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EVALUATION PRODUCTIVITY AND SUSCEPTIBILITY OF SOME PROMISING SUGAR CANE VARIETIES TO SOME PLANT DISEASES AND NEMATODE UNDER DIFFERENT ROW SPACING

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ABSTRACT

Three field trails (two plant crop and one 1st ratoon) were carried out at Mattana Agricultural Research Station, Qena Governorate in 2005/2006 and 2006/2007 growing seasons. Each trail included sixteen treatments represent the combination between four row spacing (70, 80, 90 and 100 cm between rows of sugarcane) and four sugarcane varieties (the commercial variety "G.T.54-9" three promising varieties .i.e., G.98-28, G.99-165 and Phil. 8013). Results showed that row spacing significantly affected stalk height, stalk diameter, purity %, cane and sugar yields and sugar recovery % in the 1st ratoon. Number of millable cane/m^2, sucrose % and reducing sugars were not affected by row spacing. In general, planting sugar cane varieties in row space of 90-100 cm. attained the highest values of the studied criteria. Sugarcane varieties differed significantly in stalk height, stalk diameter, millable cane/m^2, sucrose and purity percentages, cane and sugar yields in both seasons as well as sugar recovery and reducing sugars percentages in the 2nd one. The commercial sugarcane variety G.T.54-9 recorded higher values of stalk length, cane and sugar yields compared to the other three varieties. Under conditions of the present work, growing G.T.54-9 variety in rows spaced at 90 or 100 cm could be recommended to obtain the highest cane and sugar yields/fed. Both the lesion nematode (*Pratylenchus zeae*) and spiral nematode (*Helicotylenchus dihystera*) population densities varied according to both the row spacing and sugar cane varieties. There was a negative relationship between the row spacing and the nematode population. All sugar cane varieties were infested by the root lesion nematode but a high nematode population was associated with variety G.T.54-9 and a less one was found to be associated with variety Phil 8013. The same trend was also observed with the spiral nematode.

The effect of row spacing on RSD, smut and SCMV in commercial and promising sugarcane varieties in plant cane growing season (2005/2006) plant cane (2006/2007) growing season and in first ratoon (2006/2007) growing season was determined. It is of importance to point that these results could be explained by that the varieties enable the success of the extent of natural infection to be judged and permit the effect of seasonal differences in environmental conditions to be considered.

Key words: Sugarcane, Commercial and promising varieties, Row spacing, Cane, Nematode, Soil temperatures, RSD.SCMV and smut.

INTRODUCTION

In Egypt, the cultivated area of sugarcane reached to 335063 thousand feddans (Annual Report for Sugar Crops, 2008). Most of this area is cultivated by the commercial sugar cane variety G.T.54-9. Shoots emerged and mortality percentages resulted from the competition among plants until they become millable canes are greatly influenced by inter-row spacing which plays an important role with relation to the ability of varieties to achieve the full potential of its production capacity Devi *et al.* (1990) cleared that juice sucrose content was unaffected by spacing when they planted sugar cane at interrow spacing of 60 and 80 cm. Patil *et al* (1990) found that brix % and sucrose % content were not significantly affected when sugarcane was planted at three inter-row spacing of 60, 75 and 90 cm. El-Gergawy *et al* (1995) mentioned that the high population of sugarcane caused a rapid elongation of plants and increased stalk height. Abd EL-Latif *et al* (1999) revealed that increasing row spacing from 80 to 120 cm increased stalk height, stalk diameter and cane yield. Shah-Nawaz, *et al.* (2000) grow sugarcane in rows of 60, 75, 90 or 120 cm apart, or in double-row strips. Spacing of 75 cm in double-row strips produced the highest number of millable canes. Stripped cane yield was the highest with 90 cm spaced double-row strips and the lowest with the spacing of 120 cm single rows. Sucrose content in cane juice was not affected by spacing. Gowda, *et al.* (2001) mentioned that Co-7704 recorded higher average cane and sugar yields than CoC-671. Higher cane yield, sugar yield, number of millable canes were obtained with a row spacing of 75 cm than that of 90 cm. Raskar and Bhoi (2003) studied the effects of intra-row spacing (30, 60 or 90 cm). They showed that cane girth and number of millable canes were significantly higher with a 90-cm intra-row spacing compared with 30 or 60-cm intra-row spacing. Millable cane height and average number of internodes/plant were not significantly affected by spacing. Sundara (2003) grow sugarcane cultivars Co. 91010, Co. 94005 and Co. 94008 in rows spaced at 90, 120 or 150 cm. He found that Co. 91010 recorded the highest number of stalks at harvest, commercial cane sugar % and cane yield. A spacing of 90 cm resulted in the highest number of stalks at harvest. Juice quality traits were not significantly affected by spacing.

As for the different among cane varieties, Ismail (1997) mentioned that sugarcane varieties G.68-88, F.153 and G.74-96 did not differ significantly in stalk diameter and total soluble solids, brix, sucrose, sugar recovery, reducing sugar percentages, number of millable cane and cane and sugar yields. Meantime, they differed significantly in their stalk length. Generally, the variety F.153 gave the highest values of most characters compared with G.68-88 and G.74-96 varieties. Abo El-Ghait (2000) reported that sugarcane cv. G.85-37 surpassed significantly cvs. G.T.54-9, G.84-47 and F.153 in stalk height, diameter, sucrose %, cane and sugar yields, while cane varieties did not significantly differ in purity %. Ahmed *et al* (2002) cleared that the widest inter-row spacing (120 cm) gave the highest values of studied characters compared with the other row spacing. El-Geddawy, *et al.* (2002-a) found that G.T.54-9 had the highest sugar recovery % and sugar yield compared with F.153 variety. El-Geddawy, *et al.* (2002-b) reported that sugarcane cv. G.T.54-9 significantly surpassed the other cultivars in terms of stalk height and stalk diameter. Mohamed and Ahmed (2002) obtained significant differences among the studied cane varieties in stalk height, and diameter, number of millable cane, net cane and sugar yields. Rizk *et al,* (2004-a) found that sucrose percentage was insignificantly affected by the studied row distances (100,120, and 140 cm). El-Shafai and

Ismail (2006) reported that the tested sugar cane varieties differed significantly in all studied traits, and he added that the commercial variety G.T.54-9 recorded the highest averages of stalk height, number of internodes/stalk, number of millable cane, cane and sugar yields/fed, while thicker stalk, higher sucrose and sugar recovery percentages were given by Phil. 8013.

Sugar cane in many parts of the world as well as in Egypt is a subject of infection by many nematode pests. The root-lesion nematodes *Pratylenchus* spp. are the most common plant-parasitic nematode associated with sugar cane plants. In Egypt *Pratylenchus zeae* and *Pratylenchus thornei* were found to infest sugar cane (Oteifa *et al.*, 1963, Mohamed, 2000 and Montasser *et al.* 2002).

