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Comparison of Improved Sugarcane Genotypes on Farmer's Field

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Abstract: Performance of five sugarcane varieties viz. Bannu-1, Naurang-98, COL-75, S-86-US-422 and PAS-132 was evaluated at 39 locations on farmer's field in Bannu division for four consecutive years. The study revealed that varieties Bannu-1 and Naurang-98 out yielded other varieties during the entire period of investigation. However, amongst these, Naurang-98 exhibited better sugar recovery. Variety S-86-US-422 possessed higher sugar contents as compared to PAS-132 and COL-75. On the basis of results obtained, sugarcane varieties Bannu-1 and Naurang-98 were recommended for general cultivation in the area.

Key words: Sugarcane, *saccharum officinarum*, cane yield, recovery

Introduction

The socio-economic conditions in Bannu division are distinct. Its agro-climatic conditions are quite favourable for sugarcane cultivation. The crop is commercialized due to Sugar Mills in this area and constitutes 5.66 percent of total sugarcane production of NWFP. The average yield of sugarcane in this part of the province is lower as compared to other sugarcane growing belts in NWFP and Pakistan (Sundera, 1998; Anonymous, 1999). The area under cultivation of sugarcane in Pakistan is one of the biggest (4th) in the world but the yield per unit area is one of the lowest (Nazir, 1994). Ayaz *et al.* (1997) observed that sugarcane yields on farmer's field in NWFP or elsewhere in Pakistan are much lower than actual yield obtained at experimental farms, where package of technology is applied. Hussain *et al.* (1999) stated that lack of production technology is one of the major limiting factors in sugarcane improvement. In Bannu, majority of the growers are illiterate and have less awareness about the high yielding varieties and management practices. Therefore, they intend to adopt conventional methods, outdated technology and low yielding varieties.

Selection of suitable variety plays a pivotal role in enhancing the yield up to its potential. Bahadar *et al.* (2000) recorded the highest cane yield (94.33 t ha⁻¹) from variety Bannu-1. Qayyum *et al.* (1999) reported that evaluation of suitable varieties at one location proved no worth under all environments. They further emphasized to select varieties on their relative rankings and determine their stability across environments. Atta *et al.* (1991) stressed upon the constant replacement of old varieties with new one for better production. Malik (1998) warned about the dangerous results of sugarcane variety Co-1148 due to its low recovery and susceptibility to red rot disease.

It is crystal clear from the discussion that timely replacement of old, low yielding varieties and dissemination of new, high yielding varieties is the only viable and feasible approach to cope with the ever increasing sugar demand of the country and increase the Govt revenue in term of foreign exchange. Keeping in view the above objectives, series of experiments were carried out at farmer's field to evaluate and disseminate the improved varieties and bridge up the yield gap of farmer's field and experimental farms.

Materials and Methods

Investigations were carried out at the farmer's fields of Bannu division from 1995-96 to 1998-99 including four plant and

four ratoon crops to study the Performance of five varieties of sugar cane viz Bannu-1, Naurang-98, COL-75, PAS-132 and S-86-US-422 at 39 locations (24 in plant crop and 15 in ratoon stage). Sowing was done in RCB design, replicated four times with a plot size of 10 x 4.5 m. All the recommended cultural and management operations were adopted accordingly in all trials. A basal dose of NP was applied at 150-58 kg ha⁻¹. Phosphorous was applied at 1st hoeing in the month of March. Nitrogen was applied in two equal splits in April and May to plant and ratoon crops. Insecticide "Furadon" g was applied at 20 kg ha⁻¹ to all experimental plots for the control of borers. Weedicide "Gesapex Combi" was applied at 3.5-4.0 kg ha⁻¹ for weeds control. Hoeing and earthing up were also performed. The relevant data were recorded and analyzed statistically with the help of computer package MSTATC.

Results and Discussion

Cane yield: Analysis of mean values indicated that amongst 24 locations, varieties COL-75, Naurang-98 and Bannu-1 produced the highest and on par cane yield of 102.84, 102.00 and 100.53 t ha⁻¹ in plant stage at village "Surani" and "Bakhmal Killa", respectively, during 1995-96 and 1998-99 (Table 1-8). Similarly in ratoon stage, maximum cane yield (107.16 and 104.0 t ha⁻¹) was obtained from Bannu-1 and Naurang-98 at village "Mirian" during 1998-99. Anonymous (1996) reported sugarcane variety Jn-88/2 with average cane yield of 71.66 t ha⁻¹ in Peshawar valley. While Anonymous (1997) advocated maximum cane yield (99.08 t ha⁻¹) of variety Bannu-1 at farmer's field in Bannu area. Glaz (1998) identified CP 80-1827 as a superior variety of sugarcane in Florida. Khan *et al.* (1998) reported that variety S-82-US-710 produced cane yield of 69-95 t ha⁻¹ on farmer's field. Varieties S-86-US-244, S-86-US-226 produced the highest cane yield (116.8 and 105.71 t ha⁻¹) under different ecological zones of Peshawar valley (Anonymous, 1999).

