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Performance of High Ranking Sugarcane Varieties Under The Agro-Climatic Conditions of Bannu

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Abstract: The response of sugarcane superior genotypes was studied for four consecutive years from 1991-92 to 1994-95 in plant and Raton stages. The studies were confined to the major aspects i.e sugar contents, sugar and cane yields. Variety CP-75/324 gave the highest cane sugar, yields of 94.335 and 7.95 t ha⁻¹ respectively. Varieties CP-65/357, PAS-132 and COL-75 were the next following and produced at par cane yield of 83.316, 83.114 and 81.952 t ha⁻¹ respectively. Variety S-82-US-624 showed highest sugar% (9.67). Varieties CP-51/21, CP-65/357 and BF-162 ranked next for sugar contents i.e 9.59, 8.80 and 8.79 percent respectively. CP-51/21 and CP-65/57 followed CP-75/324 for sugar yield by producing 7.47 and 7.29 t ha⁻¹, respectively. According to the results it is concluded that variety CP-75/324 possessed the highest cane, sugar yield, considerable sugar percent and therefore proved as the most suitable variety for the area. It was approved as a new commercial variety for the area with local name "Bannu-1" during 1992.

Key words: Sugarcane varieties, agro-climatic conditions, Bannu

Introduction

The sugar industry in Pakistan has shown vast expansion in the past decade. Its installed potential is around 4.8 million tones of sugar per year. But unfortunately the sugar industry is dragging at 2.5-3.0 million tones of sugar production which indicates great loses in sugar production and natural resources (Malik, 1998). There are several limitations which impede the sugar cane cultivation in Bannu Division. The major constraints are shortage of suitable varieties, technology and irrigation facilities. The average per hectare yield in Bannu is poor i.e., 40.29 t ha⁻¹. The per unit area production is less than that of whole province which is 45.65 t ha⁻¹ (Anonymous, 1998). The average yield of some cane growing countries is 40-49 t ha⁻¹ in India, 68.0 t ha⁻¹ in Indonesia and 57.0 t ha⁻¹ in Australia (Khan, 1984).

At present sugar industry faces great dearth of quality varieties. Variety is the pre-requisite and major requirement for crop improvement. Malik (1998) reported that varieties with low sugar recovery like CO-1148 adversely affected the sugar production in Punjab. Glaz (1997) reported that variety CP-80-1827 was widely grown in Florida due to its better quality. In this regard considerable research work has been done by various scientists at other zones/locations and on international level. However local finding is the key solution for successful improvements as there exists variations in the agro-climatic conditions.

Materials and Methods

Performance of eight superior sugar cane varieties viz. CP 51/21, CP-65/357, CP-75/324, COL-75, S-82-US-710, S-82-US-624, BF-162 and PAS-132 was studied at Agricultural Research Station, Serai Naurang, Bannu, NWFP for four consecutive years from 1991-92 to 1994-95 in two plants and two Raton crop stages. Plantation was done in late November and mid of December, well before the onset

of frost. The trials were conducted in Randomized Complete Block Design with three replications and net plot size of 4.56 × 10 meters. Row to row distance was 90 cm. All the recommended levels of major nutrients, management and cultural operations were kept constant and applied equally to all treatments at appropriate stages. The basal dose of NPK was applied at 150-56-56 kg ha⁻¹. All phosphorous and potash doses were applied at first hoeing stage in the month of March. Nitrogen was applied in two equal split doses in the month of April and May to Raton and plant crops respectively. Selective weedicide Gexa Pex Combi was applied at 3.5-4.0 kg ha⁻¹ in all treatments of plant crop in the month of February. Hoeing and earthing up operations were performed and completed up to the 1st fortnight of June in each trial. Insecticide (Curator Granules) was applied at 20 kg ha⁻¹ to all treatments for the control of borers infestation during the month of April, May in Raton and plant crop respectively. Weekly irrigation was performed in the hot months and according to the requirements in the rest of the cropping season. Observations were recorded on various aspects at different stages. The data were compiled and analyzed statistically with the help of computer package MSTATC.

Results and Discussion

Cane yield (t ha⁻¹): The data given in Table 1 revealed highly significant differences due to various genotypes included in the test. Data regarding years of the experiment were also significantly affected for cane yield. On the basis of varietal means (plant and Raton), significantly the highest cane yield was recorded for variety CP-75/324, followed by varieties CP-65/357, PAS-132 and Col-75. These varieties were statistically at par with S-82-US-710 and CP-51/21. The interaction between the different genotypes and cane yield was non significant. These findings are in conformity with those reported by Imran *et al.* (1981),

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Table 1: Cane yield data (t ha⁻¹) of the sugarcane promising varieties (plant and Raton crops) for the year 1991-92 to 1994-95