Ratoon stunting disease (RSD) caused by the xylem inhabiting slow growing, recently renamed *Leifsonia xyli* subsp. *xyli* (Davis et al. 1980, 1984; Evtushenko et al., 2000) is one of the most important sugarcane (*Saccharum officinarum* L.) diseases worldwide (Hughes, 1974) with yield losses up to 50% having been reported (Bailey and Bechet, 1995). Damage by RSD is caused mainly by interference with water and nutrient transport (Kao and Damann, 1980). Since sugarcane is grown with 4-5 ratoon crops with one crop per year before termination of a planting, care must be taken to avoid infestation of entire fields by this bacterium. The bacterium is spread by manual and mechanical harvesting equipment depending on the susceptibility of the sugarcane cultivar (Bailey and Tough, 1992; Damann, 1992; Comstock *et al.*, 1996)

Sugarcane is susceptible to several major viral diseases transmitted by insects. At the present time the most severe viral disease is caused by the sugarcane mosaic potyvirus (SCMV). In very susceptible plants it causes severe dwarfing, leaf and stem necrosis and serious production losses (Abd El Fattah *et al.*, 2005). Sugarcane smut is the major one in the world (Antoine, 1961; Agnihorti 1990). It caused by *Ustilago scitaminea* Syd. and was first noted in Egypt by Fahmy (1930) and Jones (1935).

This work amid to study the performance of the tested sugarcane varieties as affected by different row spacing, Evaluations of promising varieties for resistance against some bacterial, fungal and viral diseases as well as the lesion and spiral nematodes.

MATERIALS AND METHODS

Field trails

Three field trails were carried out at Mattana Agricultural Research Station, Qena Governorate in 2005/2006 and 2006/2007 growing seasons(plant cane) and 2006-20087 (first ratoon). Each trail included sixteen treatments represent the combination between four row spaces (70, 80, 90 and 100 cm) and four sugarcane varieties (the commercial variety G.T.54-9, three promising varieties, .i.e., Phil.8013, G.98-28, and G.99-165) grown as plant cane crops. Split plot design was used, where the main plots were assigned for row spacing, while cane varieties were randomly distributed in the sub plots. Plot area was 42 m^2 containing 7, 8, 9 and 10 rows for row pacing of 100, 90, 80 and 70 cm, respectively. Sugarcane varieties were planted in the 1st week of March and harvested at age of 12 months in both seasons. Varietal pedigree of the sugar cane varieties in this study is shown in Table (1) Phosphorus fertilizer was broadcasted after ridging and before planting at a rate of 60 kg P_2O_5/fed as calcium super phosphate (15% P_2O_5). Urea (46% N), as a nitrogen source was applied at a rate of 230 kg N/fed as aside dressing in cane rows in two equal doses after 6-week from planting and 2- week later. Potassium was added once in form of potassium sulphate (50% k_2O) at a rate of 48 kg K_2O/fed as one dose with the 2nd N-dose. All required agricultural practices were done as recommended by Sugar Crops Research Institute.

Table (1): Varietal, classification and their parentage

Variety	Classification	Parentage	Geographic location
Phil. 8013	**Promising Varieties**	Selected from hybrid seeds of CAC71/312 x PH 642227	Latitude No 32 43 Latitude So 26 10
G.98-28		Selected from hybrid seeds of NCO310 x? (poly cross)	
G.99-165		Selected from hybrid seeds of C.P 76- 1306 x Q 76- 1053	
G.T. 54-9	**Commercial Variety**	Selected from hybrid seeds of NCO 310 x F337/925(PSA 32 x F 861)	

Recorded data:

At harvest, a sample of 20 stalks was taken at random and the following data were recorded:

1. Stalk height (cm) was measured from soil surface to the top of visible dewlap.
2. Stalk diameter (cm) was measured at the middle part of the stalk.
3. Sucrose percentage/100 cm^3 was determined according to A.O.A.C. (1995).
4. Juice purity percentage was calculated according to the following equation:

Juice purity % = sucrose % x 100 /brix%

Where: total soluble solids percentage was estimated using "Brix Hydrometer".

5. Cane yield (ton/fed.): At harvest the tree guarded rows were taken topped, cleaned from the trash, weighed and cane yield (ton/fed) was calculated.

6- Sugar recovery (%) = [richness % x purity %] x 100

Richness (%) = (sucrose/100 gm juice x richness factor)/100

Sucrose/100 gm juice = (sucrose/100 cm^3 juice) / juice density.

Juice density was taken from "Schibler Table" according to the Sugar Company.

Richness factor (extracted juice) = 100 - [(fiber % x 1.3) + 2.5]

1.3 = percent water free from sugar

2.5 = physical impurities %

7. Sugar yield (ton/fed) was estimated according the following equation:

Sugar yield (tons/fed) = cane yield (tons/fed) x sugar recovery (%)

Nematode analysis:

Soil and root samples were taken from rhizospher zone at depth of 30 cm and at the beginning of the experiment (June) October and February. An aliquot of 250 g soil for each replicate was extracted for nematode estimation by sieving and decanting methods Barker (1985). Nematodes in 5 g roots from each replicate were extracted by incubation method as the described by Young (1954).

Indirect-enzyme linked-immunosorbent assay detection of SCMV

For detection of SCMV in virus-infected samples, the indirect-enzyme linked immunosorbent assay (I-ELISA) technique was used as described by Koeing and Paul (1982). As control, sap from healthy was used. Further more, coating buffer was added to the well 1A instead of the sample to serve as blank. The sample that gave ELISA value over the two folds of the healthy one was considered as a positive (Clark and Adams, 1977).

Evaluation of varietals reaction to RSD

For the ELISA test samples were drawn from 12 months-old sugar cane genotypes through harvesting. For assign the load of the bacterium in different nodle regions tissue sample from the basic node of the stalk was taken from standard susceptible variety NCO.310. Tissues were drawn from 2nd node with adjoining internode tissues in other genotypes for the ELISA. About 5g of nodle and internode tissues were immersed in 10 ml of phosphate buffer saline (PBS) 0.1M (pH 7.2) containing 0.01M sodium diethyldithiocarbamat (NaDIECA) (Sigam Chemical Co., USA) overnight at 4°C. The diffusates were centrifuged at 3000 rpm for 15 min. at 4°C and the supernatants were collected and used as antigen for ELISA test as described by Viswanathan (1997). polyclonal antiserum raised against RSD bacterium kindly supplied by Dr. Anthony James, BSES Ltd P.O Box 86, Indooroopilly, QLD 4068, Australia,diluted to 1:1000 in PBST.

Evaluation of varietal reaction to smut disease

The trial, under the three different crop, was observed at different periods from germination and establishment and at plants' other observations were on percent smutted (Percentage infection = Number of infected plants x 100/total number stools) at 6 months after planting (MAP) and months after ratooning (MAR) for the plant crop (PC), first ratoon crop (FRC) Mohan Rao and Prakasam, 1956).

Statistical analysis

The collected data were statistically analyzed according to procedure outlined by Snedecor and Cochran (1981). LSD at 0.05 level of significance was used to compare between means.

