AGRONOMIC PERFORMANCE OF SOME MEDIUM AND LATE MATURING SUGARCANE GENOTYPES

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ABSTRACTS

Fourteen medium and late maturing genotypes (CPHS-35, CP90-1384, CP92-1167, S96-US-228, S96-SP-302, S96-SP-574, S96-SP-1215, S96-SP-27, S96-SP-102, S96-SP-108, S96-SP-133, S96-SP-190, S96-SP-646, S96-SP-675) were tested against standard SPF-213 with the objective to judge their adoptability and sustainability behaviour at Faisalabad during crop season 2004-05, Highly variable and statistically significant observations were recorded with respect to all qualitative and quantitative parameters. CPHS-35 showed maximum tillers per plant (1.65) and sugar yield (12.09 t/ha) while highest germination (62.49 %), number of millable canes (107.552 000/ha), cane yield (118.20 t/ha) and CCS (12.53%) were recorded in S96-SP-108, S97-SP-27, S96-SP-646 and S96-SP-574 respectively.

Keywords: Sugarcane, genotypes, yield, CCS.

INTRODUCTION

Sugarcane is an important cash crop of Pakistan (Ahmad *et al.,* 1991). The average annual production of this crop in world is 1290556 thousand tons with an average yield of 65597 while in Pakistan this is 47244 thousand tons and 48907 Kgs/ha (GOP, 2006). This low yield in Pakistan may be due to the cultivation of obsolete cane varieties having low sugar yield potential and susceptibility to insect pests and diseases in addition to the outmoded production technology (Aslam *et al.,* 1998). It is very much clear that cane varieties play leading role in improving cane and sugar yield. The cultural operations just provide a suitable environment to trigger the inherent potential of cane varieties for better production (Nayyar and Malik, 1989). Thus much of the gain in yield is due to new varieties (Heinz, 1987). Thus it is evident that high yielding varieties play a pivotal role in increasing cane and sugar yield. Some of the studies made with respect to this reported investigation are reviewed in the next lines.

Arsana and Samoedi (1991) observed the performance of PS77-1553 cane variety compared with PS56, F154 and M442-51 at six irrigated and nine un-irrigated sites. They noticed that PS77-1553 produced 5%, 9% and 5% more yield as compare to PS56, F154 and M442-51 under un-irrigated conditions. Sathyavelu *et al.,* (1991) evaluated performance of some clones at eight locations against control variety (CoC. 671). CoC. 90063 crossed the control in cane yield both in plant as well as ratoon crop. Desai and Kulkarni (1992) reported that cane variety CoC-671 in Karnataka state increased the total annual crush from 9.7% in 1987-88% to 44.5% in 1991-92 and sugar recovery from 10.88% to 12.18%. It was also observed that CoC-671 produced maximum sugar recovery and pol% in February and lowest in May-June due to increasing fiber. For the same purpose, Agrawal *et al.,* (1976) evaluated variety Co.66/3 superior to CoS 611/1148 with respect to growth and yield traits as well as best quality gur production.

Keeping in view the similar kind of work done by some people in the past, the comparative studies of some sugarcane genotypes were made at Faisalabad.

MATERIALS AND METHODS

A field trial was conducted at Sugarcane Research Institute, Faisalabad involving fifteen mediums and late maturing sugarcane genotypes including standard SPF-213 during 2004-05. The crop was sown in the month of March 2004 in RCBD having plot size 41mx 9.6m in loam soil. All agronomic practices including fertilization, irrigation and plant protection measures were adopted according to crop requirements. At harvest, number of millable canes (000/ha), cane yield (t/ha) and sugar yield (t/ha) were recorded while germination and tillering after 45 and 90 DAS respectively. The commercial cane sugar was determined according to procedure laid out by Spencer and Meade (1963) from the compound samples harvested after every fifteen days from October to April. The remaining data was analyzed statistically as mentioned by Steel and Torrie (1980) to determine the significant differences among all treatments at probability level 5%.

