YIELD AND QUALITY OF SOME SUGAR BEET VARIETIES AS AFFECTED BY WATER QUALITY AND NITROGEN FERTILIZATION

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Abstract

The present work was conducted at Tamiya, Fayoum Governorate in 2001/2002 and 2002/2003 seasons to study the effect of water quality and nitrogen fertilization on yield and quality of some sugar beet varieties. Each trial included tewenty four treatments represent the combination between two qualities of irrigation water (fresh and brackish water), three nitrogen levels (60,75 and 90 kg N/fed) and four sugar beet varieties (two polygerm , Beta-Poly 4, Ras-Poly and two monogerm, Tora, Helx). A split plot design with four replications was used. The obtained results showed that root length , root yield, and sucrose% were affcted significantly by water quality in both seasons . Supplying sugar beet plants with brackish water recorded the highest values of sugar yield compared with those watered with fresh water. Sugar beet varieties differed sgnificantly in root length, root girth, sucrose %, root and sugar yields in both growing seasons. Increasing N-level from 60 up to 90 kg N/fed, significantly increased root length, root girth and sucrose%, purity % as well root yield in both seasons. Sugar yield was significantly affected by adding N fetilizer in the 1st season only.

INTRODUCTION

Water has a vital role in all biological reactions that take place within plants. It is the medium in which chemical transformations take place and it is a key reactant in the reduction of carbon dioxid during photosynthesis. Turgor pressure, casued by osmotic in the watery contents of cells, imparts mechanical strength to leaves and roots, causes to open and expands growing cells indeed, much of the expansion of sugar beet leaves and storage roots take place at night when the turgor pressure is high (Johnson and Davis, 1971) and (Waldron et al., 1985). Winter (1990) revealed that sugarbeet cv. Mono-Hy D2 and Mono-Hy TX9 grown with 0, 86 and 264 mm seasonal irrigation levels increased sugar and root yields. Kalinin and Nikul (1991) found significant differences in root length, girth, juice quality root and sugar yields, when ten sugar beet varieties were tested under irrigation. Khan et al. (1998) found

that root yield was highest when sugar beet was irrigated every 7 or 14 days. Tirczka, et al. (1998) found that when sugar beet was irrigated resulted in an 18-20% increase in average of root and sugar yields, compared with non irrigated. Azzazy (2000) found that sugar beet variety Sumba recorded higher values of root length,root diameter and root yield compared with those of Farida variety.

Concerning the effect of nitrogen fetitlizers on sugar beet. Obead (1980) obtained significant differences among sugar beet varieties in sucrose percentage, root and sugar yields while juice purity was not significntly affected. Singhania and Sharma (1990) reveled that sugar beet fertilized by 0, 60, 120 or 180 kg N/ha gave avrage root yields of 9.18, 15.53, 24.15 and 27.90 t/ha, and total soluble solids increased with increasing N rates up to 120 kg/ha, while sugar content and purity percentage of juice decreased by increasing N rates. Grzes et al. (1997) found that application of 80 kg N/ha increased root length and root yield compared with application of (0, 160 or 240 kg N/ha). Ldal et al. (1997) found that when sugarbeet was given 0, 40, 80 or 120 kg N/ha, root and sugar yield generally increased with increasing N rates. Khan et al. (1998) reveled that high N rates adversly affected juice quality and purity percentage. Eckhoff (1999) showed that when sugarbeet cv. Monohikari was given 75, 100 or 125 kg N /ha, root yield did not generally differ between N rates, while sucrose content increased with the lowest dose. El-Sheikh (1999) showed that sugar beet varieties differed significantly in root length, girth, purity %, root yield and sugar yield. Azzazy (2000) found that root length and diameter were significantly increased as the applied N-dose was raised from (50,75 and 100 kg N/fed.) on the contrary, sucrose and purity percentages were negatively affected by increasing N-levels. Voronin, (2000) found that adding nitrogen fertilizer at rates of 90, 120, 150, and 180 kg/ha increased root girth and yield. Also, he mentioned that the optimum rate was 150 kg N/ha..The aim of this investigation was to study the feasibility of sowing four sugar beet varieties under two water quality and three nitrogen doses under Fayoum Governorate conditions to obtain the profitable sugar yield.

