RESPONSE OF SOME SUGAR CANE VARIETIES TO NITROGEN AND POTASSIUM APPLICATION

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Abstract

Two field experiments were carried out at two locations, i.e Shandaweel Agricultural Research Station (Souhag Governorate) and El-Mattana Agricultural Research Station (Qena Governorate), during the two successive seasons 1995/1996 and 1996/1997 to study the effect of three nitrogen fertilizer levels (180, 230 and 280 kg N/fed), three potassium fertilizer levels (0, 48 and 96 kg K_2O/fed) and their interactions on four sugar cane varieties, i.e G.T.54/9, G.85/37, G.84/47 and F.153 on yield and quality of sugar cane. A split plot design with four replications was used. Sugar cane was planted during the 1st week of April and harvested at 12-month age. The important results could be summarized as follows:

- Applying 280 kg N/fed significantly produced the highest number of millable cane/fed at Shandaweel location. Meanwhile, applying 230 kg N/fed caused the same result at EL-Mattana location.

-Application of 48 kg K_2O/fed attained a significant increase in the values of millable cane at shandaweel location.

- The combination between G.85-37 variety x 230 kg N/fed x 48 kg K_2O/fed significantly produced the highest value of cane yield (70.730 tons/fed) at Shandaweel. Also , the same variety with 180 kg N/fed and 96 kg K_2O/fed produced the highest cane yield at EL-Mattana (54.890 tons/fed)

- The combination between nitrogen and potassium fertilizers was the most important combination that significantly affected sugar recovery percentage in the tow locations. The highest values of this trait were detected from adding 280 kg N/fed and 48 kg K_2O/fed at Shandaweel (14.1 %) and from adding 180 kg N /fed without potassium application (12.4 %) at EL-Mattana location.

- The interaction between G.85-37 variety and 48 kg K_2O/fed at Shandaweel and EL-Mattana significantly produced the highest value of sugar yield (9.229 and 7.867 tons/fed, respectively).

- Growing sugar cane variety G.85-37 under 230 kg N /fed and 48 kg K_2O/fed produced the highest sugar yield at Shandaweel and EL-Mattana locations (9.575 and 8.147 tons/fed, respectively).

INTRODUCTION

Growing sugar cane in Egypt depends mainly on one commercial variety, viz. G.T.54/9. Therefore, there is a great need for releasing new varieties to avoid the risk of variety decline when grown for a long time.

The area cultivated with sugar cane became limited and is difficult to be expanded horizontally. So, it is necessary to improve sugar cane varieties quantitatively and qualitatively to raise the productivity of unit area.

Nitrogen element is considered a very important macro-element which distinguished by a direct effect on yield and quality of sugar cane. Also, Potassium enhances translocation of assimilates and promotes the rate of CO_2 assimilation. However, higher levels of potassium nutrition have also result in an increase in translocation rate of photosynthates.

Abd El-latif *et al.* (1993) used three cvs., i.e. G.T.54/9, G.85/37 and G.68/88 treated with different nitrogen levels . They noticed that G.85/37 variety recorded the highest yield.of cane and sugar content compared with G.T.54/9 and G.68/88 varieties.

The comparison of two sugar cane varieties, (El-Sayed, 1996) showed that F. 153 variety was superior over G.74/96 variety in number of millable cane, cane and sugar yields /fed.

Evaluation of three sugar cane varieties, i.e. G.T.54/9, G.85/37 and F.153, Nassar (1996) found that G.85/37 variety had the highest sugar yield compared to G.T. 54/9 and F.153 varieties. Ismail (1997) mentioned that cultivars did not differ significantly in number of millable cane and cane as well as sugar yields. Generally, the variety F.153 gave the highest values of most characters compared with G.68/88 and G.74/96 varieties. Abd El-Gawad *et al.* (1992) suggested that the cane and sugar yield responded positively and significantly to nitrogen fertilization up to 240 kg N/fed. Abd El-latif *et al.* (1993) reported that application of nitrogen at a rate of 210 kg N/fed attained the highest results for cane and sugar yields. Nafei (1993) showed that the highest values of cane and sugar yield were obtained when nitrogen fertilizer was added at rate of 210 kg N/fed Ahmed (1995) found that the application of 180 and 210 kg N/fed produced the highest cane and sugar yields, respectively and that nitrogen levels had no significant effect on the number of millable cane. Azzazy (1995) revealed that number of millable cane and sugar yield increased by increasing nitrogen fertilizer up to 210 kg N/fed El-Sayed (1996) reported that increasing nitrogen level significantly increased number of millable cane/m^2, while insignificant increases were obtained for

