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EFFECT OF SALINE IRRIGATION WATER AND PLANT SPACING ON DAMSISA PLANT (*Ambrosia maritima*, L.)

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ABSTRACT

This investigation was carried out during the two seasons 1999 and 2000 on Damsisa plant in Medicinal and Aromatic Plants Research Department, Sabahia Station, Alexandria to study the effect of saline irrigation water and plant spacing on growth, volatile oil percentage and composition in leaves, demsine as well as ambrosine and total demsine and ambrosine.

Application of saline irrigation water (4000 and 8000 ppm) significantly increased plant growth and volatile oil percentage in leaves while, it was decreased with the high level (12000 ppm).

Plant spacing (35 cm) with low levels of saline irrigation water (4000and 8000 ppm) gave the highest values of plant growth, volatile oil percentage and compositions.

Ambrosine percentage increased by increasing saline irrigation water levels with plant spacing, oppositely, demsine and total (demsine and ambrosine) percentage were decreased.

INTRODUCTION

Ambrosia maritima, L. (Damsisa), Fam. Asteraceae (Compositae), is a perennial herbaceous plant, it is a richly branched, gray herb with finely dissected fragrant leaves Tuckholm (1974).

The plant is widely distributed throughout the Mediterranean region. In Egypt, the plant is a wild herb growing on the banks of canals and River Nile as a common weed Bedevian (1936).

Damsisa is used in Egyptian folklore medicine as a remedy of rheumatic pains, decoction of plant for asthma bilharziasis, diabetes and to expel kidney stones. The active ingredients of this plant were ambrosine and demsine shown to be toxic to the snails representing the intermediate host of Schistosomiasis and Fascioliasis found in canals Picman *et al.* (1986).

Saline water is available in abundance in many countries of the world and even in desert areas, thus the importance of establishing agro-management regime that include saline water is self evident Ayer's and Westcot (1976). In Egypt especially in reclaimed lands salinity is one of the problems facing the agriculture, about 30-35 % of irrigated lands of Egypt are affected by salinity and water logging FAO (1970).

Abd El-Nabi and Hussein (1996) studied the effect of saline solution irrigation of 2560 ppm along with control 300 pp on damsisa volatile oil. They found that damsisa volatile oil percentage increased by salinity level increasing most components of volatile oil especially cineol was significantly increased. Hussein (1999) found that level of salinity (1500 ppm) caused an increase in plant height number of leaves per plant, fresh and dry weight of leaves as well as volatile oil percentage and content in *Ocimum basilicum.*

Bhati (1988) reported that the growth and seed yield were highest at the medium plant spacing (30 cm) of coriander plants.

The aim of this investigation was to study the effect of saline irrigation water and plant spacing on growth and active constituent of damsisa plant.

MATERIALS AND METHODS

The field experiments were carried out in the soil salinity and Alk. Lab., Alexandria through two successive seasons 1999 and 2000.

Seeds for the experiments were obtained from, Medicinal and Aromatic Plants Research Department, Sabahia Station, Alexandria.

Seeds were sown on 15 February 1999 and 2000 in pots of 40 cm diameter, the medium used for seeds germination was 2 clay: I sand by volume. After 60 days from sowing the seedlings were transplanted to the final blocks (50 x 100 cm), every block contains 9 plants as replicate of treatments.

The medium used for blocks was a sand loam soil and its chemical analysis was as follows:

Soil type	E.C. ds M^{-1}	pH	Soluble anions (me/L.)				Soluble cations (me/L.)			
M			$(CO_3)^{-2}$	$(HCO_3)^{-1}$	Cl^{-1}	$(SO_4)^{-2}$	Ca^{+2}	Mg^{+2}	Na^{+}	K^{+}
Sand loam	7	7.1	-	2	40	42	33.6	10.4	32.5	1.4

All plants were given the same agriculture practices. The plant spacing were 15, 25 and 35 cm. Also, four levels of saline water irrigation tap water (control), 4000, 8000 and 12000 ppm were used.

Salinity treatments were started after one month from the final transplanting of the plants. The layout of the experiments in both seasons were randomized complete blocks design in factorial experiment containing twelve treatments (four levels of salinity by three different spaces with all combinations between them, Sndecor and Cochran, 1974).

Plants of damsisa were harvested when, the plants were in full bloom stage.

Oil percentage determination:

The essential oil was extracted from leaves and flowers by water distillation according to British Pharmacopeia (1968) and Guenther (1961).

