Effect of nitrogen fertilization in relation to yield and quality on some sweet sorghum varieties.

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ABSTRACT

Two field experiments were carried out the in two Successive seasons 2003 and 2004 at Shandaweel Agricultural Research Station, Sohag Governorate to Study the effect of three levels of nitrogen fertilizer (50, 75 and 100 Kg N/fed), on growth characters, juice quality parameters and yield and yield components of some sweet sorghum varieties (Umbrella, Smith, Leati, Williams, Tracy, Planter and S.S. 301). The treatments were arranged in split–plot experimental design in four replications, the varieties were allocated in the main plot while the levels of nitrogen fertilizer were distributed at random sub-plots. The most important results were summarized as follows: Nitrogen fertlization level (100 kg N/fed.) led to attain the highest values of growth characters, yield and juice quality due to Significant increase of plant height, plant diameter, yield stalk (gross and stripped), juice extraction percentage, T.S.S.%, Sucrose % and purity%. While bagasse yield were increased by decreasing nitrogen fertllizer level up to 50 kg N/fed. Williams, Tracy, Planter and Leati variety showed superiority of growth characters, yield and juice quality parameters over the other studied variety. As fore, the interaction between the nitrogen fertlization levels and seven sweet sorghum varieties had significant effect for most aforementioned studied trails in both seasons under study. Finally, growing Williams, Tracy and Planter varieties and application nitrogen fertilizer level at 100 kg N/fed could be recommended under Sohag Governorate condition.

INTRODUCTION

The sorghum (*Sorghum bioclor* L. Moench) is one of the most important and useful crops in summer season. The name "sweet sorghum" is used to identify varieties of sorghum that are sweet and juicy. These sweet stalk varieties of sorghum are called " sugar sorghum". Yield and quality of syrup are influenced by variety, fertilization, plant population, soil type, climatic condition and manufacturing methods. However, variety and fertilization are the most important especially under local conditions (Mokadem, 1994).

Regarding, the effect of nitrogen fertilization on sweet sorghum characters, Rajput *et al.* (1983) indicated that application of 70 kg N/acre attained the best plant height of stalks. Saini and Singh (1985) amounted that the highest sucrose content was obtained with 150 kg N/ha. While, Abbas and Al-younis (1988) indicated that increasing nitrogen rate and plant population increased plant height, yield of stripped stalks and sugar yield. El- Maghraby *et al.* (1989) started that increasing nitrogen fertilizer levels up to 90 kg N/fed, reported significant effect on plant height, stalk

diameter, T.S.S.% and juice extraction percentage of sweet sorghum. Taha (1990), Galani *et al.* (1991) and Taha *et al.* (1994) obtained that the application doses of nitrogen up to 90 or 105 kg N/fed, increased significantly plant height, number leaves per plant, stalk diameter, yield of stalk juice, T.S.S.%, sucrose % and purity% of sweet sorghum. El-Maghraby *et al.* (1990) and El-Taweel (1994) reflected that increasing nitrogen levels up to 90 kg N/fed led to significant increases in juice extraction%, T.S.S.% Sucrose% and purity% Assran (1995) reported that the highest values of plant height, stalk diameter, yield of stalk, T.S.S.%, Sucrose %, reducing sugar%, purity%, juice yield were attained with increasing nitrogen fertilization up to 120 kg N/fed. as well as nitrogen application significantly increased total dry biomass, fresh stalk yield and juice yield. In addition, El-Zeny (2004) indicated that applying sweet sorghum plants with N fertilizer up to 90 kg N/fed significantly increased plant height, stalk diameter and stalk yield. Saleh (2004) found that when fertilized Honey and Brands varieties with 100 kg N/fed, Honey variety recorded the highest values of yield and its components. El-Shafai *et al.* (2005) reported that gradual significant increases in stalk height, stalk diameter, reducing sugars %, stripped stalk and forage yields resulted from raising mineral N-level from 40 to 60 or 80 kg N/fed.

Therefore, the aim of this field experiment is to study the effect of nitrogen fertilization on yield and quality of sweet sorghum verities under Sohag Governorate conditions.