cane and sugar yields. Ahmed (1998) concluded that applying 210 kg N/ha gave the highest number of millable cane/m^2 and sugar yield in the second plant crop. Ahmed *et al.* (1993) reported that sugar cane cultivar BF.129 produced higher cane yields when K fertilizer was applied at planting than at 45 days after germination. The highest mean cane yield (144.89 tons/ha) was obtained with 224 kg K_2O /ha. Rabindra *et al.* (1993) found that applying 125 kg K_2O/ha increased cane yield by 15.25 % compared to the non fertilized treatment. Subramanian (1994) reported that sugar cane variety Co 6304 which was given zero, 125 and 187.5 kg K_2O /ha as soil application or 1% KCl spray at 30, 60 and 90 days after planting with or without soil application of 125 kg K_2O, indicated that cane and sugar yields were highest with a combination of 125 kg K_2O/ha soil + 1 % KCl foliar application. Nassar (1996) found that the interaction between sugar cane varieties and K levels significantly affected sugar recovery % and sugar yield. Potassium application significantly affected sugar yield. Varieties differed significantly in number of millable cane, cane yield and sugar yield. Ismail (1997) found that cane yield was not greatly affected by potassium rate in plant or ratoon crops. On the other hand, it had a significant effect on sugar yield in plant and ratoon crops. Applying 72 kg K_2O/fed gave the highest sugar yield and sugar recovery % .The addition of 72 kg K_2O/fed gave the highest values of plant and ratoon crops.

EL-Geddawy *et al.* (2003) found that sugar cane variety G.85/37 surpassed G.T.54-9 variety in respect to net cane yield and sugar yield. However, sugar cane variety G.T.54-9 recorded the highest value of sugar recovery percentage. More over, they added that the highest sugar recover % was recorded by applying 180 kg N/fed.

The objectives of this study were to estimate stability parameters of some sugar cane varieties under Upper Egypt conditions as well as to obtain the optimum levels of nitrogen and potassium fertilizers required for cane varieties under study to obtain the highest yield and quality.

MATERIALS AND METHODS

Two field experiments were carried out at two locations, i.e Shandaweel Agricultural Research Station (Souhag Governorate) and El-Mattana Agricultural Research Station (Qena Governorate), during the two successive seasons 1995/1996 and 1996/1997 to study the effect of three nitrogen fertilizer levels (180, 230 and 280 kg N/fed), three potassium fertilizer levels (0, 48 and 96 kg K_2O/fed) and their interactions on four sugar cane varieties, i. e G.T.54/9, G.85/37, G.84/47 and F.153 on

yield and quality of sugar cane. Treatments were arranged in a split plot design with four replications. The main plots were devoted to the four sugar cane varieties, whereas the sub plots were assigned to the combination between nitrogen and potassium levels. Plot size (subplot) was 35 m^2 (5 rows, 7 m long and 100 cm between rows). Sugar cane was planted during the first week of April and harvested after 12 months. Phosphorus as calcium super phosphate (15 % P_2O_5) was applied during land preparation at the rate of 30 Kg P_2O_5. Fed Nitrogen as Urea (46 % N) and potassium as potassium sulphate (48 % k_2O) were splited into two equal doses, the first dose was applied after two months from planting and the second one was added one month later. The recommended cultural practices of sugar cane production were adopted throughout the growing season.

Soil mechanical and chemical analysis of the two investigated soils (Souhag and Qena) in 1995/1996 season are presented in Table 1.

