

Repeatability for economic traits at early stages of selection in sugarcane

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Selection in sugarcane involves appropriate choice of parents to create variability and thereafter followed by identification of superior individuals and families using selection criteria of the important traits. Correlation of these economic traits like cane diameter, cane length, cane weight between crops and locations is generally measured by repeatability and individual repeatability indicates the association of the same trait between two crop seasons (Plant and Ratoon crop). Clonal repeatability measures the association of the same trait for the same crop (plant cane or ratoon crop) between different locations. These estimates will be helpful to breeders in phenotypic selection of clones and improve selection efficiency in early clonal stages of selection. The breeding population representing 3000 progenies of ten families involving diverse ten parents were evaluated in the ground nursery, first clonal, second clonal stages in four seasons from 2008 - 2010 which included ratoon crop in 2009 and 2010 at ECC Farm, Sugarcane Breeding Institute, Coimbatore. The traits studied were cane length, stalk diameter, millable canes and Brix% and the covariance estimates among seedlings and environmental variation was studied. The study revealed significant differences among evaluated families for the traits. Among the families Co 86002 x Co 99006, ISH 35 x Co 86011, CoG 93076 x Co 94008, Co 94008 x Co 86032, Co 86002 x Co 99006 had the highest variation and high selection % for the traits. Significant estimates of repeatability was observed between plant and ratoon crop for cane length (0.39 and 0.38), stalk diameter (0.52 & 0.53) and stalk number (0.63 & 0.69) and Brix % cane (0.45 & 0.59) at first and second selection stages respectively. The coincidence factor (% common individuals selected in ground nursery and first clonal trial ranged from 6.6 % (Co 98010 x CoT 8201) to 16.1 % (CoG 93076 x Co 94008) indicating the common selections at early clonal stages. Family h^2 was high for the cane length (70.14 %), stalk diameter (91.73%) and Brix % (68-48 %), while it was moderate for number of stalks (38.14 %). High GCV was observed for stalk weight at early generations. Heritability for cane length, number of stalks and Brix % with low GCV was observed. High and significant values of individual repeatability were observed for cane length, stalk diameter, number of stalks and Brix %. High and significant estimates of clonal repeatability were observed for cane length, stalk diameter in plant cane, ratoon crop and across different clonal stages. Moderate estimates were observed for cane weight and H.R Brix % in second clonal stage. Among the traits, estimates for brix was high (> 0.57) and it was most repeatable between clonal stages. The repeatability values were high for cane length between Clonal stage II, clonal I plant crop and between clonal ratoon. For stalk diameter repeatability was higher in clonal II and the repeatability was high in clonal plant and ratoon with an estimate of 0.63. Association between yield characters and repeatability estimates both in plant and ratoon crops observed in the present study will be useful in the selection of clones for high yield and improve its efficiency at early stages of selection.