

## Qualitative and Quantitative Performance of some Promising and Commercial Sugarcane Varieties under Agro-Climatic Conditions of Thatta

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**Abstract:** Performance of commercial and promising sugarcane varieties viz. Gulabi-95, NIA-98, Triton, Th-9, Th-10, Th-33 and Th-34 along with standard variety BL-4 was studied under agro-climatic conditions of Thatta during 2000-2001. Observations on quantitative parameters i.e. cane girth, number of internodes/ stalk, stalk height, millable canes  $m^{-2}$  and cane yield  $t\ ha^{-1}$  as well as on qualitative characters i.e. Brix%, Pol%, purity% and sugar recovery % were recorded. The data revealed that promising varieties Th-10, Th-33 and Th-34 showed best performance in respect of cane yield with mean values 113, 112.5 and 109  $t\ ha^{-1}$  respectively against standard variety BL-4 ( $100\ t\ ha^{-1}$ ). While two varieties Th-9 and NIA-98 produced lowest average cane yield 82.5 and 87.2  $t\ ha^{-1}$  respectively against the check. Highest average sugar recovery was observed in Th-10 (11.43%) followed by Th-34 (10.70%) and Th-33 (10.16%) against the check variety BL-4 (9.70%). However, the commercial varieties NIA-98 and Gulabi-95 gave lowest sugar recovery with average values 8.70 and 8.91% respectively against the check. On the basis of overall performance it was inferred that promising varieties Th-10, Th-33 and Th-34 might prove best commercial sugarcane varieties in future.

**Key words:** Cane yield, sugar recovery %, Sugarcane varieties, Thatta, Pakistan

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### Introduction

Population in Pakistan is expanding rapidly. Numbers of babies are born to feed after each minute. They demand food and fiber for their survival. The total volume of agricultural products especially the sugar production in Pakistan is inadequate to meet the requirements of swiftly growing population. The situation invites an urgent need to develop new sugarcane varieties having higher potential of cane and sugar yield per hectare and greater resistance to insect pest and disease.

In Pakistan sugarcane is being cultivated on an area of about one million hectares with average cane yield  $47.6\ t\ ha^{-1}$  and average sugar recovery 8.33% (Anonymous, 2001), which is very low as compared to other cane growing countries of the world. The prominent factors contributing to low tonnage and sugar recovery in Pakistan are consistency in conventional methods of cultivation, meager input resources, exhausted infertile soils, low organic amendments, frequent irrigation constrains as well as inappropriate measures to control insect pest and disease. Besides all these factors, inherently low cane and sugar yielding varieties and

fewer provisions for evaluation and acclimatization of improved sugarcane varieties also play a distinct role. National average can be enhanced by adopting the improved package of technology and growing high yielding varieties (Javed *et al.*, 2001). According to Hussain *et al.* (2001) poor varieties / technology coupled with semi-arid conditions are major causes for lower yields of sugarcane in Pakistan. Heinz (1987) reported that cultural practices are very important in crop productivity but much of gain in yield is due to improved varieties. Sugarcane crop bears a greater yield potential if the improved varieties are evolved with proper production inputs. Thus, instead of increasing the area under sugarcane cultivation, the emphasis should be laid to enhance per hectare yield. For this purpose improved sugarcane varieties higher in cane and sugar yield with the package of advance production technology are need to be evolved through research and experimentation. The main objective of this study is to identify the potential varieties for the agro-climatic conditions of Thatta.

### **Materials and Methods**

Study was conducted to observe the qualitative and quantitative performance of some commercial and promising sugarcane varieties under agro-climatic conditions of Thatta during 2000-2001. Experiment was laid out in Randomized Complete Block Design with four replications, at National Sugar Crops Research Institute experimental farm, Thatta. Sugarcane varieties Gulabi-95, NIA-98, Triton, Th-9, Th-10, Th-33 and Th-34 along with standard variety BL-4 were planted in October 2000 by over lapping method using two budded sets. Plot size was 21 m<sup>2</sup> with seven meters long three rows, one meter apart from each other. Crop was fertilized @ 275-112-175 Kg NPK/ha. All PK and 1/3 N was applied at sowing while remaining 2/3 N was applied in two equal splits first at the completion of germination and second at the time of earthing up. Recommended agronomic practices were carried out uniformly. At the time of harvesting three stools were randomly taken from each plot to record data for cane girth, number of internodes/stalk, stalk height and sugar contents. While for millable canes data, canes in two meters row length from the middle row of each plot were randomly taken and counted. With out tops weight of the same millable canes taken from two meters row length of the plots was used to calculate the cane yield t ha<sup>-1</sup>. The services of Dewan Farooque Sugar Mill, laboratories were taken for the record of data on sugar contents. The data recorded was subjected to statistical analysis using MSTAT-C, microcomputer statistical programme. (Michigan State University, 1991).