Analysis of damsisa oil:

Gas chromatography technique was used to determine the principal components of damsisa oil.

The oil constituents percent were estimated from the measured peak area of the chromatogram according to Gunther and Joseph (1978).

The condition of G.L.C.

Information	Conditions
Instrument	Perkin Ellmar
Column	Packet PEGA 10 % (w/w)
Flow rate	Nitrogen 30/min; Hydrogen 33/min air 33 %
Columin temp.	30-180 °C
Rate temp.	5 °C/min
Injection temp.	250 °C
Dtector temp.	280 °C

RESULTS AND DISCUSSION

a) Effect of saline irrigation water and spacing on vegetative growth:

1- Plant height:

Data listed in Table (1) cleared that there was a significant increase in plant height by increasing plant distance. Similar results were recorded by Gill and Samra (1986) on *Ammi majus* and Munshi *et al.* (1990) on caraway (*Carum carvi*).

Table (1). Effect of saline irrigation water and plant spacing on plant height of damsisa plant (cm) in 1999 and 2000seasons.

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	40.3	41.2	42.2	41.23	39.3	39.9	40.3	39.83
4000	41.9	43.4	44.1	43.13	40.2	42.4	43.9	42.16
8000	33.4	34.3	35.1	34.26	32.9	33.8	34.3	33.67
12000	31.5	35.9	39.1	35.50	30.5	34.8	38.1	34.47
Mean (B)	36.77	38.7	40.13		35.73	37.73	39.15	
L.S.D at 5%	Salinity (A): 1.92 Spacing (B): 0.81 A x B: 2.01				Salinity (A): 1.72 Spacing (B): 0.58 A x B: 1.98			

It was evident in Table (1) that plant height increased with low level of salinity (4000 ppm), while it was significantly decreased at high levels. The same results mentioned above was obtained with spacing under saline stress at all levels. These results are in agreement with those obtained by Sutarno (1987) who reported that salinity increased plant height at range between (500-1500 ppm), but at 3000 ppm high mortality was occurred of *Amaranths paniculatus.* Hussein (1999) and Salem *et al.* (2001) who found that the low level of salinity (1500 ppm) caused an increase in plant height of sweet basil plant.

2. Branches number:

Data presented in Table (2) showed that number of branches per plant increased over the control with low levels, while it reduced at high salinity level (12000 ppm) during the two seasons. The highest values were obtained with 8000 ppm. These results might be related to the fact that salinity directly has been affected on vegetative buds under the soil surface and meristems activity (Abou El-Fadl *et al.*, 1987). These results were in harmony with those reported by Hussein (1999) on sweet basil (*O.* basilicum) and Kotb and El-Gamal (1997) on *Lupinus termis* (forsk).

Table (2). Effect of saline irrigation water and plant spacing on branch number per damsisa plant in 1999 and 2000. seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	11.2	14.3	17.1	14.2	10.5	15.5	18.2	14.7
4000	13.1	15.5	18.1	15.57	14.2	16.5	19.2	16.6
8000	13.5	16.1	19.3	16.3	14.1	15.5	19.2	16.9
12000	10.9	12.4	13.2	12.7	10.1	12.1	12.9	11.7

Mean (B)	12.18	14.58	16.93		12.2	15.4	17.4	
L.S.D at 5%	Salinity (A): 1.21 Spacing (B): 0.97 A x B: 0.95				Salinity (A): 0.56 Spacing (B): 1.01 A x B: 0.81			

As regard to the effect of spacing in Table (2) showed that number of branches was significantly increased with space increases. Similar results were obtained by Madan and Saimbhi (1986) on carrot and Bali (1988) on dill (*Anethum graveolens*). Also spacing under saline stress caused increasing branches number with increase of plant spacing in all concentrations.

3. Fresh and dry weights per plant:

Data obtained from Tables (3 and 4) revealed that low level of salinity caused a significant increase in fresh and dry weight per plant, when compared with the control. This finding may be attributed to the stimulating effect of plant growth by using salinity at low concentrations, which led to produce taller plants with high number of branches and leaves. These results are in agreement with those obtained with Naiem and Rodney (1987) on spearmint and marjoram.

