Indian Journal of Natural Rubber Research, 9(1) : 17-21, 1996

DIAGNOSIS AND RECOMMENDATION INTEGRATED SYSTEM : 2. DERIVATION OF CRITICAL LEVEL OF LEAF NUTRIENT CONCENTRATIONS IN RUBBER

Mercykutty Joseph and C. R. Ranganathan

Joseph, M. and Ranganathan, C.R. (1996). Diagnosis and recommendation integrated system : 2. Derivation of critical level of leaf nutrient concentrations in rubber. *Indian Journal of Natural Rubber Research*, 9(1): 17-21.

Leaf nutrient critical values were established from a data bank of leaf nutrient concentration, soil nutrient status and yield of rubber (*Hevea brasiliensis*) in South India by applying the principles of DRIS taking into consideration the simultaneous optima for all the nutrients. The critical level for each nutrient was derived using multiple linear regression model relating the foliar nutrient concentration with DRIS indices of all the nutrients. These values were compared with the DRIS derived critical levels. The DRIS derived optima as percentages of dry matter for N, P, K, Ca and Mg were 3.590, 0.258, 1.314, 0.997 and 0.302 respectively. These values were found to be comparable to those derived by multiple as well as simple linear regression and the values reported in the literature. Many of the constraints associated with the development of critical values through the conventional procedure could be overcome by this approach.

Key words : *Hevea brasiliensis*, Foliar analysis, Critical values, DRIS.

Mercykutty Joseph (for correspondence), Rubber Research Institute of India, Kottayam - 686 009, Kerala, India; C.R. Ranganathan, Tamil Nadu Agricultural University, Coimbatore - 641 003, Tamil Nadu, India.

INTRODUCTION

Chemical analysis of plant samples and diagnosis based on critical values have been used for many years in assessing the nutritional status of plants. Ulrich (1952) originally defined critical concentrations for diagnostic purposes as the concentration of a nutrient in a plant needed to produce near-maximal growth. Later, Ulrich and Hills (1967) and Mead (1984) defined critical level as the nutrient concentration required in a plant tissue for optimum growth, yield and/or quality assuming that no other factor is limiting.

The critical values are fixed for each nutrient based on the results of controlled experiments assuming that all other factors limiting growth and production are optimum which is not achieved in most of the situations resulting in variation in critical values for the same crop under different situations (Sumner, 1990). The concentration of a nutrient in a particular plant tissue varies with the concentrations of other nutrients because of the interactions among nutrients in the plant system (Schwartz and Kafkafi, 1978; Sumner and Farina, 1986; Sumner, 1990). According to Sumner and Boswell (1981) simultaneously optimum conditions for nutrients is very important for fixing the critical values.

The Diagnosis and Recommendation Integrated System (DRIS) developed by Beaufils (1973) provides a mechanism for defining the optimum nutrient levels and a method for measuring simultaneously optimum conditions among nutrients. Accord-