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EFFECT OF SOIL AND FOLIAR NITROGEN FERTILIZATION ON SUGAR BEET IN NEWLY RECLAIMED SOILS

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ABSTRACT

Two field experiments were carried out at El-Sirw Agriculture Research Station, Damietta Governorate in 1998/99 and 1999/2000 seasons to study the effect of five nitrogen rates *i.e*. 0, 30, 50, 70 and 90 kg N/fed (as soil fertilization) and five of urea concentrations *i.e*. 0, 1, 3, 4 and 5% urea (as foliar application) on growth, yield components, yield and quality of sugar beet in newly reclaimed soils (saline soil). The experiments were laid out in strip block design with three replications.

The obtained results showed that average values of root length, root fresh weight, top yield/fed, root yield/fed and root α-amino nitrogen content were significantly increased with increasing nitrogen fertilizer rate (as soil fertilization) in both seasons. Applying nitrogen fertilizer at the rate of 90 kg N/fed. gave the highest values of the previously mentioned traits in both seasons, while the highest sugar yield/fed was recorded with 70 kg N/fed.

On the other hand, sucrose percentage and purity percentage significantly decreased with increasing nitrogen fertilizer rate up to 90 kg N/fed in both seasons.

The obtained results indicated that average root length, root fresh weight, top yield/fed, root yield/fed, sugar yield/fed and root α-amino nitrogen content were significantly increased as urea concentration increased in both seasons. Foliar application of urea at 5% concentrate gave the highest values of mentioned previously characters in both seasons. On the contrary, sucrose percentage and purity percentage significantly decreased with increasing urea concentration up to 5% in both seasons.

The obtained results illustrated that all the previously mentioned traits significantly affected by the interaction between nitrogen fertilizer rates (as soil fertilization) and urea concentration (as foliar application) in both seasons. Applying nitrogen fertilizer at the rate of 70 kg N/fed and sprayed with urea 5% concentration gave the highest root yield and sugar yield/fed in both seasons.

INTRODUCTION

Sugar beet (*Beta vulgaris, L*) is one of the most important sugar crops in the world. The Egyptian Government encourages sugar beet growers to decrease the gab between sugar production and consumption as well as increase the cultivated area with sugar beet crop. Most of these areas face some stress problems, *i.e.* salinity and unbalance nutrient elements. Saline soils contain sufficient amount of salts to suppress plant growth and induce nutritional imbalance as well as deficiencies of some nutrient elements. For the optimum growth of plant nutrients must be present in balanced proportion in the growth medium.

Nitrogen is an essential nutrient for sugar beet plants, decidedly the amount and method of nitrogen application required to produce the maximum root and sugar yield under newly reclaimed soils.

Soil application of fertilizers is the oldest and most common method practiced throughout the world for all crops. It was based on the fact that primary function of the root is to absorb plant nutrients from the soil. The plants grown under salts affected soil needed more nitrogen fertilizer rate.

Khalifa and Header (1995) found that under low soil salinity level, root and sugar yield/fed of sugar beet significantly increased with increasing nitrogen rate up to 80 kg N/fed but under moderate and high soil salinity level, sugar beet plants responded to nitrogen root up to 100 kg N/fed. Sarhan (1998) reported that in newly reclaimed soil increasing nitrogen fertilizer rate up to 100 kg N/fed significantly increased root length, root fresh weight, root and sugar yields/fed, while sucrose and purity percentage decreased. El-Hawary (1999) concluded that under saline soil conditions, increasing nitrogen fertilizer rates from 0 to 90 kg N/fed to sugar beet plants significantly increased root length, root fresh weight and yields of top, root as well as sugar (ton/fed). On the other hand, sucrose percentage was decreased as nitrogen rate increased.

Hence, foliar application of plant nutrients can be very efficient under certain conditions for minimizing those unfavorable conditions (costs) and environmental hazard (pollution) as well as it had remunerated the soil nitrogen deficit caused by salinity.

Van Burg *et al.* (1982) recorded that application of urea as spray to sugar beet plants reduced sugar concentration. Gnative (1989) reported that foliar spraying sugar beet plants with liquid nitrogen increased root and sugar yield/ha. Badawi (1996) found that using urea 4% concentration as foliar spray for sugar beet plants had significant effects on root fresh weight, root, top and sugar yields/fed. El-Maghraby, Samia *et al.* (1997) found that application 1.5% N as foliar application caused a significant increase in root length, root fresh weight, root yield/fed and sugar yields/fed, but sucrose and purity percentages were decreased.