MATERIALS AND METHODS

The present work was conducted at Tamiya, Fayoum Governorate in 2001/2002 and 2002/2003 seasons to study the effect of water quality and nitrogen fertilization on yield and quality of some sugar beet varieties. Each trial included

tewenty for treatments represent the combination between two water quality treatments (fresh and brackish water), three nitrogen levels (60,75 and 90 kg N/fed) and four sugar beet varieties (two poly-germ, Beta-Poly 4, Ras-Poly and two monogerm, Tora, Helx). Fresh water was taken from a field canal which main source is Nile river, meanwhile brackish water source was a mixture of fresh with agricultural drainage water. A split plot design with four replications was used. The two treatments of two water quality were allocated in the main plots and the combination between nitrogen levels and sugar beet varieties were randomly distributed in the sub-plots. Sub-plot area was 21 m^2 including 6 ridges of 7 meters in length and 50 cm apart. The preceding crop were rice in the loction watered by brackish water and sorghum in the site irrigated by fresh water. Sugar beet varieties were sown in the Mid-september in the 1^{st} and 2^{nd} seasons. Nitrogen fertilizer was added as urea (46% N) into two equal doses; after thining and one month later. Moreover, 30 kg p_2o_2 (in the form of superphosphate 15% P_2O_2) and 48 kg K_2o as potassium sulphate 48% K_2O) per feddan were added before sowing in each trial. Physical and chemical properties of the upper 20 cm of the experimental site showed that the soil consisted of 48.2% clay, 28.0% silt, 23.8% sand and contained 22.3% ppm available N, 226 ppm P and 442 ppm K. Concetrations of trace elements in brackish water in mg/ L were M_n 6.23, F_e 3.10, C_u 0.20,Z_n 0.02, C_d 0.65 and N_i 0.27, while the concentration of these elements in fresh water amounted to M_n 1.21, F_e 0.73, C_u 0.07,Z_n 0.08, C_d 0.07 and N_i 0.49 mg/ L) . Sodium adsorption ratio, SAR was 5.7% and 9.2%. The concentration of trace elements were determined using the method described by Kopp and Kroer (1976) using anatomic absorption spectophotometer (model 2830,Perkin-Elemer). The calculated amounts of water being 2450 , 2620 and 2580 , 2790 m^3/fed represented 10 , 11 irrigations in the fresh and brackish water in the first and second sesones, respectively.The interval between irrigations was 17 days. Water was conducted through a water meter of 0.1 cubic meter accuracy used to be tightly hooked where the wide inlet towards the main permanent canal and the outlet towards the lateral temporary field canal of the irrigated plots. Harvest was done on the 25^{th} of April. At harvest ,20 roots of sugar beet were taken from each treatment and cleaned to determine the following characters:

1- Root length (cm).

2- Root girth (cm).

3- Sucrose % was determined as described py Le Docte (1927).

4- Purity % was calculated according to the following equation:

Purity % = sucrose % / TSS % x 100.

Where: Total soluble solids percentage (TSS%) was determined using Hand "referractometer."

At harvest, plants of four guarded rows from each plot were collected and weighed to determine the following traits.

5- Root yield (tons/fed).

6-Theoretical sugar yield (tons/fed) was estimated according to the following equation:

Theoretical sugar yield = Root yield x Sucrose %x Purity. %

The collected data were statistically analyzed according to Senedecor and Cochran (1981).

RESULTS AND DISCUSSIONS

1- Root length

Data in Table (1) show that root length was significantly affected by water quality in both seasons. Fresh water attained an increase in this trait amounted to 3.56 and 4.96 cm in the 1st and 2nd season, respectively compared to the brackish water. This result may be due to the higher concentration of salts in the brackish water which limited plant growth compared with fresh water which ensure natural and favorable conditions for plant growth. This finding is in agreement with that found by Kalinin and Nikul (1991). The results in Table (1) revealed that the sugar beet variety multgerm Ras poly significantly recorded higher values of root length.This result is in line with that found by El-Sheikh (1999). Increasing the applied dose of nitrogen fertilizer from 60 to 75 and 90 kg N/fed gave a significant increase in root length amounted to 7.4 and 2.81 cm in the 1st season corresponding to 6.75 and 3.31 cm in the 2nd one, respectively.The increase in root length of sugar beet plants due to the increase in N levels could be attributed to the important role of nitrogen fertilizer in encouraging plant growth. This result is in accordance with that found by Azzazy (2000) .