Table (3). Effect of saline irrigation water and plant spacing on fresh weight of damsisa herb in 1999 and 2000. seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	**25**	**35**	**Mean (A)**	**15**	**25**	**35**	**Mean (A)**
	1999				**2000**			
Control	95.0	106	109	103.3	93.1	107.1	110.2	103.4
4000	127.1	164	275	188.7	126.1	172.1	281.1	193.1
8000	175.0	178	255	202.7	172.2	179.1	265.3	205.5
12000	96.0	101	100	99.0	97.0	105.3	101.3	101.2
Mean (B)	123.3	137.3	184.8		122.1	140.9	189.5	
L.S.D at 5%	Salinity (A): 1.24 Spacing (B): 2.15 A x B: 1.99				Salinity (A): 2.17 Spacing (B): 3.91 A x B: 0.99			

Table (4). Effect of saline irrigation water and plant spacing on dry weight of damsisa herb in 1999 and 2000. seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	**25**	**35**	**Mean (A)**	**15**	**25**	**35**	**Mean (A)**
	1999				**2000**			
Control	19.81	22.3	24.1	22.07	20.1	23.4	23.9	22.47
4000	28.3	30.1	42.2	33.5	29.1	31.3	43.1	34.5
8000	33.1	33.5	39.1	35.23	32.5	33.1	38.9	34.8
12000	18.1	21.3	19.3	19.57	18.3	20.4	20.0	19.57
Mean (B)	24.83	26.8	31.18		25.0	27.05	31.48	
L.S.D at 5%	Salinity (A): 0.72 Spacing (B): 0.15 A x B: 0.99				Salinity (A): 0.65 Spacing (B): 0.41 A x B: 0.88			

High salinity level significantly decreased fresh and dry weights during the two seasons. The decrease in fresh and dry weights of plants might be due to the salinity which increased osmatic pressure and caused a drop in plant water as found by Sanchezonde and Azura (1979) on tomato plant. Similar result was obtained by Hussein on *O. basilicum* and Abou El-Fadl *et al.* (1990) on peppermint.

Concerning spaces between plants it was noted that there was a significant increase in fresh and dry weights by increasing spaces between plants. These results are in harmony with those obtained by Wiebe (1987) on carrots and Bahati (1988) on cariander. Also, the spacing with low concentration of salinity increased fresh and dry weights during the two seasons. While the higher concentration (12000 ppm) with spacing did not affect fresh and dry weights, as compared with control. The best result of fresh and dry weights of whole plant was with (35 cm spaces and level 4000 ppm).

b) Effect of saline irrigation water and spacing on volatile oil percentage and composition:

Data presented in Tables (5, 6, 7 and 8) cleared that there were an increase in volatile oil percentage and (B-Caryophyllane %, B-pinene %, cineole %, camphor % and Dihydroanllanol %) due to increase levels of saline water irrigation up to 8000 ppm, but it decreased when using 12000 ppm saline irrigation water. These results may be due to the influence of the elements of water salinity, whereas a low concentration caused increasing chemical composition in plant. Also, it was noticed that, spacing led to a remarkable increase in volatile oil percentage and composition, particularly under saline stress. The best results were obtained by salinity (8000 ppm) and 35 cm between plants. These results were in agreement with those reported by Abd El-Nabi and Hussein (1996) who reported that damsisa oil percentage increased by salinity level increasing. Most components of the oil especially cineole were significantly increased.

Table (5). Effect of saline irrigation water and plant spacing on volatile oil percentage of damsisa leaves in 1999 and 2000. seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	0.124	0.126	0.126	0.125	0.126	0.127	0.128	0.127
4000	0.228	0.229	0.229	0.229	0.225	0.227	0.228	0.228
8000	0.230	0.230	0.231	0.230	0.231	0.233	0.230	0.231
12000	0.126	0.128	0.128	0.127	0.128	0.129	0.130	0.129
Mean (B)	0.177	0.178	0.179		0.178	0.179	0.179	
L.S.D at 5%	Salinity (A): 0.020 Spacing (B): NS A x B: 0.048				Salinity (A): 0.030 Spacing (B): NS A x B: 0.048			

Table (6). Effect of saline irrigation water and plant spacing on the volatile oil compositions (B-caryophyllane %) in damsisa plant in 1999 and 2000. Seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	3.98	3.99	4.02	3.997	3.96	3.99	4.03	3.99
4000	4.05	4.08	4.11	4.08	4.02	4.09	4.10	4.07
8000	4.09	4.15	4.21	4.15	4.08	4.16	4.19	4.14
12000	3.91	3.95	3.93	3.93	3.93	3.96	3.95	3.95
Mean (B)	4.01	4.04	4.07		3.998	4.05	4.07	
L.S.D at 5%	Salinity (A): 0.02 Spacing (B): 0.01 A x B: 0.06				Salinity (A): 0.01 Spacing (B): 0.07 A x B: 0.06			

