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Quantitative and Qualitative Attributes of Sugarcane as Affected by Distinct Genotypes

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Abstract: Response of 17 sugarcane varieties was observed in 3 plant and 3 ratoon stages from 1996-97 to 1998-99. The analysis of mean values revealed that varieties Bannu-1, Naurang-98, 5-84-I-351 and S-82-US-624 possessed better cane yield and sugar recovery. Varieties Bannu-1 and S-84-I-351 exhibited higher stalk yield and considerable sugar recovery. Variety COL-75 although, produced highest cane yield in plant crop, 1998-99 but poor in sugar contents. While, S-82-US-624 and S-88-US-402 showed better cane yield and the highest sugar recovery. Varieties Bannu-1 and Naurang-98 have already been approved for general cultivation in the area. While varieties S-84-I-351, S-82-US-624 and S-88-US-402 are the candidates varieties and are under consideration for commercial cultivation in the area. Short title: Response of distinct sugarcane varieties.

Key Words: Sugarcane, saccharum officinarum, cane yield, recovery

Introduction

The importance of sugarcane needs no emphasize in the agrarian economics of the country. Beside providing sugar to the industry, it plays a key role in boosting the socioeconomic status of the farming community. Ali *et al.* (1999a) reported that Pakistan needs prodigious foreign exchange to *cope* with the giant loan interest and sugarcane would play a supportive role in this regard. They further alleged that the targets could be achieved provided that high standard varieties with improved package of technology are properly followed by the growers. Hussain *et al*. (1999) declared that the absence of improved production technology is one of the main causes of low sugarcane production in Pakistan. While the sugar consumption in pakistan is the highest in Asia (Hasham, 1999). In southern zone of NWFP, its yield per unit area is low on account of low yielding varieties, susceptible to various pests, diseases etc. Atta *et al.* (1991) stated that prominent and suitable varieties play a leading role in crop improvement. Majority of the growers are unaware of new high potential varieties, its availability, maintenance and replacement after a definite time. Most of the superior varieties deteriorate after some time which surely needs its replacement with new ones. To evaluate new most superior varieties regularly for a certain area, research and screening work is constantly needed. The process is of continuous nature for different ecological zones due to climatic and biological variations. Research activities have been conducted in past and as a result of this numerous varieties with harmonious combination of most desirable characteristics have been released from time to time for different zones. Keeping in view this primary and major objective, research work was mainly confined and focussed to develop most suitable and promising varieties for the area.

Materials and Methods

To evaluate the most suitable variety for the area, study was undertaken through varietal trials including 17 distinct sugarcane genotypes viz. Bannu-1, Naurang-98, COL-75, CFI-65/357, CP-51/21, S-82-US-624, S-84-I-351, S-86-US-422, S-86-US-856, S-85-US-340, S-88-US-436, S-89-US-230, S-88-US-402, CPF-182, S-86-1J8-710, S-86-US-375 and BF-162 in 3 plant and 3 ratoon stages from 1996-97 to 1998-99 at Agricultural Research Station, Semi Naurang, Bannu. The trials were laid out in randomized complete block designs with 3-4 replications and plot size of 3.7×6.7 m. Recommended dose of NP fertilizers (156-56 kg ha^{-1}) was applied in these trials. The management/cultural operations were adapted uniformly in all treatments. Weedicide "Gexapex Combi" was sprayed at 4-5 kg ha^{-1} in the months of Jan-February. Insecticide "Furadon" granules were applied at 20 kg ha^{-1} in two half split doses for the control of borers attack in the months of April-May. Data on cane yield and sugar recovery were collected and analyzed statistically using computer package MSTATC.

Results and Discussion

Cane yield (t ha^{-1}): Data presented in Table 1-3 elucidated that varieties COL-75, Bannu-1 and Naurang-98 produced maximum cane yield in plant crop during the period of study. While, varieties S-84-I-351 and S-82-US-624 showed the highest significant cane yield in ratoon stage during 1998-99. Qureshi (1968) concluded that Triton out yielded CP-43/33 and COJ-64 but remained on par with BL-4 and BF-162 in Faisalabad. Glaz (1998) found variety CP-80/1827 as the most widely grown in Florida due to its high tonnage and sugar recovery. Ali *et al.* (1999b) recommended new sugarcane variety CP-77/400 which exhibited higher cane yield and sugar contents as compared to variety Co-1148 in Punjab Provence. Atta *et al.* (1991) reported variety CP72/34 with higher cane yield and sugar recovery as against check BL-4 in Faisalabad.