### **Results and Discussion**

Results regarding the mean performance of different sugarcane varieties for quantitative parameters are presented in Table 1, which revealed that varieties Th-33 and BL-4 were at par in average cane girth (25.2 mm). Maximum average cane girth was observed in Th-10 (26.2 mm) followed by Triton (25.8 mm) and Th-9 (25.4 mm). While minimum average cane girth was exhibited in Gulabi-95 (22.9 mm), Th-34 (24.4 mm) and NIA-98 (24.8 mm). As regard the number of internodes/stalk, variety NIA-98 (21.9) was at the top followed by BL-4 and Th-10, which produced 20.6 and 20 average number of internodes/stalk respectively. Highest average stalk height was

Table 1: Mean quantitative performance of different sugarcane varieties at NSCRI, farm Thatta during 2000-2001

| Variety   | Cane Girth (mm) | No.of internodes/stalk | Stalk Height (cm) | Millable Canes m <sup>-2</sup> | Cane Yield (t ha <sup>-1</sup> ) |
|-----------|-----------------|------------------------|-------------------|--------------------------------|----------------------------------|
| BL-4      | 25.2cd          | 20.6b                  | 187.6c            | 18.5c                          | 100.0c                           |
| Gulabi-95 | 22.9f           | 14.7e                  | 168.7d            | 19.0bc                         | 91.2d                            |
| NIA-98    | 24.8de          | 21.9a                  | 196.2bc           | 14.5e                          | 87.2e                            |
| Th-9      | 25.4bc          | 19.2c                  | 176.9d            | 13.7f                          | 82.5f                            |
| Th-10     | 26.2a           | 20.0b                  | 217.0a            | 19.2b                          | 113.0a                           |
| Th-33     | 25.2cd          | 19.0c                  | 200.0b            | 18.7bc                         | 112.5a                           |
| Th-34     | 24.4e           | 17.8d                  | 197.3bc           | 20.2a                          | 109.0b                           |
| Triton    | 25.8b           | 17.3d                  | 190.6bc           | 17.0d                          | 91.7d                            |
| CV%       | 2.36            | 5.82                   | 7.44              | 5.97                           | 4.41                             |
| Cd-1      | 0.30            | 0.56                   | 7.41              | 0.54                           | 2.46                             |
| Cd-2      | 0.41            | 0.77                   | 10.09             | 0.74                           | 3.35                             |

Means followed by the same letters do not differ significantly at 1% level of probability.

Table 2: Mean qualitative performance of different sugarcane varieties at NSCRI, farm Thatta during 2000-2001

| Variety   | Brix%   | PoL%   | Purity% | Sugar recovery% |
|-----------|---------|--------|---------|-----------------|
| BL-4      | 20.05c  | 17.33d | 86.43a  | 9.7d            |
| Gulabi-95 | 19.52cd | 16.24e | 83.19b  | 8.9ef           |
| NIA-98    | 19.38d  | 16.09e | 83.02b  | 8.7f            |
| Th-9      | 19.99cd | 17.28d | 86.44a  | 9.8d            |
| Th-10     | 22.65a  | 20.01a | 88.34a  | 11.4a           |
| Th-33     | 20.88b  | 18.08c | 86.59a  | 10.2c           |
| Th-34     | 22.35a  | 19.36b | 86.62a  | 10.7b           |
| Triton    | 20.15c  | 17.02d | 84.46b  | 9.2e            |
| CV%       | 4.33    | 4.59   | 3.44    | 6.76            |
| Cd-1      | 0.46    | 0.42   | 1.53    | 0.34            |
| Cd-2      | 0.63    | 0.57   | 2.08    | 0.46            |

Means followed by the same letters do not differ significantly at 1% level of probability.

observed in variety Th-10 (217 cm) followed by Th-33 (200 cm) and Th-34 (197.3 cm) and the lowest average stalk height was recorded in varieties Gulabi-95 (168.7 cm) and Th-9 (176.9 cm) against the check variety BL-4 (187.6 cm). Average millable canes m<sup>-2</sup> was highest in Th-34 (20.2) followed by Th-10 (19.2), Gulabi-95 (19) and Th-33 (18.7). While minimum average millable canes m<sup>-2</sup> was observed in Th-9 (13.7) and NIA-98 (14.5) against the check variety BL-4 (18.5). Data in Table 1 further revealed that highest average cane yield was observed in Th-10 (113 t ha<sup>-1</sup>) followed by Th-33 (112.5 t ha<sup>-1</sup>) and Th-34 (109 t ha<sup>-1</sup>). While the lowest average cane yield was exhibited in Th-9 (82.5 t ha<sup>-1</sup>), NIA-98 (87.2 t ha<sup>-1</sup>) and Gulabi-95 (91.2 t ha<sup>-1</sup>) against the check variety BL-4 (100 t ha<sup>-1</sup>). Higher cane yield in Th-10, Th-33 and Th-34 in the trial was may be due to the function of yield contributing traits. Singh *et al.* (1985) reported that number of canes were the most important characters contributing directly to higher cane yield followed by cane height. Singh and Sharma (1983) stated that stalk diameter and number of millable stalks per plot are the most important components of cane yield.

Data regarding sugar recovery % and its parameters is presented in Table 2, which revealed that Maximum sugar recovery was observed in Th-10 (11.4%) followed by Th-34 (10.7%) and Th-33 (10.2%) against the check variety BL-4 (9.7%). While the varieties NIA-98 and Gulabi-95 produced

lowest average sugar recovery 8.7 and 8.9% respectively. Quality of cane juice depends upon many factors, like variety (Habib *et al.*, 1992), climate (Haltam and Pazir, 1989); fertilizer (Nazir *et al.*, 1987) and crop age (Mahmood and Nazir, 1987). Sugar recovery % is an important quality character of a sugarcane variety, which is closely correlated with economic value. Milligan *et al.* (1990) suggested that emphasis should be placed on selection for cane yield to increase sucrose content per unit area. On the basis of overall performance of the varieties in the trial, it can be inferred that Th-10, Th-33 and Th-34 may prove best commercial sugarcane varieties in future under agro-climatic conditions of Thatta.

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