QUALITATIVE AND QUANTITATIVE CHARACTERISTICS OF SOME AUTUMN SOWN PROMISING SUGARCANE VARIETIES

M. Azhar Munir, M. Zafar, M. Yasin, Javed Iqbal and M. Sarwar Cheema.
Sugarcane Research Institute, AARI, Faisalabad

ABSTRACT

The present study comprised of a field experiment with 11sugarcane promising varieties was conducted to compare their yield and quality in autumn season during 2004-05 & 2005-06. The experiment was laid out in randomized complete block design with 3 repeats having net plot size of 5 x 9.6 m^2. The data revealed that all the varieties gave significantly different yield from one another. The varieties S2002-US-637 and S2002-US-698 gave higher yields of 109 and 105.5 t/ha than that of test varieties CPF-243 and SPF-245 producing yields of 103 and 98 t/ha. So the maximum sugar recovery of 12.99% was recorded in S2002-US-698.

Keywords: Promising, sugarcane, yield, quality, higher, autumn.

INTRODUCTION

Sugarcane contributes substantially to Pakistan's economy. Sugarcane crop serves as a major raw material for production of white sugar and gur (concentrated form of sugarcane juice). Their share in value added of agriculture and GDP are 3.4% and 0.7%, respectively. For 2005-2006, the area under sugarcane crop was targeted at 955 thousand hectares as against 966 thousand hectares of last year. However, sugarcane has been sown in the area of 907 thousand hectares, – 5% below the target and 6.1% less than last year. Sugarcane production for the year 2005-06 was estimated at 44.3 million tones against the 47.2 million tones last year. Thus sugarcane production is estimated to be lower by 6.2% over the last year with an average yield of 48.85 t/ha. Factors responsible for decline in sugarcane production include late harvesting of wheat, frost affecting the crop and farmer's shifting to other competing crops (Anonymous, 2006). The major cause of low yield of sugarcane is the growing of old varieties loosing yield potential due to disease infestation. Efforts made during past decades to increase cane production were mainly introduction of high yielding varieties and adoption of improved crop production techniques (Gill, 1995).

Sugarcane is an important cash crop and plays a remarkable role in the economic uplift of the growers especially in Central Punjab (Pakistan) and country as a whole as well. But unfortunately, yield harvested by the farmers is very low showing a wide yield gap between realized potential and harvested on among different cane varieties. Although there are a number of cane varieties having reasonable yield potential but in spite of this, the yield uplift is very small. (Ali *et al.* 2002) Sarwar *et al*., (2003) found that the standard varieties like BF-162 and SPF-234 are susceptible to red rot and smut diseases in Central and Northern Punjab. Chattha *et al.*, (2002) stressed to study the new genotypes before final recommendations. Keeping in view, the present study was conducted to achieve the following objectives:

1. To evaluate the best suitable and adaptive genotype of sugarcane for commercial cultivation.
2. To compare the cane and sugar yield potential of some new sugarcane genotypes developed through fuzz at Sugarcane Research Institute, Faisalabad.
3. To develop high yielding potential varieties of sugarcane.

MATERIALS AND METHODS

A field experiment with 11sugarcane promising varieties was conducted at Sugarcane Research Institute, Faisalabad to compare their yield and quality in autumn season during 2005-06. The experiment was laid out in R.C.B.D. with three repeats at 120 cm apart trenches having net plot size of 5 x 9.6 m^2. The experiment was sown in the first week of September. The sugarcane seed rate of 75,000 DBS/ha was used for crop sowing. The crop was fertilized at 168-112-112 kg NPK ha^{-1}, as urea, single super phosphate and sulphate of potash for N, P, and K; respectively. Whole of the phosphtic and potassic fertilizer were broadcasted in the trenches before the placement of seed setts. Nitrogenous fertilizer was applied in three equal splits viz. 45 days after sowing (at the completion of emergence), 90 days after sowing (at the completion of tillering) and in mid February during 2005. Thereafter, the crop was earthed up in the mid March 2005. First irrigation was applied immediately after sowing and then irrigation interval was maintained according to water requirement of the crop after the completion of germination. Weeds were controlled chemically by the application of Gesapax Combi at 3.75 kg/ha and interculture. All other agronomic practices such as seed bed preparations, planting pattern (120 cm apart trenches) and plant protection measures were kept normal. The crop was harvested at the time of its maturity. The data on germination (%), tillers / plant, thousand canes/ ha, sugar recovery (%) and cane yield (t/ha) were recorded and analyzed using standard procedures and techniques and subjected to statistical analysis through MSTAT-C statistical computer programme (MSTAT-C, Manual, 1991).

