

Heterosis for ethanol yield and its attributing traits in sweet sorghum [*Sorghum bicolor* (L.) Moench]

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SUMMARY

An investigation was carried out to assess the extent of heterosis for ethanol yield and its attributing traits in 72 hybrids of sweet sorghum developed by crossing 4 lines with 18 testers in Line × Tester mating design during *Kharif* 2009 at Zonal Agricultural Research Station, University of Agricultural Sciences, GKVK, Bangaluru. The mean sum of squares of parents, hybrids and parents vs hybrids was significant for all the characters except reducing sugars, indicating presence of sufficient heterosis for these traits. None of the crosses were superior for all the traits studied. However, the cross 'ICSA 324 × SEREDO' was the best as it had highest standard heterosis for the two economically important characters *viz.*, juice yield and ethanol yield. Majority of the crosses exhibited significant better parent heterosis for Brix per cent, juice yield, reducing sugars, total sugars, ethanol content, grain yield and ethanol yield indicating predominance of non-additive gene action in the genetic control of these traits. Most of the hybrids expressed significant standard heterosis for all the characters over the check NTJ 2.

Key Words : *Sweet sorghum*, Heterosis, Ethanol

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The recent policy of Indian Government for blending of alcohol in petrol to an extent of five per cent increased the demand for alternative and commercially feasible raw material like sweet sorghum for ethanol production which emerged as a supplementary crop to sugarcane in rainfed areas of the country (Reddy and Sanjana Reddy, 2003). Sweet sorghum is a special purpose sorghum with sugar-rich stalk almost like sugarcane. The sugar content varies from 16-23 per cent Brix. Besides having rapid growth, high sugar accumulation and biomass production potential, it has wider

adaptability, tolerance to drought, water logging and saline-alkaline conditions. It can be grown with limited water and minimal inputs and can be harvested within a span of four months (Reddy and Sanjana Reddy, 2003). The juice has great potential for jaggery, syrup and bio-fuel (ethanol) production. Its high ethanol production ability is contributed by a few characters such as Brix per cent, juice yield, stalk sugar content and ethanol content. Sweet sorghum being an often cross pollinated crop offers a wide scope for the development of both varieties and hybrids by exploitation of additive as well as non additive genetic variance. Heterosis has been fully exploited by developing several high yielding grain sorghum hybrids (CSH-1 to CSH-21). However, heterosis for ethanol yield and its contributing traits such as Brix per cent and juice yield has not been exploited, as sweet sorghum breeding is still in its infancy. Hence, the present study was undertaken to assess the extent of heterosis of newly developed hybrids of sweet sorghum for ethanol yield and its attributing traits.

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