AVAILABILITY OF NITORGEN AND PHOSPHORUS IN THE SOIL AND GROWTH OF NATURAL RUBBER PLANTS UNDER INTEGRATED NUTRIENT MANAGEMENT SYSTEM

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Received: 03 August 2020 Accepted: 14 August 2020

Joseph, M., Joseph, K., Hareeshbabu, G. and Elias, R.S. (2020). Availability of nitrogen and phosphorus in the soil and growth of natural rubber plants under integrated nutrient management system. *Rubber Science*, **33**(2): 164-176.

A field experiment to study the effect of integration of chemical fertilizers with bio inoculants on soil fertility and growth of natural rubber plants was conducted at two locations in the traditional rubber growing region of South India experiencing humid tropical climate. After two to three rounds of application, build-up of phosphobacteria was significant in both the locations in both recordings. *Azotobacter* and *Pseudomonas* build up was noticed in a few recordings. Root infection of AMF was more than 90 per cent in both control and treated plants indicating natural infection in rubber roots. The inorganic nitrogen (N) in the soil, especially in the ammoniacal N form was improved by bio inoculant treatments either alone or in combination with chemical fertilizers. The beneficial effect of phosphorus (P) solubilizing microbes on P transformation was indicated through the significant difference in the P fractions, especially on Fe-P fraction. The positive effect was more pronounced in one location where the organic carbon status of the soil was very high. The influence of fertilizer P was directly reflected on the Ca-P fraction. Growth of rubber plants recorded at periodical interval did not show significant difference between the treatments indicating lack of response of rubber plants to applied nutrients. Better understanding of the nutrient dynamics, having continuous uptake with roots spreading to the deeper layers of the soil and release and availability from the slowly available fractions and organic forms is required to explain the soil test crop responses in a perennial crop like natural rubber.

Key words: Arbuscular mycorrhizal fungus, Bio inoculants, *Hevea brasiliensis,* Inorganic nitrogen, Nitrogen fixers, Natural rubber, Phosphorus fractions, Phosphorus solubilizers

INTRODUCTION

Soil fertility is controlled by the soil physical, chemical and biological properties. The highly weathered acid soils of South India subjected to continuous cultivation of natural rubber (*Hevea brasiliensis*) have medium to high organic matter status (NBSS and LUP, 1999; Karthikakuttyamma *et al*., 2000). Establishment and maintenance of leguminous cover crops in the early years (Watson, 1989; Kothandaraman *et al*., 1989; Philip *et al*., 2005) and litter addition through annual leaf fall (Varghese *et al*., 2001) contributed for the high levels of organic

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