

SUGARCANE CULTIVARS RESPONSE TO PLANTING DATE

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ABSTRACT

Recently, some growers in El-Minia Governorate, Middle Egypt, got used to late planting of sugar cane after wheat or sugar beet. Sugar Crops Research Institute produced many promising varieties of sugarcane among them G.84-47 and Phil.8013. Therefore, it was necessary to study the effect of delaying planting date on vegetative characters, juice quality, cane and sugar yields of these sugar cane varieties. So, two field experiments were conducted at Mallawi Agricultural Research Station, Minia Governorate, including two plant cane crops planted in 2007/2008 and 2008/2009 seasons and their first ratoons grown in 2008/2009 and 2009/2010 seasons. Three sugarcane varieties namely G.T.54-9 (the commercial variety), Phil.8013 and G.84-47 were randomly planted in four replicates, in a randomized complete block design in four dates, *i.e.* 15 March (the optimum planting date, control), 15 April, 15 May and 15 June. Thereafter, a combined analysis between the sugar cane varieties grown in the four dates was done. Sugarcane was harvested at age of 12 months for the plant cane crops and 10 months for the first ratoons.

The obtained data pointed out that planting dates had a significant effect on stalk height and diameter, total soluble solids, sucrose, purity, sugar recovery, pol. percentages, quality index as well as millable canes and recoverable sugar yields/fed of the plant cane and first ratoon crops. Meanwhile, the tested sugarcane varieties differed significantly in all studied traits, except millable cane yield/fed of the plant cane and first ratoon. Moreover, results of the present work cleared that Phil.8013 variety was the highest affected by delaying planting date.

Under conditions of the present work, planting G.84-47 and/or G.T.54-9 sugarcane varieties on the 15th of March or April is preferable to get the highest cane and sugar yields/fed.

Key words: Sugarcane variety, Planting date, Pol %, TSS % and Sugar recovery %.

INTRODUCTION

Sugarcane is the main crop in the world for sugar production. In Egypt, it produced approximately 50.3% of 1.9 million tons of local sugar production. Sugarcane plantation in Minia Governorate (nearly 38725 fed) is directed to sugar and treacle production as well as to the fresh use of cane juice (**ESST, 2011 and SCC, 2011**).

Recently, some sugar cane growers in El-Minia Governorate, Middle Egypt, got used to late planting of sugar cane after wheat or sugar beet harvesting. Sugar Crops Research Institute produced many promising varieties of sugarcane, among them G.84-47, and Phil.8013. Planting of sugarcane in the optimum date is one of the major factors needed for a sufficient vegetative growth season of the crop as well as sugar synthesis and accumulation. Besides, in Egypt, the current recommendation for planting sugarcane is from

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mid-February to mid-March for spring cane. However, some sugarcane growers in Minia Governorate plant sugarcane from March till June. Therefore, it was necessary to study the effect of different planting dates on growth criteria, juice quality, cane and sugar yields of some sugar cane varieties to find out the optimal planting date for them. In this respect, **Jhansi and Rao (1996)**, in India, noticed that cane and sugar yields, sucrose % and purity % decreased with the delay in planting date from 15 February to 15 May. They found that cane yield mean ranged from 118.75 ton/ha in cvs. Co 8315 to 92.6 ton/ha in Co 8013. Also, they pointed out that delaying the planting date led to reductions in juice sucrose and cane yield. Meanwhile, **Channabasappa et al. (1997)** showed that delaying planting decreased cane yield. In the same trend, **El-Gergawi and El-Shafai (2000)** indicated that delaying planting date from 1 March up to 15 April resulted in a significant reduction in stalk height, diameter as well as cane and sugar yields. **Ryan et al. (2005)** found that the optimum sugar yields for the plant-cane crops of CP 70-321, LHo 83-153 and HoCP 85-845 varieties were obtained with August planting in Louisiana. They added that ratoon sugar yields were not affected by planting date for all other cultivars. **Hoy et al. (2006)** reported that early (beginning of August) and late (October) planting dates can reduce yield potential in Louisiana, USA. **Ahmed et al. (2007)** indicated that planting date showed a gradual increase in cane yield with the advance of cane planting date to 15 March in Qena Governorate, Egypt. It gave 51.49 and 50.28 tons/fed in 1st and 2nd seasons, respectively. They added that cane yield decreased significantly and gradually as planting date was delayed from 15 March to 15 May, which may be attributed to the differences of climatic conditions between months.

