

## Yield and Yield Components of Some Sugar Cane Varieties (*Saccharum officinarum* L.) as affected by Different Nitrogen Fertilization Levels

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### ABSTRACT

Two field trials were conducted during two successive growing seasons of 2016/2017 and 2017/2018 at Mallawy Agricultural Research Station, Agricultural Research Center, El-Minia Governorate (Middle Egypt) to study the effect of different levels of N-fertilization (160,190 and 220 kg /fed) on yield, yield components and quality of five sugar cane varieties (G.T.54-9(C9), G.2003-47, G.99-103, G.2004-27 and G.2010-7). A split plot design with three replications was used, main plots were represented by five sugar cane varieties (V1= G.T.54-9(C9), V2= G.2003-47, V3= G.99-103, V4= G.2004-27, V5= G.2010-7). The subplots were used for the three nitrogen levels (160, 190 and 220 kg N / fed). The results indicated that: 1- Sugar cane varieties and N-fertilization levels exhibit significant effect on all studied traits in both seasons. Promising variety G.99-103 recorded the highest values of stalk height, stalk diameter (cm), millable cane ton/fed and sugar yield (ton/fed) in both seasons, while G.T.54-9(C9) variety recorded the highest values of sucrose %, purity% and sugar recovery%, whoever G.2004-27 variety outyielded the highest value of TSS%- Increasing applied N levels from 160 up to 220 Kg N/fed significantly increased stalk height, stalk diameter(cm), millable cane ton / fed, sugar yield (ton/fed) and TSS (%), while 190 Kg N/fed had the highest values of purity% and Sugar recovery%. 3- The effect of interaction between sugar cane varieties and nitrogen levels on the studied traits was significant for stalk height in both seasons and purity%, sucrose % and T.S.S. % in plant crop season only. Generally, it could be concluded that under Middle Egypt conditions, it is recommended to inoculate G.99-103 sugar cane varieties with 220 Kg N/fed to maximize the productivity and quality of sugar cane yield.

**Keywords:** Sugar cane, *Saccharum officinarum* L., varieties, nitrogen fertilization levels, yield, quality.

### INTRODUCTION

Sugar cane (*Saccharum officinarum* L.) requires substantial inputs of nitrogen to achieve maximum yields. Nitrogen is the most essential element having direct effect on cane growth, sugar cane yield, and juice quality. Studies have established that N- increase the quantity of green tops, yield components and yield of cane and sugar Azzazy and El-Geddawy, (2003); El-Geddawy *et al.* (2003); El-Geddawy *et al.* (2005) and Nassar *et al.* (2005) Similarly, Yousef *et al.* (2000) reported that nitrogen has significant influence on cane growth, yield, quality and recoverable sugar. However, nitrogen application at high rates exceeding sugar cane plant utilization has adverse effect on cane quality. Vinicius *et al.* (2018) provided that sugar cane varieties showed similar N requirements in the three evaluation cycles, on average 1.35 kg N / ton of cane in the cane-plant, 0.87 and 0.73 kg t-1 in the first and second regrowth, respectively, The nutrient constitutes less than 1% of sugar cane biomass, but its deficiency causes a reduction in the synthesis of chlorophyll, essential amino acids and the energy required to produce carbohydrates and carbon skeletons, directly reflecting the development and yield of the crop

However, Qureshi *et al.* (2001) reported that the amount of water utilized by cane plant has a linear relationship to total dry matter produced. A favorable soil water condition during cane growth also has a significant effect on the yield and quality response of sugar cane to nitrogen fertilization. Bhatti *et al.* (1986). According to Taha *et al.* (2003) meeting the nutrient and water requirements of sugar cane effectively makes the crop flourish and yield profitably. Yahaya *et al.* (2010) indicated that nitrogen application (120 and 240 kg/ha) significantly increase the yield of cane, the highest dose of nitrogen (240 kg/ha) resulted in poor cane quality. On the same trend Shahrzad and Kamla (2014) provided that increasing applied N levels from 140 up to 200 Kg N /fed significantly increased stalk length, stalk diameter, stalk yield, sugar yields, TSS (%), sucrose (%) and purity (%).