MATERIALS AND METHODS

Two field experiments were conducted at Shandaweel Agricultural Research Station, Sohag Governorate during the summer of 2003 and 2004 seasons, to study the effect of three nitrogen levels i.e. 50, 75 and 100 kg N/feddan on the growth characters, yield components and juice quality parameters of seven sweet sorghum varieties namely Umbrella, Smith, Leati, Williams, Tracy, Planter and Sucro sorge 301 randomly.

A Split-plot design with four replications were followed. The varieties were arranged in the main plots and the nitrogen levels 50, 75 and 100 kg N/fed arranged in the sub-plot. Plot size was 10.5 m^2 (5 rows, 3.5 m long and 60 cm apart, intra row spacing 25 cm) while the nitrogen (Urea 46% N) was added in two equal doses at 20 and 35 days from sowing. Sowing date was done at 20 May in the two successive seasons. Thinning to two plants per hill was done after 15 days from planting. Meanwhile phosphorous (150 kg P_2O_5 /fed) was applied at the sowing date.

The preceding crop was Wheat in the two growing seasons. The soil texture of the experimental site was clay loom. Detailed mechanical and chemicals analysis are shown in Table 1.

Table 1. Mechanical and chemical analysis soil of the experimental site.

Analysis / Seasons	Texture	pH	Organic matter (O.M) %	Available nutrients (ppm) N	P	K
2003	Clay loam	7.0	0.90	25.00	25.40	411
2004		7.2	0.84	26.31	22.00	528

At harvest time (dough stage) a random samples of 15 plants was taken from each plot to determine the morphological, yield components and juice quality parameters.

The data recorded were:

A: Growth characters:

1- Plant height/cm was measured from soil surface up to base of head.
2- Stalk diameter / cm.

B: Yield and its components:

1- Gross stalk yield (ton/fed.)
2- Stripped stalk yield (ton/fed.)
3- Yield of baggase ton/fed.

C: Juice and Juice extraction percentage:

1- Juice yield (tons/fed.).
2- Juice extraction percentage.

D: **Juice quality parameters :**

1- Total soluble solids percentage (T.S.S. %) was determined using handy refractometer.
2- The apparent sucrose percentage in juice was determined with direct polarization method:
3- The percentage of reducing sugars in the juice was determined according to Lane and Eynon method (A.O.A.C. 1995).
4- The apparent purity calculated according to the following equation:
5-

$$\text{Apparent purity \%} = \frac{\text{Sucrose \%}}{\text{Total soluble soiled \%}} \times 100$$

All the data obtained for each season were statistically recorded according to Snedecor and Cochran (1980) and L.S.D test of significance at 0.05 level was used compare between various treatments using **MSTAT-C Computer Program (1986).**

RESULTS AND DISCUSSION

1-Varietal response:

Data in Table 2 show that the tested sweet sorghum varieties were significantly different in plant height, stalk diameter, gross and stripped stalk yields per feddan, baggase and juice yield per feddan, juice extraction, reducing sugar, purity, sucrose and T.S.S percentages in 2003 and 2004 seasons. while forage yield significant in the first season only. It is noteworthy to mention that Williams variety was significantly superior in plant height, gross and stripped stalk yield per feddan, baggase, forage yield and juice yield per feddan while Umbrella variety was significantly superior in reducing sugar percentage, Leati variety in juice extraction percentage, Planter variety in purity and sucrose percentage and S.S.-301 variety in stalk diameter and T.S.S percentages as compared with the other varieties in both seasons. The differences among varieties may be attributed to the variation in their genetic structure (Zaki *et al.* 1999 and Ahmed and Hassanien 2000). Moreover, high yielding cultivar may have higher photosynthetic electron transport chain potential which a genetically controlled character compared to that of low yielding cultivar (Volodarski *et al.* 1978). Besides, the differences between the seven sweet sorghum varieties under study could be due to the variation in their response to the environmental conditions. Similar results were obtained by Besheit *et al.* (2000), El-Sayed *et al.* (1997), Taha *et al.* (1994) and Saleh (2004).

