EVALUATION OF SOME SPRING PLANTED SUGARCANE GENOTYPES UNDER DIFFERENT GROWING SEASONS: 4- STABILITY ANALYSIS FOR YIELD AND QUALITY TRAITS

B.D. Mohamed and A.B.A. El-Taib

Sugar Crops Res., Inst., ARC, Giza, Egypt.

Abstract: The present study was conducted at Kom Ombo Agricultural Research Station Farm during 2004/2005 and 2005/2006 growing seasons to evaluate the performance and stability of 14 sugarcane genotypes over 12 environments (of 2 seasons x 2 planting dates x 3 harvesting dates). The combined analysis of variance showed highly significant differences among genotypes, environments and the genotype x environment interaction for the studied traits. The results indicated that mean squares of E+ (ExG), environments (linear) and pooled deviation for all studied traits were significant except mean squares of environments (linear) for stalk weight, while mean squares of (GxE) (linear) were insignificant for studied traits except number of millable cane and cane yield. Most of the variations in the total MS of each of the studied traits were due to the environment emphasizing that adopting the proper agricultural practices, especially planting and harvesting dates in sugarcane are essential.

Furthermore, the results indicated that high yielding genotypes in cane and sugar yield (G99-103 and G2000-157) were unstable while low yielding genotype in cane (G99-217) was stable as a result of less sensitivity to the environmental changes.

Key words: sugarcane, genotypes, stability analysis, yield, quality traits .

Introduction

In a selection program, the evaluation of promising materials has to be carried out in a wide range of environments in order to determine the response of the genotypes and to detect any unfavourable interactions. The possibility of these interactions emphasses the need to select different genotypes for particular environments and the magnitude of the interactions will determine the effort to be made in searching for a genotype with wide adaptation.

However, genotype x environment interaction encountered in yield trials are a challenge to sugarcane breeder. The genotype x environment interactions has been shown to reduce progress from selection (Comstock and Moll, 1963). In addition to high mean yield, information on a cultivar's stability performance across environments would enable breeders to select more consistent-performing cultivars. Simmonds (1981) reported that stable cultivars, i.e., less dependent upon good environments to do well, have been more prominent in sugarcane than various cereals, and that response had been due to unconscious selection. Freeman (1973) reviewed the different statistical methods used to evaluate the stability parameters in several crops. Analysis of variance and regression analysis have been the most common methods, the former gives information about the presence and the magnitude of the interaction and the latter supplies a measure of the stability of the varieties. The regression method was proposed by Eberhart and Russell (1966) and is based on the determination of an environmental index for each of the environments used in a series of trials, calculated as the mean yield of all cultivars at one environment minus the general mean of all cultivars in all environments of the trials. It shows that both linear regression coefficient and the deviation from regression can be considered as parameters for measuring the yield stability of different genotypes.

Studies of sugarcane based in the method of Eberhart and Russell (1966) have been carried out by Pollock (1975), Bond (1979), Ruschell (1977) and Tai *et al.* (1982). They found that the method supplied additional information on the performance of new genotypes and better criteria for deciding on the release of a variety. In multi-environmental yield trials, different genotypes show varying performance and stability in different environments (Srivastava *et al.*, 2001). The response of sugarcane genotypes to conditions encountered in different environment varies. This may result in a change in the ranking of individuals within a series of genotypes when measured in different environments, giving rise to genotype x environment interaction. Interaction between genotype and environment impacts on the breeding strategy. If there is no interaction, then the best genotype in one environment will be the best in the other environments, but if there is significant interaction, particular genotypes must be chosen for different environments (Parfitt, 2000). Genotype x environment interaction of 12 sugarcane varieties was evaluated in. Nagar, Uttar Pradesh, India during 1997-2000 by Tyagi *et al.* (2001). Significant differences among genotypes and environments for both the characters were observed .Genotype environment interactions were highly significant and G x E (linear) and pooled deviation were also significant. COS 95255, COS 96298, COS 96260 and COS 9420, showing higher commercial cane sugar/ha and cane yield (t/ha), and lowest regression (bi) values, were most promising and suitable for both favourable and unfavourable environments. The present study was carried out to evaluate 14 sugarcane genotypes for yield, yield components and quality traits under different planting dates and harvesting times as well as to estimate the relative stability of these genotypes across environments.