Root length was not significantly affected by the interaction between the studied factors in both seasons.

Table 1. Effect of water quality and nitrogen fertilizer on root length (cm) of some sugar beet varieties of 2001/2002 and 2002/2003 seasons.

Seasons	2002/2001				2003/2002			
Sugar beet Varieties	Fresh water							
	N kg / feddan			Aver	N kg / feddan			Aver.
	60	75	90		60	75	90	
Beta poly 4	35.00	41.00	47.00	41.00	40.00	44.50	48.50	44.33
Ras poly	40.25	42.50	45.50	42.75	42.50	45.50	50.00	46.00
Tora	31.00	31.50	35.50	32.66	38.50	41.50	47.00	42.33
Helx	35.50	28.00	41.50	35.00	35.50	42.00	43.50	40.33
N Aver.	33.56	37.62	42.37	37.85	39.12	43.37	47.25	43.25
Brackish water								
Beta poly 4	25.00	33.50	34.00	31.00	36.50	38.50	41.00	38.66
Ras poly	29.00	33.00	35.50	32.50	34.50	37.50	40.50	37.50
Tora	31.00	36.50	36.00	34.50	34.00	36.00	39.50	36.50
Helx	37.00	39.50	40.00	38.83	37.50	41.00	43.00	40.50
N Aver.	30.50	35.62	36.50	34.20	35.62	38.25	41.00	38.29
NXV	60Kg	75kg	90kg	Aver.	60Kg	75kg	90kg	Aver.
Beta poly 4	30.00	37.50	40.75	36.00	38.25	41.50	44.75	41.50
Ras poly	34.62	37.5	40.50	37.62	40.00	43.25	46.00	43.25
Tora	31.00	34.00	35.75	33.58	36.25	38.75	43.25	39.41
Helx	32.50	37.50	40.75	36.91	35.00	39.75	42.00	38.91
Total N Aver.	32.03	36.62	39.43	36.03	37.37	40.81	44.12	40.77

L.S.D at 5% level for:		
Water quality (W)	S	S
Varieties (V)	3.31	2.28
Nitrogen (N)	2.57	2.64
Wxv	NS	NS
WxN	NS	NS
NxV	NS	NS
WxNxV	NS	NS

2- Root girth

The results in Table (2) reveal that water quality significantly affcted root girth in the 2nd season only. Aplying fresh water attained an increase in root girth amounted to 5.2 cm. Data illustrated in Table (2) cleared that sugar beet variety Beta poly 4 significantly recorded higher values of root girth compared with the tested varieties in both seasons. This result is in line with that found by El-Sheikh (1999).

The results cleared that root girth was significantly affected by the applied doses of nitrogen fertilizer in both seasons. The increase in root girth due to N levels could be attributed to the role of nitrogen element in enhancing cell division. This result is in line with that found by Voronin, (2000). Root girth was not significantly affected by the interactions between the studied factors in both seasons.

Table 2. Effect of water quality and nitrogen fertilizer on root girth (cm) of some sugar beet varieties of 2001/2002 and 2002/2003 seasons.

