

Yield Potential of A New Sugar Crop - Sweet Sorghum

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ABSTRACT

An experiment was conducted with four sweet sorghum varieties, viz., Mer 71/1, Wray-4, Rio and Ramada at the Sugarcane Research and Training Institute farm in the summer of 1983. All the varieties matured within 110-120 days. The recoverable sugar of Mer 71/1 was superior, followed by Rio, Ramada and Wray-4. Rio yielded the highest grains/ha, followed by Wray-4, Ramada and Mer 71/1. The variety Wray-4 produced the highest stalk yield/hectare, followed by Mer 71/1, Ramada and Rio respectively. Sucrose and gur quality of Mer 71/1 was the best followed by Rio. Results of the preliminary studies indicate the prospect of sweet sorghum cultivation in Bangladesh.

INTRODUCTION

Sweet Sorghum (*Sorghum bicolor* (L) Moench) is considered to be a source of both grain and sugar in many countries. It is possible to remove starch from the juice of sweet sorghum (Smith, *et. al.*, 1970) and utilize it in sugar production (Acosta and Smith, 1974; Sund *et. al.*, 1976). Its juice, for all purposes is almost the same as cane juice (Polack and Day, 1982). Broadhead (1981) reported that research on Sweet Sorghum for granular sugar was reactivated by the U. S. Department of Agriculture. The prospect of using it as a renewable source for alcohol production has created a lot of new interest in this crop. Moreover, the sorghum-grains are being used as a food crop in U.S.A., Thailand, Malaysia, Singapore, Argentina, Nigeria, Mexico and India.

As evident from the reports of workers of different countries, cultivation of sweet sorghum has certain advantage. It can be grown successfully under a wide range of environmental and cultural conditions. It is a quick growing crop. It can be planted in April and harvested in August and early September (Polack and Day, 1982). It allows the land to produce one or two other short duration crops in the same year, which enables the farmer to get some extra financial benefit. It requires less field work, less fertilizers and other inputs.

Though works on sweet sorghum have been reported from a number of countries, there has been no work on it in Bangladesh. The present investigation was undertaken to assess whether sweet sorghum could be grown profitably on a commercial basis in terms of sucrose content or grain yield or both together in agro-climatic conditions of Bangladesh.

MATERIALS AND METHODS

The experiment was carried out in the Sugarcane Research and Training Institute Farm with four Sweet Sorghum varieties, viz., Mer 71/1, Wray-4, Rio and Ramada to assess the prospect of sweet sorghum cultivation in Bangladesh in respect of grain yield and sucrose content. The experiment was laid out in a randomized complete block design with three replications. Plot size for each variety was 6 m x 4 m. Seeds were sown in April, 1983, following line sowing method. Row to row & plant to plant distances were 30 cm. and 15 cm. respectively. Fertilizers were applied at the rate of 70 kg N: 138 kg P_2O_5 : 70 kg K_2O per hectare. The entire quantities of P_2O_5 and K_2O were applied at the time of land preparation, while half of the N was applied at 21 days of sowing seeds and the rest half at 35 days. All the cultural operations were performed as and when necessary. Data were collected on the weight, length and diameter of the individual stalks. The ears from 10 randomly selected plants were used for collecting data on the weight, length and diameter of individual ears. The crop was harvested in August, 1983 and yield of grain and stalk was determined. Juice of different varieties of Sorghum were chemically analysed for percent available sugar according to the method of Meade (1963). Gur was prepared from the juice of the Sorghum immediately after harvest by open pan boiling method, using ordinary lime as clarifying agent. Data collected were analysed statistically and the significance of mean differences were adjusted as per LSD test.

RESULTS AND DISCUSSION

Statistical analysis of all the parameters revealed significant differences among the varieties in respect of stalk length, stalk diameter and unit stalk weight leading to stalk yield/hectare. Significant differences were also found in respect of grain yield and percent available sugar.

According to Singh and Sangwan (1980) both height and diameter contribute towards stalk yield through individual stalk weight. In the present study, variety Wray-4 attained maximum stalk height (376 cm) as compared to that of Rio (310 cm), Ramada (327 cm) and Mer 71/1 (314 cm). The maximum stalk diameter was noted in the variety Wray-4 (2.20 cm) and the minimum in Rio (1.75 cm).

