Genotypic Correlations and Paths of Influence among Components of Yield in Selected Robusta Coffee (*Coffea canephora* L.) Clones

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Abstract

On-farm trial comprising five selected robusta coffee clones and one seedling used as control were tested for component associations in farmers' fields at four different agro-ecological zones in the coffee growing areas of Kagera Region, Tanzania during the 2001/2002 growing season. In each zone, one site was selected for the trial. Each farmer's field represented a replicate and had two replicates. Data were collected for the vegetative and reproductive variables and subjected to standard statistical analyses. Simple correlation and path coefficient analyses revealed that in selection for yield of robusta coffee, greater emphasis should be given to plant height and number of berries per node as they had significant positive correlations and relatively high direct effects on yield of clean coffee. Plant girth, canopy radius and primary branches interacted positively with plant height in influencing yield of clean coffee. Number of primary branches with plant height had similar phenotypic and genotypic correlations indicating that both of these variables can simultaneously be selected in robusta coffee. On the other hand, selection for genes promoting percentage bearing primary branches will select against branching and flowering as shown by their opposite signs for genotypic and phenotypic correlations. The importance of the inter-relationships among the components of yield for high yielding clones of robusta coffee is discussed.

Introduction

The importance of using component selection criteria for high yielding clones of coffee was noted by Leroy *et al.* (1997) and Montagnon *et al.* (2001) while working on robusta coffee. Thus, knowledge of the interrelationships between yield and its components is important for selecting or improving two or more variables contributing to yield. Plant characters such as stem girth, width of canopy, percentage bearing nodes, number of flowers and berries are known to be related with and influence yield of clean coffee according to the findings of Dancer (1964), Srinivasan (1980) and Walyaro (1983). The environment may influence the relationships of variables in different ways, thus, making selection and improvement programmes unreliable. This calls for an analysis of relationships attributed to genetic causes in addition to the phenotypic relationships. However, simple correlation coefficient analysis does not provide detailed information on the paths of influence contributing to the total correlation. Path coefficient, on the other hand, enables partitioning of correlation coefficients to their components of direct effects of variables upon others and indirect effects giving a clear picture of individual contributions of variables to a dependent variable. The method is important in the assessment of compensation mechanisms operating among plant components which