

NUTRIENT AND HEAVY METAL STATUS OF SOILS UNDER RUBBER-PINEAPPLE INTERCROPPING IN COMPARISON TO RUBBER-COVER CROP SYSTEM AND NATURAL FOREST

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Soil pH, organic carbon, available nutrients and contents of heavy metals in soil in young rubber plantations under pineapple intercropping were compared with cover crop established plantations and natural forest. A total of 82 and 21 soil samples from rubber-pineapple intercropping system and rubber-cover crop system respectively were collected from surface layer (0-30 cm) of selected fields, including estates and small holdings in the central region of Kerala. Soil samples (15 nos.) were also collected from natural forest within the region of the study. Processed samples were analysed for pH, OC (%), available nutrients and phyto-available heavy metals such as Pb, Cd, Cr, Cu, Zn, Mn and Fe. Compared to soil under rubber-cover crop system, significant decrease in soil pH, available calcium and magnesium, and significant increase in available P and K were observed in soil under rubber-pineapple intercropping system. Phyto-available heavy metal status of the soils showed significantly higher cadmium and iron contents, and significantly lower lead, chromium, copper and manganese contents in rubber-pineapple intercropping system, compared to rubber-cover crop system. Comparison with soil under natural forest showed significantly lower pH and available calcium and magnesium, significantly higher copper content, and a build of available P in both the rubber based systems. Arsenic and mercury contents in soils of all the three systems were below detection limit.

Keywords: Cover crop, Heavy metals, Natural forest, Rubber-pineapple intercropping

Intercropping with pineapple is widely practiced in immature rubber plantations in the initial four years particularly in the central region of Kerala. This is a good source of income for farmers during the unproductive phase of rubber plantation. Experiments conducted in RRII indicated that scientific intercropping with pineapple improved growth of rubber and sustained soil properties (RRII, 2008).

Pineapple intercropping in young rubber is an intensively managed agricultural system involving high rate of addition of nutrients, manures, pesticides, herbicides and hormones. In a survey conducted in central Kerala, Jayasree *et al.* (2006) observed that the quantity of fertilizers applied to pineapple far exceeded the recommended doses.