ABSTRACT

EVALUATION OF F₁ HYBRIDS AND MOLECULAR CHARACTERIZATION OF INTERSPECIFIC HYBRIDS OF Coffea sp.,

By

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Coffee being a non alcoholic beverage, it is well known for its stimulating effect on the brain. This prompted the coffee growing countries to adopt the plant improvement programme through conventional and advanced breeding techniques. Accordingly, in India too similar breeding work was undertaken that resulted several hybrids of various cross combinations and these hybrids were established under the optimum shade canopy of evergreen permanent shade trees at Coffee Research Sub Station, Chettalli, Kodagu District, Karnataka. Out of these, fifteen F₁ hybrids were chosen for field evaluation. An interspecific hybrid population developed from tetraploid x diploid cross (Cauvery x (CxR)) was used for molecular characterization. The entire hybrid population was divided into three groups namely; Dwarf x Tall, Tall x Dwarf and Tall x Tall crosses and statistically analyzed following RBD and χ² test.
The studies revealed no significant between the growth parameters of the F₁ hybrids derived from Dwarf x Tall, Tall x Dwarf and Tall x Tall group of crosses. Comparatively higher plant growth was recorded in Tall x Tall crosses. Three years average yield of the F₁ progenies exhibited highest yield of 2.38kg⁻¹ plant in Tall x Dwarf combination followed by 2.36kg⁻¹ plant in Tall x Tall crosses. The lowest yield of 1.90kg⁻¹ plant was in Dwarf x Tall hybrids. Among the Tall x Tall, Sln.6 x Sln.9 hybrids indicated highest crop of 3.01 kg⁻¹ plant with 79% ‘A’ grade beans. The highest ‘A’ grade beans in the range of 74-80% combined with superior cup quality was recorded in Sln.5B F₁ hybrids when crossed with S.795, Sln.9 and Cauvery male parents. An interspecific F₁ hybrid of Cauvery and (CxR) cultivar recorded the highest scores for quality parameters and rated as specialty coffee. Morphological traits showed a strong association with the quality characteristics indicating its application in developing morphological markers for identification of superior quality genotype.

The study on leaf rust exhibited greater role of genotype and environment on incidence of leaf rust as well as environmental capability of breaking down the resistance in the cultivars. Bush spread, primary thickness and intermodal length characters were also greatly influenced by the ‘Ct’ gene transmitted through the female parent. The independent traits exhibited the genetic segregation in accordance with the Mendel’s law of independent assortment and fit in to the dihybrid ratio of 9:3:3:1 (P≥0.50 up to 0.95).

The present study revealed that the F₁ hybrids derived from Cauvery x Sln.9 among Dwarf x Tall group and Sln.9 x Cauvery and S.881 x Cauvery among Tall x Dwarf group can be fully exploited for commercial cultivation after stabilization of the characters of economic importance or by way of clonal propagation. Because, the forthcoming generation of these hybrids would lead to produce the segregating population hence, causing low productivity.