STUDY OF SOIL-PLANT INTERRELATIONSHIP IN *HEVEA*: A FACTOR ANALYSIS APPROACH

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An understanding of the numerous soil factors affecting soil fertility is a prerequisite to proper management of soils for better growth and yield of *Hevea*. Soil samples collected from 14 sites planted with clone RRII 105 in 1994 spread out in Thrissur district of Kerala State were analysed for pH, organic carbon, available P, exchangeable Ca, Mg, K, Na and Al and DTPA extractable Fe, Mn and Zn. The data subjected to factor analysis using varimax rotation showed that there were two major factors indicating the latent structure, which included soil reaction control factor and P limiting factor. It was seen that the former factor got higher positive loading from exchangeable Ca, Mg, K, and Na while exchangeable Al and DTPA-Zn contributed negatively. The latter factor is regulated positively by pH and Mn and negatively by exchangeable Al and P. Regression analysis of tree volume and factor scores revealed that P limiting factor essentially influences the plant growth.

Key words: Factor analysis, *Hevea brasiliensis* P limiting factor, Soil reaction controlling factor.

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INTRODUCTION

Soil is an important environmental component influencing the establishment, growth and yield of *Hevea brasiliensis*. An understanding of numerous soil factors affecting soil fertility is a prerequisite to proper management of soils for better growth of the rubber plant. Understanding of soil with regard to a crop includes the study of not only the characteristics of the soils but also their influences on the growth of the given crop either directly or indirectly (Rao, 2000).

The rubber plantation industry in India has scientific research support for the last four decades. The crop management practices adopted in India in the initial stages were a first approximation depending on the data generated in other countries, where the research began in the early twenties (Krishnakumar, 1989). For efficient management, there is the definite need for specific recommendations based on the prevailing agro-ecological and agro-climatological conditions of the country.

For such recommendations to come out, data generation and its careful handling for a meaningful interpretation are pre-requisites. In general, correlation studies are taken up to relate a set of parameters of interest, which however, do not reveal the latent structure of the data. Factor analysis is a statistical technique to reduce the number of variables and to detect the structure of the relationship between variables so that the variables can be classified (Thurstone, 1931). However, meagre information is available regarding the use of factor analysis, relating it to rubber cultivation in India. Recently, Rao (2000) reported the use of such multivariate statistical analytical techniques while processing the data on soil.

In the present study, factor analysis was applied to reduce the dimensionality of the data and to understand the behaviour of *Hevea* in different soils. Regression analysis was also done to relate growth in terms of tree volume and factor scores derived after factor analysis.