Table (7). Effect of saline irrigation water and plant spacing on the volatile oil compositions (B-pinene %) of damsisa plant in 1999 and 2000. Seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	1.42	1.46	1.49	1.46	1.43	1.48	1.49	1.46
4000	1.91	1.93	1.96	1.93	1.91	1.94	1.95	1.93
8000	1.92	1.99	2.01	1.97	1.94	1.98	2.03	1.98
12000	1.59	1.61	1.65	1.62	1.60	1.62	1.63	1.62
Mean (B)	1.71	1.75	1.78		1.72	1.76	1.78	
L.S.D at 5%	Salinity (A): 0.08 Spacing (B): 0.04 A x B: 0.08				Salinity (A): 0.02 Spacing (B): 0.01 A x B: 0.09			

Table (8). Effect of saline irrigation water and plant spacing on the volatile oil compositions (Cineole %) of damsisa plant in 1999 and 2000. Seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	6.03	6.08	6.09	6.07	6.01	6.09	6.09	6.06
4000	6.07	6.09	6.11	6.09	6.08	6.11	6.12	6.01
8000	6.10	6.14	6.19	6.12	6.11	6.15	6.18	6.15
12000	6.04	6.05	6.06	6.05	6.05	6.05	6.05	6.05
Mean (B)	6.06	6.09	6.11		6.06	6.10	6.11	
L.S.D at 5%	Salinity (A): 0.01 Spacing (B): 0.007 A x B: 0.09				Salinity (A): 0.01 Spacing (B): 0.02 A x B: 0.09			

c) Effect of saline irrigation water and plant spacing on demsine, ambrosine and total sesquiterpene lactones percentage in leaves:

Data in Tables (11, 12 and 13) showed that all levels of saline irrigation water and plant spacing caused increases in ambrosine percentage, while their was decreased in demsine percentage and total demsine and ambrosine in leaves of damsisa.

Table (9). Effect of saline irrigation water and plant spacing on the volatile oil compositions (Camphor %) of damsisa plant in 1999 and 2000. Seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	28.15	28.30	28.31	28.25	28.11	28.35	28.37	28.28
4000	28.38	28.41	28.45	28.41	28.40	28.43	28.46	28.43
8000	28.39	28.44	2849	28.44	28.40	28.41	28.42	28.41
12000	28.31	28.32	28.33	28.32	28.31	28.33	28.35	28.33
Mean (B)	28.31	28.37	28.4		28.31	28.38	28.4	
L.S.D at 5%	Salinity (A): 0.02 Spacing (B): 0.01 A x B: 0.12				Salinity (A): 0.09 Spacing (B): 0.01 A x B: 0.10			

Table (10). Effect of saline irrigation water and plant spacing on the volatile oil compositions (Dihydroanllanol %) of damsisa plant in 1999 and 2000. Seasons

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	20.21	20.25	20.27	20.24	20.22	20.27	20.27	20.25
4000	20.29	20.31	20.33	20.31	20.30	20.31	20.34	20.32
8000	20.32	20.37	20.36	20.35	20.33	20.37	20.37	20.36
12000	20.20	20.24	20.25	20.23	20.31	20.26	20.26	20.28
Mean (B)	20.26	20.29	20.3		20.29	20.3	20.31	
L.S.D at 5%	Salinity (A): 0.012 Spacing (B): 0.011 A x B: 0.95				Salinity (A): 0.010 Spacing (B): 0.013 A x B: 0.104			

Table (11). Effect of saline irrigation water and plant spacing on demsine percentage in leaves in 1999 and 2000 seasons.

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	2.8	2.9	3.1	2.9	2.9	3.2	3.3	3.13
4000	0.68	0.91	0.99	0.86	0.74	0.89	0.94	0.86
8000	0.70	0.93	0.98	0.87	0.61	0.94	0.99	0.85
12000	0.69	0.90	0.96	0.85	0.68	0.90	0.96	0.85
Mean (B)	1.22	1.41	1.51		1.23	1.48	1.55	
L.S.D at 5%	Salinity (A): 0.05 Spacing (B): 0.03 A x B: 0.01				Salinity (A): 0.01 Spacing (B): 0.08 A x B: 0.02			

Table (12). Effect of saline irrigation water and plant spacing on ambrosine percentage in leaves in 1999 and 2000 seasons.