Data recorded:

At harvest, three guarded rows of each treatment were harvested, topped and cleaned to estimate the following traits:

1- Number of millable cane (1000 plants/fed) was recorded by counting the number of mature stalks in each subplot after ten months from planting.
2- Cane yield (tons/fed) was determined from the weight of the middle three rows of each subplot.
3- Sugar recovery percentage was calculated according the following equation as described by Mathur (1978) :

Sugar recovery % = {S - 0.4 (B - S) } x 0.73

Where: B : Brix % and S : Sucrose %

4- Sugar yield (tons/fed) was estimated according to the following equation:

Sugar yield (tons/fed) = Cane yield (tons/fed) x Sugar recovery %.

The collected data were subjected to proper statistical analysis of split plot design according to the procedures outlined by Snedecor and Cochran (1981). The comparison among means was done using LSD at 0.05 level of probability. Based on the significant effect of the treatments for the simple analysis and the homogeneity of the experimental error a combined analysis over the two growing seasons of the two locations was carried out.

Table 1. Mechanical and chemical analysis of the experimental soil in 1995/1996 season.

The analysis	Shandaweel	El-Mattana
Mechanical		
Sand %	46.2	35.0
Silt %	29.73	32.0
Clay %	9.61	35.5
Soil texture	Sandy loam	Clay loam
Chemical		
PH	7.25	7.4
E.C. mmhos/cm^3	0.125	0.6
Cations meq/L		
Na^+	2.5	1.9
Ca^{++}	4.2	3.6
Mg^{++}	0.3	1.2
Anions meq/L		
CO_3^{--}	1.8	1.2
HCO_3^-	2.0	1.8
Cl^-	2.0	2.3
SO_4^{--}	1.5	1.9
Total nitrogen %	0.61	0.19
Available phosphorus	8.0 ppm	5.4 ppm
Available potassium	594 ppm	400 ppm

RESULTS AND DISCUSSION

1- Number of millable cane (1000 plants/fed)

Data presented in Table 2 show the effect of nitrogen and potassium levels on number of millable cane/fed for the studied sugar cane varieties at the two locations. The results indicated that the sugar cane varieties under study significantly differed for this trait in both locations.

This result could be due to genetic make-up effect of the used varieties which extremely differed for growth traits. It was observed that F.153 variety showed a superiority in number of millable cane/fed. over the three other varieties grown at Shandaweel where it outyielded G.T.54/9, G.85/37 and G.84/47 cane varieties. However, the obtained results showed that G.85/37 cane variety surpassed the other varieties in number of millable cane/fed at El-Mattana in the second season. It is worth to mention that growing sugar cane at Shandaweel, markedly produced higher number of millable cane/fed compared to that obtained at El-Mattana location.

Results illustrated in Table 2 showed that applying 280 kg N/fed significantly produced the highest number of millable cane/fed This finding was fairly true at

Shandaweel site. Meanwhile, applying 230 kg N/fed was enough to yield significantly the highest number of millable cane/fed at El-Mattana location. It could be noticed that the high fertility of the soil at Shandaweel location encouraged the plant grown to produce more tillers in the early season consequently needed higher nitrogen application (280 kg N/fed) to face the required amount of nitrogen needed for these tillers. However, the low fertile of the soil in EL-Mattana location lowered the number of tillering consequently the amount needed of the applied dose of nitrogen was lower (230 kg N/fed). The positive effect of nitrogen fertilizer was mainly due to the essential role of nitrogen element in building up plant organs and growth potential in terms of increasing plant tillering .

With regard to the influence of potassium fertilizer on the millable cane number/fed, the available data in Table 2, distinctly, clarified that application of 48 kg K_2O/fed attained a relative insignificant increase in the values of millable cane at Shandaweel region. However at El-Mattana, the applied dose of potassium fertilizer faild to attain a significant effect on this trait over the check treatment (control).

