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RESEARCH PAPER

Biophysical yield and juice quality in sweet sorghum genotypes

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Abstract : In sweet sorghum genotypes, rates of photosynthesis and transpiration , fresh cane weight differed significantly. The high yielding genotypes possessed higher rate of photosynthesis and transpiration. Juice parameters such as extraction percentage, brix, non-reducing sugars, total sugars and enzyme activity also differed among the genotypes. Fresh cane weight and brix were more in high yielding genotypes. There was a positive correlation between fresh cane weight and total sugars, non-reducing sugars and invertase enzyme activity. Photosynthesis rate had positive correlation with transpiration.

Key Words : Sweet sorghum, Biophysical Parameters, Brix, Yield

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INTRODUCTION

Sweet sorghum (*Sorghum bicolar* (L.) Moench.)is similar to grain sorghum with stalks rich in sugar and having high water use efficiency. It is a multipurpose crop. Livestock relish the sugar rich stalks and its digestibility is high compared to other stovers. The juice of sweet sorghum can be used for alcohol, jaggery and syrup production .(Anonymous, 2008). The quality of sugar or jaggery is comparable to that of sugarcane. The left over stalks after juice extraction can be used for generating power, as animal feed and for composting. In this study, sweet sorghum genotypes were valuated for various biophysical, quality characters and their association with yield.

MATERIALS AND METHODS

A field experiment was conducted with twelve sweet sorghum genotypes (SSV-84, SSV-12611, SSV-53, SSV-6928, SSV - 2525, SSV - 7073, SSV - 108, SSV -74, SSV-96, SSV-119, Rio and HES-4) at University of Agricultural Sciences, Dharwad. The experiment was laid out in Randomized Block Design with three replications. The rate of photosynthesis, photsynthetically active radiation, transpiration rate, stomatal resistance and leaf temperature were measured by using portable photosynthesis system(LICOR6400).The juice from the mature cane was extracted from mini crusher and was analyzed for quality parameters *viz.*, brix values, non-reducing sugars, total sugars and invertase enzyme activity. The brix values were recorded with hand refractometer. The non-reducing sugars and total sugars were estimated by following the method of Nelson (1944). The inveratse enzyme activity was analyzed as per the procedure of Gupta *et al.* (1985).

RESULTS AND DISCUSSION

The rate of photosynthesis and transpiration differed significantly among the genotypes (Table 1). The rate of photosynthesis was highest in SSV-6928 followed by SSV-74, SSV-108 and SSV-7073 and it ranged from 12.3 μ moles CO_2 m^{-2} s^{-1} (HES-4) to 21.2 μ moles CO_2 m^{-2} s^{-1} (SSV-6928). The high yielding genotypes possessed higher rate of photosynthesis

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