

Characterization of bench-marked soil series in the tea growing areas of Sri Lanka, in relation to Potassium dynamics

PCK Ranathungamage¹, GP Gunarathne² and BC Walpola¹

¹*Department of Soil Science, Faculty of Agriculture, University of Ruhuna, Kamburupitiya, Sri Lanka.*

²*Soils and Plant Nutrition Division, Tea Research Institute of Sri Lanka, Talawakelle. Sri Lanka.*

Abstract

As Potassium (K) is an essential and versatile plant nutrient involved in many metabolic processes and functions in plant body, proper management of soil Potassium is a must. Special attention should be paid for tea soils as K deficiencies in soil results in marginal scorching or firing leaf margins in tea flush, which is taken as the harvest. Potassium dynamics in soil behaves differently depending on many factors such as parent material and K buffering abilities of a particular soil series. Hence characterization of soils based on the K dynamics is much important and helps to make many predictions in relation to K behavior of a particular soil series. The objectives of this research were to characterize the bench-marked soil series in the tea growing areas of Sri Lanka, categorize the tea growing soils based on K dynamics and fine tune the existing Site Specific Fertilizer Recommendations (SSFR) thereby. Twenty bench-marked soil series were selected representing sixteen tea growing Agro Ecological Regions (AER) in Sri Lanka and they were analyzed. The Quantity- Intensity (QI) Isotherms relation to Soil K for selected soil series were plotted as the characterization tool. The results showed a variation among subjected soil series based on their K dynamics. Finally selected soil series were categorized in to six groups based on their Potential Buffering Capacities of K (PBC^k), Specific K Sites and Exchangeable K (ΔK_e) present in soil. Also the Exchangeable K (ΔK_e) present in soil showed a significant difference depending on the rainfall and elevation zones, while Cation Exchange Capacities (CEC) of the soil showed a significant difference only depending on the elevation zone. Furthermore it is important to concentrate on this soil categorization based on K dynamics, when fine tuning the existing K fertilizer recommendations for tea growing soils in Sri Lanka in the future.

Key words: quantity-intensity (QI) Isotherms, potential buffering capacities of K (PBC^k), specific K sites, exchangeable or labile K (ΔK_e) and site specific fertilizer recommendations (SSFR).