

Multivariate Analysis of Phenotypic Diversity in the South Ethiopian Coffee (*Coffea arabica* L.) for Quantitative Traits

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Abstract :

Coffee is the most important export crop of the south Ethiopian region with more than 46 percent share of the national market. It covers more than 185 000 ha of land in 50 Woredas (districts) with 11 are high, 7 medium and 32 are low coffee producers. Garden coffee comprises 130000 ha, semi forest 45 000 ha and forest coffee 10000 ha where the semi forest and forest coffee production systems are pertinent to the western part of the region. A field experiment on evaluation of 41 south Ethiopian coffee accessions with 2 standard checks of the southwest Ethiopian origin was conducted using Randomized Complete Block Design at Wonago Research Sub-Station during 1999- 2000 cropping seasons. Data on 7 morphological agronomic characters, average of three years data on severity of CBD and CLR infestations and yield was obtained for the 43 genotypes. The germplasm accessions differed significantly for all the 7 morphological agronomic characters and coffee bean yield in the univariate analyses of variances indicating the prevalence of variability among south Ethiopian coffee germplasm accessions. Further, the first four principal components explained 82.63 percent of the total variation prevalent within the germplasm accessions out of which 32.52 percent was explained by the first principal component. Average linkage cluster analysis using Mahalanobis (D₂) distance for the 10 characters grouped the 43 accessions in to 9 clusters. The number of accessions per cluster ranged from 1 in cluster IX to 13 in cluster II. The clustering pattern of the accessions revealed the prevalence of genetic diversity in the south Ethiopian coffee for the characters considered. The maximum inter-cluster distance was observed between clusters V and VII while the minimum was observed between clusters VI and VII. The study highlighted the possibility of using accessions of the distant clusters as potential candidates for the genetic improvement of south Ethiopian coffee through crossing and selection.

Key Word :

Cluster analysis; *Coffea arabica*; Genetic diversity; South Ethiopia; Germplasm

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