Regarding the interaction effect on this trait, the results showed that number of millable cane/fed was significantly responded to the various combinations between the studied factors in both locations. The highest values of millable cane number/fed. were obtained from F.153 cane variety fertilized with 280 kg N/fed and 96 kg K_2O fed at Shandaweel location in both seasons (89572 plants/fed). Meanwhile at El-Mattana site it was found that F.153 variety received 230 kg N/fed with 48 kg K_2O/fed application of potassium fertilizer, produced the highest number of millable cane/fed (50724 plants/fed). These results assured the relative importance of the interaction between genotype (in terms of varieties) and environment not only between locations but also the different factors in the same location.

2- Cane yield (tons/fed)

Results in Table 3 showed that G.85/37 variety significantly produced the highest values of cane yield (tons/fed) at Shandaweel and El-Mattana locations, followed by F.153 sugar cane variety at Shandaweel site and G.T.54/9 at El-Mattana site. This finding may be considered a good indication toward the relative importance for genotype x environments interaction effects and G.85/37 has a wide range of adoptability and more stability than the other three varieties. This finding is in accordance with that concluded by EL-Geddawy *et al.* (2003) who noticed that sugar cane variety G.85/37 surpassed G.T.54-9 variety in respect to net cane yield

Regarding nitrogen effect on cane yield, it was found that applying 180 kg N/fed significantly produced the highest sugar cane yield (ton/fed) at Shandaweel. Meanwhile, this effect was insignificant at EL-Mattana location. Concerning the effect of potassium fertilizer on cane yield/fed. the results obtained clarified that applied doses of potassium attained a significant increase in cane yield at Shandaweel and El-Mattana regions. Application of 48 or 96 kg K_2O/fed was enough to produce the highest cane yield in the two locations, respectivelly.

The available data in Table 3 drastically and significantly showed that the most effective interaction on cane yield was that between the examined varieties and both of nitrogen and potassium fertilizers. The highest values of cane yield was attainable from sugar cane variety G.85/37 with 230 kg N/fed and 48 kg K_2O/fed at Shandaweel and 180 kg N/fed and 96 kg K_2O/fed at EL-Mattana (70.730 and 54.890 tons/fed, respectively).

The interaction between varieties and potassium levels was found to be significant at Shandaweel and El-Mattana . The results in Table 3 illustrated that combination between sugar cane variety G.85/37 and 48 kg K_2O/fed at Shandaweel and 96 kg K_2O /fed at EL-Mattana produced the highest sugar cane yield/fed. (67.661 and 52.919 tons/fed, respectively). The results showed that at Shandaweel site, applying 48 kg K_2O /fed combined with 180 and/or 230 kg N/fed successfully produced the highest significant values of cane yield.

The second order interaction, i.e. the interaction among varieties, nitrogen and potassium levels are presented in Table 3. The results showed that the combination of G.85/37 x 230 kg N/fed x 48 kg K_2O/fed, significantly produced the highest value of cane yield (70.730 tons/fed) at Shandaweel. Also, the same variety recieved 180 kg N/fed and 96 kg K_2O/fed produced the highest value of cane yield at El-Mattana in the first season (54.890 tons/fed). Moreover it was noticed that F.153 variety fertilized with 230 kg N/fed and 48 kg K_2O/fed had the highest value of cane yield (6.313 tons/fed) at Shandaweel.

3- Sugar recovery percentage:

Results given in Table 4 showed that studied varieties clarified significant effect on sugar recovery percentage, at El-Mattana site. Sugar cane varieties G.84/47 and G.85/37 attained the highest values for sugar recovery percentage. However, the differences between these varieties in respect to their effect on sugar recovery percentage were not enough to reach the level of significance at Shandaweel site. In

general, this difference in the response of sugar cane varieties in sugar recovery % might due to both the pronounced effect of genetic make-up and the distinguished influence of seasonal effect. The available data in Table 4 cleared that the effect of nitrogen on this trait was insignificant in the two locations. On the contrary EL-Geddawy *et al.* (2003) showed that the highest sugar recover % was recorded by applying 180 kg N/fed that the highest sugar recover % was recorded by applying 180 kg N/fed.

Data in table 4 revealed that using either 48 or 96 kg K_2O/fed at Shandaweel significantly surpassed zero potassium levels with relation to sugar recovery percentage. However, the effect of potassium on sugar recovery percentage at El-Mattana site was not significant.