On the contrary Andressa *et al.* (2016) reported that the technological variables Brix%, Pol% juice, Purity% and total recoverable sugar were altered by the application of nitrogen doses, with significant reductions at the dose of 200kg N/ha<sup>-1</sup>.

The role of sugar cane variety is considered the main factor in governing the expected sugar yield. It is well to know that, the commercial variety G.T.54-9(C9) occupies most of sugar cane area in Egypt. Recently, Sugar Crops Research Institute produced some promising varieties of sugar cane among them G.2003-47, G.99-103, G.2004-27, and G.2010-7. Many studies were Designed to select among the produced varieties in yield and its components, as well as, juice quality parameters among them Rizk, *et al.* (2004), El-Shafai & Ismail (2006), El-Labbody *et al.* (2011), Mohamed *et al.* (2012), Yousif *et al.* (2015), Ahmed *et al.* (2016) and Ahmed (2017).

The objectives of this research were to determine the effect of nitrogen fertilizer levels on sugar yield, yield components and sugar quality of five sugar cane varieties under Middle Egypt conditions.

### MATERIALS AND METHODS

Two field experiments were conducted at Mallawy Agricultural Research Station, Agricultural Research Center, Minia Governorate, Egypt during the two successive growing seasons of 2016/ 17 (plant crop) and 2017/ 18 (first ratoon), to study the effect of nitrogen fertilizer levels on sugar yield, yield components and sugar quality of five sugar cane varieties under Middle Egypt conditions.

A randomized complete block with three replications arranged in split- plot design was used, five sugar cane varieties (V<sub>1</sub>: G.T.54-9(C9) as a commercial variety, V<sub>2</sub>: G.2003-47, V<sub>3</sub>: G.99-103, V<sub>4</sub>: G.2004-27 and V<sub>5</sub>: G.2010-7 as a promising varieties) were allocated to the main plots, while three N-fertilizer levels treatments (N<sub>1</sub>:160 kg/fed, N<sub>2</sub>:190 kg/fed and N<sub>3</sub>:220 kg/fed) were randomly distributed in the sub- plots, N-fertilizer levels

were added in two equal doses the 1<sup>st</sup> one after 60 days from planting and the 2<sup>nd</sup> after 30 days later. Before planting soil samples were randomly taken from the experimental site at a depth of 0 to 30 cm and prepared for physical and chemical analysis (Table 1) according to standard methods by Ankerman and large (1974). Plot area was 35m<sup>2</sup> containing five ridges at seven meters length and one meter width. The dry method of planting was adopted using two ridges of cane cuttings. The planting was in the 2<sup>nd</sup> week of March, 2016, while harvest was done in the 3<sup>rd</sup> week of March 2017 and 2018 in the 1<sup>st</sup> and 2<sup>nd</sup> seasons. All the agronomic practices for growing sugar cane were carried out as recommended by the Sugar Crops Research Institute in the region.

**Data recorded**

**I. Growth characters:**

At harvest, five plants from each sub-plot were taken at random to determine the following data:

- 1- Stalk height (cm) was measured from soil surface to the top point of visible dewlap.
- 2- Stalk diameter (cm) was measured at the middle part of stalk.
- 3- Millable cane yield (ton/fed) cane stalks of each plot were off cleaned from trash, weighed and cane yield was calculated.

**II. Juice quality:**

- 1- Purity (%) was calculated using the following formula according to Singh and Singh (1998)

**Juice purity (%) = sucrose (%) / TSS (%) X100.**

- 2- Total soluble solids (TSS %) was measured by hand refractometer according to the methods outlined in the A.O.A.C. (1995).
- 3- Sucrose (%) was determined by Digital Automatic Polarimeter A.O.A.C. (1995).

**III. Sugar recovery (%) and Sugar yield(ton/fed):**

**A sample of 25 plants from each sub-plot were chosen immediately after harvest, cleaned and crushed through mill and juice was analyzed to determine the following data:**

- 1- Sugar recovery (%) was calculated according to the following formula described by Yadav and Sharma (1980).

