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EVALUATION OF SOME SPRING PLANTED SUGARCANE GENOTYPES UNDER DIFFERENT GROWING SEASONS: 1- QUALITY TRAITS PERFORMANCE

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Abstract: The present study was carried out at Kom-Ombo Agricultural Research Station farm during 2004/2005 and 2005/2006 growing seasons to estimate the quality traits (Brix %, sucrose %, pol %, purity % and sugar recovery %) of fourteen sugarcane genotypes under six growing seasons representing the combinations of two planting dates with three harvesting dates (GS1 to GS6). The two planting dates were 26 March (recommended date), and 26 April (late date), 2004 and 2005, respectively and the three harvesting dates were 26 Feb., 26 March and 26 April, 2005 and 2006, respectively in which the age of the genotypes was 11, 12, 13 and 10, 11, 12 for recommended and late date, respectively. The used genotypes were GT54-9, Ph8013, G99-80, G99-103, G99-122, G99-160, G99-165, G99-208, G99-217, G2000-4, G2000-8, G2000-157, G2000-171 and G2000-176.

The experiment design was randomized complete blocks with three replications arranged in split-plots system.

The results indicated that: Genotypes, growing seasons and their interaction had highly significant effect on all quality traits. Reducing growing season by delaying planting date or advancing harvesting dates reduced quality traits significantly and the early planting – second harvest growing season recorded the highest values of quality traits.

G99-208, G99-217, G99-160 and G2000-171 significantly exceeded GT54-9 in sugar recovery, the most important quality traits, and proved to be promising genotypes. The evaluated genotypes varied in their response to the used growing season in quality traits implying the possibility of obtaining high quality traits throughout the milling season by scheduling the planting and harvesting dates and used specific genotype in specific growing season in which could achieved high quality traits.

Key words: sugarcane, genotypes, quality traits, growing season.

Introduction

There are many factors affecting quality traits of sugarcane. Among these factors genotypes, growing seasons, and their interactions; are the most important factors in determining quality traits. Each sugarcane genotype has uniqe potential for quality traits and differences among selected genotypes at sugarcane breeding programes in quality traits have

always been studied. El-Sogheir and Besheit, 2003; El-Taib *et al.*, 2005 and Gilbert *et al.*, 2006 reported differences among sugarcane genotypes in quality traits.

The growing season which represented the period between planting and harvesting dates could be extended by delaying harvesting date or reduced by delaying planting date or by advancing harvesting date (Hoey and Hossain, 1981; Verma and Yadav, 1985; Mohamed and Abo Douh, 2001 and Gulati, 2002). However, the interaction of genotypes x growing season plays a great role in determining the quality traits of selected sugarcane genotypes. Miller and James, 1978; Patel *et al.*, 1993; Singh and Singh, 1998; Singh and Singh, 2002 and El-Sogheir and Besheit, 2003 suggested that more emphasis should be placed on testing selected genotype on greater number of growing seasons (the period between planting and harvesting dates) than on the testing of them at one growing season and the results of their studies indicating that early maturity sugarcane genotypes recorded high quality traits values at the beginning of milling season compared to mid or late maturity genotypes and any sugarcane production region should be planted with three genotypes at least to obtain high quality traits values during milling season. The first group represents the early-season maturity genotypes group, the second represents the mid-season maturity genotypes group, while the third representing the late-season maturity group.

In Egypt, GT54-9 genotype is the main sugarcane genotypes and it is harvested throughout the milling season. This results in poor quality traits at the early months of milling season as a result of harvesting before achieving the peak of quality traits. Also, its quality traits decline at the late months of milling season as a result of continuous vegetative growth. To overcame these problems, emphasis should be directed toward developing and selecting sugarcane cultivars representing the early, mid and late-season maturity groups.

The objective of this study was to evaluated the quality traits of 14-sugarcane genotypes under six growing season to assess their maturity group and study the possibility of advancing the superior genotypes with GT54-9 genotype to guarantee high quality traits during all milling season.