Fahmi, Mahasen (1999) stated that root length, root fresh weight, root and sugar yields/fed of sugar beet were significantly increased with foliar application of urea at 2% concentration on compared with spraying by tap water.

Therefore, this investigation was carried out to study the effect of nitrogen rates as soil fertilization and urea as foliar nutrition on growth, yield, its components and quality of sugar beet plants as well as reducing fertilizer costs and pollution in newly reclaimed soils at north Delta in Egypt.

MATERIALS AND METHODS

Two field experiments were carried out at El-Sirw Agriculture Research Station, Damietta Governorate in 1998/99 and 1999/2000 seasons to study the effect of five nitrogen rates *i.e.* 0, 30, 50, 70 and 90 kg N/fed (as soil fertilization) and five of urea concentrations *i.e.* 0 (spraying with distilled water), 1, 3, 4 and 5% urea (as foliar application) on growth, yield components, yield and quality of sugar beet variety Athespoly in newly reclaimed soils (saline soil).

Nitrogen fertilizer was applied in the form of urea (46% N). the amount of nitrogen used was applied as a soil dressing in once after thinning (40 days after sowing). The urea solution was sprayed at 60 and 90 days from sowing date as the previously mentioned concentrations.

The experiments were laid out in strip block design with three replicates. The vertical plots were devoted to soil nitrogen fertilization treatments, whereas the horizontal plots were assigned to urea foliar spray concentrations. The area of each plot was 10.5 m^2 (6 ridges x 0.5m wide x 3.5 long).

Soil samples were taken from 5 and 25 cm depth in the experimental sites before soil preparation to determined and reported as average of the important mechanical properties of soil as shown in table (1)

Table 1: Mechanical and chemical soil characters at the experimental sites during the two seasons 1998/99 and 1999/2000.

Variables	Seasons	
	1998/99	1999/2000
Mechanical analyses		
Sand %	22.6	22.8
Silt %	26.9	26.8
Clay %	97.3	97.9
Texture class	Loamy	Loamy
Chemical analysis		
E.Ce ds/m at 25 ºC	4.5-5.3	4.5-5.5
CaCO3 %	1.60	1.55
Organic matter %	0.9	0.7
Ca ++	1.20	1.20
Mg ++	0.40	0.20
Na +	0.37	3.03
K +	0.07	0.06
SO_4^{--}	1.70	2.05
HCO_3^{--}	0.35	0.35
Cl^-	1.99	2.30
Available N %	40 ppm.	38 ppm
Available P %	14 ppm	15 ppm

The soil was prepared as usual for sugar beet crop and phosphorus fertilizer was applied to seed bed preparation at the rate of 100 kg Superphosphate (15.5 % P_2O_5) per feddan.

Sowing took place on November 14th and October 26th in the first and second seasons, respectively. Sugar beet balls were hand sown as the usual dry sowing method on one side of the ridge in hills 20 cm apart. The plots were irrigated immediately after sowing directly.

To enhance the emergence of plants, a quick irrigation was applied after seven days. Sugar beet seedlings were thinned after 40 days from sowing date to obtain one plant per hill. The other agricultural practices were kept the same as normal practiced in sugar beet crop.

At harvest time (after 190 days from sowing) the plants grown on the two inner ridges of each plot were harvested and cleaned. Roots and tops were separately and weighted and the following data were recorded:

1- Root length (cm) 2- Root fresh weight (g)

3- Top yield /fed.(ton) 4- Root yield /fed (ton)

5- Sugar yield /fed (ton), it was calculated by multiplying root yield by root sucrose percentage.

The following measurements were determined on five roots chosen randomly from the central two ridges of each plot to have the following records:

6- Sucrose percentage, it measured by on automatic fresh system (HYCEL) for analysis of sugar beet quality according to Le Docte (1927)

7- Purity percentage, it was determined as ratio between sucrose % and TSS% of roots.

8- Root-amino nitrogen contents, it determined according to method of Carruthers *et al.* (1962).