RESULTS AND DISCUSSION

The main yield and quality contributing characteristics of different sugarcane genotypes are presented in the table and their description is presented in coming lines under various headings.

Germination

The inherent growth potential of a sugarcane genotype is determined by the germination capacity of its seed cane setts. The data given in the table revealed that there was a significant variation in germination percentage among the different genotypes. Higher values of germination percentage were noticed in two genotypes, S98-SP-108 (62.49%) and S98-SP-675 (61.66%), as compare to standard SPF-213 (56.90%). These genotypes were also statistically at par with each other. While the lowest percentage germination (27.49%) were noted in S98-SP-133. Variable germination for different cane cultivars has been reported by Hapase *et al.,* (1995).

Tillers per plant

Tillering potential of a genotype determines the ultimate crop stand and it makes up deficiencies in germination as indicated by data presented in table. Only two genotypes succeeded in producing higher number of tillers per plant than standard SPF-213 (1.60) and these were CPHS-35 (1.65) and S98-SP-108 (1.64). S96-SP-27 exhibited the minimum value of this parameter i.e. 1.05. Similar findings were claimed by Mishra and Nadiu (1997).

Number of millable canes

Cane formation is one of the most important yield contributing factors. The genotypes responded differently by producing measurable differences. Significant and variable data with respect to this parameter were recorded. Only one genotype S96-SP-27 recorded higher cane count (107.552 000/ha) as compare to standard SPF-213 (99.131 000/ha) while lowest number of millable canes were recorded in S98-SP-646 (69.44 000/ha). The experimental data reported by Bora *et al.,* (1997) states similar facts.

Cane yield

It is considered one of the most important yield-contributing factors as it is evident from data table. Five genotypes S96-SP-646, S98-SP-108, CPHS-35, S96-SP-302 and S97-SP-27 revealed higher cane yields as 118.20, 113.30, 109.00, 108.00 and 105.00 t/ha when compared with standard (104.50 t/ha). The genotype S98-SP-675 yielded the lowest cane yield as 62.76 t/ha. These conclusions are in close parallelism with those of Mahendran *et al.,* (1995).

CCS

It is the real judgment of cane quality and equally important for millers and breeders. Seven genotypes stood higher with respect to CCS as compare to standard SPF-213 (10.92%). These genotypes along with their CCS values were S97-SP-574 (12.53%), CP90-1384 (12.19%), S96-SP-1215 (11.79%), S97-US-102 (11.38%), S96-SP-228 (11.27%), CPHS-35 (11.09%) and S96-SP-203 (10.94%) respectively. This discussion coincides that of Rao *et al.*, (1995) who observed similar kind of trend.

Sugar Yield

It is the function of cane yield and corresponding CCS. Statistically significant results revealed that three genotypes produced higher sugar yields i.e. 12.09, 11.82 and 11.73 t/ha, which were CPHS-35, S96-SP-302 and S98-SP-646 respectively while compared with standard genotype SPF-213 (11.41 t/ha). The latter two genotypes were also statistically at par with the standard. This description is in accordance with Kapur and Kanwar (1991).