Materials and Methods

The present study was conducted at Kom Ombo Agricultural Research Station Farm during 2004/2005 and 2005/2006 growing seasons to evaluate the performance and stability of 14 sugarcane genotypes under two planting dates and three harvesting dates. The genotypes used in this study were: GT54/9 (the commercial variety) which its Fuzze (seed) was introduced from Taiwan and was selected in Egypt while the second genotype Ph8013 was introduced from Philippine and the other twelve genotypes are promising genotypes from Egyptian sugarcane breeding program, namely G99-122, G99-160, G99-165, G99-208, G99-217, G2000-4, G2000-8, G2000-157, G2000-171 and G2000-176.

The two planting dates in which the genotypes were planted were 26th March representing full season convential cropping system (CP) and 26 April representing late planting system (LP).

The three harvesting dates were 26th Feb., 26th March and 26th April, at which the age of evaluated genotypes were 11, 12, and 13 months under convential planting date and 10, 11 and 12 months under late planting date.

Thus, the 14 sugarcane genotypes were evaluated over 12 environments (2 seasons x 2 planting dates x 3 harvesting dates). The trial design was randomized complete blocks with three replications arranged in split-plot system. The combination of planting and harvesting dates were allocated in the main plots and the genotypes were in sub plots. The sub plot was 5 rows, 7 meter long and 1 meter apart. The recommended cultural practices of sugarcane production were adopted throughout the growing seasons.

At each harvest date, the following data was recorded:

1.Number of millable cane/fed.

2- Stalk weight (kg).

3- Cane yield (ton/fed.).

4- Sugar yield (ton/fed.).

5- Brix %. 6- Sucrose .

7- Pol % . 8- Purity %.

9-Sugar recovery %.

The stability parameters are bi and S_2di assessed to each of the 14 genotypes over all environments. Where, bi and S^2di were estimated by using Eberhart and Russell's model (1966). A stable genotype is a genotype has a regression coefficient of unity (bi=1.0) and a deviation from regression mean square equals zero ($S^2di = 0$) and hence an ideal genotype would have both a high average performance over wide range of environments together with stability parameters as defined by Eberhart and Russell (1966).

The homozygosity error test of the data was done before the combined analysis of variance which were performed as outlined by Federer (1963). Revised LSD at 5% probability was used for means comparison of studied traits.

Results and Discussion

A- Combined analysis:

The combined analysis of variance showed significant differences between genotypes among environments and a significant genotypes x environments interaction for all studied traits Table (1), so, the stability analysis was valid.

B – Joint regression:

The joint regression analysis of variance for the traits of the evaluated genotypes (Table 2) indicated highly significant differences of E+(ExG) for all studied traits implying that the environments as well as the interaction of environments x genotypes played an important role in determining these traits. Mean squares of environments (linear) for all studied traits were highly significantly except for stalk weight. Consequently, the regression coefficients (b_i) on the environmental index and deviation from regression mean squares (S^2d_i) pooled over the 12 environments were calculated for each genotype.

The GxE interaction is partitioned into GxE (linear) interaction and pooled deviation mean square. The GxE (linear) mean square provides a test of genetic differences among genotypes for their regression upon the environmental index. Insignificant mean squares of GxE (linear) were obtained for all studied traits except for number of millable cane and cane yield Table (2). The differences in regression coefficient values among genotypes were insignificant while the significant linear interaction for number of millable cane and cane yield indicated that all genotypes did not respond similarly to the varied environments table (2). Significant mean squares of pooled deviation Table (2) for all studied traits pointed out that genotypes differ significantly with respect to their deviation from their respective average linear response.