Concerning the interaction effects between the studied factors, i.e. varieties, nitrogen and potassium fertilizers, the collected data proved that the combination between nitrogen and potassium fertilizers was the most important combination that significantly affected sugar recovery percentage in the two locations. The highest values of this trait were detected from adding 280 kg N and 48 kg K_2O/fed at Shandaweel (14.1 %) and from adding 180 kg N/fed without potassium application (12.4 %) at EL-Mattana location.

4- Sugar yield (tons/fed)

Regarding varietal effect on sugar yield (tons/fed), the results indicated that F.153 and G.85/37 sugar cane varieties showed a superiority in sugar yield over the other varieties grown at Shandaweel and at El-Mattana sites. This result was mainly due to the superiority of these varieties in cane yield at Shandaweel. This result coincide with that found by EL-Geddawy *et al.* (2003) who found that sugar cane variety G.85/37 surpassed G.T.54-9 variety in respect to net cane yield and sugar yield. It is worth mentioning that all the examined cane varieties produced higher sugar yield (tons/fed) when grown at Shandaweel site compared to El-Mattana as it is shown in Table 5. This result could be attributed to lower content of available N, P and K nutrients in the experimental site of El-Mattana compared with that of Shandaweel (Table 1).

The results illustrated in Table 5 showed that the application of 180 kg N/fed significantly recorded the highest sugar yield at Shandaweel . Whereas, applying 230 kg N/fed at El-Mattana was necessary to produce the highest sugar yield (tons/fed).

Considering the influence of potassium application, the collected data in Table 5 cleared that adding 48 kg K_2O/fed was enough to produce the highest and significant

sugar yield at Shandaweel location. However, the used levels of potassium did not exist a distinct result on sugar yield at El-Mattana location.

Regarding the interaction effect on this trait, the results showed that sugar yield (tons/fed) was significantly responded to the interaction between sugar cane varieties and the levels of nitrogen application at Shandaweel and El-Mattana locations in both seasons. The highest values of sugar yield were obtained by adding 230 kg N/fed for sugar cane varieties F.153 and G.85-37 at Shandaweel (9.05 and 8.85 tons/fed, respectively). Whereas application of 230 kg N/fed. was necessary to produce the highest value of sugar yield with G.85/37 and F.153 varieties at EL-Mattana location (7.519 and 7.480 tons/fed, respectively).

The interaction between G.85/37 variety and 48 kg K_2O/fed at Shandaweel and EL-Mattana significantly produced the highest value of sugar yield (9.229 and 7.867 tons/fed respectively).

It was observed that application of 180 kg N/fed and 48 kg K_2O/fed at Shandaweel was required to obtain the highest significant sugar yield.

The second order interaction between the studied factors (V x N x K) significantly affected sugar yield/fed. These results were fairly true in the two growing seasons of the two locations. Growing sugar cane variety G.85/37 fertilized with 230 kg N/fed. and 48 kg K_2O/fed. produced the highest sugar yield (tons/fed) at Shandaweel and EL-Mattana locations (9.575 and 8.147 tons/fed)

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Table 2. Effect of nitrogen and potassium levels on millable cane number of some sugar cane varieties under two locations (Combined over the two seasons)