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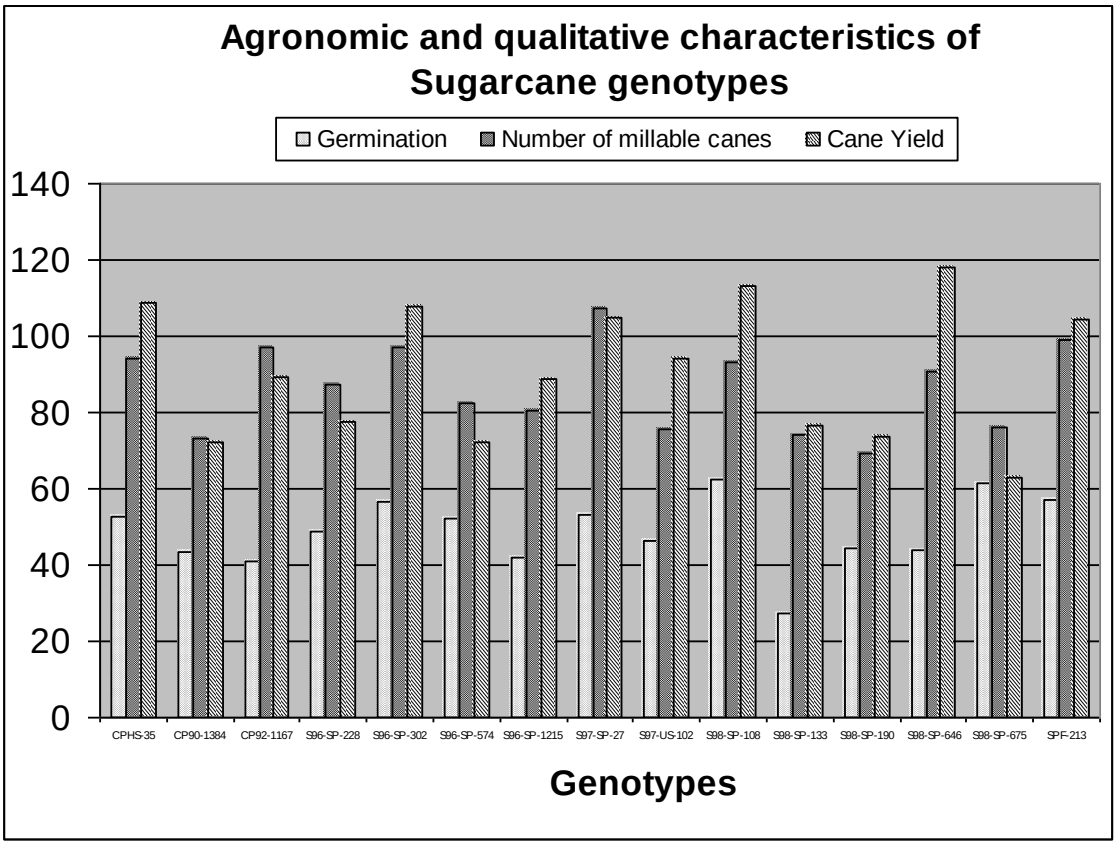
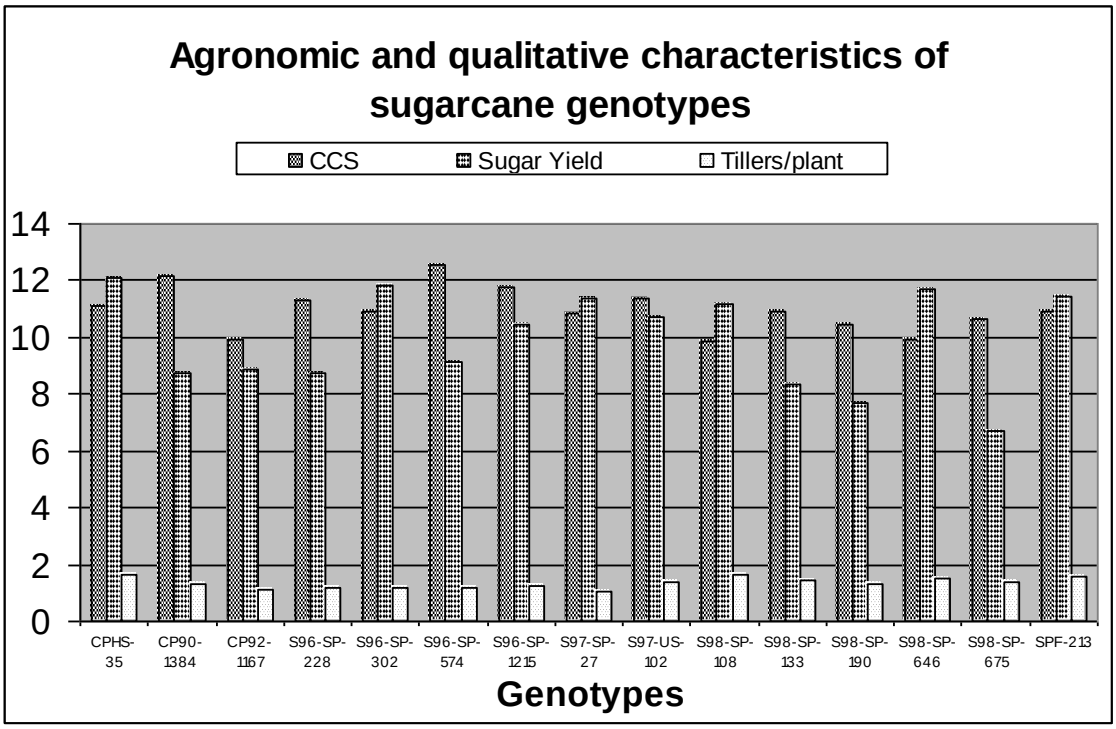
Table-1 Agronomic and qualitative characteristics of sugarcane genotypes