Materials and Methods

The present study was carried out at Kom Ombo Agricultural Research Station Farm during two successive plant cane crops (2004/2005 and 2005/2006) to measure the quality traits performance of 14 sugarcane genotypes under six growing seasons representing the

combinations of two planting dates with three harvesting dates.

The two planting dates i.e. 26 March (recommended date) and 26 April (late date) and three harvesting dates i.e. 26 Feb., 26 March and 26 April were used, forming six growing seasons combinations. The combinations were planting at 26 March & harvest at 26 February (GS1), planting at 26 March & harvest at 26 March (GS2), planting at 26 March & harvest at 26 April (GS3), planting at 26 April & harvest at 26 February (GS4), planting at 26 April & harvest at 26 March (GS5) and planting of 26 April & harvest at 26 April (GS6).

The averages of minimum and maximum monthly temperature of the growing seasons were shown in table (1).

Table(1): The minimum & maximum monthly temperature at the experimental region (seasons 2004 – 2005 and 2005 – 2006).

Month	Minimum		Maximum	
	Season 2004 – 2005	Season 2005 – 2006	Season 2004 – 2005	Season 2005 – 2006
April	16.0	16.2	35.8	35.9
May	20.6	17.7	41.7	38.2
June	20.8	21.0	41.3	40.8
July	21.7	20.3	43	42.0
August	20.9	22.0	41.1	42.5
September	19.3	18.4	39.8	40.6
October	19.0	17.1	37.1	35.7
November	12.9	10.1	29.9	29.0
December	6.6	9.3	24.9	27.6
January	5.9	7.4	23.1	25.1
February	9.5	8.7	26.9	28.1
March	11.0	11.2	31.1	31.6
April	--	14.4	--	34.8

The genotypes used in this study were: GT54/9 (the commercial variety). The second genotype Ph8013 was introduced from Philippine, while the other twelve genotypes are promising genotypes from the Egyptian sugarcane breeding program namely G99-80, G99-103, G99-122, G99-160, G99-165, G99-208, G99-217, G2000-4, G2000-8, G2000-157, G2000-171 and G2000-176.

The experimental design was randomized complete blocks with three replications arranged in split plots system. The growing seasons were randomly alocated in the main plots, while genotypes were randomly assigned in the sub-plots. The sub plot was 5 rows, 7 meter long and one meter apart and each row was planted by 24-three buded setts. The recommended cultural practices of sugarcane production were adopted throughout the growing season and irrigation was stopped one month before harvest. The soil texture was clay loam containing 0.07% total nitrogen, 5.11 ppm available P and 516 available K.

At each harvesting date, a sample of 30 stalks from each sub plot was taken at random, stripped, cleaned and squeezed by an electric pilot mill according to the method described by Meade and Chen, 1977 and the following quality traits were estimated.

1- Brix % (The percent of total soluble solids in juice) was determined using brix hydrometer.

2- Sucrose % was determined using the direct polarization method.

3- Pol % was calculated according to the following formula discribed by Meade and Chen, 1977. Pol % = sucrose % g x pol factor, pol factor = 100-[fiber % x 1.3 + sediments % and leaves %].

4- Purity % was calculated using the following formula described by Meade and Chen, 1977 :

$$Apparent\ purity = \frac{Sucrose\%}{Brix\%} x\ 100$$

5- Sugar recovery % was calculated according to the following formula described by Yadav and Sharma (1980): sugar recovery % = [S-0.4 (B.S)] x 0.73, where B= Brix %, S= Sucrose %.

The homozygosity error test of the data was performed and it indicated the homozygosity of data. Thus the combined analysis of variance was performed as outlined by Federer (1963). Revised LSD at 5% and 1% probability was used for means comparison of studied traits.

Results and Discussion

1 – Brix %:

The statistical analysis of data shown in table (2) indicated that growing season, genotypes and their interaction had highly significant effect on Brix %. The second growing season (GS2) recorded significantly the highest Brix % value (22.29%) while the fourth growing

season recorded significantly the lowest Brix % value (19.88%). This could be attributed to the complete maturity of cane plants at second growing season while is age was 12 months (planted at 26 March and harvested at the next 26 March). In contrary, the cane plants at fourth growing season age was only 10 months (planted at 26 April and harvested at 26 Feb.) while the Brix % of the other used growing seasons reflected the response of cane plants in maturity stage according to their age.

