



Effect of male sterility inducing cytoplasm on hybrid mean performance for bioenergy traits in sweet sorghum [*Sorghum bicolor* (L.) Moench]

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Abstract : Influence of male sterility inducing cytoplasm on mean performance with respect to ethanol yield and its attributing traits in sweet sorghum was studied in 48 hybrids developed by crossing six A- lines viz., ICSA 631, ICSA 731, ICSA 324, ICSA 500, ICSA 38 and ICSA 84 and their corresponding B- lines with four R- lines viz., SEREDO, ICSV-700, ICSV 111 and E 36-1 in a line × tester mating design. The 16 parents and their 48 hybrids were grown separately in contiguous blocks in single row of 3m length with 0.15 m × 0.60 m spacing in simple lattice design with two replications at the experimental plots of Gandhi Krishi Vignana Kendra (GKVK), University of Agricultural Sciences (UAS), and Bangalore. Presence of significant cytoplasmic differences in hybrid means performance for mean cane height, mean cane weight, juice yield, juice extraction per cent and ethanol yield. No definite trend favouring any particular cytoplasm was observed.

Key Words : Male sterility inducing cytoplasm, Cytoplasmic difference, Sweet sorghum, Bioenergy

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INTRODUCTION

Hybrid cultivar development in sorghum has been possible due to the discovery of workable cytoplasmic nuclear male-sterility (CMS) designated as A₁ (milo) (Stephens and Holland, 1954). A large number of milo CMS-based sorghum hybrids have been developed and released/ marketed in India and in several other countries. Devastation of 'Texas' CMS-based maize hybrids due to southern corn leaf blight (*Bipolaris maydis*) epidemic in 1970 triggered research on assessing the response of CMS-based hybrids identical in nuclear genetic background but differing in their maternal cytoplasm for biotic stresses and productivity traits in several crops such as grain sorghum (Ramesh *et al.*, 2006), rice (Katayama, 1978 and Viraktamath, 1987), and cotton (Gill *et*

al., 2007). There is no report in literature on the effects of male sterility inducing cytoplasm on mean performance of hybrids on bioenergy traits in sweet sorghum. In the present study, the mean performances of male sterile cytoplasm based hybrids were compared to those based on male sterile cytoplasm for ethanol yield and its attributing characters in sweet sorghum.

MATERIALS AND METHODS

The material consisted of six CMS (A) lines viz., ICSA 631, ICSA 731, ICSA 324, ICSA 500, ICSA 38 and ICSA 84, their corresponding maintainer (B) lines and four restorer (R) lines viz., SEREDO, ICSV 700, ICSV 111 and E 36-1 procured from International Crops Research Institute for Semi Arid Tropics (ICRISAT), Patancheru, India. The six A-lines were crossed

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