The data were statistically analyzed according to Gomez and Gomez (1984). The treatment means were compared using the least significant different (LSD) according to the procedure outlined by Steel and Torrie (1980).

RESULTS AND DISCUSSION

Results presented in Tables 2 to 8 show that average root length, root fresh weight, top yield /fed, root yield/fed, sugar yield /fed and-amion nitrogen content in roots were significantly increased with increasing nitrogen fertilizer rate as soil fertilization in both reasons. On the contrary, sucrose and purity percentage significantly decreases as nitrogen rate increased in both seasons. Increasing nitrogen fertilizer rates from 0 to 90 kg N/fed increased root length by 54.22% and 46.33%, root fresh weight by 22.73% and 24.33%, top yield (ton/fed) by 53.29% and 35.62% and root yield (ton/fed) by 220.61% and 144.38% as compared with those of the control (0 kg N/fed) in 1998/99 and 1999/2000 seasons, respectively. In this connection, applying nitrogen fertilizer at the rate of 70 kg N/fed give 168.25% and 110.99% increase in sugar yield/fed as compared with those of the control (No added N) in 1998/99 and 1999/2000 seasons, respectively. The highest sucrose percentage 20.46% and 20.86% as well as purity percentage 80.41% and 82.10% were recorded with nitrogen fertilizer at a rate of 30 kg N/fed in 1998/99 and 1999/2000 seasons, respectively. Alpha amino nitrogen content was lowest (2.12 and 1.99) with the control plants (0 kg N/fed) and highest (3.05 and 2.77%) by 90 kg N/fed. in the first and second seasons, respectively.

The increase in root length with increasing nitrogen rate may be attributed to the nitrogen rate in increasing division and elongation of root cells led to increasing root length.

The increase in root fresh weight due to nitrogen might be attributed to the increase in root length (Table 2) caused by nitrogen which led to increasing root fresh weight. These results are in harmony with those of Sarhan (1998) and El-Hawary (1999) .The increase in top, root and sugar yields caused by nitrogen may be attributed to the favourable effects of nitrogen on increasing size and number of leaves which led to increasing leaf area per plant which in turn led to higher photosynthetic activities resulted in increasing net assimilation rate translocated and stored in beet roots resulting in increasing root and sugar yield. These results are in agreement with those of Khalifa and Header (1995), Ibrahim (1998) and El-Hawary (1999) who found that root and sugar yield plants of sugar beet increased with increasing nitrogen fertilizer rate. The decrease in sucrose and purity % related to the increase in rates of nitrogen may be due to the role of nitrogen in increasing non sucrose substance such as proteins ,amino acids and other substances which led to decreasing juice purity. The results are in the same line with those of Smit *et al*. (1995) who reported that sucrose and purity % in sugar beet decreased with increasing nitrogen rates.

Results recorded in Tables 2-8 show clearly that average root length, root fresh weight, top yield/fed, root yield/fed, sugar yield/fed and nitrogen content in roots of sugar beet significantly increased with increasing urea concentration as a foliar application in both seasons. On the other hand, sucrose and purity percentage decreased as urea concentration as foliar application increased in both seasons.

Foliar application of urea at 5% concentration caused 19.18%, 37.16%, 29.17%, 16.36%, 11.57% and 20.52% in 1998/99 and 19.62%, 26.74%, 34.63%, 11.82%, 9.94% and 23.58% increase in root length, root fresh weight, top yield/fed, root yield/fed, sugar yield fed and -amino nitrogen content in roots as compared with those of the control (spraying with distilled water) , respectively. The highest sucrose percentage (19.11% and 19.81%) recorded with urea 1% concentration, but the highest purity percentage was found with plants grown under the control (spraying with distilled water) in 1998/99 and 1999/2000 seasons, respectively.

The increase in root and sugar yields/fed caused by foliar application of urea might be attributed to the active role of urea in enhancing growth of sugar beet plants i.e. root length (Table 2) and root fresh weight (Table 3) which led to increasing root and sugar yields/fed. These results are in the same line with those recorded by Van Burg *et al.* (1982), Gnative (1989), Badawi (1996), El-Maghraby, Samia *et al.* (1997) and Fahmi, Mahasen (1999).