Table(2): Effect of the growing seasons, genotypes and their interaction on Brix %.

Genotypes	GS1	GS2	GS3	GS4	GS5	GS6	Mean
GT 54-9	20.48	22.29	21.49	19.80	21.92	20.44	21.07
PH 8013	21.14	22.77	22.49	19.46	22.64	21.68	21.70
G. 99-80	20.30	22.74	21.87	19.65	21.73	20.49	21.13
G. 99-103	21.70	21.28	21.97	18.67	21.50	21.22	21.06
G. 99-122	19.92	21.81	21.42	19.47	21.32	20.37	20.72
G. 99-160	20.60	22.11	21.73	21.09	22.57	22.41	21.75
G. 99-165	20.39	20.78	20.87	19.44	21.19	20.53	20.53
G. 99-208	21.39	23.33	23.00	20.54	22.58	23.45	22.38
G. 99-217	21.68	23.42	23.49	19.83	22.73	23.27	22.40
G. 2000-4	21.26	22.34	21.37	20.95	21.87	21.49	21.55
G. 2000-8	20.96	21.93	21.98	19.92	22.11	21.92	21.47
G.2000-157	19.05	21.29	22.74	17.70	19.62	19.61	20.00
G.2000-171	21.69	22.97	21.55	21.55	22.13	22.44	22.05
G.2000-176	20.61	23.04	22.09	20.26	22.55	21.82	21.73
Mean	20.80	22.29	22.00	19.88	21.89	21.51	21.40
LSD at			0.05	0.01			
Growing seasons			0.27	0.37			
Genotypes			0.30	0.40			
Growing seasons x Genotypes			0.75	0.98			

G99-208 and G99-217 genotypes significantly surpassed the other evaluated genotypes and their Brix % were almost similar (22.38 and 22.40% respectively). While G99-122, G2000-157 and G99-165 recorded significantly the lowest Brix % where their Brix % values were statistically similar to each other and were 20.72, 20.00 and 20.53, respectively. Differences in Brix % among sugarcane genotypes were reported by Mohamed and Abou-Dooh, 2001 and Singh and Singh, 2002.

G99-208 recorded almost the same Brix % at second (23.33%), at third (23.00) and at sixth (23.45%) growing seasons and its Brix % at these growing seasons was significantly higher than the other genotypes at these growing seasons, while it recorded significant reduction in Brix % at first, fourth and fifth growing seasons. This could be attributed to the differences in temperature prevailing during accumulation of soluble solids substrate among these tested growing seasons. G2000-157 genotype recorded significantly the lowest Brix % (17.70%) at fourth planting seasons while its Brix relatively improved at the other growing seasons recordering the highest Brix % (22.74) at third growing season. The differences in Brix % among sugarcane genotype at various growing season and the differences in Brix of the same genotypes at different growing seasons were reported by El-Taib, 1999 and Jadhav *et al.*, 2002.

2 – Sucrose %:

The statistical analysis of data presented in table (3) showed that the response of sucrose % to growing seasons, genotypes and their interaction was highly significant. The second growing season significantly recorded the highest sucrose % (19.15). This could be due to the fact that this growing season which extended for 12-months from 26 March (recommended date for spring sugarcane planting) to next 26 March provided optimum conditions for sucrose accumulation while the third and fifth growing seasons seems to introduce sub-optimal conditions for sucrose accumulation as the sucrose % was 18.65% at third growing season and 18.50% at fifth growing season. However, the conditions prevailing at first, fourth and sixth growing seasons seems to be unsuitable for sucrose accumulation resulting in low sucrose %. Rao and Rao (2000) reported differences in sucrose % of cane plants among various growing seasons.

G99-208, G99-217, G99-160 and G2000-171 recorded almost the same sucrose % which were 18.90%, 19.01%, 18.91% and 18.84% and the high sucrose % of these genotypes could candidate them to be commercial cultivar while G99-165 genotypes recorded the lowest sucrose % (16.18%). Differences in sucrose % among sugar cane genotypes was reported by Mohamed (1989) and El-Taib (1999).