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	2.2	2.4	2.9	2.50	2.2	2.6	2.9	2.57
4000	2.8	3.0	3.2	3.00	2.7	4.1	4.3	2.78
8000	2.8	3.2	3.4	3.13	2.8	3.2	3.6	3.20
12000	2.9	3.2	3.6	3.23	2.7	3.2	3.9	3.27
Mean (B)	2.68	2.95	3.28		2.6	3.28	3.68	
L.S.D at 5%	Salinity (A): 0.07 Spacing (B): 0.01 A x B: 0.02				Salinity (A): 0.01 Spacing (B): 0.04 A x B: 0.02			

Table (13). Effect of saline irrigation water and plant spacing on total demsine and ambrosine in leaves in 1999 and 2000 seasons.

Levels salinity in ppm (A)	Spacing in cm (B)							
	15	25	35	Mean (A)	15	25	35	Mean (A)
	1999				2000			
Control	5.0	5.3	6.0	5.43	5.1	5.8	6.2	5.7
4000	3.48	3.91	3.94	3.89	3.74	4.99	5.24	4.66
8000	3.50	4.13	4.38	4.00	3.41	4.14	4.59	4.05
12000	3.59	4.10	4.56	4.08	3.38	3.90	4.86	4.05
Mean (B)	3.89	4.36	4.72		3.91	4.71	5.22	
L.S.D at 5%	Salinity (A): 0.36 Spacing (B): 0.12 A x B: 0.10				Salinity (A): 0.50 Spacing (B): 0.14 A x B: 0.03			

REFERENCES

Abd El-Nabi, N.M. and E.H. Hussein (1996). Effected of irrigation with saline water on damsisa oil and it is afficacy on spodolera littoralis (Bios D) Egypt Hung Hort. Cont., I.

Abou El-Fadl, I.A.; E.A. El-Gamal and M.M. Khalil (1987). Effect irrigation by saline water and two types of soil on growth and essential oil yield in lemongrass (In press).

Abou El-Fadl, I.A.; M.K. Abd Ella and E.H. Hussein (1990). Effect of saline irrigation water on the growth and some principal compounds of peppermint and spearmint in two types of soil. J. Agric. Res. Tanta Univ., 16(2): 276-295.

Ayers, R.S. and D.W. Westcot (1976). Water quality for agriculture. (FAO) Food and Agr. Org. of the United Nations, Rome. FAO and Drainage paper 29.

Bali, A.S. (1988). Response of dill (*Anethum graveolens*, L.) to row spacing and nitrogen. Indian J. of Agronomy, 33(3): 337-338; 1 Ref.

Bedevian, A. (1936). Illustrated Polyglottic Dictionary of Plant names "Argus and Papazian Presses, Cairo.

Bhati, D.S. (1988). Effect of nitrogen application and row spacing on coriander (*Coriandrum sativum*) production under irrigated condition in semiarid Rajasthan. Indian. J. of Agric. Sci., 58(7): 568-569; 4 Ref.

British Pharmacopeia (1968). Determination of volatile oils in drugs. Published by the Pharmaceutical Press, London. W.C.L.

FAO/UNESCO (1970). International source book on irrigation and drainage of dry land in relation to salinity and alkhalinity. FAO Soil Bull, 22:(2).

Gill, B.S. and J.S. Samra (1986). Yield behaviour of *Ammi majus* under different transplanting dates, spacings and nitrogen levels J. of Res. Punjab. Agric. Univ., 23(2): 213-216; 3 Ref.

Guenther, E. (1961). The essential oils vol. I and III. D, van westrand company Inc. New York.

Gunther, Z. and S. Joseph (1978). Hand book series in chromatography CRC. Inc.

Hussein, A.B. (1999). Physiological studies on the effect of soil salinity on sweet basil plants. M. Sc. Thesis, Agric. Fac. Zagazig Univ.

Kotb, Sh. and E.A. Gamal (1997). Effect of salinity and GA_3 treatment on growth and alkaloidal content of lupinus termis (Forsk). Egypt, J. Agric. Res., 75(4).