Table 1: Cane yield (t ha⁻¹) of sugarcane varieties (Plant crop 1995-96)

Varieties	Location	
	Surani	Barat
Bannu-1	100.53 ab	95.18 abc
Naurang-98	92.52 bc	93.82 bc
COL-75	102.84 a	92.55 bc
PAS-132	90.86 c	80.88 d

It responded the highest recovery of 11.76, 11.59 and 11.24. In ratoon stage, higher recovery (10.60 and 10.22%) was noted in Naurang-98 at village "Mirian" and "Niamat

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Table 2: Cane yield (t ha⁻¹) Ratoon crop 1995-96

Varieties	Location		
	Sharif Killa	Nurar	Daud Shah
Bannu-1	77.26 a	81.54 ab	50.90 d
Neureng-98	87.93 a	88.07 a	54.38 cd
COL-75	85.10 ab	57.08 cd	49.42 d
PAS-132	63.91 c	58.30 cd	33.81 a

Table 3: Cane yield (t ha⁻¹) Plant crop 1996-97

Varieties	Bannu-1	Neureng-98	COL-75
Mewa khel	90.19 a	60.57 dc	58.24 de
Khala Khel	70.57 bc	57.48 def	64.53 cd
Gambol'	78.42 b	58.40 de	58.93 de
Mirian	85.24 cd	47.63 fg	44.77 g
Najib Kik,	73.39 bc	60.34 de	65.23 cd
Surani	87.06 cd	54.02 efg	57.45 def

Recovery: Data given in Table 2 (V1) manifested taht in plant crop, varieties Bannu1, S-88-US-422 and Naurang-98

Table 4: Cane yield (t ha⁻¹) Ratoon crop 1996-97

Varieties	Location	
	Barat	Merdal Kala
Bannu-1	100.11 a	98.05 a
Naurang-98	68.38 c	72.26 c
COL-75	59.79 d	82.28 b
PAS-132	63.75 cd	68.53 cd

Table 5: Cane yield (t ha⁻¹) Plant crop 1997-98

Location	Bannu-1	Neureng-98	COL-75
Pitawi Killa	98.03 a	84.63 abc	80.68 be
Biastr khel	56.56 fgh	30.33 i	43.33 hi
Nurar	91.45 ab	73.63 b-e	81.82 bed
Maramandi	72.90 c-f	70.60 c-f	63.68 def
Niamatabad	64.25 efg	48.54 h	45.00 gh

Table 6: Cane yield (t ha⁻¹) Ratoon crop 1997-98

Location	Bannu-1	Naurang-98	COL 75
Mewa Khel	54.65 ef	50.45 f	34.65 g
Kale Khel	97.36 a	80.32 b	77.38 b
Gamber	76.35 b	63.23 cd	56.70 def
Mirian	66.40 c	41.88 g	61.56 cde
Surani	79.49 b	67.57 c	64.48 cd

Table 7: Cane yield (t ha⁻¹) Plant crop 1998-99

Location	Bannu-1	Naurang-98	S-86-US-422
Sharif Killa	72.48 ef	89.70 b	69.75 ef
Shukrullah	39.87 mn	36.24 mn	46.60 lm
Akbar Khan	80.26 cd	85.31 bc	53.73 jkl
Mirian	65.08 fgh	59.62 h-k	62.0 ghi
Tughal Khel	73.27 de	70.23 ef	72.21 ef
Isaki	57.08 ijk	60.20 g-k	37.07 n
Bakhmal	85.62 be	102.0 a	61.16 g-j
Serubada Khel	53.54 ld	46.56 lm	41.90 n
Nurar	84.87 bc	80.54 cd	82.13 c
Kale Khel	56.18 ijk	27.37 o	26.84 o
Nar Najib	70.48 efg	67.53 efg	53.41 kl

Table 8: Cane yield (t ha⁻¹) Ratoon crop 1998-99

Location	Bannu-1	Naurang-98	COL 75
Mirian	107.16 a	104.0 a	89.70 b
Pitawi Killa	85.62 b	102.0a	61.16c
Niamat Abed	48.33 de	50.28 d	41.76 e
Maramandi	63.40c	64.88c	61.59c

Means in a column not sharing similar letter are significantly different at 5% level of probability

Table 9: Recovery (%) of sugarcane varieties (Plant crop 1995-96)

Varieties	Location	
	Surani	Barat
Bannu-1	7.5	8.4
Naurang-98	8.22	8.24
COL-75	7.04	7.06
PAS-132	7.19	6.66

Table 10: Recovery (%) Ratoon crop 1995-96

Varieties	Location		
	Sharif Killa	Nurar	Daud Shah
Bannu-1	8.83	7.29	9.19
Naurang-98	9.02	9.93	7.98
COL-75	7.45	6.92	7.25
PAS-132	8.20	6.00	6.42

Table 11: Recovery (%) Plant crop 1996-97

Varieties	Bannu-1	Neureng-98	COL-75
Mewa khel	8.23	8.66	7.38
Khala Khel	9.03	9.12	7.19
Gamber	8.53	8.55	7.43
Mirian	8.59	8.79	8.17
Najib Killa	8.71	8.55	7.80
Surani	8.11	8.91	7.29