As for varieties differences, it is well known that sugarcane varieties are completely different in their performance, quality and yields due to great variation in their gene structure. In addition, number of shoots emerged and mortality percentage resulted from the competition among plants until they become millable canes is greatly influenced and dependent on planting date and affects the subsequent crop cycle of sugarcane crop which occupies soil for more than 4-5 growing seasons. In this respect **Ahmed (1998)** found that G.T.54-9 variety recorded the highest values of brix and sucrose percentages, while G.75-368 gave the highest sugar recovery %. **Abd El-Azez (2008)** evaluated some sugarcane varieties namely G.84-47, G.99-103, G.98-28, G.98-88, Phil.8013 and the commercial variety G.T.54-9. He revealed that sugarcane varieties differed significantly in stalk height, stalk diameter, millable cane and recoverable sugar yields. Moreover, the tested varieties differed in quality parameters (TSS%, purity % and sugar recovery %). Sugar cane Phil.8013 and G.99-103 varieties recorded the highest values of millable cane and recoverable sugar yields. In addition, **El-Sogheir and Ferweez (2009)** tested five sugarcane varieties *i.e.*, G.84-47, G. 99-103, G.98-28, Phil.8013 and G.T.54-9. They indicated that G.84-47 surpassed all tested varieties in quality parameters (TSS %, purity % and sugar recovery %) and millable cane yield. **Abd El-Fattah (2010)** examined four sugarcane varieties (G.99-103, G.98-28, Phil.8013 and G.T.54-9). He found that G.99-103 variety ranked the first in stalk height, diameter and weight, while Phil.8013 and G.T.54-9 varieties gave the best values of quality parameters, *i.e.* TSS %, purity % and sugar recovery %.

The present investigation was carried out to study the effect of different planting dates on vegetative traits, juice quality as well as cane and sugar yields of some sugar cane varieties.

MATERIALS AND METHODS

Two field experiments were conducted at Mallawi Agricultural Research Station, Minia Governorate, Egypt, including two spring plant cane crops planted in 2007/2008 and 2008/2009 seasons and their first ratoons grown in 2008/2009 and 2009/2010. Three sugarcane varieties namely G.T. 54-9 (the commercial variety), Phil.8013 and G. 84-47 were arranged in a randomized complete block design, with four replicates, in four planting dates (15 March, the optimum planting date as a control; 15 April; 15 May and 15 June). The combined analysis between the sugarcane varieties and four planting dates was done. Plot area was 42 m² (six rows of 100 cm width and 7 m length). Dry method of planting was adopted using two drills of three-budded cane cuttings. Nitrogen fertilizer was added as Ammonium Nitrate (33.5% N) at the rate of 210 kg/fed in two equal doses as side dressing in cane rows, after full emergence of cane plants and one month later for the plant cane and the first ratoon. Phosphorus fertilizer was added in the form of calcium superphosphate (15.5% P₂O₅) at the rate of 60 kg/fed, which was broadcasted after ridging in furrows before planting for the plant cane and with the first dose of nitrogen fertilizer for the first ratoons. Potassium fertilizer was added as potassium sulphate (48% K₂O) at the rate of 48 kg/fed after two months from planting for the plant cane and after full emergence for first ratoons. All the required agricultural practices were done as followed by sugarcane growers in the region. Some chemical and physical properties of the soil of the experimental site were determined before seed bed preparation according to the procedures outlined by **Jackson (1967)**. The physical analysis of the experimental site showed that the soil was silty clay loam. Its chemical analysis cleared that the soil contained 21.10 and 19.35 ppm N; 8.50 and 7.85 ppm P; 175 and 180 ppm K, with pH of 8.10 and 8.00, in the 1st and 2nd season, respectively. Temperature degrees during the period of study were recorded.

Table 1: Temperature degrees of the experimental site during the period of study in 2007-2008, 2008-2009 and 2009-2010 seasons.