RESULTS AND DISCUSSION

Stalk height

Data in Table (2) showed that plant density in term of spacing between ridges differed significantly with respect to their influence on the stalk height. It is obviously noted that stalk height and row spacing were in inversely proportional. As the row spacing increased from 70 cm up to 100 cm, the values of plant height statistically decreased. This result may be due the fact that the increase of plant population in closer spacing increased competition among cane plants for light, water, and nutrients and in turn increased plant height. This was true in both plant cane and the 1st ratoon seasons.

Results also showed that sugarcane varieties differed significantly in stalk height in the two plant cane and the 1st ratoon. These results are in agreement with those obtained by El-Sogheir and Mohamed (2003) who mentioned that the tested sugarcane varieties significantly differed in stalk height. The commercial sugarcane variety G.T.54-9 recorded the highest stalk height over the other varieties with no significant difference with G.98-28 variety. Meantime, G.99-165 produced the shortest stalk in the three promising varieties. The difference between the studied varieties may be due to their gene make-up effect. These results are in line with that obtained by Ahmed *et al.* (2002); El-Geddawy *et al.* (2002b) and Mohamed and Ahmed (2002)

Table (2): Stalk height (cm) of four sugarcane varieties as affected by inter- row spacing in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Stalk height of four sugarcane varieties (cm)				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil. 8013	
Plant cane 2005-2006					
70	310.0	308.7	277.7	289.0	296.3
80	307.3	306.7	267.7	285.0	291.7
90	303.0	303.0	259.3	276.7	285.5
100	280.0	282.7	240.0	259.7	265.6
Mean	300.1	300.3	261.2	277.6	284.8
L.S.D at 5% level for: Row spacing (A): 9.96 Cane varieties (B): 10.13 (A) x (B): N.S					
First ratoon 2006-2007					
70	305.0	296.3	282.7	293.3	294.3
80	296.7	290.7	278.7	287.3	288.3
90	290.0	286. 7	274.7	283.3	283.7
100	283.3	276. 7	268.3	271.7	275.0
Mean	293.75	287.58	276.08	283.91	285.33
L. S.D at 5% level for: Row spacing (A): 2.61 Cane varieties (B): 7.33 (A) x (B): N.S					
Plant cane 2006-2007					
70	312.0	306.0	280.0	302.3	300.1
80	306.0	297.7	273.3	299.7	294.2
90	303.3	305.0	261.7	293.3	290.8
100	278.3	286.7	250.0	263.3	269.6
Mean	299.9	298.8	266.3	289.7	288.7
L. S.D at 5% level for: Row spacing (A): 10.51 Cane varieties (B): 8.57 (A) x (B): N.S					

The interactions among sugarcane varieties and inter-row spacing were insignificant with respect to their effect on stalk height of the plant grown in the three sugarcane varieties.

Stalk diameter:

Results in Table (3) revealed that widening the inter-row spacing from 70 up to 100 cm resulted in a gradual and significant increase in stalk diameter in the two vergin cane and 1st ratoon, however, it could be noted that the difference between 90 and 100 cm row width in the 1st ratoons was significant. This result may be due the low competition on nutrients and solar radiation for the plants grown under wider space. Similar results were reported by Raskar and Bhoi (2003).

Table (3): Stalk diameter (cm) of four sugarcane varieties as affected by inter-row spacing in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Stalk diameter of four sugarcane varieties (cm)				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil. 8013	
Plant cane 2005-2006					
70	2.7	2.7	2.7	2.7	2.7
80	2.7	2.8	2.7	2.7	2.8
90	2.9	2.8	2.8	2.9	2.8
100	2.9	2.9	2.9	3.0	2.9
Mean	2.79	2.83	2.73	2.85	2.82
L.S.D at 5% level for: Row spacing (A): 0.07 Cane varieties (B): 0.04 (A) x (B): N.S					
First ratoon 2006-2007					
70	2.7	2.7	2.7	2.8	2.7
80	2.8	2.8	2.8	2.9	2.8
90	2.8	2.9	2.8	3.0	2.8
100	2.9	2.9	2.8	3.0	2.9
Mean	2.8	2.85	2.78	2.92	2.84
L.S.D at 5% level for: Row spacing (A): 0.06 Cane varieties (B): 0.04 (A) x (B): N.S					
Plant cane 2006-2007					
70	2.7	2.7	2.7	2.8	2.7
80	2.7	2.8	2.8	2.9	2.8
90	2.8	2.9	2.9	2.9	2.8
100	2.9	2.9	3.1	3.0	3.0
Mean	2.77	2.84	2.90	2.95	2.87
L.S.D at 5% level for: Row spacing (A): 0.07 Cane varieties (B): 0.04 (A) x (B): N.S					

Sugar cane varieties differed significantly in their stalk diameter in the 1st and 2nd planted cane and as well as 1st ratoon. Sugarcane variety Phil.8013 overpassed the other varieties with regard to this trait followed by G.98-28, G.T.54-9 and G.98-165. This finding was completely true in the 1st plant cane and its 1st ratoons, however, in the 2nd planted cane sugar cane variety Phil.8013 still surpassed the other varieties in this respect with a real change in varietal position with respect to this trait. The variation among sugar cane varieties in stalk diameter may be controlled by the gene make up effect. These results are in agreement with those obtained by Mohamed and Ahmed (2002). Stalk diameter was not affected by the interaction between the inter-row spacing and sugarcane variety in the 1st and 2nd seasons.

Number of millable cane/m^2 long:

Data in Table (4) revealed that the differences between the studied iner-row spacing were significance with respect to their effect on number of millable cane/m long for the two plant cane crops however this effect was positive in the 1st plant crop (2005/2006) and the 1st ratoon. Mean while data appeared a negative and significant response in the mailable cane/m long with the increase in the row spacing in the 1st rations and the 2nd planted cane. This observation was in accordance with the expected result as well as with the result of the 2nd plant crop.

Actually, it is obviously show that there are a statististical difference between the studied sugar cane varieties in their millable cane number in the two plant crops and the 1st ratoon. However, the results in Table (4) cleared a complete accordance between the 2nd plant crop and the 1st ratoons of the 1st plant crop, where the commercial variety G.T.54-9 recorded the highest value of this trait followed by G.98-28, G.98-165 and then Phil.8013.

Sucrose percentage:

Data in Table (5) showed that sucrose percentage was statistically influenced by row spacing in the 1st plant crop and its ratoon, whereas this effect was in significantly in the 2 plant crop. It could be noted that there is a relative response in this measurement with the increase in row width up to 90 cm. This result is in agreement with that reported by Devi *et al* (1990); Shah-Nawaz *et al.* (2000) and Sundara (2003).

The evaluated sugarcane varieties differed significantly in sucrose percentage in both seasons. Sugarcane variety Phil.8013 surpassed the three other varieties and recorded the highest sucrose percentage (15.01%and 4.93% in the 1stcrop and its ratoon. In the 2nd plant cane, the commercial variety G.T.54-9 had the highest value of this trait (14.59%). The variation among sugar cane varieties in sucrose % may be controlled by their gentic strutures. Similar results were reported by EL-Sogheir and Mohmed (2003).