Results presented in Tables 2-8 show that the interaction effect between nitrogen fertilizer rates (as soil application) and urea concentrations (as foliar application) was significant on all studied traits in both seasons. Applying nitrogen fertilizer at the rate of 70 kg N/fed as soil fertilization and spraying sugar beet plants by urea 5% concentration as foliar application gave the highest root fresh weight (890 and 980 g), root yield/fed (21.07 and 23.10 tons) and sugar yield/fed (3.75 and 4.31 tons) as compared with all other treatments in 1998/99 and 1999/2000 seasons, respectively.

Generally, it can be concluded that soil fertilization with 70 kg N/fed and foliar application of urea at the concentration of 5% was beneficial for obtaining optimum root and sugar yields/fed of sugar beet and reducing fertilizer costs and ground pollution through reducing the amount of soil fertilizer in newly reclaimed soils at North Delta conditions.

Table 2: Average of root length (cm) at harvest as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	25.00	26.10	27.30	28.00	29.70	27.22	26.20	27.70	28.80	30.73	32.60	29.21
30 kg/fed	27.00	28.10	28.67	30.70	32.00	29.29	29.43	31.70	33.60	34.80	36.73	33.25
50 kg/fed	30.20	31.00	33.10	34.50	35.90	32.94	33.03	34.67	36.73	38.17	39.50	36.42
70 kg/fed	33.80	35.30	27.20	39.00	41.10	35.28	36.50	38.30	39.57	41.57	42.40	39.67
90 kg/fed	38.30	41.00	42.10	43.30	45.20	41.98	39.50	40.80	42.87	44.90	45.73	42.76
Mean	30.86	32.40	31.67	35.10	36.78		32.93	34.63	36.31	38.03	39.39	
LSD at 5% for:												
Soil N :						1.08						0.32
Foliar S:						0.38						0.49
N x S :						0.89						0.38

Table 3: Average of root fresh weight (g) at harvest as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	300	344	370	381	390	357.0	350	385	415	423	433	401.2
30 kg/fed	430	464	470	475	490	465.8	455	477	498	527	543	500.0
50 kg/fed	473	490	563	584	600	542.0	550	583	665	705	747	650.0
70 kg/fed	579	640	730	752	890	718.2	695	760	875	930	980	848.0
90 kg/fed	680	720	790	850	880	784.0	840	855	900	945	960	900.0
Mean	474.4	528.0	584.6	608.4	650.0		578.0	612.0	670.6	706.0	732.6	
LSD at 5% for:												
Soil N :						6.76						17.74
Foliar S:						15.31						11.44
N x S :						9.59						19.37

Table 4: Average top yield /fed (ton) as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	3.50	4.05	4.47	4.55	4.75	4.26	3.70	4.33	4.72	4.90	4.97	4.52
30 kg/fed	4.52	5.32	6.18	6.78	6.98	5.96	4.85	5.15	6.08	6.50	6.90	5.90
50 kg/fed	6.43	7.23	8.15	8.78	9.18	7.95	6.30	6.78	6.40	8.43	9.08	7.40
70 kg/fed	8.35	8.95	9.82	10.29	10.95	9.67	7.80	8.48	9.22	9.82	10.47	9.16
90 kg/fed	9.58	10.07	10.94	11.47	11.88	10.79	9.40	9.95	10.75	11.42	11.75	10.65
Mean	6.48	7.12	7.91	8.37	8.75		6.41	6.94	7.43	8.21	8.63	

LSD at 5% for:	1998/99	1999/2000
Soil N :	0.11	0.11
Foliar S:	0.05	0.05
N x S :	0.08	0.08

Table 5: Average root yield/fed (ton) as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons.

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	5.20	5.80	6.80	6.91	7.02	6.21	8.00	8.40	9.30	9.55	9.68	8.99
30 kg/fed	12.0	12.30	12.56	12.97	13.57	12.68	14.40	14.52	15.05	15.37	15.65	15.00
50 kg/fed	15.50	16.90	17.85	18.38	18.78	17.48	19.10	19.40	20.30	20.48	21.00	20.06
70 kg/fed	18.20	18.63	19.70	20.32	21.07	19.58	20.90	21.10	22.00	22.40	23.10	21.90
90 kg/fed	18.80	19.35	20.15	20.60	20.67	19.91	20.10	21.83	22.53	22.60	22.80	21.97
Mean	13.94	14.60	15.41	15.84	16.22		16.50	17.05	17.84	18.08	18.45	