C – Stability parameters:

The stability parameters used in this study were mean performance of genotypes ($\bar{X}$), regression coefficients (b_i), and mean squares of deviation from regression (S^2d_i) are presented in tables (3-5) and discussed individually for each studied trait.

1- Number of millable cane/fed.

The results in Table (3) indicated that all studied genotypes except G99-122 genotype were unstable which

Table(1): Mean square of yield components, cane and sugar yield characters for 14 genotypes of sugarcane under 12 environments.

S.O.V.	d.f	M.S.								
		Number of millable cane /fed.	Stalk weight (kg)	Cane yield (ton/fed.)	Sugar yield (ton/fed.)	Brix %	Sucrose %	Pol %	Purity %	Sugar recovery %
Environments	11	190451623.377**	0.767**	1589.480**	41.157**	43.306**	40.453**	29.130**	60.430**	21.463**
R (Env)	24	7005714.286	0.021	15.276	0.288	0.781	0.826	0.592	2.281	0.485
Genotypes	13	56227967.033**	0.663**	905.110**	10.323**	17.239**	25.978**	16.681**	135.519**	17.199**
Env x Genotypes	143	46277077.922**	0.070**	134.189**	10.65**	2.017**	4.32**	1.515**	6.332**	1.425**
Error	312	5729560.440	0.011	8.028	0.200	0.434	0.537	0.378	1.775	0.336

*, ** Significant and highly significant, respectively.

Table(2): The joint regression analysis of variance for the studied traits.

S.O.V.	d.f	M.S.								
		Number of millable cane /fed.	Stalk weight (kg)	Cane yield (ton/fed.)	Sugar yield (ton/fed.)	Brix %	Sucrose %	Pol %	Purity %	Sugar recovery %
Genotypes	13	18742655.7**	0.221	301.703**	3.441	5.746	8.659	5.560	45.173**	5.733
E+ (E x G)	154	19701000000**	20.491**	28412.634**	432.701**	6505.633**	4648.973**	3162.427**	101021.428**	2133.919**
E (Linear)	1	698260038**	2.839	5842.981**	151.250**	158.914**	146.766**	107.234**	218.968**	68.055**
G x E(linear)	13	18893629.5**	0.026	77.131**	1.491	1.495	1.646	1.139	2.763	0.952
Pooled dev.	140	21664000000**	22.517**	31205.00**	474.753**	7154.923**	5112.669**	3477.798**	111121.75**	2346.737**
Pooled error	312	1909853.48	0.004	2.676	0.067	0.145	0.179	0.126	0.592	0.112

*, ** Significant and highly significant, respectively.

Table(3): Mean ($\overline{X}$) and stability parameters bi and S^2di for 14 sugarcane genotypes under 12 environments

Genotypes	traits								
	Number of millable cane/ fed			Stalk weight (Kg)			Cane yield (ton/fed)		
	$\overline{X}$	bi	S^2_{di}	$\overline{X}$	bi	S^2_{di}	$\overline{X}$	bi	S^2_{di}
GT 54-9	38833	1.20	5231263.20**	1.197	0.75	0.01**	46.12	0.65	8.51**
PH 8013	36316	2.23	8236297.45**	1.300	1.44	0.03**	46.76	1.52	24.33**
G. 99-80	37366	0.30	15453734.91**	1.032	0.73	0.01	38.64	0.52	52.16**
G. 99-103	36566	1.63	5492899.93**	1.527	0.92	0.05**	55.88	1.20	108.14**
G. 99-122	37983	0.17	2452662.54	1.141	0.36	0.01**	43.16	0.20	16.02**
G. 99-160	35716	2.00	32124878.42**	0.985	0.69	0.03**	36.18	1.32	136.17**
G. 99-165	37783	0.87	6383520.47**	1.201	0.94	0.01**	45.03	0.47	21.06**
G. 99-208	37716	0.41	16238375.07**	1.076	1.17	0.01**	40.69	1.40	11.29**
G. 99-217	37750	1.02	10718060.91**	1.133	1.43	0.02**	42.81	1.63	3.53
G. 2000-4	37016	0.74	24009569.18**	1.272	1.44	0.04**	46.29	1.14	38.86**
G. 2000-8	37300	0.95	7523409.8**	1.142	0.76	0.01*	42.44	0.79	20.06**
G. 2000-157	39650	0.93	13856847.48**	1.310	0.76	0.01*	51.67	0.81	15.10**
G. 2000-171	34850	0.42	15184264.54**	1.255	1.53	0.01**	43.46	1.16	20.62**
G. 2000-176	36133	1.12	6388211.89**	1.159	1.12	0.01*	41.91	1.19	24.56**
Average	37213			1.195			44.36		
r	-0.267			0.257			-0.005		