Varieties	N-Levels Kg/fed	Shandaweel location				EL-Mattana location			
		Potassium levels kg K_2O/fed							
		0	48	96	Mean	0	48	96	Mean
G.Y.54-9	180	55.328	50.178	59.407	54.971	36.107	31.700	37.332	35.047
	230	44.000	39.573	45.405	43.053	40.400	38.220	39.934	39.518
	280	58.678	61.340	55.305	58.441	32.910	37.367	35.007	35.095
Average		52669	50.454	53.372	52.155	36.473	35.762	37.424	36.553
G.85-37	180	64.533	66.901	63.200	64.877	45.427	41.398	43.620	43.514
	230	58.583	63.803	57.135	59.840	45.573	46.687	42.410	44.878
	280	61.562	68.402	58.926	62.963	46.967	39.674	39.394	42.011
Average		61.559	66.368	59.754	62.560	46.010	42.585	41.808	43.468
G.84-47	180	50.495	59.259	65.785	58.512	38.834	28.947	37.547	35.109
	230	73.620	69.210	68.755	70.529	43.360	33.557	30.427	35.782
	280	63.520	71.050	65.517	66.695	40.467	40.460	38.574	39.833
Average		62.546	66.506	66.685	55.246	40.887	34.421	35.516	36.908
F.153	180	83.130	84.565	77.172	81.622	47.067	41.574	37.773	42.138
	230	71.860	69.091	62.566	67.775	40.574	50.724	44.794	45.364
	280	75.950	82.370	89.572	82.630	37.047	44.227	47.370	42.882
Average		76.921	78.675	76.433	77.334	41.562	45.508	43.312	43.461
N x K	180	63.371	65.225	66.391	64.996	41.883	35.904	39.068	38.947
	230	61.972	60.464	58.465	60.299	42.468	42.297	39.391	41.385
	280	64.927	70.747	67.330	67.682	39.358	35.932	40.086	39.955
Average		63.424	65.493	64.062	32.496	41.233	39.544	39.515	40.108

L.S.D. at 0.05 level of significance:

Varieties	2.700	3.638
Nitrogen	1.609	1.386
Potassium	N.S.	1.386
V x N	3.219	2.772
V x K	3.219	2.772
N x K	2.788	2.400
V x N x K	5.576	4.801

Table 3. Effect of nitrogen and potassium levels on cane yield (tons/fed) of some sugar cane varieties under two locations (Combined over the two seasons)

Varieties	N-Levels Kg/fed	Shandaweel location				EL-Mattana location			
		Potassium levels kg K_2O/fed							
		0	48	96	Mean	0	48	96	Mean
G.Y.54-9	180	65.273	59.980	56.163	60.472	48.371	47.675	45.861	47.292
	230	41.863	47.441	51.071	46.791	50.050	47.555	50.007	49.200
	280	61.012	54.185	58.968	58.055	49.510	49.381	50.446	49.780
Average		56.049	53.869	55.401	55.104	49.310	48.194	48.771	48.759
G.85-37	180	57.391	66.680	61.424	61.832	49.915	50.381	54.890	51.729
	230	61.431	70.730	65.867	66.009	50.341	51.053	51.970	51.121
	280	56.536	65.575	61.868	61.326	48.938	48.581	51.898	49.806
Average		58.453	67.661	63.052	63.056	49.732	50.005	52.919	50.886
G.84-47	180	55.656	50.451	55.138	53.749	49.168	49.550	47.314	48.678
	230	48.698	54.518	56.020	53.079	46.890	47.410	45.280	46.529
	280	56.953	47.503	58.008	54.154	50.562	48.378	48.390	49.013
Average		53.769	50.823	56.389	53.661	48.773	48.446	47.000	48.073
F.153	180	57.913	65.708	64.162	62.598	40.033	44.083	38.888	39.333
	230	66.661	68.313	61.146	65.374	44.873	42.443	46.987	44.767
	280	59.526	59.291	54.432	57.750	37.062	39.795	42.283	39.713
Average		61.370	64.438	59.913	61.907	40.652	40.440	42.717	41.271
N x K	180	59.061	60.705	59.221	60.036	46.872	46.665	46.738	46.758
	230	54.663	60.251	58.529	57.813	48.039	47.115	48.562	47.905
	280	58.507	56.638	58.319	57.821	46.443	46.359	48.256	47.078
Average		57.410	59.198	58.689	58.432	47.112	46.772	47.852	47.247

L.S.D. at 0.05 level of significance:

Varieties	2.043	1.0588
Nitrogen	2.134	N.S.
Potassium	1.321	0.823
V x N	3.412	2.368
V x K	3.412	1.436
N x K	2.955	N.S.
V x N x K	5.911	3.452

Table 4. Effect of nitrogen and potassium levels on sugar recovery % of some sugar cane varieties under two locations (Combined over the two seasons)