LSD at 5% for:	1998/99	1999/2000
Soil N :	0.54	0.27
Foliar S:	0.54	0.16
N x S :	0.56	0.16

Table 6 : Average sugar yield/fed (ton) as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	1.00	1.13	1.35	1.39	1.42	1.26	1.59	1.68	1.89	1.95	2.00	1.82
30 kg/fed	2.39	2.51	2.65	2.75	2.82	2.59	2.93	3.01	3.15	3.24	3.32	3.13
50 kg/fed	3.30	3.33	3.48	3.56	3.61	3.46	3.95	4.07	4.15	4.15	4.22	4.11
70 kg/fed	3.42	3.46	3.62	3.68	3.75	3.59	3.99	4.15	4.28	4.26	4.31	4.20
90 kg/fed	3.30	3.35	3.45	3.43	3.34	3.38	3.62	3.87	3.97	3.93	3.83	3.84
Mean	2.68	2.76	2.90	2.95	2.99		3.22	3.36	3.49	3.51	3.54	

LSD at 5% for:	1998/99	1999/2000
Soil N :	0.05	0.11
Foliar S:	0.03	0.05
N x S :	0.05	0.08

Table 7 : Average sucrose percentage as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	19.25	19.49	19.85	20.05	20.23	19.77	19.90	19.98	20.30	20.45	20.67	20.26
30 kg/fed	19.90	20.43	20.55	20.68	20.75	20.46	20.35	20.70	20.95	21.05	21.23	20.86
50 kg/fed	20.00	19.70	19.52	19.35	19.20	19.55	20.70	20.98	20.50	20.28	20.10	20.51
70 kg/fed	18.76	18.59	18.37	18.10	17.80	18.32	19.85	19.65	19.47	19.00	18.70	19.33
90 kg/fed	17.57	17.33	17.12	16.66	16.17	16.97	18.00	17.75	17.60	17.40	16.80	17.51
Mean	19.10	19.11	19.08	18.97	18.83		19.76	19.81	19.76	19.64	19.50	

LSD at 5% for:	1998/99	1999/2000
Soil N :	0.16	0.15
Foliar S:	0.16	0.06
N x S :	0.19	0.12

Table 8: Average purity percentage as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	75.88	75.81	76.68	77.34	77.41	76.62	78.81	78.57	79.14	79.24	79.50	79.05
30 kg/fed	79.60	80.70	80.80	80.59	80.34	80.41	81.08	82.08	82.30	82.45	82.57	82.10
50 kg/fed	80.63	75.77	74.40	73.42	72.24	75.29	83.81	81.67	78.75	77.17	76.05	79.49
70 kg/fed	76.51	75.42	63.80	72.25	70.49	71.69	81.59	80.21	78.79	76.15	74.50	78.25
90 kg/fed	72.44	70.83	69.45	67.51	66.46	69.34	74.84	73.05	71.84	70.65	67.82	71.64
Mean	77.01	75.71	75.03	74.22	73.39		80.03	79.12	78.16	77.13	76.09	

LSD at 5% for:	1998/99	1999/2000
Soil N :	5.52	0.87
Foliar S:	4.81	0.70
N x S :	5.25	0.75

Table (9) : Average root-amino nitrogen content as affected by nitrogen fertilizer rates as soil fertilization and foliar application of urea concentrations in 1998/99 and 1999/2000 seasons.

Soil N rates	1998/99 Season						1999/2000 Season					
	Urea concentrations					Mean	Urea concentrations					Mean
	0%	1%	3%	4%	5%		0%	1%	3%	4%	5%	
0 kg/fed	1.80	1.96	2.29	2.53	2.85	2.12	1.72	1.87	1.97	2.10	2.25	1.99
30 kg/fed	2.12	2.09	2.42	2.65	2.94	2.23	1.86	2.03	2.13	2.28	2.42	2.11
50 kg/fed	2.27	2.24	2.55	2.78	3.06	2.55	2.13	2.23	2.35	2.45	2.60	2.35
70 kg/fed	2.27	2.37	2.67	2.87	3.15	2.76	2.34	2.49	2.63	2.75	2.83	2.61
90 kg/fed	2.37	2.47	2.68	2.95	3.22	3.05	2.55	2.67	2.81	2.91	2.99	2.77
Mean	2.29	2.43	2.55	2.67	2.76		2.12	2.26	2.38	2.50	2.62	

LSD at 5% for:	1998/99	1999/2000
Soil N :	0.02	0.01
Foliar S:	0.02	0.02
N x S :	0.03	0.03

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تـأثير التسميد الأزوتـي الأرضـي والـورقي علـى محصـول بنجـر السـكر المنـزرع فـى الأراضى حديثة الإستزراع.

