

Variability and Interrelationships between Coffee (*Coffea arabica* L.) Seedling Characters and their Implication in Selection

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SMMARY

Eighty one accessions of the Ethiopian coffee (*Coffea arabica* L.) germplasm were evaluated for fifteen characters at the seedling stage at Jimma Agricultural Research Center during 2002/2003 cropping season with the objectives of estimating the magnitude of phenotypic and genotypic variability, correlation coefficient, heritability and expected genetic advance. In effect, seedlings from the 81 accessions were raised and grown up in the nursery after arranging them in simple lattice with sixteen seedlings per plot. Eight months old seedlings were evaluated for different characters. The accessions differed significantly for all the traits except shoot (SDW) and root (RDW) dry weight, tap root length (TRL) and number of lateral roots (NLR) indicating that there is sufficient variability to have an effective selection for traits of interest. Stem diameter showed the minimum phenotypic (PCV) (10.1%) as well as genotypic coefficient (6.4%) of variation (GCV) whereas both PCV (33.5%) and GCV (21.7%) were highest for shoot fresh weight. Estimates of broad sense heritability ranged from 37.1% for root fresh weight (RFW) to 65.7% for leaf width (LW). Values of expected genetic advance (GA) expected from selection of the top 5% of the accessions as expressed relative to the means ranged from 9.4% for stem diameter (SD) to 31.9% for leaf area (LA). High heritability estimates for internode length, total number of stem nodes, leaf length, leaf width and leaf area coupled with high genetic advance indicated that these traits could be improved through mass selection. Of all the traits considered in the present investigation, seedling height with internode length; number of true leaves with total number of stem nodes; leaf length with leaf width, leaf area and shoot fresh weight; leaf width with leaf area and shoot fresh weight; leaf area with shoot fresh weight; and root fresh weight with lateral root length exhibited significant phenotypic and genotypic correlations suggesting that selection directed towards one character may also directly affect the others. However, care should be taken in controlling environmental effects due to significant positive phenotypic correlations. Overall, the study confirmed the presence of trait variability and higher estimates of genetic parameters for most of the characters in the Ethiopian coffee germplasm evaluated indicating the presence of immense opportunity for genetic improvement of the crop.