Varieties	N-Levels Kg/fed	Shandaweel location				EL-Mattana location			
		Potassium levels kg K_2O/fed							
		0	48	96	Mean	0	48	96	Mean
G.Y.54-9	180	13.4	14.4	12.8	13.5	11.5	11.4	11.6	11.6
	230	13.9	13.4	13.7	13.6	10.9	11.0	10.9	10.9
	280	14.1	15.1	13.0	14.1	12.3	11.4	11.6	12.0
Average		13.8	14.3	13.6	13.7	11.7	11.8	11.4	11.5
G.85-37	180	13.8	13.9	14.0	13.7	12.5	11.4	12.5	12.2
	230	13.9	13.5	13.2	13.4	10.9	11.8	12.4	11.7
	280	12.5	13.5	13.7	13.0	13.0	12.0	11.7	12.2
Average		13.4	13.6	13.1	13.4	12.1	11.7	12.2	12.0
G.84-47	180	13.3	12.9	14.4	13.5	12.2	11.7	11.8	11.9
	230	13.4	13.1	13.5	13.3	11.8	11.4	11.9	11.7
	280	13.5	14.1	13.3	13.6	12.2	12.6	12.3	12.3
Average		13.4	13.4	13.7	13.5	12.1	11.8	11.9	12.8
F.153	180	14.1	14.0	13.1	13.7	12.1	11.1	11.5	11.6
	230	13.7	13.7	14.2	13.8	12.2	11.3	11.6	11.8
	280	13.7	13.8	14.1	13.8	11.8	12.4	10.8	11.7
Average		13.8	13.8	13.8	13.8	12.1	11.6	11.3	11.7
N x K	180	137	13.8	13.5	13.7	12.1	11.4	11.8	11.8
	230	13.7	13.4	13.5	13.6	11.5	11.4	11.7	11.5
	280	13.4	14.1	13.3	13.6	12.4	12.0	11.6	12.0
Average		13.6	13.8	138	13.6	12.0	11.6	11.7	11.8

L.S.D. at 0.05 level of significance:

Varieties	N.S.	0.3
Nitrogen	N.S.	N.S.
Potassium	0.2	N.S.
V x N	0.4	N.S.
V x K	0.4	N.S.
N x K	0.5	0.5
V x N x K	0.8	0.7

Table 5. Effect of nitrogen and potassium levels on sugar yield (tons/fed) of some sugar cane varieties under two locations (Combined over the two seasons)

Varieties	N-Levels Kg/fed	Shandaweel location				EL-Mattana location			
		Potassium levels kg K_2O/fed							
		0	48	96	Mean	0	48	96	Mean
G.Y.54-9	180	8.735	8.670	7.128	8.189	5.583	5.443	5.323	5.449
	230	5.830	6.368	7.044	6.414	5.487	5.246	5.467	5.400
	280	8.619	8.165	7.685	8.157	7.698	6.967	6.469	7.945
Average		7.729	7.734	7.297	7.587	7.028	6.973	6.555	6.852
G.85-37	180	7.923	9.268	8.344	8.512	7.208	7.729	7.371	7.435
	230	8.547	9.575	8.429	8.851	6.869	8.147	7.543	7.519
	280	7.062	8.846	8.128	8.012	6.271	7.726	6.848	7.248
Average		7.844	9.229	8.300	8.458	7.083	7.867	7.254	7.401
G.84-47	180	7.419	56.514	7.970	7.301	7.114	5.496	6.866	6.826
	230	6.546	7.146	7.579	7.090	6.398	6.342	7.301	6.680
	280	7.704	6.691	7.739	7.228	7.068	6.433	6.803	6.768
Average		7.224	6.774	7.763	7.257	6.860	6.424	6.990	6.758
F.153	180	8.207	9.201	8.442	8.617	6.666	6.832	6.821	6.883
	230	9.129	9.367	8.668	9.050	7.691	7.360	7.390	7.480
	280	8.140	8.127	7.669	7.984	6.388	6.720	6.441	6.517
Average		8.492	8.904	8.259	8.552	6.915	6.971	6.884	6.923
N x K	180	8.071	8.414	7.979	8.155	5.507	7.144	6.839	6.997
	230	7.963	8.114	7.929	7.852	6.826	7.069	7.283	7.059
	280	7.882	7.961	7.805	7.883	7.081	6.962	6.640	6.895
Average		7.822	8.163	7.905	7.963	6.972	7.058	6.921	6.984