Table(3): Effect of the growing seasons, genotypes and their interaction on sucrose %.

Genotypes	GS1	GS2	GS3	GS4	GS5	GS6	Mean
GT 54-9	17.88	19.53	18.39	16.91	18.76	17.19	18.11
PH 8013	18.01	19.68	18.96	16.49	20.03	18.25	18.57
G. 99-80	17.30	19.64	18.48	16.43	18.07	16.91	17.81
G. 99-103	18.00	17.55	18.09	14.98	17.77	17.41	17.30
G. 99-122	17.15	18.94	18.56	16.56	17.98	17.10	17.71
G. 99-160	18.01	19.47	19.05	17.97	19.67	19.31	18.91
G. 99-165	16.59	16.38	16.89	14.94	16.56	15.74	16.18
G. 99-208	18.00	20.08	19.58	16.84	19.20	19.73	18.90
G. 99-217	18.57	20.19	20.33	16.16	19.18	19.63	19.01
G. 2000-4	17.98	19.15	17.84	17.70	18.61	17.62	18.15
G. 2000-8	17.93	18.86	18.30	17.26	18.92	18.48	18.29
G.2000-157	16.21	18.48	19.32	14.36	16.38	16.03	16.80
G.2000-171	18.67	20.10	18.50	18.27	18.68	18.84	18.84
G.2000-176	17.62	20.05	18.77	17.11	19.13	18.61	18.55
Mean	17.71	19.15	18.65	16.57	18.50	17.92	18.08
LSD at				0.05			0.01
Growing seasons				0.28			0.38
Genotypes				0.34			0.45
Growing seasons x Genotypes				0.83			1.09

The second growing season seems to represent the optimum growing conditions for all evaluated genotypes in accumulation of sucrose. However, the third growing season was alike with the second growing season regarding the sucrose % of GT54-9, Ph8013, G2000-8, G99-122, G99-165, G99-208, G99-217 and G99-160. However, most of the evaluated genotypes recorded the lowest sucrose % at fourth and/or at the sixth growing seasons. This means

that these two growing season failed to introduce good conditions for sucrose accumulation for the evaluated genotypes. The differences in sucrose % of sugarcane genotypes at various growing seasons or at the same growing season as well as the difference of sucrose % of the same genotype at various growing seasons were reported by El-Sogheir and Besheit, 2003 and Gilbert *et al.*, 2006.

3 - Pol %:

The statistical analysis of data shown in table (4) indicated that growing season, genotypes, and their interaction had highly significant effect on pol %.

Table(4): Effect of the growing seasons, genotypes and their interaction on pol%.

Genotypes	GS1	GS2	GS3	GS4	GS5	GS6	Mean
GT 54-9	14.83	16.14	15.33	14.08	15.31	14.31	15.00
PH 8013	14.77	16.14	15.63	13.49	15.68	14.73	15.07
G. 99-80	14.07	16.26	15.14	13.33	14.73	13.69	14.53
G. 99-103	15.16	14.47	14.89	12.49	14.58	14.17	14.29
G. 99-122	13.99	15.49	15.15	13.43	14.78	13.93	14.46
G. 99-160	15.10	16.16	15.99	14.98	16.13	15.77	15.69
G. 99-165	13.64	13.94	13.92	12.41	13.62	13.23	13.46
G. 99-208	15.30	16.82	15.97	14.24	15.65	16.11	15.68
G. 99-217	15.60	16.97	16.96	13.39	15.56	16.06	15.76
G. 2000-4	15.35	16.24	15.08	14.93	15.03	14.66	15.21
G. 2000-8	14.92	15.34	14.94	14.19	15.54	14.80	14.95
G.2000-157	13.42	15.33	16.18	12.17	13.59	13.52	14.04
G.2000-171	15.34	16.56	15.49	14.88	15.54	15.15	15.49
G.2000-176	14.46	16.09	15.29	14.08	15.82	14.97	15.12
Mean	14.71	15.85	15.42	13.72	15.11	14.65	14.91
LSD at			**0.05**		**0.01**		
Growing seasons			0.23		0.32		
Genotypes			0.28		0.37		
Growing seasons x Genotypes			0.70		0.92		