Table (4): Number of millable cane/m long of four sugarcane varieties as affected by inter-row spacing in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Number of millable cane/m long of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil. 8013	
Plant cane 2005-2006					
70	12.60	12.60	11.07	11.33	11.93
80	12.80	12.53	11.54	12.07	12.23
90	12.27	14.13	12.07	12.57	12.76
100	14.53	13.62	13.17	12.40	13.43
Mean	13.05	13.25	11.96	12.09	12.59
L.S.D at 5% level for: Row spacing (A): 1.01 Cane varieties (B): 0.04 (A) x (B): N.S					
First ratoon 2006-2007					
70	14.80	14.00	13.77	12.90	13.87
80	13.87	13.43	13.10	12.23	13.16
90	13.13	12.97	12.53	11.53	12.54
100	12.43	12.47	11.93	11.10	11.98
Mean	13.56	13.22	12.83	11.94	12.89
L.S.D at 5% level for: Row spacing (A): 0.18 Cane varieties (B): 0.79 (A) x (B): N.S					
Plant cane 2006-2007					
70	15.17	12.87	12.33	12.20	13.14
80	13.67	12.90	13.00	12.57	13.03
90	13.97	13.37	13.03	11.63	13.00
100	13.70	13.63	12.90	11.03	12.82
Mean	14.13	13.19	12.82	11.86	12.99
L.S.D at 5% level for: Row spacing (A): 0.93 Cane varieties (B): 0.04 (A) x (B): N.S					

Table (5): Sucrose percentage of four sugarcane varieties as affected by inter-row spacing in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Sucrose percentage of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil. 8013	
Plant cane 2005-2006					
70	13.01	14.39	14.65	14.45	14.12
80	15.04	14.44	14.04	15.05	14.64
90	14.71	15.86	13.23	15.41	14.80
100	14.73	13.99	13.52	15.14	14.34
Mean	14.37	14.67	13.86	15.01	14.48
L.S.D at 5% level for: Row spacing (A): 1.19 Cane varieties (B): 0.59 (A) x (B): N.S					
First ratoon 2006-2007					
70	13.40	13.80	13.01	13.99	13.55
80	14.81	14.04	13.88	14.70	14.36
90	15.41	14.98	13.48	15.59	14.86
100	14.68	14.17	13.77	15.46	14.52
Mean	14.57	14.25	13.53	14.93	14.23
L.S.D at 5% level for: Row spacing (A): 0.7 Cane varieties (B): 0.06 (A) x (B): N.S					
Plant cane 2006-2007					
70	14.53	13.93	12.94	15.10	14.13
80	14.28	13.21	12.97	14.05	13.63
90	15.13	12.62	12.88	14.35	13.74
100	14.41	13.99	12.96	13.65	13.75
Mean	14.59	13.44	12.94	14.29	13.81
L.S.D at 5% level for: Row spacing (A): N.S Cane varieties (B): 0.54 (A) x (B): N.S					

Sucrose percentage was significantly affected by the interaction between cane varieties and row spacing in 1st plant crop only. In this season, no significant difference in sucrose % was recorded between G.T.54-9 and Phil.8013 when they were grown in rows spaced at 80 and/or 100 cm. However, the differences between the two varieties were significant at 70 and 90 cm rows. Also, insignificant variance was detected between G.98-28 and G.99-165 cvs. grown at 70, 80 or 100-cm spacing with a statistical difference between them at 90 cm. Regardless the statistical influence of the interaction between the examined varieties and row distance, it could be detected that sugar cane variety Phil.8013 appeared a stable response to row distance, where it is attained the highest value of sucrose% in the two plant crop as well as the 1st ratoons of the 1st plant crop.

Purity percentage:

Results in Table (6) revealed that the row spacing caused a significant difference in purity percentage in the 1st and 2nd plant crop as well the 1st ratoon. Results also pointed out that there is a positive relationship between row distance and the values of purity percentage. This could be due to the increase in the values of sucrose percentage with the increase in row spaces.

Data also indicated that the examined sugar cane varieties differed significantly in purity % in the 1st; 2nd crop as well as the 1st ratoons. Sugar cane variety G.T.54-9 surpassed the other three varieties in this trait. On the contrary, sugar cane variety G.99-165 gave the lowest purity % in the three crops. Similar results were reported by El-Sogheir and Mohamed (2003). With respect to the interactions effect between row spacing and sugar cane varieties. The result showed insignificant effect on purity % was recorded. Purity percentage was not significantly affected by the interaction between the tested sugarcane varieties and row spacing in both seasons

Sugar recovery percentage:

Data in Table (7) showed that increasing the row distance up to 90 cm positively and statistically raised the values of sugar recovery percentage. This finding was fairly true in the two plant crop and the 1st ratoon. This result is in agreement with that outlined by Sundara (2003). The examined sugarcane varieties did not differ significantly in sugar recovery % in the two plant crop. However, the differences in this trait reached the level of significance in the 1st ratoons, where the highest sugar recovary % was recorded by sugarcane variety G.T.54-9 and phil 8013 while the lowest value of this trait was obtained from G.99-165 variety. This finding was true in both plant crop and the 1st ratoon. This result is in line with that obtained by El-Geddawy, *et al.* (2002a) and Mohamed and Ahmed (2002).

The interaction between row spacing and the studied sugarcane varieties had no significant effect on sugar recovery percentage in both plant crop and the 1st ratoon.

Table (6): Purity percentage of four sugarcane varieties as affected by inter-row spacing in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Purity percentage of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98- 28	G.99165	Phil.8013	
Plant cane 2005-2006					
70	81.85	79.19	77.93	77.88	79.09
80	83.45	81.04	79.88	82.16	81.63
90	87.31	85.38	84.73	83.17	85.15
100	90.51	88.59	85.26	85.96	87.58
Mean	85.78	85.55	81.95	82.17	83.36
L.S.D at 5% level for: Row spacing (A): 2.14 Cane varieties (B): 1.92 (A) x (B): N.S					
First ratoon 2006-2007					
70	83.51	80.10	78.77	78.39	80.19
80	86.77	83.79	82.07	83.08	83.93
90	89.53	87.48	84.08	84.10	86.30
100	88.12	89.22	86.57	87.78	87.92
Mean	86.94	85.15	82.87	83.34	84.59
L.S.D at 5% level for: Row spacing (A): 1.62 Cane varieties (B): 1.43 (A) x (B): N.S					
Plant cane 2006-2007					
70	85.55	80.13	80.41	79.84	81.84
80	85.68	82.82	80.78	84.49	83.44
90	86.52	84.88	80.81	85.58	84.45
100	88.96	85.93	84.91	86.33	86.53
Mean	86.68	83.44	81.73	84.04	83.80
L.S.D at 5% level for: Row spacing (A): 2.25 Cane varieties (B): 1.66 (A) x (B): N.S					