In variety Wray-4 there was a good combination of stalk height (376 cm), diameter (2.20 cm) and unit stalk weight (0.86 kg) resulting in highest stalk yield/hectare (78.54 tons), which differed significantly from other varieties (Table 1). Rio produced the highest grains/ha (2.5 tons) which was significantly higher than other varieties. Wray-4 produced the second highest grains/ha (1.5 tons), followed by Ramada (1.1 tons) and Mer 71/1 (0.70 tons) (Fig. 1). Similar results were obtained by Angelle (1982) who tested some Sorghum varieties in which Wray-4 and Rio were the main varieties and Wray-4 proved to be the best in respect of stalk yield and Rio in respect of grain yield. As regards % recoverable sugar, Mer 71/1 produced the highest recovery

Table 1. Yield contributing parameters of the Sweet Sorghum cultivars under study.

Variety	Stalk length (cm)	Unit stalk wt. (kg)	Stalk diameter (cm)	Stalk yield (ton/ha)
Rio	310	0.73	1.75	43.31
Ramada	327	0.92	1.91	70.79
Wray - 4	376	0.86	2.20	78.54
Mer 71/1	314	0.86	1.99	66.65
L S D (0.05)	10.06	0.0489	1.29	3.63

(7.61), followed by Rio (6.89), Ramada (4.73) and Wray-4 (3.63). Similar result was obtained by Broadhead (1979) in his experiment with Rio giving high sucrose content.

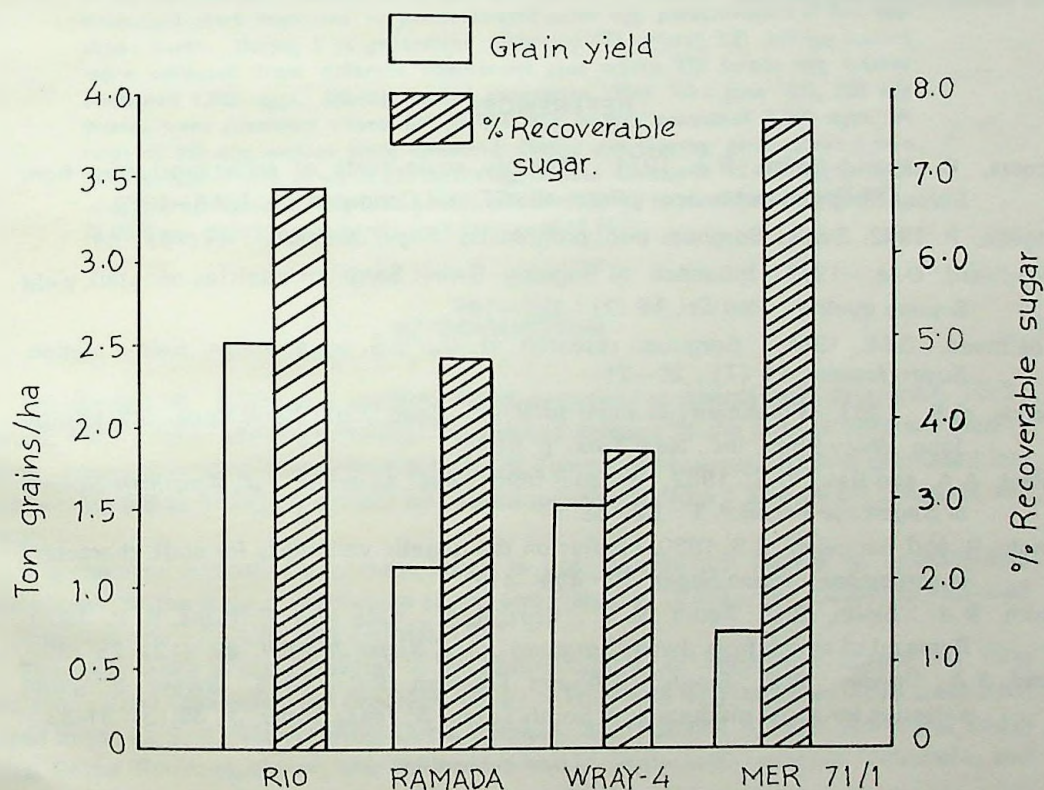


Figure 1. Grain yield and recoverable sugar of four varieties of Sweet Sorghum, viz Rio, Romada, Wray - 4 and Mer 71/1.

Mer 71/1 yielded the highest recovery of gur followed by Rio. Taste and colour of gur of the varieties were in close resemblance with sugarcane gur. Amongst the varieties, gur was better in Mer 71/1 and Rio. Further investigations are needed for quality evaluation of gur from sweet sorghum.

Results obtained from this preliminary study on sweet sorghum indicate that there is prospect of this crop for cultivation in Bangladesh and it deserves further study.

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