Seasons	2002/2001				2003/2002			
Sugar beet Varieties	Fresh water							
	N kg / feddan			Aver	N kg / feddan			Aver.
	60	75	90		60	75	90	
Beta poly 4	31.00	32.50	32.50	32.00	34.00	36.50	34.50	37.00
Ras poly	28.00	30.50	33.00	30.50	32.00	37.00	40.00	36.33
Tora	29.50	29.50	36.50	31.83	31.00	35.50	38.00	34.83
Helx	30.00	32.50	36.50	33.00	33.50	36.50	37.00	35.66
N Aver.	29.62	31.25	34.62	31.83	32.62	36.37	38.87	35.95
Brackish water								
Beta poly 4	32.00	33.00	35.50	33.50	30.00	32.50	35.50	32.66
Ras poly	25.00	28.50	30.50	28.00	28.50	31.50	36.50	32.16
Tora	26.50	31.50	29.00	29.00	24.00	30.50	33.00	29.16
Helx	22.50	33.50	34.00	30.00	23.50	28.00	31.00	27.50
N Aver.	26.50	31.62	32.25	30.12	26.50	30.62	34.00	30.75
NXV	60Kg	75kg	90kg	Aver.	60Kg	75kg	90kg	Aver.
Beta poly 4	31.50	32.75	34.00	32.75	32.00	34.50	38.00	34.83
Ras poly	26.50	29.50	31.75	29.25	30.25	34.25	38.25	34.25
Tora	28.00	30.50	32.75	30.41	27.50	33.00	35.50	32.00
Helx	26.25	33.00	35.25	31.50	28.50	32.25	34.00	31.58
Total N Aver.	28.06	31.43	33.43	30.97	29.56	33.50	36.43	33.16

L.S.D at 5% level for:		
Water quality (W)	NS	S
Varieties (V)	3.15	2.56
Nitrogen (N)	3.85	1.58
WxV	NS	NS
WxN	NS	NS
NxV	NS	NS
WxNxV	NS	NS

3 - Root yield

Data presented in Table (3) show that supplying water quality significantly affected root yield in both seasons. Aplying fresh water increased root yield by 2.32 and 2.62 tons/fed. in the 1st and 2nd seasons respectively. This result may be due to that fresh water ensures natural and favorable conditions for plant growth reflected in higher values of root length (Table 1) and root girth (Table 2) compared with brackish

water contains higher concentration of salts which inhibited plant growth. This finding coincides with that reported by Winter (1990).

The results obtained clear that the tested sugar beet varieties significantly differed in root yield in both seasons. Sugar beet variety Ras poly recorded the higher root yield compared with the other varieties in both seasons. This result is in agreement with the results obtained by Obead (1980).

Table 3. Effect of water quality and nitrogen fertilizer on root yeild (tons / fed.) of some sugar beet varieties of 2001/2002 and 2002/2003 seasons.

Seasons	2001/2002				2002/2003			
Sugar beet Varieties	Fresh water							Aver.
	N kg / feddan			Aver	N kg / feddan			
	60	75	90		60	75	90	
Beta poly 4	17.65	21.30	25.70	21.55	23.50	25.75	28.40	25.88
Ras poly	22.50	26.50	28.50	25.83	25.50	28.25	31.20	28.31
Tora	16.15	21.50	23.50	20.38	19.75	22.25	23.75	21.91
Helx	21.05	23.95	26.00	23.66	19.30	21.75	23.50	21.51
N Aver.	19.33	23.31	25.92	22.85	22.01	24.50	26.71	24.40
Brackish water								
Beta poly 4	15.65	19.85	23.05	19.51	19.50	22.65	24.75	22.30
Ras poly	19.00	22.90	24.25	22.05	22.25	24.30	28.40	24.98
Tora	15.35	20.45	20.90	18.90	17.35	19.65	20.90	19.30
Helx	18.80	22.20	24.00	21.66	18.70	20.50	22.50	20.56
N Aver.	17.20	21.35	23.05	20.53	19.45	21.77	24.13	21.78
NXV	60Kg	75kg	90kg	Aver.	60Kg	75kg	90kg	Aver.
Beta poly 4	16.65	20.57	24.37	20.53	21.50	24.20	26.57	24.09
Ras poly	20.75	24.70	26.37	23.94	23.87	26.27	29.80	26.65
Tora	15.75	20.97	22.20	19.62	18.55	20.95	22.32	20.60
Helx	19.92	23.07	25.00	22.66	19.00	21.12	23.00	21.04
Total N Aver.	18.26	22.33	24.48	21.69	20.73	23.13	25.42	23.09