The pol % of sugarcane plants grown in second growing season significantly surpassed those of the other tested growing seasons. This is due to the highest sucrose % (19.15%) recorded for sugarcane plants grown in this growing season since pol % is calculated by multiplying sucrose % by pol factors (Meade and Chen, 1977). Also, the values of pol % at the other used growing seasons had the same trend of sucrose % (Table 4). The pol % of cane plants grown at fifth growing season which extended for 11-months from 26 April to 26 March significantly surpassed the pol % of the cane plants grown in first growing season which also extended 11-months but from 26 March to 26 Feb. Thus, the superior of cane plants in pol % grown at fifth growing season in pol % could due to the condition prevailing at the period between 26 Feb. and 26 March (before harvest) and the cane plants grown at first growing season did not exposed to it since they were harvested at 26 Feb. (Table 1).

Also, the data showed that the sugarcane plants grown at fourth growing season recorded significantly the lowest pol % (13.72). This could due to short duration of this growing season which was 10-months and it was not enough for repining of sugarcane plants. The pol % of cane planted grown at first growing season (14.71%) was almost equal that of cane plants at the sixth growing seasons. This could be attributed to the high temperature prevailing at the period between 26 March to 26 April (Table 1) which lead to decline in sucrose % of cane plants grown at sixth growing season (Table 4) which resulting in reduction of pol %.

Furthermore, these data indicated that G99-208, G99-217 and G99-160 had almost the same pol % which were 15.68, 15.76 and 15.69% respectively and these values were significantly higher than those of the other genotypes. El-Taib *et al.* (2005) reported differences in pol % among sugarcane genotype. Most of the evaluated genotypes recorded the highest pol % at the second growing seasons while few of them recorded the same pol % at the third growing season.

4 - Purity %:

The statistical analysis of data presented in table (5) reported that purity % had highly significant response to the growing seasons, genotypes and their interaction.

The cane plants gown in the second growing season recorded significantly higher purity % (85.50) as did in Brix, sucrose and pol % (Table 2, 3 and 4). The cane plants grown at fourth growing season had almost purity % (83.22%) equal to that of cane plants grown at sixth growing season. These two growing seasons had the same beginning (26

Table(5): Effect of the growing seasons, genotypes and their interaction on purity %.

Genotypes	GS1	GS2	GS3	GS4	GS5	GS6	Mean
GT 54-9	87.27	87.58	85.62	85.48	85.55	84.12	85.94
PH 8013	85.20	86.42	84.30	84.65	84.63	84.17	84.89
G. 99-80	85.18	86.38	84.48	83.67	83.13	82.47	84.22
G. 99-103	84.42	82.17	82.42	80.23	82.63	82.05	82.32
G. 99-122	85.98	86.73	86.67	85.08	84.30	84.23	85.50
G. 99-160	86.73	87.95	87.62	85.22	87.17	86.25	86.82
G. 99-165	81.43	78.83	80.92	76.83	78.07	76.43	78.75
G. 99-208	84.10	86.08	85.13	81.97	85.02	84.12	84.40
G. 99-217	85.63	86.18	86.53	81.43	84.32	84.28	84.73
G. 2000-4	84.45	85.53	83.22	84.33	85.10	81.93	84.09
G. 2000-8	85.52	86.03	83.25	86.60	85.62	84.32	85.22
G.2000-157	85.08	86.78	85.00	81.18	83.52	81.73	83.88
G.2000-171	86.07	87.50	85.88	84.78	84.43	83.95	85.44
G.2000-176	85.48	87.02	84.97	84.42	84.80	85.03	85.29
Mean	85.18	85.80	84.71	83.28	84.16	83.22	84.39

LSD at	**0.05**	**0.01**
Growing seasons	0.47	0.64
Genotypes	0.62	0.81
Growing seasons x Genotypes	1.51	1.99

April) and the end of the sixth growing season was delayed 2 months than that of the fourth growing seasons and the equality in purity % due to the decline in sucrose % at sixth growing seasons (Table 4) from fifth growing season to the sixth growing season as a results of prevailing temperature during April (Table 1). GT54-9, Ph8013, G2000-8, G2000-171, G99-122, G2000-176 and G99-160 genotypes recorded

almost the same purity % and their purity % was significantly higher than that of the other evaluated genotypes.