RESULTS & DISCUSSION

Germination (%)

The data presented in table revealed that the germination (%) of all varieties was significantly affected when sown in autumn season. The results given in table showed that CPF-243 gave the maximum germination (54%) which was statistically at par with both SPF-245 and S 2002-US-637 having germination of 53%. This might be due to the variability in genetic make up of different genotypes. Ahmad *et al.* (2003) and Zafar *et al.,* (2003) also reported variable behaviour of different genotypes for germination. The poor germination shown by some genotypes could also be due to low temperature during autumn season (Rafiq *et al.,* 2007)

Number of tillers per plant

The data presented in table revealed that the tillering behaviour of all varieties was significantly affected when sown in autumn season. However maximum number of tillers / plant (3.60) were produced by S2002-US-637 which was statistically at par with CPF-243 producing number of tillers / plant of 3.59. The variety S2002-US-504 produced minimum number of tillers / plant of 1.57. This may be due to reason that tillering is largely a verietal character and is partly affected by cultural practices as reported by Rashid *et al.,* (2001) and Rehman *et al.,* (2007).

Number of canes per hectare

Number of canes is an important yield contributing parameter, which directly contribute to the final cane yield (Rafiq *et al.,* 2007). It is also evident from table that CPF-243 produced maximum thousand canes / ha (130) which was followed by SPF-245, SPF-241 and S2002-US- 698 producing 122.5, 120.5 and 119.5 thousand canes / ha, respectively. The minimum

thousand canes / ha (99.5) were produced by S2002-US-504. Similar results were also reported by Zafar *et al*. (2003) and Rafiq *et al.* (2007).

Stripped cane yield (t/ ha)

The final cane yield of a sugarcane variety is a function of the well co-ordinated inters play of its genetic constitution as well as environment to which it is grown (Rafiq *et al.,* 2007). The data given in table revealed that S2002-US-637 gave maximum stripped cane yield of 109 t/ha which was statistically at par with S2002-US-698 giving cane yield of 105.5 t/ha as against test varieties CPF-243 and SPF-245 producing cane yield of 103 and 98 t/ha respectively. Similar results were also reported by Chattha *et al*. (2004) and Bashir *et al.,* (2005).

Sugar Recovery (%)

Sugar recovery is a good estimation of the sugar content in sugarcane (Ramdoyal, 1999) and is used as a criterion for evaluation of maturity and quality of sugarcane under field conditions (Habib *et al.,* 1992). The sugar recovery of different sugarcane varieties was significantly affected. Table revealed that maximum sugar recovery (12.99%) was recorded in S2002-US-698 which was followed by S2002-US-504 and CPF-243 having sugar recovery of 12.74% and 12.56% respectively. This might be due to the genotypes of the parent material of these varieties (*Naich et al*., 2006). These results are in agreement with the findings of Saxena *et al.,* (1996) and Block *et al.,* (2004) who studied a number of sugarcane varieties and found different levels of sugar recovery %.

Conclusions

The varieties S2002-US-637 and S2002-US-698 should be promoted and other good yielding varieties having highest sugar recovery (%) must also be planted during the both autumn and spring season.

Table Yield; yield components and quality comparison of promising varieties of autumn sown sugarcane

(Average of two years data)

Sr. No.	Varieties	Germination %age	Tillers/ plant	'000' cane/ha	Stripped Cane yield t ha^{-1}	Sugar recovery %age
1.	S2002-US-698	42 cd	2.15 cd	119.5 bc	105.50 ab	12.99
2.	S2002-US-772	43 c	1.59 g	107.5 e	102.60 bc	10.49
3.	S2002-US-640	42 cd	2.05 de	101.5 f	90.00 f	12.11
4.	S2002-US-637	53 a	3.60 a	118.5 c	109.00 a	11.98
5.	S2002-US-573	48 b	1.88 ef	106.5 e	97.00 d	11.22
6.	S2002-US-560	42 cd	2.93 b	100.0 f	96.00 de	12.19
7.	S2002-US-504	42 cd	1.57 g	99.5 f	92.00 ef	12.74
8.	CPF-243	54 a	3.59 a	130.0 a	103.00 b	1254
9.	S98-SP-108	38 d	1.65 fg	111.0 d	102.50 bc	11.44
10	SPF-241	52 ab	2.32 c	120.5 bc	104.00 b	11.22
11.	SPF-245	53 a	2.15 cd	122.5 b	98.00 cd	10.53
	LSD at 5%	4.225	0.2348	3.439	4.741	-

Values followed by the same letter in the same column do not differ significantly at 0.05 probability.