Table 12: Recovery (%) Ratoon crop 1996-97

Varieties	Location	
	Barat	Merdal Kala
Bannu-1	9.30	9.19
Naurang-98	10.09	9.44
COL-75	8.14	8.03
PAS-132	8.12	8.07

Table 13: Recovery (%) Plant crop 1997-98

Location	Bannu-1	Naurang-98	COL 75
Pitawi Killa	8.26	8.47	7.49
Biastr khel	7.72	7.64	7.21
Nurar	8.61	8.71	8.45
Maramandi	7.99	8.52	7.53
Niamatabad	8.33	8.55	6.71

Table 14: Recovery (%) Ratoon crop 1997-98

Location	Bannu-1	Naurang-98	COL 75
Mewa Khel	9.46	9.26	8.70
Kale Khel	8.48	7.81	7.55
Gamber	8.85	8.77	8.28
Mirian	7.64	8.58	7.45
Surani	8.76	9.20	8.21

Table 15: Recovery (%) Plant crop 1998-99

Location	Bannu-1	Naurang-98	S-86-US-422
Sharif Killa	11.76	11.2	11.59
Shukrullah	10.28	10.25	11.38
Akbar Khan	10.28	11.07	11.13
Mirian	10.91	10.92	11.2
Tughal Khel	8.98	11.24	8.61
Isaki	7.83	10.13	10.32
Bakhmal	7.71	8.8	8.61
Serubada Khel	9.21	9.22	8.24
Nurar	11.4	10.77	10.88
Kale Khel	8.68	9.5	9.84
Nar Najib	10.36	11.06	11.01

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Table 16: Recovery (%) Bataan crop 1998-99

Location	Bannu-1	Naurang-98	COL 75
Mirian	9.46	10.60	9.17
Pitawi Killa	8.24	8.71	6.07
Niamat Abed	10.0	10.22	9.40
Maramandi	7.71	7.60	6.85

abad", followed by Bannu-1 with recovery of 10.0% at village "Niamat abad" during 1998-99 (Table 9-16). Varieties PAS-132 and COL-75 resulted poor recovery at all locations (Table 9-16). Malik (1998) indicated the dangerous results of variety Co-1 1 48 in Punjab due to its low recovery and susceptibility to diseases. Khan *et al.* (1998) recorded higher recovery (10.07%) in variety S-82-US-710 on farmer's field in Bannu. Anonymous (1986) reported that sugarcane variety "M-93" possessed the highest recovery of 13.15% at 3 ecological zones of Peshawar valley.

References

Anonymous, 1986. MSTATC micro computer statistically programme. Michigan State University of Agriculture, Michigan Lansing, USA.

Anonymous, 1996. Annual technical report. Sugar Crops Research Institute, Mardan.

Anonymous, 1997. Annual progress report. Agricultural Research Station, Serai Naurang.

Anonymous, 1999. Annual technical report. Sugar Crops Research Institute, Mardan.

Atta, M., A.R. Zahid, K.H. Hasani and M.A. Bajwa, 1991. Quantitative and qualitative performance of early manuring sugar cane varieties at Faisalabad. Pak. Sugar J., 6: 6-11.

Ayaz, S., M. Akhtar, I. Ahmad, A.N. Ali and N. Haq, 1997. Causes of high and low yields of sugarcane crop in the light of growers opinions: A general review. Pak. Sugar J., 12: 17-19.

Bahadar, K., M. Jamal, K. Nawab, K. Rasool and M.S. Baloch, 2000. Performance of high ranking sugarcane varieties under the agro-climatic conditions of Bannu. Pak. J. Biol. Sci., 3: 169-171.

Glaz, B., 1998. Sugarcane variety census: Florida 1998. Sugar y Azucar, 93: 30-37.

Hussain, M., M. Ali, A. Ruzzaq and S. Afghun, 1999. Interacted influence of deep tillage and nitrogen management on the qualitative traits of sugarcane. Pak. Sugar J., 14: 7-13.

Khan, B., M. Jamal, S. Rahman, Ahmad and M. Ali, 1998. S-82-US-710, a new sugar cane variety for the Southern areas of NWFP (Bannu and D.I.Khan Division). Proceedings of the 33rd Convention Pakistan Society of Sugar Technologists, August 24-25, 1998, Hotel Pearl Continental, Lahore, pp: 21-25.

Malik, K.B., 1998. Spread of unknown varieties-A warning to Punjab sugar industry. Pak. Sugar J., 13: 16-16.

Nazir, M.S., 1994. Sugarcane. In: Crop Production, Bashir, E. and R. Bantel (Eds.), National Book Foundation, Islamabad, Pakistan, pp: 421-422.

Qayyum, A., M. Arif, M. Bux and I. Mohammad, 1999. Phenotypic stability of early maturing sugar cane varieties in Peshawar valley. Pak. Sugar J., 14: 9-14.

Sundera, B., 1998. Sugarcane cultivation. In Sugar Cane Cultivation in India, pp: 178-182.