Month	2007 season		2008 season		2009 season		2010 season	
	Temperature, °C							
	Max .	Min .	Max .	Min .	Max .	Min .	Max .	Min .
January	-	-	18.4	5.9	20.6	6.2	19.8	4.3
February	-	-	21.6	6.7	22.4	7.3	22.0	5.6
March	26.3	9.5	29.0	11.7	24.2	9.1	26.1	8.7
April	31.9	13.0	32.2	14.6	30.9	14.0	31.1	12.6
May	36.3	19.2	34.4	18.4	33.3	17.8	34.9	17.0
June	38.0	20.2	37.5	21.5	39.3	22.8	40.0	19.8
July	37.6	21.5	36.0	21.9	38.5	24.1	-	-
August	36.3	21.6	37.7	22.2	36.7	22.2	-	-
September	33.0	19.7	36.2	21.3	36.1	21.4	-	-
October	32.5	18.3	30.3	16.5	33.8	19.0	-	-
November	27.8	12.2	26.8	12.3	27.7	8.9	-	-
December	21.5	7.6	22.6	8.8	20.8	5.2	-	-

Source: Mallawi Meteorological Station, El-Minia, Egypt.

The recorded data:

At age of 12 months for the plant cane crop and 10 months for the first ratoon, 20 plants of sugarcane from each plot were cut to estimate the following:

1. Vegetative traits:

1.1. Stalk height (cm): It was measured from soil surface to the top visible dewlap.

1.2. Stalk diameter (cm): It was measured at the middle part of the stalk.

2. Quality parameters:

2.1. Total soluble solids percentage (TSS %), which was determined using "Brix hydrometer" standardized at 20⁰ C as shown by **AOAC (2005)**.

2.2. Sucrose %, which was determined using "Sacharemeter" according to **AOAC (2005)**.

2.3. Juice purity % was estimated according to **Satisha et al. (1996)** using the following equation: Purity % = sucrose % x 100 / TSS %.

2.4. Pol % of cane stalks, which was calculated using the following equation, after the determination of sucrose % in the cane juice, according to **Satisha et al. (1996)**. Pol % = {Brix % - (Brix % - sucrose %) 0.4} 0.73.

2.5. Sugar recovery %, which was calculated using the equation according to the procedures used by the Egyptian Sugar and Integrated Industries Co. as follows:

$$\text{Sugar recovery \%} = \{ \text{Pol \%} - 0.8 / \text{Purity \% juice} \times \text{Purity \% juice} - 40 / 100 - 60 \} \times 100$$

2.6. Quality index of cane stalks, which was calculated using the following equation: Quality index = sugar recovery % / Pol % x 100

3. Millable cane and recoverable sugar yields:

3.1. Millable cane yield (ton/fed): cane stalks of the four guarded rows were harvested at age of 12 months for the plant cane and 10 months for the first ratoons, topped, cleaned, weighed and cane yield was calculated in ton/fed.

3.2. Recoverable sugar yield (ton/fed), which was estimated according to the following equation reported by **Mathur (1981)**:

$$\text{Recoverable sugar yield (ton/fed)} = \text{millable cane yield (ton/fed)} \times \text{sugar recovery \%}$$

The proper statistical analysis of data was done according to **Gomez and Gomez (1984)**. The differences between means of the studied treatments were compared using least significant difference (LSD) at 5% level.

RESULTS AND DISCUSSION**A. Vegetative traits (cane stalk height and diameter):**

Data in Table 2 showed a significant and gradual reduction in stalk height and diameter of sugarcane for both the plant cane and first ratoon as planting date was delayed from 15th March up to 15th June. These results may be due to the fact that sugar cane planted in different dates would ripen simultaneously with the gradual decrease in temperature degrees in November, December and January, which means that sugarcane planted latter had shorter effective growth term compared to those planted earlier and hence shorter stalks and thinner diameter. It could be noted from the results that the rate of reduction in stalk height accompanied the delay in planting date was higher than that of stalk diameter for both plant cane and first ratoon. Also, the rate of reduction in stalk height and stalk diameter as a result of delaying planting date was

higher for plant cane than first ratoon. These results are in harmony with those obtained by **El-Gergawi and El-Shafai (2000)**.