2-Effect of nitrogen fertilizer levels:

Data in Table 3 show that increasing nitrogen fertilizer level up to 100 kg N/fed increased significantly plant height, stalk diameter, gross and stripped stalk yields per feddan, juice yield per feddan, juice extraction, reducing sugar, purity, sucrose, T.S.S percentages and forage yield as compared with the other nitrogen fertilizer levels (50 and 75 kg N/fed) in 2003 and 2004 seasons, while nitrogen fertilizer level 50 kg N/fed increased significantly baggase yield in 1st and 2nd seasons of the study. The increase of the characters under the study could be due to the increase in amount of metabolites synthesized by plants, which may depend to a large extent upon the favorable effect of nitrogen fertilizer level in the metabolic processes and physiological activities of meristimatic tissue, which are responsible for cell division and elongation in addition to formation of plant organs. Moreover, the present results might be attributed to the effect of nitrogen fertilizer on the vigorous vegetative growth and accumulation of photosynthesis assimilates. These results are in agreement with those reported by Abd El-latif *et al.* (1993), El-shafai *et al.*

(2005), El-Taweel (1994), El-Zeny (2004), Galani *et al.* (1991), Saheb *et al.* (1997) and Taha and El. Koliey (1999).

3- Effect of interaction:

Data in Table 4 showed that sweet sorghum plant height, and stalk diameter were significantly affected by the interaction between (sweet sorghum varieties x nitrogen fertilizer levels) in 2003 and 2004 seasons. While forage yield significant in the first season only. Nitrogen fertilizer level 100 kg N/fed to sweet sorghum variety Williams one give the tallest plants (392.50 cm), while the highest stalk diameter was significantly recorded by growing sweet sorghum variety S.S.-301 (2.72 cm) under the application of 100 kg N/fed in both seasons of the study.

The results in Table 5 indicated that gross, stripped stalk, juice yields and juice extraction percentage responded significantly to the interaction between sweet sorghum varieties and nitrogen fertilizer levels except baggase was insignificantly affected. The maximum values gross, stripped stalk and juice yields per feddan was recorded by growing Williams variety under the application of 100 kg N/fed during in both season of the study. The interaction of the application of 100 kg N/fed to Sucro sorg 301 variety was significantly affected and gave the highest value of juice extraction % in during the second of the study.

Data obtained in Table 6 indicated that T.S.S., sucrose, reducing sugar and purity percentages in juice of sweet sorghum were significantly affected by the interaction between (sweet sorghum varieties x nitrogen fertilizer levels) in both seasons except for purity percentage in the 2nd season only. Planter variety showed the highest value sucrose and purity percentages in both seasons when it received 100 kg N/fed as compared with the others studied characters and same trend for Sucro sorg 301 in T.S.S. percentage. On the contrary Williams variety gave the highest value in reducing sugar percentage when it was fertilized by only 50 kg N/fed. These results are supported by Assran (1995), El-Sayed *et al.* (1997), El-shafai *et al.* (2005), El-Zeny (2004), Taha (1990) and Saheb *et al.* (1997).

Table 2. Growth, yield and juice quality parameters of sweet sorghum the evaluated varieties in 2003 and 2004 growing seasons