**Sugar recovery (%) = [sucrose % - 0.4(TSS %- sucrose %)] × 0.73.**

**Where:**

0.4= each pound of non-sucrose solids in the juice will retain 0.4 of a pound of sucrose as outlined by Hebert (1973).

0.73=denote a correction factor for actual milling condition in factories that depends on the overall mean fiber percentage cane during processing as outlined by Mathur (1997).

- 2- Sugar yield (ton /fed) was calculated according to the following formula described by Mathur (1997).

**Sugar yield(ton/fed)=cane yield(ton/fed)XSugar recovery (%).**

**Table 1. Some physical and chemical analysis of soil at the experimental soil at 30 cm depth in 2016/2017 and 2017/2018 seasons.**

Physical properties						
seasons	Sand%	Silt%	Clay%			
1st	9.63	61.87	28.50			
2 <sup>nd</sup>	7.52	62.13	30.35			
Texture grade			Clay loam			
chemical properties						
seasons	Total N%	Available ppm	Available%	CACO <sub>3</sub> %	PH	EC( m mhos/cm)
1st	0.45	11.25	0.081	2.06	7.65	1.11
2 <sup>nd</sup>	0.43	12.16	0.085	2.08	7.45	1.08

The obtained data of the two investigated seasons were computed and statistically analyzed for testing the significance of the studied factors and their interactions by LSD test according to Steel and Torrie (1981).

**RESULTS AND DISCUSSION**

**I. Growth characters:**

Data presented in Table 2 show the effect of sugar cane varieties and N-fertilizer levels as well as their interactions on stalk height, stalk diameter (cm) and millable cane yield ton/fed in both seasons.

Sugar cane varieties differed significantly in stalk height, diameter (cm) and millable cane yield ton/fed in both seasons. G.99-103 variety (v<sub>3</sub>) produced the highest values of stalk height (294.00, 270.22 and 282.11cm.), stalk diameter (3.42, 3.32 and 3.37cm.) and millable cane yield (60.10, 58.70 and 59.40 ton/fed) in plant cane, first ratoon crops and comb., respectively. While, the lowest values were obtained by G.2004-27(v<sub>4</sub>) (236.11, 223.53,

229.82cm, 2.68, 2.52, 2.60cm, 39.60 and 39.22, 39.41ton/fed) for all previous traits in plant cane, first ratoon crops and comb., respectively. This result may be due to the genetic differences among varieties in their ability of the formation of internodes and determination of their length and diameter. These results are in according with those obtained by El-Shafai and Ismail (2006), El-Labbody *et al.* (2011), Mohamed *et al.* (2012) and Yousif *et al.* (2015).

Nitrogen fertilization levels significantly effect on stalk height, diameter (cm) and millable cane yield ton/fed in both seasons. Increasing the applied N doses from 160 up to 220 Kg. N /fed increasing stalk height, diameter (cm) and millable cane yield ton/fed, gradually. These results are in agreement with Nassar *et al.* (2005) and Vinicius *et al.* (2018).

The interaction between sugar cane varieties and nitrogen levels effects on all previous traits were not significant in plant cane and first ratoon crops.

**Table 2. Stalk height, Stalk diameter (cm.) and millable cane yield ton/fed of five sugar cane varieties as affected by three N-fertilizer levels and their interactions during 2016/2017 and 2017/2018 season.**