Regarding the evaluated sugarcane varieties, data in Table 2 showed that the tested varieties differed significantly in their stalk height and diameter in both plant cane and first ratoon. Sugarcane G.84-47 variety exhibited general superiority over the other varieties in respect to stalk height, while the commercial variety G.T.54-9 recorded the lowest values of this trait for both plant cane and first ratoon. Meantime, Phil.8013 variety showed a general superiority over the other varieties in stalk diameter, while G.84-47 variety had the lowest value of this trait. The variations among the tested cane varieties in these traits might be due to the action of gene the make-up, which played an important role in plant structure and morphology. These findings are in agreement with those reported by **Abd El-Latif (1998)**; **El-Gergawi and El-Shafai (2000)** and **El-Sogheir and Ferweez (2009)**, who recorded significant differences among the tested cane varieties in stalk height and diameter.

Data in Table 2 pointed to a significant influence of the interaction between planting dates and sugarcane varieties on stalk height and diameter in the plant and 1st ratoon crops. As for plant height, the results showed that difference in this trait between G.T.54-9 and G.84-47 varieties was insignificant when they were planted on the 15th of April, while the difference between them was significant on the other planting dates. In the 1st ratoon, it was found that the variance between G.T. 54-9 and Phil.8013 varieties in stalk height was insignificant in the earlier planting date. However, the difference between them in this trait was significant in the other planting dates.

Regarding the effect of the interaction between the studied factors on stalk diameter, it was noticed that the difference between Phil.8013 and each of G.T. 54-9 and/or G.84-47 varieties was great and distinguished in the earliest planting date, either in the plant cane or 1st ratoon crops compared to the differences recorded in the other planting dates, pointing to the influence of early planting on this trait.

Table 2: Effect of planting date on stalk height and diameter (cm) for the plant cane and first ratoon of three sugarcane varieties (combined over the two seasons).

Planting dates (A)	Sugar cane variety (B)	Plant cane		First ratoon	
		Stalk height (cm)	Stalk diameter (cm)	Stalk height (cm)	Stalk diameter (cm)
15/3	G.T.54-9	297.67	2.63	305.00	2.60
	Phil.8013	307.00	3.07	304.00	3.02
	G.84-47	317.67	2.43	317.67	2.40
Mean		307.45	2.71	308.89	2.67
15/4	G.T.54-9	295.00	2.51	302.33	2.54
	Phil.8013	281.67	2.94	290.33	2.90
	G.84-47	300.00	2.40	301.33	2.37
Mean		292.22	2.62	298.00	2.60
15/5	G.T.54-9	255.00	2.64	269.00	2.54
	Phil.8013	247.67	2.84	242.00	2.77
	G.84-47	265.67	2.35	267.67	2.37
Mean		256.11	2.61	259.56	2.56
15/6	G.T.54-9	203.00	2.51	210.00	2.48
	Phil.8013	200.00	2.81	200.67	2.74
	G.84-47	238.33	2.34	243.00	2.32
Mean		213.78	2.55	217.89	2.51
Average of varieties	G.T.54-9	262.67	2.57	271.58	2.54
	Phil.8013	259.08	2.92	259.25	2.86
	G.84-47	280.42	2.38	282.42	2.37
Overall mean		267.39	2.62	271.08	2.59
LSD at 0.05 for:		A = 4.74 B = 3.10 AB = 6.21	A = 0.05 B = 0.04 AB = 0.07	A = 5.87 B = 4.52 AB = 7.29	A = 0.04 B = 0.03 AB = 0.06

B. Quality parameters:

Data in Tables 3-5 showed a significant decrease in quality parameters of sugarcane in terms of TSS %, sucrose %, purity %, sugar recovery %, pol. % and quality index as planting date was delayed from 15th March up to 15th June for both plant cane and the first ratoon. It could be noted that the rate of reduction in the studied quality traits of cane juice as a result of delaying the planting date was higher in the plant cane than those recorded in the first ratoon. These results may be due to the fact that prolonging the period during which sugarcane plants are exposed to increasing temperature degrees before harvesting during March, April and June as a result of delaying planting date direct plants to retrieve its vegetative growth, which require the analysis of the disaccharide (sucrose) into monosaccharide (glucose and fructose), causing a deterioration in juice quality characteristics. Such effect on quality parameters with delaying planting date was mentioned by **Hoy et al. (2006)** and **Ahmed et al. (2007)**.