L.S.D at 5% level for:			
Water quality	(W)	S	S
Varieties	(V)	1.18	1.57
Nitrogen	(N)	1.02	1.38
WxV		NS	NS
WxN		NS	NS
NxV		NS	NS
WxNxV		NS	NS

Increasing the applied doses of nitrogen fertilizer from 60 to 75 and 90 kg N/fed attained a significant increase in root yield amounted to 6.22 and 2.15 tons/fed. in the 1st season, corresponding to 4.69 and 2.29 tons/fed. in the 2nd one, respectively. The effective impact of nitrogen on root yield could be attributed to its role as an essential constituent of protein, amide, amino acid, Co-enzymes and in turn plant capacity of photosynthesis and dry matter accumulation. The role of nitrogen in increasing root

yield may be partially due to increasing water content of beet roots. This finding is in accordance with that reported by Ldal et al (1997) and Voronin, (2000).

None of the interactions between the studied factors had a significant effect on root yield in both seasons.

4- **Sucrose percentage:**

Sucrose percentage was affected significantly by applying water with different qualities (fresh and brackish). Irrigating sugar beet plants by brackish water increased sucrose % by 12.03% and 7.71% in the 1st and 2nd seasons respectively, compared with those watered by, fresh water. This result could be attributed to that, plants grown under conditions of higher concentration of salts of water contain lower water content, i.e. higher sucrose content expressed as a percentage compared with plants supplied with fresh water.

Table 4. Effect of water quality and nitrogen fertilizer on sucrose percentage of some sugar beet varieties of 2001/2002 and 2002/2003 seasons.

Seasons	2001/2002				2002/2003			
Sugar beet Varieties	Fresh water							
	N kg / feddan			Aver.	N kg / feddan			Aver.
	60	75	90		60	75	90	
Beta poly 4	19.15	18.15	17.10	18.13	17.45	19.90	19.40	18.91
Ras poly	19.90	18.95	17.80	18.83	18.60	18.75	18.35	18.56
Tora	19.00	18.10	17.05	18.05	17.30	19.20	17.85	18.11
Helx	18.20	18.30	16.65	17.71	17.45	18.05	17.05	17.51
N Aver.	19.06	18.37	17.15	18.19	17.70	18.97	18.16	18.27
Brackish water								
Beta poly 4	21.90	21.35	19.90	21.05	18.50	20.60	19.35	19.48
Ras poly	22.50	21.80	20.65	21.65	21.80	21.15	19.45	20.80
Tora	21.00	19.75	18.80	19.85	19.50	18.95	18.35	18.93
Helx	20.50	18.95	17.50	18.98	20.40	19.15	18.25	19.26
N Aver.	21.47	20.46	19.21	20.38	20.05	19.96	18.85	19.62
NXV	60Kg	75kg	90kg	Aver.	60Kg	75kg	90kg	Aver.
Beta poly 4	20.52	19.75	18.50	19.59	17.97	20.25	19.37	19.20
Ras poly	21.20	20.37	19.22	20.76	20.20	19.95	18.90	19.68
Tora	20.00	18.92	17.92	18.95	18.40	19.07	18.10	18.52
Helx	19.35	18.62	17.07	18.35	18.92	18.60	17.65	18.39
Total N Aver.	20.26	19.41	18.18	19.29	18.87	19.46	18.50	18.95

L.S.D at 5% level for:			
Water quality	(W)	S	S
Varieties	(V)	0.78	1.06
Nitrogen	(N)	0.67	0.90
WxV		NS	NS
WxN		NS	NS
NxV		NS	NS
WxNxV		NS	NS

Data in Table (4) indicated that sugar beet varieties significantly differd in sucrose percentage in both seasons. Sugar beet variety Ras-Poly recorded the highest values of sucrose % in both seasons compared with the other tested varieties. This result may be due to the gene-make up.This result is in agreement with that found by Obead (1980).

The results in Table (4) clear that sucrose percentage adversely and significantly affected by increasing the applied nitrogen fertilizer level to sugar beet plants up to 90 kg N/feddan in both seasons. This finding coincides with that reported by Eckhoff (1999).