Treatments	Characters	Stalk height(cm)			Stalk diameter(cm)			Millable cane yield ton/fed		
		1st	2nd	Comb.	1st	2nd	Comb.	1st	2nd	Comb.
A: Varieties	V1	275.00	254.37	264.68	2.97	2.92	2.94	48.10	46.67	47.38
	V2	260.00	243.62	251.81	2.77	2.68	2.72	46.40	45.93	46.16
	V3	294.00	270.22	282.11	3.42	3.32	3.37	60.10	58.70	59.40
	V4	236.11	223.53	229.82	2.68	2.52	2.60	39.60	39.22	39.41
	V5	258.33	238.98	248.66	2.71	2.63	2.67	40.10	44.32	44.71
F-test		**	**	**	**	**	**	**	**	**
LSD at <sub>0.05</sub>		5.92	2.47	7.56	0.08	0.13	0.08	0.87	0.76	0.63
B: N-levels	N1	239.47	219.75	229.61	2.72	2.57	2.65	45.84	44.80	45.32
	N2	267.60	249.07	258.33	2.93	2.84	2.89	47.58	46.60	47.09
	N3	287.00	269.62	278.31	3.07	3.03	3.05	50.16	49.50	49.83
F-test		**	**	**	**	**	**	**	**	**
LSD at <sub>0.05</sub>		4.59	1.92	5.85	0.06	0.10	0.06	0.67	0.59	0.49
C: Interaction A×B	V1×N1	245.00	224.60	234.80	2.73	2.60	2.67	45.30	44.09	44.69
	V1×N2	280.00	257.50	268.75	3.00	3.00	3.00	48.00	46.43	47.22
	V1×N3	300.00	281.00	290.50	3.17	3.17	3.17	51.00	49.49	50.24
	V2×N1	235.00	217.10	226.05	2.57	2.43	2.50	44.10	43.41	43.76
	V2×N2	266.67	248.83	257.75	2.80	2.70	2.75	45.90	45.76	45.83
	V2×N3	278.33	264.93	271.63	2.93	2.90	2.92	49.20	48.61	48.90
	V3×N1	270.67	244.33	257.50	3.20	3.07	3.13	58.80	56.99	57.90
	V3×N2	301.33	276.50	288.92	3.43	3.30	3.37	60.00	58.29	59.14
	V3×N3	310.00	289.83	299.92	3.63	3.60	3.62	61.50	60.81	61.15
	V4×N1	208.33	195.77	202.05	2.53	2.27	2.40	37.50	37.17	37.33
	V4×N2	233.33	222.50	227.92	2.70	2.60	2.65	39.30	38.93	39.11
	V4×N3	266.67	252.33	259.50	2.80	2.70	2.75	42.00	41.57	41.78
	V5×N1	238.33	216.93	227.63	2.57	2.50	2.53	43.50	42.33	42.91
	V5×N2	256.67	240.00	248.33	2.73	2.60	2.67	44.70	43.62	44.16
	V5×N3	280.00	260.00	270.00	2.83	2.80	2.82	47.10	47.02	47.06
F-test		*	**	NS	NS	NS	NS	NS	NS	NS
LSD at <sub>0.05</sub>		10.26	4.29	-	-	-	-	-	-	-
V:		V1= G.T.54-9(C9), V2= G.2003-47, V3= G.99-103, V4= G.2004-27, V5= G.2010-7								

**II. Juice quality:** tested sugar cane varieties in plant cane and first ratoon

Data presented in Table 3 pointed out that purity%, TSS% and sucrose % were differed significantly by the

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**Table 3. Purity%, TSS% and Sucrose % of five sugar cane varieties as affected by three N- fertilizer levels and their interactions during 2016/2017 and 2017/2018 seasons**