Variety	1991-92	1992-93	1993-94	1994-95	Means
	Year I (Plant)	Year II (Raton)	Year III (Plant)	Year IV (Raton)	
CP-51/21	93.867	67.407	68.567	78.800	77.160bcde
CP-65/357	87.193	69.073	82.700	94.293	83.315b
BU-1	107.780	71.540	94.763	103.257	94.335a
CO-L75	87.053	62.187	91.340	87.230	81.952bed
BF-162	82.777	44.723	93.387	59.787	70.168
PAS-132	94.950	55.090	92.757	89.660	83.114be
S-82-US-710	83.570	54.650	82.623	91.563	78.102bcde
S-82-US-624	82.627	51.317	62.573	81.790	69.577e
Means	89.977a	59.498c	83.589b	85.798b	**
SE for varieties	= 3.651;		LSD = 10.94	SE for years = 4.772	LSD = 3.37
SE for years X varieties	= 7.307		CV = 15.87		

Table 2: Sugar contents data (CCS%) of sugarcane promising varieties (plant and Raton crops) for the year 1991-92 to 1994-95

Variety	1991-92	1992-93	1993-94	1994-95	Means
	Year I (Plant)	Year II (Raton)	Year III (Plant)	Year IV (Raton)	
CP-51/21	9.76	9.74	8.59	10.28	9.59a
CP-65/357	8.07	9.42	9.20	8.49	8.80ab
BU-1	8.65	8.34	8.67	8.03	8.42abc
COL-75	7.84	8.13	7.83	7.30	7.78be
BF-162	8.64	8.32	8.64	9.66	8.79abc
PAS-132	6.71	7.19	7.18	7.70	7.20d
S-82-US-710	8.32	8.32	9.34	8.03	8.50abc
S-82-US-624	10.08	9.54	9.00	10.07	9.67a
Means	8.51	8.63	8.54	8.70	**
SE for years	= 4.593;		SE for varieties = 0.834	LSD = 1.58	

Table 3: Sugar yield data (t ha⁻¹) of sugarcane promising varieties (plant and Raton crops) for the years 1991-92 to 1994-95

Variety	1991-92	1992-93	1993-94	1994-95	Means
	Year I (Plant)	Year II (Raton)	Year III (Plant)	Year IV (Raton)	
CP-51/21	9.16	6.56	5.89	8.10	7.43ab
CP-65/357	7.03	6.51	7.60	8.00	7.29ab
BU-1	9.32	5.97	8.21	8.29	7.95a
COL-75	6.82	5.06	7.15	6.37	6.35be
BF-162	7.15	3.72	7.97	5.77	6.15be
PAS-132	6.37	3.96	6.66	6.90	5.97c
S-82-US-710	6.95	4.55	7.71	7.35	6.64be
S-82-US-624	8.32	4.90	5.63	8.23	6.77abc
Means	7.64a	5.15c	7.10b	7.38ab	
SE for years	= 3.718;		LSD = NS	SE for varieties = 0.686	LSD = 1.30

Qayyum *et al.* (1985) and Biswas (1986) who determined variability in cane yield of different genotypes of sugarcane in various climatic conditions. They found that varieties CP-65/357, CO-1321 and CO-1148 gave higher cane yield. Lotula (1982), Poltronieri *et al.* (1982), Bakhsh and Nayyar (1983), Chougale and Patel (1983), Fonguey and Fontenot (1986) and Rozeff (1987) reported varieties BL-4, CP-65/357, CO-419, NCO-310, PR-1048, B-4362 and CO-62175 with the best performance. Khan *et al.* (1998) found variety S-82-US-710 with maximum cane yield of

69.95 t ha⁻¹.

Sugar contents (CCS%): According to the data given in Table 2, the varieties showed significant variation for sugar percent (CCS%) but found non Significantly different among the years. It is evident from the above table that S-82-US-624 possessed the highest sugar percentage. It was followed by varieties CP-51/21, CP-65/357 and BF-162. The lowest sugar contents was recorded for PAS-132 and COL-75. Similar results were also obtained by Pazir and

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Hatam (1980), Imran *et al.* (1981), Poltronieri *et al.* (1982) and Bakhsh and Nayyar (1983). They reported that varieties CP-51/21, CP-65/357, BL-4 and CP-57/603 gave higher sugar contents. Variety CP51/321 showed 10.52 percent of sugar contents. Khan *et al.* (1998) recorded higher sugar percentage of 9.63 for variety S-82-US-710.

Sugar yield (t ha⁻¹): Data for sugar yield were found significantly different due to various genotypes, however it showed non-significant variations for different years. According to Table 3 variety CP-75/324 produced the highest sugar yield. The next higher yields were shown by CP51/21 and CP65/357 respectively. The sugar yield is directly affected by the cane yield and sugar percentage of the varieties. The poorest sugar yield was recorded in PAS-132 and COL-75 which is due to its lower sugar contents. These findings are in accordance with those of Imran *et al.* (1981), Inayatullah (1983) and Khattak *et al.* (1986) who found varieties CP-651357, CP-51/21, CO-1148 and CO-1321 with higher sugar yields. Naidu *et al.* (1981) and Glaz (1986) also reported varieties CO-621 15 and CP-77/1776 with higher sugar yields.

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