Sr. #	Genotypes	Germination (%)	Tillers plant^{-1}	Millable canes (000/ha)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
1.	CPHS-35	52.73bcd	1.65a	94.357cd	109.00bc	11.09	12.09a
2.	CP90-1384	43.33fg	1.33abcd	73.09g	71.96g	12.19	8.77fg
3.	CP92-1167	41.18fg	1.13cd	74.826g	89.06e	9.95	8.86f
4.	S96-SP-228	48.80bcdef	1.16cd	87.152e	77.61f	11.27	8.75fg
5.	S96-SP-302	56.66ab	1.68ab	96.87c	108.0c	10.94	11.82b
6.	S96-SP-574	52.38bcde	1.19cd	82.204f	72.83g	12.53	9.12f
7.	S96-SP-1215	42.02fg	1.28bcd	80.555f	88.80e	11.79	10.46e
8.	S96-SP-27	53.09bc	1.05d	107.552a	105.00c	10.84	11.35bc
9.	S97US-102	46.30edef	1.40abc	75.781g	94.36d	11.38	10.73de
10.	S98SP-108	62.49a	1.64ab	92.968d	113.30b	9.88	11.19cd
11.	S98SP-133	27.49h	1.45abc	73.958g	76.47fg	10.91	8.34g
12.	S98SP-190	44.52defg	1.34abcd	69.444h	73.44fg	10.46	7.68h
13.	S98SP-646	44.04efg	1.53ab	90.712e	118.20a	9.93	11.73ab
14.	S98SP-675	61.66a	1.36abcd	75.955g	62.76h	10.65	6.68i
15.	SPF-213 (std.)	56.90ab	1.60ab	99.131b	104.50c	10.92	11.41bc
	LSD at 5%	8.558	0.3345	3.778	4.684	-	0.5128

Std. = Standard
LSD = Least Significant Difference.


Agronomic and qualitative characteristics of Sugarcane genotypes
Germination
Number of millable canes
Cane Yield
140
120
100
80
60
40
20
0
CPHS-35
CP90-1384
CP92-1167
S96-SP-228
S96-SP-302
S96-SP-574
S96-SP-1215
S97-SP-27
S97-US-102
S98-SP-108
S98-SP-133
S98-SP-190
S98-SP-646
S98-SP-675
SPF-213
Genotypes


Agronomic and qualitative characteristics of sugarcane genotypes
CCS
Sugar Yield
Tillers/plant
14
12
10
8
6
4
2
0
CPHS-35
CP90-1384
CP92-1167
S96-SP-228
S96-SP-302
S96-SP-574
S96-SP-1215
S97-SP-27
S97-US-102
S98-SP-108
S98-SP-133
S98-SP-190
S98-SP-646
S98-SP-675
SPF-213
Genotypes