Treatments	Characters	Purity%			TSS%			Sucrose %		
		1st	2nd	Comb.	1st	2nd	Comb.	1st	2nd	Comb.
A: Varieties	V1	83.00	82.71	82.85	21.09	20.86	20.97	17.48	17.23	17.36
	V2	76.69	77.85	77.27	20.54	20.34	20.44	15.74	15.80	15.77
	V3	79.76	80.23	80.00	19.31	19.19	19.25	15.40	15.39	15.39
	V4	76.76	77.46	77.11	21.11	20.98	21.04	16.19	16.23	16.21
	V5	76.45	76.03	76.24	20.67	20.80	20.73	15.76	15.78	15.77
F-test		**	**	**	**	**	**	**	**	**
LSD at <sub>0.05</sub>		1.13	3.1	1.56	0.13	0.65	0.31	0.17	0.31	0.18
B: N-levels	N1	80.70	79.55	80.12	19.77	19.74	19.76	15.95	15.70	15.83
	N2	80.20	80.31	80.26	20.64	20.56	20.60	16.54	16.49	16.51
	N3	74.70	76.70	75.70	21.22	21.00	21.11	15.85	16.07	15.96
F-test		**	*	**	**	**	**	**	**	**
LSD at <sub>0.05</sub>		0.88	2.40	1.21	0.10	0.51	0.24	0.13	0.24	0.14
C: Interaction A×B	V1×N1	86.57	83.17	84.87	20.10	20.20	20.15	17.40	16.80	17.10
	V1×N2	83.81	84.73	84.27	21.20	20.50	20.85	17.77	17.37	17.57
	V1×N3	78.60	80.23	79.42	21.97	21.87	21.92	17.27	17.53	17.40
	V2×N1	77.99	77.28	77.63	20.13	20.10	20.12	15.70	15.53	15.62
	V2×N2	80.10	79.95	80.03	20.43	20.40	20.42	16.37	16.30	16.33
	V2×N3	72.00	76.33	74.16	21.07	20.53	20.80	15.17	15.57	15.37
	V3×N1	79.58	78.28	79.21	19.10	19.00	19.05	15.2	14.97	15.08
	V3×N2	82.71	82.96	82.84	19.27	19.17	19.22	15.93	15.90	15.92
	V3×N3	77.00	78.88	77.94	19.57	19.40	19.48	15.07	15.30	15.18
	V4×N1	77.49	78.12	77.80	20.43	20.10	20.27	15.83	15.70	15.77
	V4×N2	79.78	78.90	79.34	20.93	21.10	21.02	16.70	16.63	16.67
	V4×N3	72.99	75.35	74.17	21.97	21.73	21.85	16.03	16.37	16.20
	V5×N1	81.85	80.33	81.09	19.10	19.30	19.20	15.63	15.50	15.57
	V5×N2	74.57	75.03	74.80	21.37	21.63	21.50	15.93	16.23	16.08
	V5×N3	72.91	72.72	72.82	21.53	21.47	21.50	15.70	15.60	15.65
F-test		**	NS	**	**	NS	**	**	NS	*
LSD at <sub>0.05</sub>		1.96	-	2.71	0.23	-	0.53	0.30	-	0.32
V:		V1= G.T.54-9(C9), V2= G.2003-47, V3= G.99-103, V4= G.2004-27, V5= G.2010-7								

Moreover, (V<sub>1</sub>) G.T.54-9 (C9) sugar cane variety surpassed all tested varieties in purity% of (83.00%, 82.71% and 82.85%) and sucrose % of (17.48%, 17.23% and 17.30%) in plant cane and first ratoon crops and

environmental conditions prevailing during maturity development of purity%, TSS% and sucrose %. These results are in agreement with that reported by Rizk *et al.* (2004), El- Labbody *et al.* (2011), Mohamed *et al.* (2012) and Ahmed *et al.* (2016).

Concerning the effect of N- fertilization levels, it was concluded that all Juice quality traits were significantly affected by N- fertilization levels in the plant cane and 1<sup>st</sup> ratoon crops, respectively. the application of 190 kg-N/fed resulted the best values for purity% of 80.31% and sucrose % of (16.54 and 16.49) in the second and both seasons, respectively, while 160 kg-N/fed treatment obtained the best purity% of 80.71% in the plant cane crop. Moreover, the application of 220 kg-N /fed occupied the best values for TSS% of (21.22 and 21.00) in the plant cane and 1<sup>st</sup> ratoon crops, respectively. These results were the same trend with obtained by those Nassar *et al.* (2005), Shahrzad and Kamla (2014) , Yousif *et al.* (2015) , Andressa *et al.*(2016) and Vinicius *et al.* (2018).

The interaction between sugar cane varieties and nitrogen levels effects on all Juice quality traits were significantly differed significantly in plant crop only. (V<sub>1</sub>) G.T.54-9(C9) sugar cane variety with 160kg-N/fed

surpassed all tested varieties in purity% of (86.57%), and with 190kg-N/fed obtained the highest value for sucrose % of 17.77%, moreover, with 220kg-N/fed cleared highly TSS% value of 21.97%.