The evaluated genotypes varied in their response to the tested growing seasons in terms of purity %. G54-9 and Ph8013 genotypes recorded the highest purity % at first and second growing seasons while its purity was significantly lower and similar the remained growing seasons. G2000-4 and G2000-8 genotypes recorded the highest purity % at first, second, fourth and fifth growing season while its purity was significantly lower and similar at third and sixth growing season. This could due to the warm weather prevailing at April (Table 1) which results in decline in purity. G99-122, G2000-157 and G2000-176 genotypes recorded the highest purity at second growing season, while G99-103 and G99-208 genotypes recorded the highest purity % at first, second and fifth growing season. G99-160 and G99-217 recorded the highest purity % at first, second, third and fifth growing seasons.

5 - Sugar recovery %:

Statistical analysis of data shown in table (6) indicated that the effect of growing seasons, genotypes and their interaction on sugar recovery was highly significant. Sugarcane plants grown at the second growing season recorded significantly the highest sugar recovery % indicating that the ideal growing season for sugarcane crop was obtained when the planting date was 26 March (recommended date) and the harvesting date was at 12 months. Delaying planting date without extending growing season throughout delaying harvest (fourth, fifth and sixth growing season) reduced the sugar recovery %. Also, the sugar recovery % was reduced when the planting date was the recommended date and the age at harvest was 11 or 13 months (first and third growing seasons) compared to that of 12-old month (second growing seasons). The reduction in sugar recovery at first growing season could due to the short duration of this growing season which resulted in immature cane plants while the reduction at third growing season due to the decline in sugar recovery as the results of warm weather prevailing at last month of this growing seasons (Table 1). The lowest sugar recovery (11.12%) was obtained by fourth growing season as a results of short growing season (10-months) while it improved (12.55) at fifth growing season (11 month) and decline (12.10) at sixth growing seasons as results of temperature raising up (Table 1).

G99-169 genotypes significantly superior the other genotypes in sugar recovery which was (12.97%) while G99-165 significantly recorded the lowest sugar recovery (10.54%). The differences in sugar recovery % was reported by El-Taib, 1999 and Roa and Rao, 2000.

All the evaluated genotype recorded significantly the highest sugar recovery % at the second

growing season. G2000-8 recorded almost the same sugar recovery at first (12.21%) and third (12.28%) growing seasons. The sugar recovery of all genotypes at fifth growing season was higher than their recovery sugar at fourth and sixth growing seasons. Mehla *et al.* (1997), Jadhav *et al.* (2000) and Jadhav *et al.* (2002) reported differences in sugar recovery % among sugarcane genotypes at various growing seasons.

Table(6): Effect of the growing seasons, genotypes and their interaction on sugar recovery %.

Genotypes	GS1	GS2	GS3	GS4	GS5	GS6	Mean
GT 54-9	12.29	13.45	12.52	11.50	12.78	11.96	12.42
PH 8013	12.23	13.46	12.81	11.17	13.86	12.47	12.67
G. 99-80	11.76	13.43	12.50	11.06	12.12	11.30	12.03
G. 99-103	12.06	11.72	12.08	9.84	12.22	11.60	11.58
G. 99-122	11.71	12.99	12.71	11.24	12.15	11.52	12.05
G. 99-160	12.39	13.44	13.12	12.21	13.52	13.19	12.97
G. 99-165	11.01	10.67	11.16	9.59	10.74	10.09	10.54
G. 99-208	12.15	13.71	13.29	11.21	13.02	13.32	12.78
G. 99-217	12.65	13.79	13.92	10.66	12.96	13.26	12.87
G. 2000-4	12.16	13.04	11.99	11.96	12.64	11.73	12.25
G. 2000-8	12.21	12.87	12.28	11.82	12.89	12.63	12.45
G.2000-157	11.00	12.67	13.11	9.51	11.19	10.66	11.35
G.2000-171	12.75	13.83	12.61	12.38	12.63	13.08	12.88
G.2000-176	11.99	13.76	12.74	11.56	12.96	12.64	12.61
Mean	12.02	13.06	12.63	11.12	12.55	12.10	12.25
LSD at			0.05		0.01		
Growing seasons			0.21		0.29		
Genotypes			0.27		0.35		
Growing seasons x Genotypes			0.66		0.87		

