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DTPA EXTRACTABLE SOIL MICRONUTRIENTS IN THE TRADITIONAL RUBBER GROWING REGIONS IN INDIA

Essentiality of micronutrients in rubber (*Hevea brasiliensis*) and the specific deficiency symptoms were established by Bolle-Jones (1954) and Shorrocks (1964). Rubber cultivation is mainly confined to red and lateritic types of soil which are highly weathered acid soils and are reported to be low in available nutrients (Pushpadas and Karthikakuttyamma, 1980). Though micronutrients are present in different forms in soil as minerals, complexes, chelates, ions etc. only a small fraction of these nutrients are absorbed by plants (Hodgson, 1963). The absorption of micro-nutrients by plants depends on various factors such as soil pH, organic matter content, weathering conditions, texture, climate, etc. Continuous cultivation of rubber with modern high yielding clones and constant use of high analysis fertilizers, create deficiency of micro-nutrients in soil. In the traditional regions, rubber cultivation is in the second or third replanting cycle and chances of micronutrient deficiency in the soil cannot be ruled out. The present study was undertaken to evaluate the available micronutrient status in rubber growing soils in the traditional regions of India.

Soil samples were collected from 0-30 and 30-60 cm depths from different rubber estates representing the major traditional rubber growing regions of South India. Available Fe, Mn, Zn and Cu contents in the soils were determined through extraction with 5 mM DTPA extractant (0.005 M DTPA, 0.01 M $CaCl_2$, 0.1 M TEA and pH adjusted to 7.3, Lindsay and Norvell, 1978). The extract was prepared by shaking 10 of soil sample and 20 ml of DTPA extractant for two hours (soil to extractant ratio of 1: 2). The extract was filtered through a Whatman No. 1 filter paper and the micro-nutrients were estimated with an atomic absorption spectrophotometer (GBC). Organic carbon and pH (soil to water ratio 1:2.5) were also estimated (Jackson, 1958).

The data on available Fe status is presented in Table 1. The mean values for surface soil ranged from 9.5 to 51.6 mg per kg. The lowest value was recorded at Bethany (Kanyakumari district) and the highest at Pudukad (Trichur district). Similarly, in the subsurface soil, the values ranged from 7.0 mg per kg soil (Chittar, Kanyakumari district) to 48.2 mg per kg soil (Pudukad, Trichur district). In the subsurface soil, the values ranged from 7.0 mg per kg^{-1} soil (Chittar) to 48.2 mg per kg^{-1} soil (Pudukad). The surface soil had higher available Fe content as compared to the subsurface soil. According to Mohapatra *et al.* (1975), the available Fe content in the soils of Kerala, Tamil Nadu and Karnataka ranged from traces to 21.9 mg per kg soil. Acid soils are relatively higher in soluble Fe content (Lindsay and Schwab, 1982). The content of soluble Fe in soils is extremely low in comparison with the total Fe content. Soluble inorganic forms include Fe^{3+}, $Fe(OH)^{+}$, $Fe(OH)^{2+}$ and Fe^{2+} (Lindsay and Schwab, 1982).