Varieties	Plant height (cm)			Stalk diameter (cm)			Gross stalk yield ton/fed.			Stripped stalk yield ton/fed.			Baggase (ton/fed.)			Juice yield ton/fed.		
	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
Umbrella	240.00	235.44	237.72	1.99	2.02	2.01	23.67	22.66	23.17	18.94	17.74	18.34	8.06	8.47	8.27	10.87	9.27	10.07
Smith	341.00	333.67	340.34	2.31	2.33	2.32	23.00	21.54	22.27	18.13	17.03	17.58	5.22	8.19	8.21	9.91	8.84	9.38
Leati	219.89	211.89	215.89	1.84	1.83	1.84	21.94	20.48	21.21	18.21	16.04	17.13	7.29	6.07	6.68	10.92	9.97	10.45
Williams	373.33	375.11	374.22	2.53	2.53	2.53	34.35	33.84	34.60	26.88	26.56	26.72	12.25	13.25	12.75	14.64	13.30	13.97
Tracy	351.00	343.33	347.17	2.23	2.31	2.27	28.19	27.33	27.76	24.56	22.57	23.41	12.21	10.28	11.25	12.05	12.28	12.17
Planter	301.67	295.44	298.56	2.23	2.32	2.28	27.99	26.68	27.34	24.50	22.02	23.26	10.39	9.07	9.73	14.11	12.94	13.53
S.S. 301	322.44	329.67	326.06	2.58	2.67	2.62	23.05	20.30	21.68	18.74	15.61	17.18	7.88	6.63	7.25	10.85	8.99	9.92
F. test	*	*		*	*		*	*		*	*		*	*		*	*	
L.S.D$_{0.05}$	15.49	16.22		0.07	0.11		1.51	1.53		1.44	0.97		1.44	0.83		0.72	0.37	

Varieties	Juice Extraction %			Reducing sugar %			Purity %			Sucrose %			T.S.S. %			Forage yield		
	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
Umbrella	54.23	49.94	52.09	2.96	3.96	3.46	54.74	59.47	57.11	10.20	10.59	10.40	18.62	17.79	18.21	4.74	4.92	4.83
Smith	51.97	49.90	50.94	2.85	3.62	3.24	59.36	57.87	58.62	10.66	10.80	10.73	18.27	18.27	18.27	4.87	4.51	4.69
Leati	57.28	59.78	58.53	2.52	3.34	2.93	62.66	60.79	61.73	9.42	9.13	19.28	15.01	14.99	15.00	3.72	4.44	4.08
Williams	52.65	48.43	50.54	2.70	3.77	3.24	67.48	67.03	67.26	12.58	12.30	12.44	18.61	18.36	18.49	8.47	7.29	7.88
Tracy	46.77	50.16	48.47	2.90	3.89	3.40	62.37	60.98	61.68	12.33	11.72	12.03	19.72	18.60	19.16	3.94	4.77	4.36
Planter	52.33	56.61	54.47	2.78	3.42	3.10	66.50	73.29	70.90	13.64	13.33	13.49	19.91	18.17	19.04	3.50	4.66	4.08
S.S. 301	55.32	55.86	55.59	2.76	3.50	3.13	52.31	53.82	53.07	10.41	10.30	10.36	19.69	19.08	19.49	4.31	4.69	4.50
F. test	*	*		*	NS		*	*		*	*		*	*		*	NS	
L.S.D$_{0.05}$	4.24	2.51		0.29	-		4.80	2.34		0.96	0.61		0.78	0.68		1.69	-	

Table 3. Effect of nitrogen fertilizer levels on growth, yield and juice quality parameters of sweet sorghum varieties in 2003 and 2004 growing seasons

Nitrogen levels Nkg/fed	Plant height (cm)			Stalk diameter (cm)			Gross stalk yield ton/fed.			Stripped stalk yield ton/fed.			Baggase (ton/fed.)			Juice yield ton/fed.		
	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
50	289.86	286.24	288.05	2.11	2.14	2.13	21.32	20.07	20.70	17.23	16.68	16.46	11.46	10.46	10.96	5.67	5.43	5.55
75	306.43	306.14	308.29	2.27	2.30	2.29	27.16	25.05	26.11	21.76	19.94	20.85	9.34	8.65	8.99	12.78	11.91	12.35
100	322.86	318.71	320.79	2.35	2.43	2.39	30.03	28.95	29.49	25.15	23.34	24.25	7.81	7.44	7.63	17.28	15.34	16.31
F. test	*	*		*	*		*	*		*	*		*	*		*	*	
L.S.D$_{0.05}$	7.93	8.46		0.05	0.06		1.02	0.74		0.71	0.63		0.66	0.66		0.46	0.17	