Table (7): Sugar recovery percentage of four sugarcane varieties as affected by inter-row spacing in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Sugar recovery percentage of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil. 8013	
Plant cane 2005-2006					
70	11.34	11.31	10.40	10.95	10.75
80	11.05	11.09	10.14	10.88	10.79
90	12.25	11.72	11.70	11.17	11.71
100	11.40	11.47	11.09	10.90	11.21
Mean	11.51	11.15	10.83	10.80	11.12
L.S.D at 5% level for: Row spacing (A): 0.45 Cane varieties (B): N.S (A) x (B): N.S					
First ratoon 2006-2007					
70	10.93	10.30	10.09	11.46	10.69
80	11.18	10.69	10.41	11.52	10.88
90	12.13	12.32	11.35	11.82	11.91
100	12.10	11.75	11.09	11.80	11.69
Mean	11.59	11.27	10.74	11.58	11.29
L.S.D at 5% level for: Row spacing (A): 0.93 Cane varieties (B): 0.45 (A) x (B): N.S					
Plant cane 2006-2007					
70	11.48	11.02	10.57	11.99	11.26
80	11.45	10.89	10.73	11.34	11.10
90	12.11	11.98	11.37	11.52	11.74
100	11.99	10.69	10.72	11.85	11.31
Mean	11.76	11.14	10.85	11.67	11.36
L.S.D at 5% level for: Row spacing (A): 0.43 Cane varieties (B): N.S (A) x (B): N.S					

Reducing sugars percentage:

Data in Table (8) indicated that reducing sugars percentage significantly affected by the inter-row spacing in the 1st plant crop only. However, the differences between row distances were negligible and insignificant in the 2nd plant crop and the 1st ratoon. The studied sugarcane varieties did not differ significantly in their reducing sugar % in 1st plant cane and its ratoons. However, in the 2nd plant cane, the lowest significant value of reducing sugar % was related to the lowest row spacing. This observation was completely true in the three sugar cane crops. The lowest % in reducing sugar in the 2nd plant crop mainly could be due to the increase in sucrose value under row spacing of 70 cm. The interaction between row spacing and the studied sugar cane varieties had no significant effect on reducing sugars percentage in the three crops. This result is in agreement with that reported by Sundara (2003).

Cane yield:

Data in Table (9) showed that cane yield was almost appeared a gradually and significantly increase by increasing row width from 70 up to 100 cm in the three sugar cane crops. Spacing rows at 90 cm apart and 100 cm gave the highest net cane yield in the two plant cane and the 1st ratoons, respectively. The lowest cane yield/fed was obtained from sugarcane planted in rows of 70 cm apart. The pronounced effect of the wider inter-row spacing may be due to the positive effect of those treatments on the individual stalk weight and stalk diameter. These results are in line with those obtained by Abd EL-Latif *et al.* (1999); Ahmed *et al.* (2002) and El-Shafai and Ismail (2006).

The results revealed that the evaluated sugarcane varieties differed significantly in net cane yield in the two plant cane and the 1st ratoons. Sugar cane variety G.98-28 gave the highest net cane yield in 1st plant cane, while G.T.54-9 gave the highest value of this trait in 2nd plant cane and Phil.8013 in the 1st ratoons. Meanwhile, G.99-165 variety recorded the lowest cane yield/fed in the three sugar cane crops. These results are in agreement with those obtained by Mohamed and Ahmed (2002). Cane yield was insignificantly influenced by the interaction between row spacing and the studied sugarcane varieties.

Table (8): Reducing sugars percentage as affected by inter-row spacing and sugar cane varieties in 2005/2006 and 2006/2007 seasons

Row spacing (cm)	Reducing sugars percentage of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil.8013	
Plant cane 2005-2006					
70	0.40	0.42	0.50	0.45	0.44
80	0.47	0.43	0.43	0.52	0.46
90	0.43	0.51	0.43	0.48	0.46
100	0.42	0.40	0.49	0.41	0.43
Mean	0.43	0.44	0.46	0.47	0.45
L.S.D at 5% level for: Row spacing (A): 0.04 Cane varieties (B):N.S (A) x (B): N.S					
First ratoon 2006-2007					
70	0.47	0.52	0.49	0.49	0.49
80	0.49	0.51	0.52	0.40	0.48
90	0.47	0.51	0.50	0.47	0.49
100	0.40	0.54	0.54	0.50	0.49
Mean	0.46	0.52	0.51	0.47	0.49
L.S.D at 5% level for: Row spacing (A): N.S Cane varieties (B): N.S (A) x (B): N.S					
Plant cane 2006-2007					
70	0.48	0.54	0.50	0.39	0.48
80	0.52	0.54	0.56	0.42	0.51
90	0.50	0.54	0.53	0.50	0.52
100	0.42	0.56	0.57	0.53	0.52
Mean	0.42	0.56	0.57	0.53	0.52
L.S.D at 5% level for: Row spacing (A): N.S Cane varieties (B): 0.06 (A) x (B): N.S					

Table (9): Cane yield (ton/fed) as affected by inter-row spacing and sugar cane varieties in 2005/2006 and 2006/2007 seasons

Row spacing (cm)	Cane yield (ton/fed) of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil.8013	
Plant cane 2005-2006					
70	42.460	46.800	40.073	45.760	43.773
80	48.820	49.947	40.853	50.000	47.405
90	52.907	51.093	42.233	53.33	49.892
100	52.380	52.487	42.867	48.827	49.140
Mean	49.142	50.082	41.507	49.480	47.553
L.S.D at 5% level for: Row spacing (A): 1.39 Cane varieties (B): 2.353 (A) x (B): N.S					
First ratoon 2006-2007					
70	44.207	43.347	40.253	46.200	43.502
80	49.293	50.367	42.573	50.440	48.168
90	51.147	51.240	42.560	53.733	49.670
100	53.777	52.353	45.443	50.360	50.483
Mean	49.60	49.327	42.707	50.183	47.956
L.S.D at 5% level for: Row spacing (A): 2.18 Cane varieties (B): 1.84 (A) x (B): N.S					
Plant cane 2006-2007					
70	44.736	46.653	40.453	47.240	44.771
80	49.627	49.193	42.840	50.253	47.978
90	52.640	51.347	44.067	51.547	49.900
100	54.323	50.520	43.443	49.760	50.012
Mean	50.332	49.928	42.701	49.700	48.165
L.S.D at 5% level for: Row spacing (A): 1.65 Cane varieties (B): 2.56 (A) x (B): N.S					

Sugar yield:

Result in Table (10) cleared that sugar yield was gradually and significantly increased with increasing row spacing from 70 up to 90 cm. Thereafter, widening row spacing to 100 cm was accompanied with a statistical reduction in the values of sugar yield. The pronounced effect of the wider inter-row spacing may be due to the positive effect of those treatments on the net cane yield which are considered one of the main constituents of sugar yield and sugar recovery %. This result is in line with that reported by Shah-Nawaz *et al.* (2000) and El-Sogheir *et al.* (2006) who showed that the increased in sugar yield in the tested varieties could attributed to their superiority in yield and yield components.

Table (10) : Sugar yield (ton/fed) as affected by inter-row spacing and sugar cane varieties in 2005/2006 and 2006/2007 seasons.