**III. Sugar recovery (%) and Sugar yield (ton/fed):**

The obtained results in Table 4 revealed that the tested varieties significantly differed in sugar recovery (%) and sugar yield (ton/fed) in the plant cane and 1<sup>st</sup> ratoon crops. The best sugar recovery (%) of 11.70%, 11.52 % and 11.61% were recorded by (V<sub>1</sub>) C 9 variety in the plant cane, 1<sup>st</sup> ratoon crops and comb. respectively, while sugar cane(V<sub>3</sub>) G.99-103 variety surpassed all tested varieties for sugar yield (ton/fed), which recorded the highest mean values of (6.07, 5.94 and 6.01 ton/fed) in the plant cane ,1<sup>st</sup> ratoon crops and comb., respectively. on contrary(V<sub>4</sub>) G.2004-27 variety had the lowest values (4.11, 4.1<sup>Y</sup> and 4.11 ton/fed,) in both seasons and comb., respectively. This result may be due to variation in genetics structure among tested sugar cane varieties. These results are in harmony with those of Rizk *et al.* (2004), El-Shafai and Ismail (2006), El- Labbody *et al.* (2011), Mohamed *et al.* (2012) and Ahmed *et al.* (2016) they found that statistical differences in sugar yield and sugar recovery % were recorded among the studies varieties.

**Table 4. Sugar recovery% and Sugar yield (ton/fed) of five sugar cane varieties as affected by three N-fertilizer levels and their interactions during 2016/2017 and 2017/ 2018 season.**

Treatments	Characters	Sugar recovery%			Sugar yield (ton/fed)		
		1st	2nd	Comb.	1st	2nd	Comb.
A: Varieties	V1	11.70	11.52	11.61	5.62	5.38	5.50
	V2	10.09	10.21	10.15	4.67	4.69	4.68
	V3	10.10	10.12	10.11	6.07	5.94	6.01
	V4	10.38	10.46	10.42	4.11	4.1 <sup>Y</sup>	4.1
	V5	10.54	10.05	10.30	4.76	4.45	4.61
F-test		**	**	**	**	**	**
LSD at <sub>0.05</sub>		0.67	0.39	0.38	0.34	0.23	0.20
B: N-levels Kg/fed	N1	10.53	10.28	10.41	4.82	4.59	4.71
	N2	10.88	10.85	10.86	5.17	5.05	5.11
	N3	10.28	10.29	10.29	5.15	5.09	5.12
F-test		NS	**	**	*	**	**
LSD at <sub>0.05</sub>		-	0.30	0.30	0.26	0.18	0.16
C: Interaction A×B	V1×N1	11.91	11.27	11.59	5.40	4.97	5.18
	V1×N2	11.97	11.76	11.86	5.74	5.46	5.60
	V1×N3	11.23	11.53	11.38	5.73	5.71	5.72
	V2×N1	10.17	10.01	10.09	4.49	4.34	4.41
	V2×N2	10.76	10.70	10.73	4.94	4.90	4.92
	V2×N3	9.35	9.91	9.63	4.60	4.82	4.71
	V3×N1	9.96	9.75	9.85	5.86	5.56	5.71
	V3×N2	10.66	10.65	10.66	6.39	6.21	6.30
	V3×N3	9.68	9.97	9.83	5.96	6.07	6.01
	V4×N1	10.22	10.18	10.20	3.83	3.78	3.81
	V4×N2	10.95	10.84	10.90	4.30	4.22	4.26
	V4×N3	9.97	10.38	10.18	4.19	4.32	4.25
	V5×N1	10.40	10.21	10.30	4.52	4.32	4.42
	V5×N2	10.04	10.27	10.16	4.49	4.48	4.49
	V5×N3	11.18	9.67	10.43	5.27	4.55	4.91
F-test		NS	NS	NS	NS	NS	**
LSD at <sub>0.05</sub>		-	-	-	-	-	0.35
V:		V1= G.T.54-9(C9) , V2= G.2003-47 , V3= G.99-103, V4= G.2004-27 , V5= G.2010-7					

Regarding the effect of N- fertilization levels, it was concluded that sugar recovery (%) and sugar yield (ton/fed) were significantly affected by N- fertilization levels in the plant cane, 1<sup>st</sup> ratoon crops and comb. respectively. The application of 190 kg-N/fed resulted the best values for sugar recovery (%) of 10.88%, 10.85% and 10.86% in both seasons and comb., respectively, as well as sugar yield of (5.17ton/fed) in the plant cane crop season. However 220 kg-N/fed recorded the highest sugar yield of (5.09 and 5.12 ton/fed) in the 1<sup>st</sup> ratoon crop and comb. respectively. This result may be due to the effect of N-

fertilization on increasing stalk height, diameter (cm) and millable cane yield ton/fed These results are in the line with that reported by El-Geddawy *et al.* (2003), El-Geddawy *et al.* (2005), Nassar *et al.* (2005), Shahrzad and Kamla (2014) , Yousif *et al.* (2015) and Vinicius *et al.* (2018).