Nitrogen levels Nkg/fed	Juice Extraction %			Reducing sugar %			Purity %			Sucrose %			T.S.S. %			Forage yield ton/fed		
	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
50	32.54	33.65	33.10	2.48	3.30	2.89	56.18	55.89	56.04	9.92	9.74	9.83	17.67	17.43	17.55	4.09	4.39	4.24
75	56.39	56.41	56.40	2.79	3.65	3.22	60.98	63.21	62.10	11.44	11.32	11.38	18.78	17.91	18.35	5.40	5.12	5.26
100	69.88	68.80	69.34	3.06	3.98	3.52	66.02	67.43	66.73	12.69	12.35	12.52	19.28	18.34	18.81	4.88	5.61	5.25
F. test	*	*		*	*		*	*		*	*		*	*		*		
L.S.D$_{0.05}$	2.67	1.88		0.29	0.28		3.15	2.30		0.62	0.38		0.40	0.37		1.06	0.81	

Table 4. Effect of the interaction between varieties and nitrogen fertilizer levels on growth characters of seven sweet sorghum varieties in 2003 and 2004 growing seasons.

Varieties	Nitrogen Level Kg/Fed.	Plant height/ cm.			Stalk diameter/cm			Forage yield ton/fed		
		2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
Umbrella	50	226.33	223.67	225.00	1.90	1.90	1.90	3.84	3.91	3.88
	75	241.00	237.00	239.00	2.00	2.03	2.01	5.06	5.42	5.23
	100	252.67	246.67	249.17	2.07	2.13	2.10	5.33	5.42	5.38
	Mean	240.00	238.44	237.72	1.99	2.02	2.00	4.74	4.92	4.83
Smith	50	328.33	319.33	324.33	2.10	2.13	2.11	3.40	4.10	3.75
	75	342.00	341.33	341.66	2.40	2.40	2.40	6.01	4.68	5.35
	100	351.67	385.33	368.50	2.43	2.47	2.46	5.20	4.74	4.97
	Mean	341.00	348.66	344.83	2.31	2.33	2.32	4.87	4.51	4.69
Lenti	50	205.67	210.67	208.17	1.73	1.63	1.68	3.91	4.08	4.00
	75	219.33	221.67	220.50	1.87	1.90	1.88	4.40	4.86	4.63
	100	234.67	203.33	219.00	1.93	1.97	1.95	2.66	4.38	3.62
	Mean	219.89	211.89	215.89	1.84	1.83	1.83	3.72	4.44	4.08
Williams	50	352.67	347.67	350.17	2.37	2.33	2.35	6.25	5.99	6.12
	75	377.33	362.67	380.00	2.57	2.50	2.53	9.07	7.45	8.26
	100	390.00	395.00	392.50	2.67	2.75	2.71	10.07	8.43	9.25
	Mean	373.33	375.11	374.22	2.53	2.52	2.52	8.46	7.29	7.88
Tracy	50	335.67	328.33	332.00	2.10	2.17	2.13	3.85	3.83	3.84
	75	351.33	346.00	348.66	2.27	2.37	2.32	4.36	4.04	4.20
	100	366.00	355.67	360.83	2.33	2.40	2.36	3.61	6.44	5.13
	Mean	351.00	343.33	347.16	2.23	2.31	2.27	3.94	4.77	4.36
Planter	50	285.00	275.67	280.33	2.10	2.20	2.15	3.15	4.81	3.98
	75	305.00	297.33	301.16	2.23	2.27	2.25	4.54	4.17	4.36
	100	315.00	313.31	314.15	2.37	2.50	2.43	2.80	5.01	3.91
	Mean	301.66	295.43	298.54	2.23	2.32	2.27	3.50	4.66	4.08
S.S. 301	50	294.33	296.32	295.32	2.47	2.60	2.53	4.23	4.04	4.14
	75	323.00	331.00	327.00	2.53	2.63	2.58	4.41	5.20	4.81
	100	350.00	359.66	354.83	2.67	2.76	2.72	4.31	4.82	4.57
	Mean	322.44	328.66	326.05	2.56	2.66	2.60	4.32	4.69	4.51
L.S.D at 0.05	A	15.49	16.22		0.07	0.11		1.89	NS	
	B	7.93	8.46		0.05	0.06		1.06	0.81	
	A x B	20.55	22.22		0.14	N.S		NS	2.14	

Table 5. Effect of the interaction between varieties and nitrogen fertilizer levels onyield and yield components of seven sweet sorghum varieties in 2003 and 2004 growing seasons.