*, ** Significant and highly significant, respectively.

LSD at 0.05 1109 0.048 1.31

Table(4): Mean ($\overline{X}$) and stability parameters bi and S^2di for 14 sugarcane genotypes under 12 environments

Genotypes	Traits								
	Sugar yield (ton /fed)			Brix %			Sucrose %		
	$\overline{X}$	bi	S^2_{di}	$\overline{X}$	bi	S^2_{di}	$\overline{X}$	bi	S^2_{di}
GT 54-9	5.744	0.74	0.25**	21.07	0.92	0.19	18.11	0.95	0.22
PH 8013	5.965	1.48	0.38**	21.70	1.52	0.07	18.57	1.44	0.35*
G. 99-80	4.656	0.66	0.62**	21.13	1.28	0.19	17.80	1.26	0.17
G. 99-103	6.521	0.97	2.22**	21.06	0.78	1.09**	17.30	0.72	0.85**
G. 99-122	5.221	0.52	0.32**	20.72	1.07	0.17	17.71	1.11	0.16
G. 99-160	4.640	1.13	1.45**	21.75	0.92	0.75**	18.91	0.95	0.82**
G. 99-165	4.736	0.45	0.20**	20.53	0.65	0.18	16.18	0.72	0.43**
G. 99-208	5.261	1.40	0.14*	22.38	1.12	0.22	18.90	1.18	0.19
G. 99-217	5.598	1.72	-0.003	22.40	1.39	0.21	19.01	1.48	0.45**
G. 2000-4	5.640	0.84	0.30**	21.55	0.16	0.86**	18.15	0.11	1.62**
G. 2000-8	5.299	0.73	0.33**	21.47	0.96	-0.04	18.29	0.72	0.01
G. 2000-157	5.912	1.17	0.14*	20.00	1.45	1.06**	16.80	1.56	0.79**
G. 2000-171	5.627	1.09	0.46**	22.05	0.70	0.62**	18.84	0.63	0.41*
G. 2000-176	5.302	1.11	0.45**	21.73	1.07	0.07	18.55	1.08	0.07
Average	5.437			21.40			18.08		
r	0.353			-0.003			0.071		

*, ** Significant and highly significant, respectively.

LSD at 0.05 0.207 0.30 0.34

S^2di significantly differ from zero. The stable genotype G99-122 had bi<1.0, therefore, it could be adapted to extreme environments (late planting or early harvesting dates).

The most desired genotype for number of millable cane was G2000-157 because it had a mean performance higher than average and than that of the other genotypes. The correlation between mean performance ($\overline{X}$) and regression coefficient (bi) for number of millable cane/fed. was negative and non-significant (r= -0.267).

2 – Stalk weight (kg):

The stability parameters (bi and S^2di) and mean performance ($\overline{X}$) of the individual genotype are shown in Table (3). The results revealed that all genotypes except G99-80 were unstable (S^2di significantly differed from zero). G99-103 genotype could be considered the best in stalk weight, since it had stalk weight (1.527 kg) more than the average of all genotypes followed by 2000-157 (1.310 kg) and Ph8013 (1.300 kg). The correlation coefficient between mean performance ($\overline{X}$) and (bi) for stalk weight was positive and but non-significant (r= 0.257).