The interaction between sugar cane varieties and nitrogen levels effects on sugar recovery (%) and sugar yield (ton/fed) traits was not significant effect in plant cane, first ratoon crops and comb. respectively.

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### المحصول ومكوناته لبعض أصناف قصب السكر متأثره بمستويات مختلفه من التسميد الأزوتي

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أقيمت تجربتان حقليتان بالمزرعة البحثية- محطة البحوث الزراعية- ملوى - المنيا- مصر الوسطى خلال موسم الزراعة ٢٠١٦/٢٠١٧ (محصول غرس) و٢٠١٧/ (محصول خلفه أولى) بغرض دراسة تأثير استخدام ثلاث مستويات مختلفة من التسميد الأزوتي: ١- ١٦٠ كجم أزوت/ف ، ٢- ١٩٠ كجم أزوت/ف ، ٣- ٢٢٠ كجم أزوت/ف على المحصول ومكوناته وصفات الجودة لخمس أصناف لقصب السكر :- ١- جيزة تليوان ٥٤ ٩- (س ٩) ، ٢- جيزة ٢٠٠٣- ٤٧ ، ٣- جيزة ٩٩- ١٠٣ ، ٤- جيزة ٢٠٠٤- ٢٧ ، ٥- جيزة ٢٠١٠- ٧. وقد استخدم القطع المنشقة مرة واحدة في أربعة مكررات ، حيث خصصت القطع الرئيسية للأصناف ووزع التسميد الأزوتي في القطع الشقية. وأوضحت النتائج ما يلي: ١- كان لأصناف قصب السكر ومستويات التسميد الأزوتي تأثيرا معنويا على جميع الصفات محل الدراسة في كلا الموسمين ، كما سجل الصنف المبشر جيزة ٩٩- ١٠٣ أعلى القيم لصفة طول وقطر النبات بالمسم ومحتوى القصب بالطن /ف ومحصول السكر بالطن /ف في كلا الموسمين، بينما تفوق الصنف التجارى جيزة تليوان ٥٤ ٩- (س ٩) في صفات النسبة المئوية للسكر ونتاج القفاوة ونتاج السكر النظري ، كما تفوق الصنف جيزة ٢٠٠٤- ٢٧ في صفة النسبة المئوية للمواد الصلبة الذائبة الكلية. ٢- أظهرت النتائج أن الزيادة في مستويات التسميد الأزوتي من ١٦٠ كجم /ف إلى ٢٢٠ كجم /ف أدت إلى زيادة معنوية لكل من صفات طول وقطر النبات بالمسم ومحصول القصب بالطن/ف ومحصول السكر بالطن /ف والنسبة المئوية للمواد الصلبة الذائبة الكلية، بينما كان لمعدل ١٩٠ كجم /ف أعلى نسبة مئوية للقفاوة ونتاج السكر النظري. ٣- أظهر التداخل بين أصناف قصب السكر ومستويات التسميد الأزوتي تأثيرا معنويا لصفة طول النبات بالمسم في كلا الموسمين و صفات القفاوة والنسبة المئوية للسكر ووزن النسبة المئوية للمواد الصلبة الذائبة الكلية في الموسم الأول فقط وتوصى الدراسة بأنه تحت ظروف مصر الوسطى ينصح بزراعة صنف قصب السكر جيزة ٩٩- ١٠٣ أو جيزة تليوان ٥٤ ٩- (س ٩) مع التسميد بمعدل ٢٢٠ كجم أزوت /ف للحصول على أعلى محصول قصب وسكر بجودة عالية.