Varieties	Nitrogen Level Kg/N/fed.	Gross stalk yield ton/fed.			Stripped stalk yield ton/fed.			Yield of baggase ton/fed			Yield of juice ton/fed.			Juice extraction %		
		2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
Umbrella	50	19.20	18.19	18.69	15.36	14.28	14.82	9.38	9.63	9.50	5.99	4.64	5.31	38.84	32.90	35.87
	75	24.25	22.86	23.55	19.21	17.43	18.32	8.50	9.09	8.79	10.77	8.34	9.55	55.78	47.95	51.86
	100	27.56	26.93	27.24	22.24	21.51	21.87	6.31	6.69	6.50	15.93	14.82	15.37	71.85	68.97	70.41
	Mean	23.67	22.66	23.16	18.93	17.74	18.33	8.06	8.47	8.26	10.89	9.26	10.07	55.49	49.94	52.71
Smith	50	18.56	17.56	18.10	15.24	13.46	14.35	10.78	8.65	9.71	4.46	4.81	4.63	29.32	35.76	32.54
	75	23.46	21.49	22.47	17.45	16.81	17.13	7.44	8.45	7.94	10.01	8.36	9.18	57.60	49.72	53.66
	100	26.89	25.57	26.23	21.68	20.83	21.25	6.44	7.48	6.96	15.24	13.35	14.29	70.29	64.23	67.26
	Mean	23.00	21.54	22.27	18.12	17.03	17.57	8.22	8.19	8.20	9.90	8.84	9.37	52.40	49.90	51.15
Leatl	50	16.58	17.00	17.79	14.67	12.92	13.79	10.00	7.88	8.94	4.67	5.04	4.85	31.82	39.07	35.44
	75	23.00	20.85	21.92	18.60	16.00	17.30	6.70	5.64	6.17	11.90	10.35	11.12	64.09	64.74	64.41
	100	24.40	23.59	23.99	21.38	19.21	20.29	5.17	4.70	4.93	16.21	14.51	15.36	75.92	75.56	75.74
	Mean	21.99	20.48	21.23	18.21	16.04	17.12	7.29	6.07	6.68	10.92	9.96	10.44	57.27	59.79	58.53
Williams	50	28.22	27.76	27.99	21.96	21.77	21.86	14.58	15.20	14.89	7.38	6.58	6.98	33.64	30.24	31.94
	75	37.66	35.12	36.39	28.58	27.67	28.12	12.57	12.78	12.67	16.01	14.89	15.45	56.12	54.05	55.08
	100	37.18	38.65	37.91	30.11	30.22	30.16	9.59	11.78	10.68	20.52	18.84	19.68	68.22	62.34	65.28
	Mean	34.35	33.84	34.09	26.88	26.55	26.71	12.24	13.25	12.74	14.63	13.43	14.03	52.66	48.87	50.76
Tracy	50	22.16	20.13	21.14	18.31	16.31	17.31	12.87	12.11	12.49	5.44	4.20	4.82	30.07	25.83	27.95
	75	29.66	28.37	29.01	25.31	24.33	24.82	13.07	9.67	11.37	12.23	14.67	13.45	48.49	60.33	54.41
	100	32.76	33.50	33.13	29.15	27.06	28.10	10.66	9.08	9.88	18.47	17.98	18.22	63.55	66.80	65.07
	Mean	28.19	27.33	27.76	24.25	22.56	23.40	12.20	10.28	11.24	12.04	12.28	12.16	47.37	50.92	49.14
Planter	50	23.22	22.09	22.65	20.07	17.28	18.67	12.45	10.54	11.49	7.62	6.73	7.17	37.99	39.07	38.53
	75	28.31	26.42	27.36	23.77	22.25	23.01	9.23	8.89	9.06	14.54	13.36	13.95	61.30	60.07	60.68
	100	32.45	31.53	31.99	29.65	26.52	28.09	9.49	7.78	8.63	20.17	18.74	19.45	68.09	70.71	69.40
	Mean	27.99	26.68	27.33	24.49	22.01	23.25	10.39	9.07	9.73	14.11	12.94	13.52	55.79	56.61	56.20
S.S. 301	50	19.23	17.79	18.51	15.00	13.75	14.37	10.17	9.25	9.71	4.82	4.50	4.66	32.23	32.73	32.48
	75	23.77	20.28	22.01	19.36	16.04	17.20	7.84	8.02	8.93	11.82	9.03	10.27	60.80	60.29	60.59
	100	26.16	22.86	24.51	21.85	18.04	19.94	5.63	4.61	5.12	16.22	13.43	14.82	74.27	74.58	74.42
	Mean	23.05	20.30	21.67	18.73	15.61	17.17	7.88	6.62	7.25	10.85	8.98	9.91	55.43	55.86	55.88
L.S.D at 5%	A	1.81	1.83		1.44	0.97		1.44	0.83		0.72	0.37		4.24	2.81	
	B	1.02	0.74		0.71	0.63		0.66	0.66		0.46	0.17		2.67	1.88	
	AxB	2.70	1.97		1.87	1.67		N.S	N.S		1.21	0.46		N.S	4.97	