3 – Cane yield (ton/fed.):

The stability parameters (bi and S^2di) and the mean performance ($\overline{X}$) presented in table (3) indicated that, all tested genotypes except G99-217 genotype were unstable (S^2di significantly differed from zero). It is clear that the stable genotype G99-217 had bi>1, indicating that this genotype relatively well adopted under high performing environments. The most desired genotypes for cane yield were G99-103 (55.88 ton/fed.) and G2000-157 (51.67 ton/fed.) genotypes. Since they have high mean performance compared to the mean of over all genotypes. This result confirmed with the correlation coefficient between mean performance ($\overline{X}$) and (bi) for cane yield which it was negative and insignificant (r= -0.05).

4 – Sugar yield (ton/fed.):

The results in table (4) indicated that all studied genotypes except G99-217 were unstable since their S^2di values significantly differ from zero. The only stable genotype G99-217 had bi greater than one, showing that this genotype was not responsive to the change in environmental condition and it relatively well adopted under high performing environments. The highest mean performance of sugar yield (6.521 ton/fed.) was recorded by unstable genotype (G99-103). This results confirmed with the correlation between mean performance ($\overline{X}$) and regression coefficient (bi) for sugar yield which it was positive (r= 0.353).

5 - Brix %:

The stability parameters (bi and S^2di) and the mean performance ($\overline{X}$) for Brix % of the studied genotypes

Table(5): Mean ($\bar{X}$) and stability parameters bi and S^2di for 14 sugarcane genotypes under 12 environments

Genotypes	Traits								
	Pol %			Purity %			Sugar recovery %		
	$\bar{X}$	bi	S^2_{di}	$\bar{X}$	bi	S^2_{di}	$\bar{X}$	bi	S^2_{di}
GT 54-9	15.00	0.95	0.19	85.94	1.25	1.38**	12.42	0.86	0.20
PH 8013	15.07	1.40	0.03	84.89	0.61	0.12	12.66	1.33	0.44**
G. 99-80	14.53	1.42	0.09	84.22	1.19	0.27	12.03	1.18	0.18
G. 99-103	14.29	0.78	0.43**	82.32	0.86	1.86**	11.58	0.70	0.51**
G. 99-122	14.46	1.23	0.16	85.50	0.74	0.62	12.05	1.04	0.18
G. 99-160	15.69	0.94	0.48**	86.82	0.78	1.46**	12.97	0.92	0.51**
G. 99-165	13.46	0.78	0.32**	78.75	1.71	2.53**	10.54	0.69	0.39**
G. 99-208	15.68	1.04	0.07	84.40	1.00	0.48	12.78	1.14	0.16
G. 99-217	15.76	1.45	0.34**	84.73	1.07	1.97**	12.87	1.48	0.42**
G. 2000-4	15.21	0.09	0.94**	84.09	0.80	6.20**	12.25	0.05	1.10**
G. 2000-8	14.95	0.67	0.03	85.22	0.30	1.61**	12.45	0.55	0.07
G. 2000-157	14.04	1.51	0.52**	83.88	1.88	0.03	11.35	1.56	0.46**
G. 2000-171	15.49	0.76	0.20	85.44	0.98	-0.003	12.88	0.51	0.29**
G. 2000-176	15.12	0.99	0.11	85.29	0.74	0.05	12.61	1.00	0.12
Average	14.91			84.39			12.25		
r	-0.073			-0.53*			0.054		

*, ** Significant and highly significant, respectively.

LSD at 0.05 0.28 0.62 0.27

are shown in table (4). The results showed that the genotypes GT54-9, Ph8013, G99-80, G99-122, G99-165, G99-208, G99-217, G2000-8 and G2000-176 were stable in Brix % which bi and S^2di for them were insignificantly differed from one and zero, respectively. It is obvious that GT54-9, G99-165 and G2000-8 exhibited below average response to different environments (bi<1.0) and they are considered relatively better in less favorable environments while the other stable genotypes are considered better at favorable environments (bi>1.0). G99-217 and G99-208 genotypes could considered the best in Brix % since they had Brix % more than the average of all genotypes.