L.S.D. at 0.05 level of significance:

Varieties	0.517	0.361
Nitrogen	0.295	N.S.
Potassium	0.295	N.S.
V x N	0.571	0.391
V x K	0.571	0.391
N x K	0.452	N.S
V x N x K	0.989	0.678

استجابة بعض أصناف قصب السكر لإضافة السماد الآزوتي والبوتاسي

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أقيمت تجربتان حقليتان بمحطتي البحوث الزراعية بشندويل (محافظة سوهاج) والمطاعنه (محافظة قنا) في موسمي ١٩٩٥/١٩٩٦ و ١٩٩٦/٩٧ لدراسة تأثير التوافق بين ثلاث مستويات من السماد النيتروجيني (١٨٠ ، ٢٣٠ و ٢٨٠ كجم ن/فدان) ، ثلاثة مستويات من التسميد البوتاسى (بدون إضافة ، ٤٨ و٩٦ كجم بو٢ا/فدان على المحصول ومكوناته لأربعة أصناف من القصب) جيزة تايوان ٥٤-٩ ، جيزة ٨٥-٣٧ ، جيزة ٨٤-٤٧ و ف ١٥٣ . واتبع في تنفيذ التجربة تصميم القطع المنشقة مرة واحدة في أربعة مكررات ، وكان ميعاد الزراعة في الأسبوع الأول من إبريل وتم الحصاد بعد ١٢ شهرا من الزراعة. وفيما يلي أهم النتائج المتحصل عليها:

*- اذدادت معنويا صفة عدد العيدان القابلة للعصير (ألف نبات/فدان) معنويا بإضافة ١٨٠ كجم ن/فدان في منطقة شندويل بينما كانت إضافة ٢٣٠ كجم ن/فدان كافية لأنتاج زيادة معنوية فى عدد من العيدان القابلة للعصير بمنطقة المطاعنة.

*-أدت إضافة ٤٨ كجم بو٢ا/فدان إلى زيادة معنوية في صفة عدد العيدان القابلة للعصيرفى منطقة شندويل اما في منطقة المطاعنه لم تكن هذه الزيادة معنوية.

*-أعطى صنف القصب جيزة ٨٥-٣٧ أعلي محصول عيدان قابلة للعصير عندما سمد بمعدل ٢٣٠ كجم ن/فدان + ٤٨ كجم بو٢ا/فدان في منطقة شندويل حيث اعطى ٧٠,٧٣٠ طن عيدان/فدان . كذلك اعطى نفس الصنف ٥٤,٨٩٠ طن عيدان/فدان في المطاعنة عند اضافة ١٨٠ كجم ن/فدان + ٩٦ كجم بو٢ا /فدان.

*- اظهر التفاعل بين السماد النيتروجيني والبوتاسى تأثيرا معنويا على صفة نسبة ناتج السكر في كلا الموقعين. وتحققت أعلي القيم لهذه الصفة(١٤,١ %) عند اضافة٢٨٠ كجم ن/فدان + ٤٨ كجم بو٢ا /فدان بمنطقة شندويل بينما كانت نسبة ناتج السكر ١٢,٤ % عند اضافة ١٨٠ كجم ن/فدان فقط.

*- حقق صنف القصب جيزة ٨٥-٣٧ أعلي محصول من السكر (٩,٢٢٩ و ٧,٨٦٧ طن سكر/فدان بكل من شندويل والمطاعنة على التوالي) عند تسميده بمعدل ٤٨ كجم بو٢ا/فدان.

*- تم الحصول على أعلي قيم لمحصول السكر (٩,٥٧٥ و ٨,١٤٧ طن سكر/فدان بشندويل والمطاعنة على الترتيب) عندما سمد القصب بمعدل ٢٣٠ كجم ن/فدان + ٤٨ كجم بو٢ا/فدان.