,1981).

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زيـادة تحمل الملوحـة لصنفين مـن الطمـاطم باسـتخدام الثيـديازيورون والبوتـاسيوم تحت الظروف الملحية

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أجريت تجربتـان حقليتـان خـلال موسـمي(1997-1996)بالمزرعـة البحثيـة بمحطـة راس سـدر جنوب سيناء لدراسة اثر عدد 18معاملة هى محصلة التداخل بين معاملتين بمنظم النمو الثيديازيورون وهم 5و. –1 جزء فى البليون بالإضافة الى معاملة الكنترول(الماء العادي) تضاف مع ماء الري وكذلك معاملتين للرش بكلوريد البوتاسيوم هى 1 و2 % كلوريد البوتاسيوم علاوة على الكنترول (الماء العادى) وذلك على صفات النمو والانتاجية وكذلك المركبات الكيميائية لصنفين من الطماطم (ادكاوى- كاسل روك) تحت ظروف التربة الملحية مع الري بمياه الآبار المالحة وأوضحت النتائج الاتى:

-تفوق الصنف كاسل روك على الصنف ادكاوى معنويا فى عدد الثمار وحجمها وكذلك محصول الثمار الطازج للفدان خلال الموسم الأول و سلك نفس السلوك فى العام الثاني ولكن بدون معنوية.

-آدت معاملة النباتات بتركيز 5و جزء في البليون ثيديازيورون الى الحصول على قيم عالية لعدد وحجم الثمار وكذلك الوزن الطازج للنبات والمحصول الطازج للفدان خلأل ا لموسم الأول. لكن فى العام الثاني كانت هناك زيادة تدريجية فى المحصول بزيادة تركيز الثديازيورون الى 1 جزء فى البليون.

-حقق الرش بتركيز 2% كلوريد بوتاسيوم افضل القيم في قياسات النمو والوزن الطازج والجاف للنبات خلال الموسمين 1996-1997

-اظهر التفاعل بين المعاملة 5و جزء فى البليون ثيديازيورون مع الرش كلوريد البوتاسيوم 2% للصنف كاسل روك افضل قيم لصفات النمو والوزن الطازج والجاف للنبات

-تفوق الصنف كاسل روك على الصنف ادكاوى فى التحمل للملوحة العالية حيث كان محتواة من الصوديوم اقل .لكن سلك النبات السلوك المعاكس بالنسبة لمحتواة من البوتاسيوم- الكالسيوم -المغنيسيوم وكذلك البروتين .

-أدى معاملة النباتات بتركيز 5و جزء فى البليون ثيديازيورون الى الحصول على اقل محتوى من الصوديوم ولكن سلك البوتاسيوم- الكالسيوم- الماغنسيوم السلوك المعاكس .

-حقق الرش بتركيز 2% كلوريد بوتاسيوم الحصول على اقل محتوى من الصوديوم وكذلك أعلى محتوى من البوتاسيوم –الكالسيوم- الماغنسيوم وحقق التركيز 1% كلوريد نوتاسيوم المرتبة الثانية.

Table (1): Main effects of cultivars, thidiazuron and KCl as a foliar application treatments on growth parameters of tomato plant at 60 days after transplanting (DAT) under saline conditions in 1997 and 1998 growing seasons.

Treatments	1997						1998					
	Plant height (cm)	No. of leaves/ plant	No. of Branches/ plant	Stem diameter (cm)	Shoot fresh wt. (g/plant)	Shoot dry wt. (g/plant)	Plant Height (cm)	No. of leaves/ plant	No. of branches/ plant	Stem diameter (cm)	Shoot fresh wt. (g/plant)	Shoot dry wt. (g/plant)
Effect of cultivars:												
Edkawy	51.97	101.63	14.33	0.796	151.22	29.11	36.36	45.93	7.81	0.712	69.95	12.78
Castle Rock	38.61	136.52	27.11	0.732	226.99	44.36	34.56	51.37	9.59	0.788	102.69	15.56
LSD (0.05)	0.28	Ns	3.86	0.009	53.00	6.82	Ns	2.92	1.68	0.046	13.98	1.77
Effect of Thidiazuron levels:												
0.0 ppb	41.18	107.78	19.06	0.735	161.81	30.81	33.84	44.44	8.33	0.725	71.68	12.01
0.5 ppb	44.93	122.11	22.72	0.753	191.12	38.00	38.76	55.28	9.44	0.744	106.76	17.96
1.0 ppb	49.76	127.33	20.39	0.805	214.38	41.39	33.78	46.22	8.33	0.782	80.53	12.54
LSD (0.05)	3.14	15.63	1.85	0.018	26.90	5.24	3.54	3.70	0.76	0.030	5.81	0.88
Effect of KCl levels:												
0.0 %	44.12	101.72	18.33	0.748	154.57	30.37	34.17	44.05	8.50	0.724	78.40	12.25
1.0 %	44.81	107.22	18.11	0.734	162.26	32.75	34.41	47.33	8.50	0.727	74.61	13.12
2.0 %	46.95	148.28	25.72	0.810	250.48	47.08	37.81	54.55	9.11	0.799	105.97	17.14
LSD (0.05)	1.96	13.49	2.54	0.029	25.36	4.59	2.74	3.54	Ns	0.014	4.89	1.35

J. Agric. Sci. Mansoura Univ., 25 (4): 2107 – 2119, 2000
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