Table 3: Effect of planting dates on total soluble solids % (TSS %) and sugar recovery % for the plant cane and first ratoon of three sugar cane varieties (combined over the two seasons).

Planting dates (A)	Sugar cane variety (B)	Plant cane		First ratoon	
		TSS %	Sugar recovery %	TSS %	Sugar recovery %
15/3	G.T.54-9	21.90	12.78	21.73	12.46
	Phil.8013	22.47	13.35	22.03	12.85
	G.84-47	22.33	13.15	22.03	12.66
Mean		22.23	13.09	21.93	12.65
15/4	G.T.54-9	22.50	12.96	21.97	12.47
	Phil.8013	22.17	12.97	21.93	12.78
	G.84-47	22.37	12.99	22.33	12.69
Mean		22.34	12.97	22.08	12.64
15/5	G.T.54-9	20.47	11.37	20.27	11.05
	Phil.8013	21.80	12.01	21.93	12.14
	G.84-47	21.77	11.97	22.03	12.16
Mean		21.34	11.78	21.41	11.79
15/6	G.T.54-9	19.73	10.33	19.20	10.16
	Phil.8013	21.27	11.52	21.10	11.40
	G.84-47	21.33	11.59	21.07	11.34
Mean		20.78	11.15	20.46	10.97
Average of varieties	G.T.54-9	21.15	11.86	20.79	11.54
	Phil.8013	21.93	12.46	21.75	12.29
	G.84-47	21.95	12.43	21.87	12.21
Overall mean		21.68	12.25	21.47	12.01
LSD at 0.05 for:		A=0.14 B=0.11 AB=0.21	A=0.16 B=0.08 AB=0.17	A=0.15 B=0.10 AB=0.20	A=0.17 B=0.07 AB=0.19

Data in Tables 3-5 showed that the tested sugarcane varieties recorded significantly different values of TSS %, sucrose %, purity %, sugar recovery %, pol % and quality index. These results were true in the plant cane and the first ratoon. The maximum values of sucrose %, purity %, sugar recovery %, and quality index were recorded by Phil.8013 variety, while, the highest values of TSS % and pol % were recorded by G.84-47 variety in the plant cane and first ratoon. Moreover, the differences between Phil.8013 and G.84-47 varieties in the studied quality traits were mostly insignificant in the plant and 1st ratoon cane crops. These findings might be due to genetic variation among the studied varieties for these traits. These results are in harmony with those obtained by Abd El-Latif (1998); Abd El-Azez (2008) and El-Sogheir and Ferweez (2009).

Table 4: Effect of planting dates on sucrose % and purity % for the plant cane and first ratoon of three sugar cane varieties (combined over the two seasons).

Planting dates (A)	Sugar cane variety (B)	Plant cane		First ratoon	
		Sucrose %	Purity %	Sucrose %	Purity %
15/3	G.T.54-9	18.87	86.43	18.48	85.03
	Phil.8013	19.63	87.37	18.97	86.11
	G.84-47	19.38	86.78	18.75	85.10
Mean		19.30	86.86	18.73	85.42
15/4	G.T.54-9	19.17	85.21	18.52	84.31
	Phil.8013	19.14	86.35	18.89	86.13
	G.84-47	19.18	85.75	18.84	84.35
Mean		19.16	85.77	18.75	84.93
15/5	G.T.54-9	17.02	83.18	16.63	82.07
	Phil.8013	17.82	81.73	18.14	82.71
	G.84-47	17.88	82.31	18.19	82.54
Mean		17.57	82.41	17.65	82.44
15/6	G.T.54-9	15.73	79.72	15.45	80.49
	Phil.8013	17.33	81.32	17.16	81.32
	G.84-47	17.43	81.69	17.09	81.12
Mean		16.83	80.96	16.57	80.98
Average of varieties	G.T.54-9	17.70	83.64	17.27	82.98
	Phil.8013	18.48	84.23	18.29	84.07
	G.84-47	18.47	84.13	18.22	83.28
Overall mean		18.22	84.00	17.93	83.44
LSD at 0.05 for:		A=0.18 B=0.10 AB=0.21	A=0.55 B=0.28 AB=0.56	A=0.16 B=0.10 AB=0.20	A=0.49 B=0.25 AB=0.51