The interactions between the studied factors had insignificant effect, on sucrose percentage in both seasons.

5 -Purity percentage

The results in Table (5) show that purity percentage was affected significantly by the two qualities of irrigation water in the first season only. Irrigated sugar beet plants by brackish water increased purity% by 7.24%, compared with those watered by fresh water.This result was in line with that obtained by Kalinin and Nikul (1991).

Table 5. Effect of water quality and nitrogen fertilizer on purity percentage of some sugar beet varieties of 2001/2002 and 2002/2003 seasons.

Seasons	2001/2002				2002/2003			
Sugar beet Varieties	Fresh water							
	N kg / feddan			Aver.	N kg / feddan			Aver.
	60	75	90		60	75	90	
Beta poly 4	84.24	76.75	69.10	76.70	77.54	83.62	78.70	79.95
Ras poly	86.99	79.66	74.32	80.32	85.68	80.60	74.97	80.42
Tora	86.22	77.85	67.08	77.05	80.54	85.40	74.40	80.11
Helx	79.38	77.04	65.37	74.10	81.14	79.11	75.84	78.70
N Aver.	84.21	77.82	69.09	77.04	81.23	82.18	75.98	79.80
Brackish water								
Beta poly 4	89.41	81.35	75.21	81.99	73.03	78.95	71.66	74.55
Ras poly	90.00	84.50	77.99	84.16	95.82	85.47	74.12	85.14
Tora	95.45	87.82	76.05	86.44	83.18	78.18	71.49	77.62
Helx	87.22	77.72	68.76	77.90	87.68	76.98	71.56	78.74
N Aver.	90.52	82.85	74.50	82.62	84.93	79.90	72.21	79.01
NXV	60Kg	75kg	90kg	Aver.	60Kg	75kg	90kg	Aver.
Beta poly 4	86.83	79.05	72.16	79.34	75.29	81.29	75.18	78.59
Ras poly	88.49	82.08	76.16	82.24	90.75	83.04	74.54	81.09
Tora	90.83	82.84	71.56	81.74	81.86	81.79	72.95	79.03
Helx	83.30	77.38	67.32	76.00	84.41	78.05	73.70	78.72
Total N Aver.	87.36	80.34	71.80	79.83	83.08	81.04	74.09	79.40

L.S.D at 5% level for:			
Water quality	(W)	S	NS
Varieties	(V)	5.36	NS
Nitrogen	(N)	4.61	5.17
WxV		NS	NS
WxN		NS	NS
NxV		NS	NS
WxNxV		NS	NS

Data presented in Table (5) indicate that sugar beet varieties significantly differed in purity percentage in the 1st season only. Sugar beet variety Ras-Poly recorded the highest values of purity % in the first season compared with the other tested varieties. This result may be due to the gene-make up. This result is in agreement with that found by El-Sheikh (1999).

The results clear that purity percentage was significantly decreased by increasing the applied nitrogen fertilizer level up to 90 kg N/feddan in both seasons. This finding coincides with that reported by Azzazy (2000).

The interactions between the studied factors insignificantly affected purity percentage in both seasons.

6- Sugar yield:

Data in Table (6) show that sugar yield was significantly affected by supplying beet plants with water of two different qualities (fresh and brackish) in the first season only. Sugar beet plants irrigated by brackish water produced higher sugar yield by 0.23 ton/fed. compared with those watered by fresh water.

Table 6. Effect of water quality and nitrogen fertilizer on sugar yeild (Tons/ fed.) of some sugar beet varieties of 2001/2002 and 2002/2003 seasons.