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تقييم بعض التراكيب الوراثية لقصب السكر المزروعة فى الربيع تحت مواسم زراعية مختلفة ١-أداء صفات الجودة

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تـم إجراء هذه الدراسة فى مزرعة محطة بحوث كوم أمبو الزراعية خلال موسمى ٢٠٠٤/ ٢٠٠٥ ، ٢٠٠٥/٢٠٠٦ لتقدير صفات الجودة (البركس%- السكروز% – الحلاوة% – النقاوة% – نـاتج السـكر%) لعدد أربعة عشر تركيبا وراثيا عند زراعتها فى ستة مواسم نمو تمثل توافق ميعاديـن زراعـة مـع ثلاث مواعيد حصاد . وكانت مواعيد الزراعة هى ٢٦ مارس (الميعاد الأمثل) و ٢٦ أبريل (الميعاد المتأخر) سنة ٢٠٠٤ ، ٢٠٠٥ على التوالى وكانت مواعيد الحصاد ٢٦ فـبراير ، ٢٦ مارس و ٢٦ أبريل ٢٠٠٥ ، ٢٠٠٦ على التوالى وكان عمر الأصناف عندها ١١ ، ١٢ ، ١٣ لمـيعاد الزراعة الأمثل و ١٠ ، ١١ ، ١٢ لميعاد الزراعة المتأخر وكان تصميم التجربة فى قطاعات كاملة العشوائية وتم ترتيبها فى نظام القطع المنشقة مرة واحدة .

وكانـت التراكيـب الوراثية التى تم تقييمها هى: جيزه-تايوان ٩/٥٤ والفلبينى ٨٠١٣ وجيزه ٨٠-٩٩ وجـيزه ٩٩-١٠٣ وجيزه ٩٩-١٢٢ وجيزه ٩٩-١٦٠ وجيزه ٩٩-١٦٥ وجيزه ٩٩-٢٠٨ وجيزه ٩٩-٢١٧ وجيزه ٢٠٠٠-٤ وجيزه ٢٠٠٠-٨ وجيزه ٢٠٠٠-١٥٧ وجيزه ٢٠٠٠-١٧١ وجيـزه ٢٠٠٠-١٧٦.

وقد أوضحت النتائج الآتى :

١- كان تأثير التراكيب الوراثية ومواسم الزراعة والتفاعل بينهما معنويا فى جميع صفات الجودة.

٢- تقصـير موسـم الـنمو بالزراعة فى ميعاد متأخر أو بتقديم ميعاد الحصاد أدى إلى انخفاض صـفات الجودة معنويا . وقد سجل موسم الزراعة فى ٢٦ مارس والحصاد فى ٢٦ مارس أفضل صفات جودة .

٣- التراكيب الوراثية جيزه ٩٩-٢٠٨ وجيزه ٩٩-٢١٧ وجيزه ٩٩-١٦٠ وجيزه ٢٠٠٠-١٧١ أثبتت أنها أصناف مبشرة ومتفوقة عن الصنف التجارى جيزه تايوان ٥٤-٩ فى ناتج السكر (أهم صفات الجودة) .

٤- اختلفـت صـفات الجـودة للتراكيب الوراثية المقيمة فى استجابتها لمواسم النمو المستخدمة موضـحة إمكانـية الحصـول على صفات جودة عالية خلال موسم النمو بتنظيم مواعيد الزراعة والحصاد وزراعة التركيب الوراثى فى موسم النمو الذى يحقق فيه أعلى صفات جودة .