The interaction between planting date and varieties had a significant effect on quality parameters of sugarcane in terms of TSS and sugar recovery percentages of the plant cane and first ratoon as shown in Table 3. The results showed that the differences between G.84-47 and Phil.8013 varieties in TSS % were insignificant when sugarcane as plant cane and first ratoon were grown on 15th of March, 15th May and 15th June. Meanwhile, the differences between G.T.54-9 and G.84-47 varieties and between Phil.8013 and G.84-47 varieties were insignificant when sugarcane as a plant cane grown on 15th April, while the differences between G.T.54-9 and G.84-47 varieties and between Phil.8013 and G.84-47 varieties reached the level of significance when sugarcane as a first ratoon grown under 15th April, the differences between G.T.54-9 and G.84-47 varieties and between (G.T.54-9, G.84-47 varieties) were insignificant when sugarcane as a plant cane and first ratoon grown on 15th May and 15th June.

Sucrose and purity percentages in Table 4 were significantly affected by the interaction between planting dates and sugarcane varieties. The results

obtained that the differences between G.84-47 and G.T.54-9 and between G.T.54-9 and Phil.8013 varieties on sucrose % were insignificant when sugarcane as a plant cane grown on 15th of April. Meantime, the differences reached the level of significance when sugarcane as a first ratoon grown under 15th of April. On the other hand the differences between G.84-47 and G.T.54-9 and between Phil.8013 and G.84-47 varieties in purity % were insignificant when sugarcane as a first ratoon grown under 15th May. Meanwhile, the differences reached the level of significance when sugarcane as a plant cane grown under 15th of May.

Table 5: Effect of planting date on pol. % and quality index of three sugar cane varieties for plant cane and first ratoon (combined over the two seasons).

Planting dates (A)	Sugar cane variety (B)	Plant cane		First ratoon	
		Pol %	Quality index	Pol %	Quality index
15/3	G.T.54-9	15.10	84.60	14.92	83.53
	Phil.8013	15.57	85.72	15.19	84.55
	G.84-47	15.44	85.19	15.13	83.67
Mean		15.37	85.17	15.08	83.92
15/4	G.T.54-9	15.45	83.84	15.03	82.95
	Phil.8013	15.30	84.79	15.12	84.49
	G.84-47	15.40	84.35	15.28	83.03
Mean		15.38	84.33	15.14	83.49
15/5	G.T.54-9	13.94	81.57	13.74	80.47
	Phil.8013	14.75	81.42	14.90	81.46
	G.84-47	14.77	81.04	14.96	81.30
Mean		14.49	81.34	14.53	81.08
15/6	G.T.54-9	13.24	77.99	12.92	78.67
	Phil.8013	14.38	80.10	14.26	79.92
	G.84-47	14.43	80.32	14.22	79.75
Mean		14.02	79.47	13.80	79.45
Average of varieties	G.T.54-9	14.43	82.00	14.15	81.40
	Phil.8013	15.00	83.01	14.87	82.61
	G.84-47	15.01	82.72	14.90	81.94
Overall mean		14.81	82.58	14.64	81.98
LSD at 0.05 for:		A=0.11 B=0.08 AB=0.15	A=0.68 B=0.30 AB=0.60	A=0.10 B=0.08 AB=0.14	A=0.63 B=0.28 AB=0.56

The interaction in Table 5 between planting dates and varieties had a significant effect on pol% and quality index as a plant cane and first ratoon. The results showed that the differences between G.84-47 and Phil.8013 varieties in quality index% were insignificant when sugarcane as plant cane grown on 15th of March. Meanwhile, the differences between the same varieties reached the level of significance when sugarcane as a first ratoon grown under 15th March. Meantime, the differences between G.T.54-9 and

G.84-47 varieties and G.84-47 and Phil.8013 varieties in pol% reached the level of significance when sugarcane as a first ratoon grown under 15th April. On the other hand the differences between Phil.8013, G.84-47 varieties on quality index were insignificant when sugarcane as a plant cane 15th of April. While, reached the level of significance when sugarcane as a first ratoon grown under 15th April.

