Phosphorus Behaviour in Boralu Series Soil of Rubber (*Hevea brasiliensis*) Plantations

K.T.T. Samaranayaka[1], H.M.S.K. Herath[1*], A.M.W.K. Senevirathna[1*], R.P. Hettiarachchi[2], E.D. Silva[2] and V. Edirimanna[2]

[1]Department of Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka*
[2]Department of Soil & Plant Nutrition, Rubber Research Institute of Sri Lanka, Dartonfield, Agalawatta, Sri Lanka

Monoculture cropping system adopted for more than a hundred years in rubber *(Hevea brasiliensis)* plantation with same agro-management practices has resulted in nutrient imbalance due to either depletion or accumulation of nutrients in soils. Phosphorus (P) is an essential macronutrient for rubber plantations. The main objective of this study was to determine P behaviour in Boralu series soil in relation to soil pH, organic carbon, available P, moisture content, cation exchange capacity, and bulk density. Forty-eight soil samples representing Boralu series soil were evaluated for available P by NH_4F/HCl and organic carbon by the Walkley Black method. Descriptive statistical data were derived and a regression analysis was also carried out to find a relationship between soil parameters. Available P varied from 30.77mg kg^{-1} in manure circle and 23.20mg kg^{-1} outside the manure circle. Organic carbon content in both areas, in and out of the manure circle, varied from 1.16 to 1.16%. Significant ($p=0.03$) differences were observed between the inside and outside the manure circle for organic carbon content. Whereas no significant differences between the inside and outside of manure circle were observed for the moisture content ($p=0.31$), available P ($p=0.37$), and cation exchange capacity($p=0.13$). There was a positive correlation between organic carbon and available phosphorus with $R^2=0.27$ by the action of phosphorus solubilizing microbes. There was a negative correlation between the organic carbon content and soil pH with $R^2=0.27$as well as available P and bulk density with $R^2=0.25$. Results show that available P content increase with organic matter.

Keywords: Available phosphorus, Boralu series, Bulk density, Organic carbon, pH