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أجريـت تجربتـان حقليتـان بمحطـة البحـوث الزراعيـة بالسـرو بمحافظـة دميـاط خـلال موسـمى 1999/98 و2000/99 لدراسـة تـأثير خمسـة معدلات من السماد الآزوتـى (صـفر ،30،50،70،90 كجم ن/فدان)كتسميد أرضى وخمسة تركيزات من محلول اليوريـا (صـفر ،1، 3 ، 4 ،5%) رشـا علـى النباتـات على النمو والمحصول وجودته لبنجر السكر والمنزرع فى الأراضى حديثة الإستزراع .
استخدم تصميم الشرائح المتعامدة فى ثلاثة مكررات .وتتلخص أهم النتائج فيما يلى :
أظهرت النتـائج أن طـول الجذر ووزن الجذر الغض ومحصـول العرش والجذور والسكر طن / فدان ومحتوى الجذور من ألفا أمينوا نيتروجين إزدادت معنويا بزيادة معدل السماد الآزوتى فى كلا الموسمين ،بينما نقص معنويا كلا من النسبه المئويه للسكروز والنقاوة بزيـادة معدل السماد الآزوتـى فـى كـلا الموسمين .أعطت إضافه الازوت بمعدل 90كجم/فدان أعلى قيم لكل من طـول ووزن الجـذر الغـض ومحصـول العرش والجذور/فدان فى كلا الموسمين. بينما كان أعلى محصول سكر طن/فدان عند إضـافة 70 كجم ن /فدان فـى كلا موسمى الدراسة. كمـا سـجلت النتـائج أن أعلـى نسبة مئويـة للسكروز والنقـاوة كانت مـع معدل 30 كجم ن/فدان فى كلا موسمى الدراسة مقارنة مع المعاملات الاخرى.
أوضـحت النتـائج أن طـول الجـذر ووزن الجـذر الغـض ومحصـول العـرش طن/فدان ومحصـول الجذورطن/فدان ومحصول السكر طن /فدان ومحتوى الجذور من الفا أمينو نتروجين ازدادت معنويـا بزيـادة تركيـز اليوريـا فـى محلـول الـرش فـى كـلا موسـمى الدراسـة. بينمـا نقصـت معنويـا النسـبة المئويـة للسـكروز والنقاوة بزيادة تركيز اليوريا فى محلول الرش فى كلا موسمى الدراسة.أعطى الرش بمحلول اليوريـا بتركيـز 5% أعلـى متوسـطات لكل الصـفات المدروسـة السـابقة فيمـا عـدا النسـبة المئويـة للسـكروز والنقـاوة مقارنـة بالتركيزات الاخرى فى كلا موسمى الدراسة.
أظهـرت النتـائج بوضـوح أن تـأثير التفاعل بـين التسـميد الازوتـى الارضـى والـرش باليوريـا كـان معنويا لكل الصفات المدروسة السابقة فى كلا موسمى الدراسة. وقد اعطى تسميد نباتات بنجـر السـكر بمعـدل 70 كجم ن/فدان ورشـها بتركيـز 5% يوريـا أعلـى محصـول للجـذور والسـكر طن/فدان مقارنـة بالمعـاملات الاخرى فى كلا موسمى الدراسة.
عموما توصـى الدراسة أنه يمكن زيادة إنتاجية محصول الجذور والسكر طن/فدان من بنجر السكر النامى تحت ظروف الاراضى حديثة الاستزراع (الملحية) فى شمال الدلتا بإضافة 70كجم ن /فدان مـع رش النباتـات بمحلـول اليوريـا بتركيـز 5 %. وان الـرش باليوريـا يمكـن أن يـوفر كميـات مـن السـماد الازوتــى الارضى وكذلك تقليل تلوث البيئة وتكاليف الانتاج.