Row spacing (cm)	Sugar yield (ton/fed) of four sugarcane varieties				
	Commercial variety	Promising varieties			Mean
	G.T. 54-9	G.98-28	G.99-165	Phil.8013	
Plant cane 2005-2006					
70	4.807	4.822	4.153	5.007	4.697
80	5.399	5.539	4.162	5.435	5.134
90	6.481	5.976	4.944	5.970	5.843
100	5.975	5.692	4.751	5.330	5.437
Mean	5.665	5.507	4.502	5.436	5.278
L.S.D at 5% level for: Row spacing (A): 0.217 Cane varieties (B): 0.403 (A) x (B): N.S					
First ratoon 2006-2007					
70	4.829	4.799	4.053	5.296	4.744
80	5.509	5.316	4.447	5.681	5.238
90	6.203	6.310	4.836	6.359	5.927
100	6.511	5.812	5.038	5.916	5.819
Mean	5.763	5.559	4.594	5.813	5.432
L.S.D at 5% level for: Row spacing (A): 0.555 Cane varieties (B): 0.287 (A) x (B): N.S					
Plant cane 2006-2007					
70	5.143	5.142	4.279	5.665	5.057
80	6.021	5.361	4.606	5.701	5.422
90	6.381	6.153	4.869	5.950	5.838
100	6.499	5.615	4.667	5.899	5.670
Mean	6.011	5.568	4.605	5.804	5.497
L.S.D at 5% level for: Row spacing (A): 0.388 Cane varieties (B): 0.454 (A) x (B): N.S					

The commercial sugarcane variety G.T.54-9 surpassed the three other varieties and markedly recorded the highest sugar yield in the 1st and 2nd plant cane as well as the 1st ratoons. While, G.99-165 sugar cane variety showed the lowest sugar yield. Similar results were reported by El-Geddawy *et al.* (2002a); Mohamed and Ahmed (2002) and EL-Sogheir and Mohamed (2003). The interaction between the studied factors had insignificant effect on sugar yield for the studied cane crops.

Nematode population in relation to sugar cane varieties and row spacing:

Data on the population densities of *P. zeae* and *H. dihystera* as affected by different sugar cane varieties and row spacing are presented in Tables (11, 12, 13 and 14). In general, it was noticed that there is a negative relationship between the rate of row spacing and nematode population density, i.e., as closer row spacing, higher nematode population density. The nematode population density associated with sugar cane plants also differed according to sugar cane varieties. As for soil temperature in general, there is a negative relationship between soil temperature and nematode population density, and this was also noted by Mohamed (2000). At the plant cane, the highest *P. zeae* population density was found to be associated with sugar cane variety G.T.54-9 followed by variety G.99-195, G.98-28 and Phil.8013. The same trend was also observed in the case of spiral nematode, *H. dihystera*. At the first ratoon, therefore the varieties were categorized according to their degree of nematode infestation (Nematode density) as follows: sugar cane variety G.T.54-9 was more infested by *P. zeae and H. dihystera* followed by G.99-195, G.98-28 and Phil.8013. At the second plant cane stage, sugar cane variety G.T. 54-9 was the first to be infested by *P. zeae* followed by G.98-28, G.99-195 and Phil.8013. As for *H. dihystera,* sugar cane var. G.T.54-9 was highly infested by *H. dihystera* followed by G.98-28, G.99-195 and Phil.8013.

Table (11): Population of *P. zeae* and *H. dihystera* in the commercial sugarcane variety G.T.54-9 in three growing seasons as influenced by sugarcane row spacing.

Growing seasons	Row spacing (cm)	Months	*P. zeae* Soil 250 g	*P. zeae* Root 5 g	Total	*H. dihystera*	Soil temp.
Plant cane 2005/2006	70	June	3211	134	3345	1896	25.75
		October	3072	142	3214	2103	27.74
		February	3299	133	3432	2001	17.06
	80	June	2981	128	3109	1903	25.75
		October	2800	136	2936	2061	27.74
		February	3165	127	3292	2136	17.06
	90	June	2611	101	2712	1996	25.75
		October	2713	117	2830	1981	27.74
		February	2931	101	3032	1803	17.06
	100	June	2489	94	2583	1673	25.75
		October	2491	91	2582	1594	27.74
		February	2636	113	2749	1437	17.06
First ratoon 2006/2007	70	June	3137	121	3258	2410	26.84
		October	2861	110	2971	2621	32.1
		February	3721	146	3867	2901	18
	80	June	2986	118	3104	2476	26.84
		October	2800	103	2903	2397	32.1
		February	3420	131	2551	2864	18
	90	June	2771	96	2867	2109	26.84
		October	2676	86	2762	2071	32.1
		February	3096	104	3200	2470	18
	100	June	2396	83	2479	1933	26.84
		October	2619	85	2704	2013	32.1
		February	2537	86	2623	2106	18
Plant cane 2006/2007	70	June	3118	127	3245	1617	26.84
		October	2766	133	2899	1802	32.1
		February	2986	126	3112	1688	18
	80	June	3067	118	3185	1873	26.84
		October	2691	119	2810	1930	32.1
		February	2963	113	3076	1709	18
	90	June	2981	97	3078	1800	26.84
		October	2404	101	2505	1796	32.1
		February	2796	93	2889	1531	18
	100	June	2439	81	2520	1693	26.84
		October	2198	96	2294	1713	32.1
		February	2181	90	2271	1396	18

Table (12): Population of *P. zeae* and *H. dihystera* in the promising sugarcane variety G.98-28 in three growing seasons as influenced by sugarcane row spacing.

Growing seasons	Row spacing (cm)	Months	*P. zeae* Soil 250 g	*P. zeae* Root 5 g	Total	*H. dihystera*	Soil temp.
Plant cane 2005/2006	70	June	1711	140	1851	1260	25.75
		October	1531	118	1649	1291	27.74
		February	1970	163	2133	1117	17.06
	80	June	1340	163	1503	974	25.75
		October	1350	67	1417	1031	27.74
		February	1935	141	2076	1215	17.06
	90	June	1517	104	1621	989	25.75
		October	1298	80	1378	880	27.74
		February	1890	130	2020	966	17.06
	100	June	1251	95	1346	651	25.75
		October	1206	46	1252	503	27.74
		February	1982	96	2078	631	17.06
First ratoon 2006/2007	70	June	1833	136	1969	1601	26.84
		October	1447	118	1565	1721	32.1
		February	2001	130	2131	1700	18
	80	June	1671	128	1799	1821	26.84
		October	1370	90	1460	1893	32.1
		February	1686	93	1779	1768	18
	90	June	1357	98	1455	1637	26.84
		October	1183	73	1256	1761	32.1
		February	1317	76	1393	1520	18
	100	June	1435	63	1498	1260	26.84
		October	1067	54	1121	1314	32.1
		February	1314	48	1362	1130	18
Plant cane 2006/2007	70	June	1711	140	1851	1260	26.84
		October	1531	118	1649	1291	32.1
		February	1970	163	2133	1117	18
	80	June	1340	163	1503	974	26.84
		October	1350	67	1417	1031	32.1
		February	1935	141	2076	1215	18
	90	June	1517	104	1621	989	26.84
		October	1298	80	1378	880	32.1
		February	1890	130	2020	966	18
	100	June	1251	95	1346	651	26.84
		October	1206	46	1252	503	32.1
		February	1682	96	1778	631	18

Table (13): Population of *P. zeae* and *H. dihystera* in the promising sugarcane variety G.99-165 in three growing seasons as influenced by sugarcane row spacing.