Table 1: Quantitative and Qualitative analysis of sugar cane genotypes (Plant Crop, 1996-97)

Variety	Can Yield (t ha^{-1})	Recovery (%)
Bannu-1	94.86 NS	8.24
Naurang-98	85.93	8.06
CP 51/21	84.80	8.57
CP 65/357	85.89	8.79
COL-75	92.13	7.73
BF-162	86.35	8.64
S-82-US-624	77.73	9.17

NS = Non Significant

Table 2: Quantitative and Qualitative analysis of sugar cane genotypes (Plant Crop, 1997-98)

Variety	Cane yield (t ha^{-1})	Recovery (%)
Bannu-1	89.99 a	8.00
5-86-1)5-856	34.73 d	10.61
S-86-US-422	80.13 bcd	8.56
Naurang-98	72.48 abc	8.15
S-82-US-624	65.58 abc	9.49
CP 51/21	73.46 abc	9.18
CP 65/357	71.88 abc	9.44
COL-75	73.69 abc	7.03
5-84-1-351	88.79 ab	8.79
5-85-1)5-340	74.90 abc	9.37
S-88-US-402	60.40 bcd	10.08
S-88-US-436	62.51 a-d	8.19
S-89-US-230	69.76 ab	9.21
CPF-182	58.29 cd	8.66
8-86-US-710	49.53 cd	8.49
S-86-US-375	48.62 cd	9.10

Means followed by different letters are significant at 6% level of probability

Table 3: Quantitative and Qualitative analysis of sugar *cane* genotypes (Plant Croy, 1998-99)

Variety	Cane yield (t ha^{-1})	Recovery (%)
Bannu-1	78.93 b	11.09
5-86-U5-856	52.32 c	11.24
S-86-US-422	65.88 be	10.97
Naurang-98	78.88 b	10.59
5-82-1)5-624	68.98 be	12.35
CP 51/21	62.79 bc	11.14
CP 65/357	66.73 be	10.79
COL-75	103.50 a	9.86
S-84-1-351	67.60 bc	10.43
5-85-1)5-340	77.12 b	11.31
5-88-1)5-402	61.70 bc	12.49
S-86-US-375	55.20 c	11.84

Means followed by different letters are significant at 5% level of probability

Table 4: Quantitative and Qualitative analysis of sugar cane genotypes (Ratoon Crop, 1996-97)

Variety	Cane yield (t ha^{-1})	Recovery (%)
Bannu-1	35.09 cd	8.78
Naurang-98	80.75 ab	9.66
CP 51/21	53.87 abc	9.40
CP 651357	48.10 bc	10.20
COL-75	75.77 a	8.08
BF-162	23.11 d	8.18
S-82-US-624	51.56 bc	9.62

Means followed by different letters are significant at 5% level of probability

Table 5: Quantitative and Qualitative analysis of sugar cane genotypes (Ratoon Crop, 1997-98)

Variety	Cane yield (t ha^{-1})	Recovery (%)
Bannu-1	48.36 NS	9.63
Naurang-98	65.74	9.10
CP 51/21	45.10	9.47
CP 65/357	44.56	9.04
COL-75	62.48	7.14
S-82-US-624	64.93	9.55

NS = Non Significant

Recovery (%): As for as sugar recovery is concerned, ratoon crop showed higher sugar contents as compared to plant crop (Table 4-6). Among the different varieties, S-82-US-624, CP-51/21 and S-88-US-402 manifested the highest sugar recovery in ratoon stage during 1998-99.

Table 6: Quantitative and Qualitative analysis of sugar cane genotypes (Ratoon Crop, 1998-99)

Variety	Cane yield (t ha^{-1})	Recovery (%)
Bannu-1	69.83 abc	9.92
S-86-US-856	42.79 d	11.76
5-86-L1S-422	50.47 cd	10.37
Naurang-98	74.58 ab	10.20
S-82-US-624	75.86 ab	12.73
CP 51/21	46.18 cd	12.68
CP 65/357	50.25 cd	10.48
COL-75	58.46 a-d	9.24
S-84-1-351	77.90 a	10.22
5-85-U5-340	59.74 a-d	10.76
S-88-US-402	60.87 a-d	12.63
S-88-US-436	53.04 a-d	9.24
5-89-U5-230	62.07 a-d	10.87
CPF-182	49.87 cd	10.48
5-86-US-710	57.55 a-d	10.10
S-86-US-375	49.42 cd	10.42

Means followed probability by different letters are significant at 5% level of probability

Similarly varieties S-88-US-402 and S-82-US-624 showed higher recovery in plant stage during 1998-99. Miller *et al.* (1990) observed t hat sucrose content of CP-80/1557 was higher by 6.4 and 17.8% than CP-70/1133 and CP72/2086, respectively. Malik (1998) warned about the disasters to sugar industry due to multiplication of low recovery variety Co.1148 in Punjab. Ali *et al.* (1999a) reported varieties CP-77/400 and CPF-235 with better sugar recovery. Chattha *et al.* (1999) reported that in a variety composition trial, newly evolved variety CPF-236 out yielded by 17.10 and 0.6% to standard variety E1L-4 and CP-77/400. Moreover, this variety exhibited high sugar recovery over standard variety in all its study stages.

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