

Spatial Variability of Available Soil P and K and its Impact on the Site Specific Nutrient Management of Paddy

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Abstract

Adopting blanket fertilizer recommendations can cause imbalances in supply of plant nutrients. The present study was conducted in Kurunegala, Anuradapura and Polonnaruwa districts to investigate the variability of initial soil Phosphorus (P), Potassium (K) levels and yield response for P and K to explore the suitability of site specific nutrient management (SSNM). Surface soil (0-15 cm depth) samples were collected in 28 paddy fields before commencement of the growing seasons: *yala* 2017 and *maha* 2018 and analysed for available P and K. Treatment plots of each site comprised of an ample treatment applied with 50% higher rates than that of N, P₂O₅ and K₂O recommended by Department of Agriculture (DOA) and omission treatments of P and K. Except the nutrient omitted, other nutrients were applied in ample quantities in omission treatments. Total yield of each plot was recorded at harvesting. Initial soil P and K levels were compared with the critical levels (high, medium and low) established by DOA for a site specific application of P and K. Soil analysis showed that soils of 14% of sites were high in P (> 10 mg kg⁻¹), soils of 43% of sites were low in P (< 5 mg kg⁻¹), and soils of 43% of sites were medium in P (5 – 10 mg kg⁻¹). Initial soil K level was high (80 – 160 mg kg⁻¹) in 36% of sites, low (< 40 mg kg⁻¹) in 14% of sites and medium (40 – 80 mg kg⁻¹) in 50% of sites. The coefficient of variance (CV) of the initial P and K levels were 93% and 47%, respectively. These CVs indicated considerable spatial variability of available K and P contents of paddy growing soils. However, omission plot trails did not show a clear yield response for added P and K, revealed the short-term availability of P and K in soil masks the impact of their variability on crop growth. It was concluded that a considerable variability of P and K present in the paddy grown soils in three districts but its short-term impact on the variability of yield does not support the site-specific nutrient management.

Keywords: Paddy, Phosphorus, Potassium, Site specific nutrient management

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