REFERENCES

1. Ahmad, F., M.A. Bajwa and S. Bashir. 2003. Performance of various sugarcane varieties under Faisalabad conditions. Pak. Sugar J. 18 (05): 15-16.
2. Ali, F.G., M.A. Iqbal, A. A. Chattha & S. Afghan. 2002. Performance of some sugarcane varieties at different seeding densities under Faisalabad (Pakistan) conditions. Pak. Sugar J. 21 (6): 22-23.
3. Anonymous. 2006. Agricultural Statistics of Pakistan, 2005-06, Ministry of Food, Agriculture and Livestock (Economic Wing), Islamabad. pp. 11, 14.
4. Baloch, F.M, N.A. Soomro, S. A. Ali, T.J.A. Buriro and M.U. Usmanikhail. 2004. Comparison of quantitative and qualitative parameters of local sugarcane varieties with varieties of other provinces. Indus Journal of Plant Sciences; 3 (3): 303-307.
5. Bashir, S., A. A. Chattha, M. Yasin and Z. Mehmood. 2005. Sugarcane varieties and row spacing effect on sugarcane traits. Pak. Sugar J. 2 (20): 18-20.
6. Chattha, A. A., M. A. Bajwa, M. A. Grawal, F. Hussain and Z. Gill. 2002. The quantitative and qualitative performance of cane cultivars in central Punjab (2002). Pak. Sugar J. 17: (6): 49-51.
7. Chattha, A.A., M. Afzal, M. A. Iqbal, F. Ahmad and M. Umer Chattha. 2004. CPF-243, An early maturing, high yielding and high sugar variety. Pak. Sugar J. 19(6): 25-27.
8. Gill, M. B. 1995. Physio agronomic studies on flat versus pit plantation of autumn and spring sugarcane (*Saccharum officinarum L.*) Ph.D. Agri. Thesis, Dept. of Agronomy, U.A.F. pp: 41-89.
9. Habib, G., K. B. Malik and M.Q. Charta. 1992. Preliminary evaluation of exotic sugarcane varieties for qualitative characteristics. Pak J. Agric. 13 (14): 320-326.
10. MSTAT-C, Manual, 1991. Micro-statistical programme, Michigan State University, U.S.A.
11. Naich, A.N., P.A. Baloch and A. Abro. 2006. Evaluation of growth and yield parameters of different sugarcane (*Saccharum officinarum* L.) varieties under national uniform varietal trial Pak. Sugar J. 17 (1): 2-5.
12. Rafiq, M., A.A. Chattha, A. Sattar, Z. Mahmood and M.A. Nadeem. 2007. Comparative performance of autumn planted sugarcane-promising clones under Faisalabad conditions. Pak. Sugar J. 22 (1): 50-55.
13. Rahman, M. S., G.M.A. Hossain, A. K. Azad, M.I.Ara and M. Kusha.2006. Perfomance of sugarcane varieties for gur production under high brine tract (Aez-26) of Bangladesh. Pak. Sugar J. 21 (6): 18-21.
14. Ramdoyal, K. 1999. Genetic correlation and repeatability of agronomic characters in sugarcane population in contrasting environment and different crop years. Sugarcane. No. 4. pp 6-12.
15. Rashid, M.H., M.A. Quddus, M.A. Rashid and N.E. Elahi, 2001. Performance of modern sugarcane varieties for gur production in; Modhupur Tract Soils. Bangladesh. J. Sugarcane; 23:57-60.
16. Sarwar, M., M. Afzal, M. A. Iqbal and A. A Chattha, 2003. Performance of promising sugarcane varieties at farmer's field in Thal and Southern Punjab. Pak. Sugar J. 17: (6): 44-48.
17. Saxena, M.M.S., P.S. Verma, B.D. Singh and G.P. Singh. 1996. COS 93218-9 mid late maturing variety. O.V.P. Bharatiya – Sugar: 22(3): 33, 35-36.
18. Zafar, M., M.A. Grawal, M.A. Munir, F. Hussain and A. A. Chattha. 2003. Selection of American origin sugarcane clones at primary nursery stage on the growth, quality and disease response basis. Pak. Sugar J. 20 (2): 8-12.