6- Sucrose %:

The stability parameters (bi and S^2di) and the mean performance ($\overline{X}$) for sucrose % are shown in table (4). The results indicated that the genotypes GT54-9, G99-80, G99-122, G99-208, G2000-8 and G2000-176 were stable in sucrose % which bi and S^2di insignificantly differed from one and zero, respectively. GT54-9 and G2000-8 were stable and exhibited below average response to different environments (bi<1.0) and they are considered relatively better in less favorable environments. The best genotypes in sucrose % were G99-217, G99-160, G99-208 and G2000-171. This result confirmed with the correlation coefficient between mean performance ($\overline{X}$) and (bi) for sucrose % which it was positive and insignificant (r= 0.071).

7- Pol %:

The results in table (5) indicated that GT54-9, Ph8013, G99-80, G99-122, G99-208, G2000-8, G2000-171 and G2000-176 were stable for pol % which bi and S^2di insignificantly differed from one and zero, respectively and four of them i.e. GT54-9, G2000-8, G2000-171 and G2000-176 genotypes exhibited below average response to different environments (bi<1.0) and they are considered relatively better in less favorable environments. The best genotypes in pol % were G99-217, G99-160, G99-208 and G2000-171. This result confirmed with the correlation between mean performance ($\overline{X}$) and regression coefficient (bi) for pol % which it was negative and insignificant (r= -0.073).

8 - Purity %:

The stability parameters (bi and S^2di) and the mean performance ($\overline{X}$) of the individual genotype presented in table (5) indicated that the genotypes Ph8013, G99-80, G99-122, G99-208, G2000-157, G2000-171 and G2000-176 were stable for purity % which bi and S^2di differed insignificantly from one and zero, respectively), the stable genotypes, Ph8013, G99-122, G2000-157 and G2000-171 were below average response to different environments (bi<1) and they are considered relatively better in less favorable environments. The other stable genotypes had (bi≥1) greater than one which they will perform consistently better under favorable environments. The most desired genotypes for purity % was G99-160 which had higher purity (86.82%) compared to the mean overall genotypes. The correlation coefficient between mean performance and (bi) for purity % it was negative and significant (r= - 0.53).

9 – Sugar recovery %:

The stability parameters (bi and S^2di) and the mean performance ($\overline{X}$) of the individual genotypes are presented in table (5). The results indicated that the genotypes GT54-9, G99-80, G99-122, G99-208, G2000-8 and G2000-176 were stable for sugar recovery %. It is clear that GT54-9 and G20008 genotypes were stable and exhibited below average response to different environments (bi<1) and they are considered relatively better in less favorable environments while the other stable genotypes had bi greater than one and they could performance well under high performing environments. Most of the genotypes recorded mean performance of sugar recovery higher than the mean over all genotypes. This result confirmed with the positive and insignificant correlation (r= 0.054) between mean performance ($\overline{X}$) and regression coefficient (bi) for sugar recovery %.

Conclusions:

Data presented in this paper confirm the fact that high yielding genotypes in cane and sugar yield (G99-103 and G2000-157) are more likely to have lower stability. Low yielding genotype in cane yield (G99-217) tend to have higher stability resulted from less sensitivity to environmental changes. Therefore, the breeding for high yielding and high or average stability should include a wide range of environmental variability in order to succeed in developing genotypes that possess the ability to produce satisfactory under stress conditions. Consequently, it may possible to combine high yield with stability of performance by crossing the high yielding genotypes such as G99-103 and G2000-157 with stable genotypes.

References

Bond, R.S. 1979. Evaluating a new variety (NII) in seed cane increase plots by means of a sample harvest method. S. afr. Sugar J. 63: 481-483.

Comstock, R.E. and R.H. Moll. 1963. Genotype environment interaction. P. 164-196. In W.D. Hanson and H.F. Robison (ed.) Statistical Genetic and Plant Breeding, NAS-NRC, Pub. 982.