Madan, S.P.S. and M.S. Saimbi (1986). A note on the effect of fertilizer and spacing on seed yield in carrot (*Daucus carota*, L.) Haryana, J. of Hort. Sci., 15(1-2): 147-148; 3 Ref.

Munshi, A.M.; G.H. Zargar; G.H. Baha and G.N. Bhat (1990). Effect of plant density and fertilized levels on the growth and seed yield of black zeera under rain-fed conditions. Indian. Cacoa-Arecanut and spices. J., 13(4): 134-136; 4 Ref.

Naiem, E. and C. Rodney (1987). Salinity depression of growth and essential oil formation in spearmint and majoram and its reversal by foliar applied cytokinin phtochemistry, 26 (5): 1333-1334.

Picman, A.F.; J.T. Arnasan and T.D.H. Lamert (1986). Hymenin another sesquterpene lactone in *Ambrosia maritima*. J. Apple. Sci., 9(10): 786-789.

Salem, A.G.; M.K. Abdella and L.M. Abd El-Nabi (2001). Effect of saline irrigation water on growth, oil yield and quality and Associated insects of some Ocimum species. Egypt. J. Agric. Res., 79(2): 563-586.

Sanchezonde, M. P. and P. Azura (1979). Effect of balanced solution with different osmotic pressure on tomato plant. J. of plant Nutr., 3: 295-307. (C.F. Hort. Abst., 51: 4662.1981)

Snedecor, G.W. and W.G. Cochran (1974). "Statical methods". Lowa State Univ., Press Amer., Lowa USA 6th Ed. pp. 593.

Sutarno, J. (1987). Effect of salinity NaCl on the growth of Amaranthus paniculatus. Hort. Abst., 57(8): 631.

Tuckholm, V. (1974). Students flora of Egypt 2nd Ed. P. 568, Cairo Univ., Cooperative Printing Campany, Beirut.

Wiebe, H.J. (1987). Effects of plant densities and nitrogen supply on yield harvest date and quality of carrots. Acta Hort. No. 198, 191-198; 1ref.

دراسة تأثير الرى بالمياه المالحة ومسافات الزراعة على النمو والمكونات الفعالة لنبات الدمسيسة

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قسم النباتات الطبية والعطرية ـ مركز البحوث الزراعية ـ الدقى ـ القاهرة

أجريت هذه التجربة خلال عامى ١٩٩٩ ، ٢٠٠٠ بمعمل بحوث الملوحة والقلوية بمزرعة الصبحية ـ الإسكندرية بهدف استخدام مستويات مختلفة من المياه المالحة للرى والكثافة النباتية ومدى تأثيرهما على النمو والمكونات الفعالة لنبات الدمسيسة.

وقد استخدمت أربع تركيزات من المياه المالحة صفر، ٤٠٠٠ ، ٨٠٠٠ ، ١٢٠٠٠ جزء فى المليون مع مسافات زراعة ١٥ ، ٢٥ ، ٣٥ سم بين كل نبات. وكانت النتائج كالآتى:

١ـ عند استخدام التركيزات ٤٠٠٠ ، ٨٠٠٠ جزء فى المليون أدى ذلك إلى زيادة فى النمو والزيوت الطيارة.

٢ـ أدى استخدام التركيز العالى ١٢٠٠٠ جزء فى المليون إلى انخفاض فى معدلات النمو وكذا المكونات الفعالة.

٣ـ لوحظ أنه كلما زادت المسافات بين النباتات أحدث ذلك زيادة فى النمو والمكونات الفعالة وخاصة أثناء رى النباتات بتركيزات ٤٠٠٠ ، ٨٠٠٠ جزء فى المليون ، بينما بدأت تنخفض بزيادة التركيز إلى ١٢٠٠٠ جزء فى المليون.

٤ـ زيادة نسبة مركب الامبروزين بزيادة مستوى الملوحة فى مياه الرى والمسافة بين النباتات وفى نفس الوقت انخفضت نسبة مركب الدمسين مما ترتب عليه انخفاض المجموع الكلى للدمسين والامبروزين.

وبناءا على هذه الدراسة يمكن التوصية بأن أنسب مسافة زراعة بين نباتات الدمسيسة هى ٣٥ سم مع أنسب تركيز لملوحة ماء الرى....٤ للحصول.على.اعلى.محصول.جاف ،٨٠٠٠ جزء فى المليون للحصول على.اعلىنسبة للزيت الطيار.

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