Seasons	2001/2002				2002/2003			
Sugar beet Varieties	Fresh water							
	N kg / feddan			Aver.	N kg / feddan			Aver.
	60	75	90		60	75	90	
Beta poly 4	2.83	2.96	3.04	2.94	3.17	4.28	4.33	3.93
Ras poly	3.89	3.98	3.77	3.88	4.07	4.27	4.31	4.22
Tora	2.63	3.03	2.69	2.78	2.74	3.64	3.15	3.18
Helx	3.07	3.37	2.85	3.09	2.73	3.07	3.03	2.94
N Aver.	3.11	3.33	3.08	3.18	3.18	3.81	3.70	3.57
Brackish water								
Beta poly 4	3.06	3.44	3.44	3.32	2.65	3.68	3.43	3.25
Ras poly	3.84	4.21	3.91	3.99	4.64	4.39	4.09	4.37
Tora	3.07	3.55	2.99	3.20	2.81	2.91	2.74	2.82
Helx	3.36	3.26	2.91	3.18	3.34	3.02	2.94	3.10
N Aver.	3.34	3.62	3.31	3.42	3.36	3.50	3.30	3.39
NXV	60Kg	75kg	90kg	Aver.	60Kg	75kg	90kg	Aver.
Beta poly 4	2.95	3.20	3.24	3.13	2.91	3.98	3.88	3.59
Ras poly	3.87	4.10	3.84	3.94	4.36	4.33	4.20	4.30
Tora	2.85	3.29	2.84	2.99	2.78	3.27	2.94	3.00
Helx	3.22	3.31	2.88	3.14	3.04	3.04	2.98	3.02
Total N Aver.	3.22	3.47	3.20	3.30	3.27	3.66	3.50	3.48

L.S.D at 5% level for:		
Water quality (W)	S	NS
Varieties (V)	0.43	0.35
Nitrogen (N)	NS	0.31
WxV	NS	NS
WxN	NS	NS
NxV	NS	NS
WxNxV	NS	NS

This result could be attributed to that, plants grown under conditions of higher concentration of salts of water contain lower water content, i.e. higher sucrose content expressed as a percentage compared with plants supplied with fresh water (Table (4). This finding is true with that found by Tirczka, et al. (1998).

The results indicated that sugar beet varieties significantly differed in sugar yield in both seasons. Sugar beet variety Ras-Poly surpassed the other tested varieties in sugar yield. This result may be due to the gene-make up. This finding is in line with that found by Obead (1980). The obtained data showed that nitrogen fertilizer application significantly affected sugar yield in the 2nd season only.The medium dose of nitrogen attained the highest values of sugar yield.

The interactions between the studied factors insignificantly affected sugar yield in both seasons.

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محصول وجودة بعض اصناف بنجر السكر وتاثرهما بجودة المياه والتسميد الازوتى

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اقيمـــت اربع تجارب حقلية بمركز طامية بمحافظة الفيوم خلال موسمى الزراعة ٢٠٠١/٢٠٠٢ و٢٠٠٢/٢٠٠٣ بغـــرض دراســـة تاثير جودة المياه (الرى بالمياه العذبة والرى بالمياه المخلوطة) وثلاثة-مستويات للسماد الازوتى (٦٠ و٧٥ و٩٠) كجم ن/فدان على محصول وجودة اربع اصناف تجاريـــة مـــن بنجر السكرهى (بيتا بولى ٤ ، راس بولى ، تورا والصنف هلكس) . وقد اوضحت النتائج مايلى:

تاثر طول الجذر ومحصول الجذور والنسبة المئوية للسكروز معنويا بجودة المياه فى الموسمين.

ادى رى بنجر السكر بالمياه المخلوطة الى زيادة محصول السكر مقارنة بالرى بالمياه العذبة.

اختلفت الاصناف المنزرعة فى صفة طول الجذر وقطر الجذر والنسبة المئوية للسكروز والنقاوة ومحصول الجذور و السكر معنويا فى كلا الموسمين.

بـــزيادة مســـتويات التسميد الازوتى من ٦٠ الى ٩٠ كجم ن/ فدان ادى الى زيادة طول الجذر ، وقطر الجذر والنسبة المئوية للسكروز والنقاوة ومحصول الجذور معنويا فى الموسم الاول والثانى.

ادت زيـــادة السماد الازوتى الى زيادة محصول السكر فى الموسم الثانى فقط. وقد تفوق الصنف عديد الاجنة راس بولى وريه بماء عذب او مخلوط مع تسميده بمعدل ٩٠ كجم ن/فدان فى المحصول والسكر على بقية الأصناف المختبرة .