Eberhart, S.A. and W.A. Russell. 1966. Stability parameters for comparing varieties. Crop Sci. 6: 36-40.

Federer, W.T., 1963. Experimental Design. Oxford. IBH Publihsing Co. New Delhi.

Freeman, F.H. 1973. Statistical methods for the analysis of genotype x environment interactions. Heredity 31: 399-354.

Parfitt, R.C. 2000. Genotype x environment interaction among secondary variety trials in the northern region of the South Africa sugar industry. Proc. of the Annual Cong. South Africa. Tech. Assoc. 74: 245-248.

Pollock, J.S. 1975. Selection consequences of differential performance of standard clones across environments. Sugarcane Bred. Newsl., ISSCT 35: 36-38.

Ruschell, R. 1977. Phenotypic stability of some sugarcane varieties (*Saccharum* spp.) in Brazil. Proc. ISSCT. 16: 275-281.

Simmonds, N.W. 1981. Genotype (G), environment (E) and GE components of crop yields. Exp. Agric. 17: 355-362.

Srivastava, H.M., H.N. Shahi, N. Kulshreshtha, J. Singh and P.K. Bajpai. 2001. A new approach to study genotype x environment interaction and stability in sugarcane. ISSCT. 24 (2): 531-533.

Tai, P.Y.P., E.R. Rice, V. Chew and J.D. Miller. 1982. Phenotypic stability analyses of sugarcane cultivar performance tests. Crop Sci. 22: 1179-1184.

Tyagi, S.D., D.N. Singh and Nand-Krishna. 2001. The effect of genotype-environment interaction on varieties of sugarcane. Indian Sugar 51 (3): 171-174.

Assiut J. of Agri. Sci., 38 (1) (53-65)

تقييم بعض التراكيب الوراثية لقصب السكر المزروعة فى الربيع تحت مواسم نمو مختلفة ٤ – تحليل الثبات لصفات المحصول والجودة

بازيد دردير محمد ، أشرف بكرى أحمد الطيب

معهد بحوث المحاصيل السكرية – مركز البحوث الزراعية – الجيزه – مصر

أجريــت هذه الدراسة فى مزرعة محطة البحوث الزراعية بكوم أمبو التابعة لمركز البحوث الزراعــية بالجــيزه خلال موسمى ٢٠٠٥/٢٠٠٤ ، ٢٠٠٦/٢٠٠٥ لتقييم أداء وثبات أربعة عشر تركيبا وراثيا فى ١٢ بيئة (موسمين زراعيين × ٢ ميعاد زراعة × ٣ ميعاد حصاد) .

أظهرت النتائج فروق عالية المعنوية بين التراكيب الوراثية والبيئات والتفاعل الوراثى البيئى. كمــا تشــير النــتائج إلى أن متوسط مربعات البيئات + (البيئات × التراكيب الوراثية) والبيئات (انحــراف خطــى) والانحراف عن الانحدار للصفات المدروسة كان معنويا ماعدا متوسط مربع البيــئات (خطى) لصفة وزن الساق للعيدان القابلة للعصير ومحصول القصب . معظم الاختلافات لمتوســط المربعات الكلى لكل صفة من الصفات المدروسة كان راجعا للإختلافات البيئية . وهذه النــتائج أكدت أن تطبيق معاملات زراعية مناسبة خاصة مواعيد الزراعة والحصاد فى محصول قصب السكر ضرورية .

أضــف إلــى ذلك ، أوضحت النتائج أن التراكيب الوراثية ذات المحصول العالى من قصب الســكر (جــيزه ٩٩-١٠٣ وجــيزه ٢٠٠٠-١٥٧) كانــت غير ثابتة بينما التركيب الوراثى ذو المحصول المنخفض من القصب (جيزه ٩٩-٢١٧) كان ثابتا نتيجة لانخفاض حساسيته للتغيرات البيئية .