C. Millable cane and recoverable sugar yields:

Results in Table 6 clarified a significant decrease in millable cane and recoverable sugar yields of both plant cane and first ratoon as planting date was delayed from 15th March to 15th June. Delaying planting date from 15th March to 15th April, 15th May or 15th June led to decreasing millable cane yields by 3.61, 18.01 and 27.58 tons/fed for plant cane, corresponding to 3.40, 12.86 and 22.61 tons/fed for the first ratoon. Similarly, recoverable sugar yield decreased by 0.54, 2.85 and 4.17 tons/fed, for plant cane by 0.43, 1.99 and 3.44 tons/fed respectively. It could be noted that the rate of reduction in millable cane and recoverable sugar yields of sugarcane resulted from delaying the planting date was higher for plant cane than first ratoon. Such effect was mentioned by **Jhansi and Rao (1996)** and **Ahmed et al. (2007)**.

Results in Table 6 showed that the tested varieties varied significantly in recoverable sugar yield and insignificantly in millable cane yield of sugar cane for the plant cane and first ratoon. The highest values of recoverable sugar yield were recorded by Phil.8013 variety (5.57 tons/fed) for the plant cane and G.84-47 variety (5.80 tons/fed) for first ratoon. The difference between Phil.8013 and G.84-47 in this trait was insignificant for the plant cane. These results are in harmony with those obtained by **Abd El-Latif (1998)**; **Abd El-Azez (2008)** and **El-Sogheir and Ferweez (2009)**.

The interaction between planting date and varieties had a significant effect on millable cane and recoverable sugar yields/fed for both plant cane and first ratoon as shown in Table 6. The results showed that the differences between G.84-47 and G.T.54-9 varieties on millable cane yield/fed were insignificant when sugarcane as plant cane grown on 15th of March and 15th April. Meanwhile, the differences between the same varieties reached the level of significance when sugarcane as a first ratoon grown under 15th March and 15th April. On the other hand, the differences between G.T.54-9 and G.84-47 varieties on recoverable sugar yield/fed were insignificant when sugarcane as a first ratoon grown under 15th March. Meanwhile, those differences reached the level of significance when sugarcane as a plant cane grown under 15th March. Also, the differences between G.T.54-9 and G.84-47 varieties on recoverable sugar yield/fed were insignificant when sugarcane as plant cane grown on 15th of April, while that differences reached the level of significance when sugarcane as a first ratoon grown under 15th April. Effect of planting date on productivity and quality of the studied sugarcane varieties was the lowest with G.84-47 variety than the other ones for both plant cane and first ratoon crops. Moreover, results of the present work pointed out that Phil.8013 was the highest variety affected by delay planting date. So, planting dates of sugarcane G.T. 54-9 variety (the commercial variety) beside G.84-47 variety on the 15th March or April is preferable under conditions of the present study.

Table 6: Effect of planting dates on millable cane and recoverable sugar yields (ton/fed) for the plant cane and first ratoon of three sugar cane varieties (combined over the two seasons).