Table 6. Effect of the interaction between varieties and nitrogen fertilizer levels on juice quality parameters of seven sweet sorghum varieties in 2003 and 2004 growing seasons.

Varieties	Nitrogen Level Kg/fed.	Total soluble solids (T.S.S.%).			Sucrose %			Reducing sugar %			Purity %		
		2003	2004	Mean	2003	2004	Mean	2003	2004	Mean	2003	2004	Mean
Umbrella	50	17.41	16.97	17.19	8.98	9.50	9.19	3.17	3.27	3.22	51.02	56.00	53.50
	75	19.01	17.97	18.49	10.45	10.78	10.61	3.06	3.12	3.09	55.00	60.00	57.50
	100	19.43	18.43	18.93	11.28	11.50	11.39	2.57	2.78	2.67	58.21	62.40	60.30
Mean		18.61	17.79	18.20	10.20	10.59	10.39	2.93	3.05	2.99	54.74	59.46	57.10
Smith	50	17.21	17.63	17.42	9.25	8.67	8.96	3.13	3.13	3.13	53.81	49.24	51.52
	75	18.81	18.57	18.69	11.00	11.11	11.05	2.71	2.82	2.76	58.49	59.87	59.18
	100	18.80	18.60	18.70	12.33	12.00	12.16	2.50	2.62	2.56	65.79	64.51	65.15
Mean		18.27	18.26	18.26	10.86	10.59	10.72	2.78	2.85	2.81	59.36	57.87	58.61
Leadi	50	14.60	14.63	14.61	8.11	7.89	8.00	2.78	3.13	2.95	55.60	53.86	54.73
	75	14.77	14.97	14.87	9.33	9.00	9.16	2.40	3.00	2.70	63.29	60.13	61.71
	100	15.67	15.37	15.52	10.81	10.50	10.65	2.22	2.66	2.44	69.10	68.38	68.74
Mean		15.01	14.99	15.00	9.41	9.13	9.27	2.46	2.93	2.69	62.66	60.79	61.72
Williams	50	17.50	18.25	17.87	11.30	11.00	11.15	3.18	3.50	3.34	64.59	60.44	62.51
	75	18.90	18.33	18.61	12.44	12.67	12.56	2.47	3.09	2.78	65.83	69.11	67.47
	100	19.43	18.50	18.96	14.00	13.22	13.61	2.21	2.13	2.17	72.05	71.53	71.79
Mean		18.61	18.36	18.48	12.58	12.29	12.43	2.62	2.90	2.76	67.49	67.02	67.25
Tracy	50	18.70	18.30	18.50	10.89	10.89	10.89	3.13	3.46	3.29	58.15	59.52	58.83
	75	19.90	18.67	19.28	12.44	11.27	11.85	3.01	2.99	3.00	62.51	60.39	61.45
	100	20.57	18.83	19.70	13.67	13.00	13.33	2.43	2.22	3.32	66.45	69.04	67.74
Mean		19.72	18.60	19.16	12.33	11.72	12.02	2.85	2.89	2.87	62.37	62.98	62.67
Planter	50	19.00	17.67	18.33	12.67	12.22	12.44	3.13	3.25	3.19	66.69	69.13	67.91
	75	20.10	18.17	19.13	13.50	33.54	13.52	3.11	3.08	3.09	67.21	74.60	70.90
	100	20.63	18.67	19.65	14.75	14.22	14.48	2.43	2.53	2.48	71.59	76.16	73.87
Mean		19.91	18.17	19.04	13.64	13.32	13.48	2.89	2.95	2.92	68.49	73.29	70.89
S.S. 301	50	19.26	18.67	18.91	8.33	8.00	8.16	2.92	3.37	3.14	43.44	43.07	43.25
	75	20.00	18.67	19.33	10.89	10.89	10.89	2.58	2.54	2.56	54.52	58.37	56.44
	100	20.40	20.00	20.20	12.01	12.00	12.00	2.27	2.39	2.33	58.97	60.03	59.50
Mean		19.88	19.08	19.48	10.41	10.29	10.35	2.59	2.76	2.67	52.31	53.82	53.06
L.S.D at 0.05	A	1.51	1.53		1.44	0.83		0.30	N.S		4.80	2.34	
	B	1.02	0.74		0.86	0.66		0.29	0.28		3.15	2.30	
	AxB	2.70	1.97		N.S	N.S		0.77	0.74		8.33	N.S	