Growing seasons	Row spacing (cm)	Months	*P. zeae*		Total	*H. dihystera*	Soil temp.
			Soil 250 g	Root 5 g			
Plant cane 2005/2006	70	June	1983	118	2101	824	25.75
		October	1806	133	1939	1373	27.74
		February	2371	146	2517	1651	17.06
	80	June	1667	121	1788	910	25.75
		October	1596	139	1735	1390	27.74
		February	2207	131	2338	1388	17.06
	90	June	1711	94	1805	875	25.75
		October	1523	105	1628	1086	27.74
		February	1983	96	2079	961	17.06
	100	June	1534	131	1665	581	25.75
		October	1317	96	1413	840	27.74
		February	1706	63	1769	907	17.06
First ratoon 2006/2007	70	June	1783	110	1893	1811	26.84
		October	1163	94	1257	963	32.1
		February	1938	127	2065	1340	18
	80	June	1976	121	2097	1890	26.84
		October	1091	81	1172	990	32.1
		February	1893	119	2012	1396	18
	90	June	1801	95	1896	1644	26.84
		October	736	73	809	780	32.1
		February	1620	123	1743	1103	18
	100	June	1537	86	1623	1291	26.84
		October	706	65	771	602	32.1
		February	1318	83	1401	891	18
Plant cane 2006/2007	70	June	1635	88	1723	1031	26.84
		October	1031	79	1110	673	32.1
		February	1137	118	1255	1421	18
	80	June	1601	91	1692	1186	26.84
		October	895	63	958	705	32.1
		February	1219	103	1322	1306	18
	90	June	1439	83	1522	981	26.84
		October	736	76	803	493	32.1
		February	1186	129	1315	1176	18
	100	June	1135	67	1202	643	26.84
		October	593	60	653	435	32.1
		February	1066	96	1162	1190	18

Table (14): Population of *P. zeae* and *H. dihystera* in the promising sugarcane variety Phil.8013 in three growing seasons as influenced by sugarcane row spacing.

Growing seasons	Row spacing (cm)	Months	*P. zeae* Soil 250 g	*P. zeae* Root 5 g	Total	*H. dihystera*	Soil temp.
Plant cane 2005/2006	70	June	1037	49	1086	937	25.75
		October	1000	40	1040	1120	27.74
		February	1302	52	1354	1296	17.06
	80	June	964	41	1005	962	25.75
		October	945	37	982	1013	27.74
		February	1206	44	1250	1200	17.06
	90	June	910	38	948	781	25.75
		October	893	30	923	867	27.74
		February	1189	48	1237	1061	17.06
	100	June	879	35	914	675	25.75
		October	830	33	863	805	27.74
		February	993	35	1028	893	17.06
First ratoon 2006/2007	70	June	983	34	1017	1332	26.84
		October	788	41	829	1341	32.1
		February	1110	37	1147	1289	18
	80	June	897	27	924	1361	26.84
		October	703	36	739	1287	32.1
		February	1287	34	1321	965	18
	90	June	831	30	861	1186	26.84
		October	398	28	426	1219	32.1
		February	798	22	820	1143	18
	100	June	526	25	551	1003	26.84
		October	211	22	233	1198	32.1
		February	512	20	530	1065	18
Plant cane 2006/2007	70	June	803	34	837	967	26.84
		October	1219	29	1248	1016	32.1
		February	1103	40	1143	863	18
	80	June	532	43	575	991	26.84
		October	1063	38	1101	821	32.1
		February	730	34	764	709	18
	90	June	198	37	235	903	26.84
		October	835	30	862	538	32.1
		February	410	19	429	412	18
	100	June	137	21	158	786	26.84
		October	412	18	430	231	32.1
		February	419	21	440	440	18

Table (15). Mean population density of *Pratylenchus zeae* and *Helicotylenchus dihystera* on sugar cane varieties as infested by sugar cane row spacing.

Sugar cane varieties	Seasons	Genus of nematode	Months			
			June	October	February	Means
Phil. 8013	Plant Cane 2005/2006	P.z*	988.25	951.25	1217.25	1052.25
		H.d	838.75	951.25	1112.50	967.50
	First Ratoon 2006/2007	P.z	838.25	586.75	954.25	475.00
		H.d	1220.50	1261.25	865.50	1115.75
	Plant Cane 2006/2007	P.z	451.25	911.00	964.00	685.42
		H.d	911.75	851.50	570.00	777.75
G.98-28	Plant Cane 2005/2006	P.z	1580.25	1424.00	1596.75	1533.67
		H.d	968.50	926.25	982.25	959.00
	First Ratoon 2006/2007	P.z	1680.25	1325.50	1270.00	1425.25
		H.d	1579.75	1672.25	1529.50	1593.83
	Plant Cane 2006/2007	P.z	1580.25	1424.00	2076.75	1693.67
		H.d	968.50	926.25	982.25	959.00
G.99-165	Plant Cane 2005/2006	P.z	1814.75	1678.75	2150.75	1881.42
		H.d	797.50	1172.25	1226.75	10655.00
	First Ratoon 2006/2007	P.z	1877.25	1001.00	1855.25	1577.83
		H.d	1659.00	833.75	1182.50	1225.08
	Plant Cane 2006/2007	P.z	1489.75	883.25	1263.75	1212.25
		H.d	960.25	576.50	1273.25	936.67
G.T.54-9	Plant Cane 2005/2006	P.z	2937.25	2890.75	3126.25	2984.75
		H.d	1867.00	1934.75	1844.25	1882.00
	First Ratoon 2006/2007	P.z	2927.00	2835.00	2510.25	2757.42
		H.d	2232.00	2275.50	2585.25	2364.25
	Plant Cane 2006/2007	P.z	3007.00	2627.00	2837.00	2823.67
		H.d	1745.00	1810.28	1581.00	1712.34

* P.z = *Pratylenchus zeae* H.d = *Helicotylenchus dihystera*

As for row spacing, it was found that when plant density increased, nematode population increased. This is may be due to that higher feeder roots in space on which nematodes feed occurred when plant density increased. In the present study, the population of *P. zeae* or *H. dihystera* varied with different varieties. Such variance was due to the influence of the host varieties on nematode rate build up. These results agree with those obtained by Mehta *et al.* (1994) and Montasser *et al.* (2002).

Evaluation of varietals reaction to RSD, smut and SCMV diseases

The effect of row spacing on RSD, smut and SCMV in commercial and promising sugarcane varieties in plant cane growing season 2005/2006; plant cane 2006/2007 growing season and in first ratoon 2006/2007 growing season was determined. Results in Table (16) showed that no virus infection was noted in the three promising sugarcane varieties (Phil.8013, G.98-28 and G.99-165) compared to the commercial one (G.T.54-9), as the % of SCMV presence that confirmed by ELISA was ranged from 26.7 to 60% in the three growing seasons.