Planting dates (A)	Sugar cane variety (B)	Plant cane		First ratoon	
		Millable cane yield (ton/fed)	Recoverable sugar yield (ton/fed)	Millable cane yield (ton/fed)	Recoverable sugar yield (ton/fed)
15/3	G.T.54-9	53.90	6.89	58.82	7.33
	Phil.8013	59.90	8.00	50.27	6.46
	G.84-47	54.20	7.13	57.30	7.25
Mean		56.00	7.34	55.46	7.01
15/4	G.T.54-9	52.50	6.80	56.53	7.05
	Phil.8013	53.00	6.87	45.94	5.87
	G.84-47	51.67	6.71	53.70	6.82
Mean		52.39	6.80	52.06	6.58
15/5	G.T.54-9	38.90	4.42	43.93	4.86
	Phil.8013	35.90	4.37	40.67	4.94
	G.84-47	39.17	4.69	43.20	5.26
Mean		37.99	4.49	42.60	5.02
15/6	G.T.54-9	29.43	3.04	34.20	3.47
	Phil.8013	26.34	3.03	30.06	3.36
	G.84-47	29.50	3.42	34.30	3.89
Mean		28.42	3.17	32.85	3.57
Average of varieties	G.T.54-9	43.68	5.29	48.37	5.68
	Phil.8013	43.78	5.57	41.73	5.16
	G.84-47	43.63	5.49	47.13	5.80
Overall mean		43.70	5.45	45.74	5.55
LSD at 0.05 for:		A=0.45 B=Ns AB=1.24	A=0.08 B=0.09 AB=0.18	A=0.65 B=Ns AB=1.17	A=0.10 B=0.12 AB=0.20

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إستجابة أصناف قصب السكر لميعاد الزراعة

محمد أبو بكر بخيت- صلاح على عبد اللاه محمود عنان - أشرف بكرى أحمد الطيب
معهد بحوث المحاصيل السكرية - مركز البحوث الزراعية - الجيزة

يقوم حديثاً بعض زراع قصب السكر في محافظة المنيا بمصر الوسطى بزراعة القصب الغرس الربيعي بعد حصاد القمح أو البنجر، وقد أنتج معهد بحوث المحاصيل السكرية عدد من أصناف قصب السكر المبشرة من ضمنها صنف القصب الفلبيني ٨٠١٣ و جيزة ٨٤ - ٤٧ .

لذا أقيمت تجربتان حقليتان بمحطة البحوث الزراعية بملوى ، محافظة المنيا - مصر، لدراسة تأثير تأخير ميعاد الزراعة على الصفات الخضرية وجودة العصير وحاصل العيدان والسكر لهذه الأصناف. وزعت ثلاثة أصناف من القصب هي الصنف التجاري جيزة-٥٤ -٩ والفلبيني ٨٠١٣ و جيزة ٨٤-٤٧ في أربعة مكررات في تصميم قطاعات كاملة العشوائية لكل ميعاد زراعة في أربعة مواعيد زراعة هي ١٥ مارس (ميعاد الزراعة الأمثل للقصب الربيعي -مقارن) و ١٥ ابريل و ١٥ مايو و ١٥ يونيه (مواعيد الزراعة السائدة لدى زراع المنطقة) ثم تم إجراء تحليل تجمعي لبيانات مواعيد الزراعة والأصناف. وتم حصاد القصب الغرس الربيعي على عمر ١٢ شهر و ١٠ شهور للخلفة الأولى.

أوضحت النتائج المتحصل عليها ما يلي :

- ١- أثر ميعاد الزراعة معنوياً على الصفات الخضرية (طول وقطر العود)، صفات جودة العصير (نسبة المواد الصلبة الذاتية الكلية، نسبة السكروز، نسبة النقاوة، نسبة الحلاوة، نسبة استخلاص السكر ومعامل الجودة)، الصفات الإنتاجية (محصولي العيدان القابلة للعصر و السكر) في القصب الغرس والخلفة الأولى.
- ٢- اختلفت الأصناف المختبرة (جيزة-٥٤ -٩ والفلبيني ٨٠١٣ و جيزة ٨٤ - ٤٧) معنوياً في جميع الصفات المدروسة عدا ناتج العيدان القابلة للعصر لكلا القصب الغرس والخلفة الأولى.
- ٣- كانت صفات الصنف الفلبيني ٨٠١٣ هي الأكثر تأثراً بتأخير ميعاد الزراعة مقارنة بالصنفين الآخرين.
- ٤- تحت ظروف التجربة ، يفضل زراعة صنف جيزة ٨٤ - ٤٧ في ١٥ مارس أو إبريل بجانب الصنف التجاري جيزة-٥٤ -٩ للحصول على أعلى حاصل للعيدان القابلة للعصر و السكر.