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الملخص العربي

تأثير التسميد النيتروجيني على صفات المحصول والجودة في بعض أصناف الذرة السكرية

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أجريت تجربتان حقليتان خلال موسمى ٢٠٠٣ و ٢٠٠٤ بمحطة البحوث الزراعية بشندويل بمحافظة سوهاج وذلك لدراسة ثلاث مستويات من التسميد الازوتى (٥٠، ٧٥ ، ١٠٠ كيلوجرام نيتروجين/ للفدان) على صفات النمو الخضرى ومحصول العيدان وصفات جودة العصير فى سبعة أصناف من الذرة السكرية هى (Umbrella, Planter, Tracy, Williams, Leati, Smith, S.S. 301) . وذلك تحت ظروف محافظة سوهاج.

وتشير النتائج المتحصل اليها إلى :

١ – ان مستوى التسميد (١٠٠ كيلوجرام /للفدان) قد ادى الى الحصول على افضل صفات النمو الخضرى والمحصول وجودة العصير حيث حدثت زيادة معنوية فى طول النبات وقطر الساق ووزن العيدان قبل التنظيف وبعده ووزن العصير ونسبة استخلاصه و % T.S.S(المواد الصلبة الذائبة) و Sucrose% (السكروز) ونسبة النقاوة. بينما حدثت زيادة معنوية بنقص مستوى التسميد إلى ٥٠ كيلوجرام /للفدان فى صفات الـ Baggas (مخلفات العصير) و(السكريات المختزلة R.S.%)

٢ – تفوقت الأصناف (Leati, Planter, Tracy, Williams) فى صفات النمو الخضري والمحصول ووزن العصير وصفات الجودة.

٣ – كان هناك تأثير معنوى بين الأصناف ومستوى التسميد النتروجينى فى معظم الصفات تحت الدراسة.

٤ – مما سبق يمكن التوصية بزراعة الأصناف Planter, Tracy, Williams وإضافة سماد اوزتى بمعدل ١٠٠ كجم للفدان تحت ظروف محافظة سوهاج.