Table (16): Detection of RSD, smut and SCMV in commercial and promising sugarcane varieties in plant cane growing season 2005/2006.

Grown seasons	Row spacing	% of infection with SCMV, smut and RSD in sugarcane varieties						
		Promising				Commercial		
		Phil. 8013	G.98-28	G.99-165		G.T.54-9		
		RSD	Smut	Smut	RSD	SCMV	Smut	RSD
Plant cane 2005/2006	70	55	0.66	2.33	20	26.7	0.00	10
	80	65	0.00	2.00	00	00.0	0.00	00
	90	65	0.00	0.00	35	46.7	1.33	35
	100	45	0.00	0.66	00	00.0	0.00	20
First ratoon 2006/2007	70	70	1.33	3.00	40	53.3	0.00	35
	80	80	0.00	2.00	20	26.7	0.66	30
	90	45	1.66	1.33	45	60.0	2.00	45
	100	20	0.00	2.00	00	00.0	1.66	40
Plant cane 2006/2007	70	30	0.00	1.33	00	00.0	0.00	20
	80	20	0.00	1.66	00	00.0	0.00	00
	90	55	1.33	0.66	30	40.0	0.66	00
	100	00	0.00	0.00	00	00.0	1.00	25

Note (1): No mosaic-like symptoms were observed in Phil.8013, G.98-28 and G.99/165 sugarcane promising varieties. The sugarcane promising variety of Phil.8013 was resistant to smut.

Note (2): The % of smut infection was determined in 300 plants.

Note (3): RSD and SCMV were confirmed by ELISA test, while, smut was determined visually.

On the other hand, the absence of SCMV in sugarcane plants cultivated in some row spacing could be due to the virus-free stocks.

Results also showed that, the RSD was spread in three (Phil. 8013, G.99-165 and G.T.54-9) out of the four tested sugarcane varieties. Its spread was higher Phil.8013 (11/12 row spacing) followed by G.T.54-9 (9/12 row spacing) and G.99-165 (6/12 row spacing). Also its % ranged from 20 to 80% (for Phil8013) and 20 to 45% (for G.T.54-9 and G.99-165)

On the other hand, smut was found higher in G.99-165 (10/12 row spacing with % of 0.66-3.00%) followed by G.T.54-9 (6/12 row spacing with a ratio of 0.66-2.00%) and Phil.8013 (4/12 row spacing and % of 0.66-1.33%) sugarcane varieties. It is of importance to point that these results could be explained by that the varieties enable the success of the extent of natural infection to be judged and permit the effect of seasonal differences in environmental conditions to be considered.

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تقييم انتاجية وقابلية بعض أصناف قصب السكر المبشرة للاصابة ببعض الأمراض والنيماتودا تحت معدلات تخطيط مختلفة

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أقيمت ثلاث تجارب حقلية بمحطة بحوث المطاعنة (محافظة قنا) زراعة غرس خلال موسمى 2006/2005 & 2007/2006 وخلفة اولى خلال موسم 2007/2006 وذلك لدراسة تأثير معدلات التخطيط على محصول وجودة بعض أصناف قصب السكر. اشتملت معاملات التجربة على أربعة معدلات التخطيط (70 سم ,80 سم , 90 سم 100, سم بين خطوط القصب) و أربعة أصناف من قصب السكر (الصنف التجارى G.T.54-9والاصناف المبشرة G.98-28, G.99-28, Phil.8013) وتأثير هذة المعدلات علي قابلية هذة الاصناف للاصابة بنيماتودا تقرح الجذور والنيماتودا الحلزونية والمرض الفيروسى(موزايك قصب السكر) والمرض البكتيرى (مرض تقزم الخلفة) والمرض الفطرى (مرض التفحم السوطى) تحت الظرف الطبيعية. أستخدم تصميم القطع المنشقة مرة واحدة فى أربع مكررات حيث وزعت معدلات التخطيط فى القطع الرئيسية ووزعت الأصناف فى القطع الشقية الأولى ، وكانت مساحة القطعة الشقية 42 م2 تحتوى القطعة التجريبية على(6 , 7 ، 8 ,9 خط فى المعدلات 100 ,90 ,80 , 70 سم بين الخطوط على الترتيب). أثرت معدلات التخطيط على طول وسمك الساق والنقاوة وحاصل القصب والسكر فى كلا الموسمين بينما تأثر ناتج السكر فى الموسم الأول فقط ولم تتأثر عدد العيدان القابلة للعصير والنسبة المئوية للسكروز والسكريات المختزلة فى كلا الموسمين وقد كان معدل التخطيط (100 & 90 سم) افضل لتلك الصفات مقارنة بالمعدلات الأخرى. اختلفت الأصناف معنويا فى صفات الطول والسمك وعدد العيدان القابلة للعصير وحاصل القصب والسكر والنسبة المئوية للسكروز والنقاوة فى كلا الموسمين بينما تأثر ناتج السكر والسكريات المختزلة فى الموسم الثاني فقط وقد تفوق الصنف التجارى G.T.54-9 على باقى الأصناف فى معظم الصفات المدروسة. تحت ظروف هذا البحث يمكن التوصية

بزراعة الصنف G.T.54-9 على خطوط بينها 90 أو 100 سم للحصول على أعلى محصول عيدان وسكر/فدان. وبالنسبة لانتشار وتواجد نيماتودا تقرح الجذور (*Pratylenchus zeae*) والنيماتودا الحلزونية (*Helicotylenchus dihystera*) وجد أن هناك علاقة عكسية بين الكثافة العددية لهذه النيماتودا وبين معدلات التخطيط ودرجة حرارة التربة. كذلك وجد أن أعلي كثافات عددية بكل من نيماتودا تقرح الجذور والنيماتودا الحلزونية وجدت مصاحبة للصنفG.T.54-9 وأقل كثافة عددية لكل من نيماتودا تقرح الجذور والنيماتودا الحلزونية كان مع الصنف Phil. 8013. ومما سبق نجد أن درجة الحرارة ومعدلات التخطيط لهما أثر فعال علي الكثافة العددية لنيماتودا تقرح الجذور والنيماتودا الحلزونية علي الأصناف تحت الدراسة. وقد تم دراسة تأثيرمعدل التخطيط على قابلية اصناف قصب المبشرة والصنف التجارى فى كلا الموسمين للاصابة بالمرض الفيروسى(موزايك قصب السكر) وبالمرض البكتيرى (مرض تقزم الخلفة) والمرض الفطرى (مرض التفحم السوطى) ومن الاهمية ان نشير الى النتائج المتحصل عليها يمكن ان تعزى الى قدرة الاصناف المختبرة على تحمل العدوى فى الظروف الطبيعية بنجاح مع الاخذ فى الاعتبار الاختلافات البيئية الموسمية تحت الظروف الطبيعية.