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Exploring the Response of Paddy for Varying Levels of Soil Phosphorus in Tropical Soils

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Abstract

Better management of soil Phosphorus (P) in crop cultivation leads to environmental and economic benefits. Proper understanding of the crop response to inherent soil P is important to develop site-specific recommendations. The objective of this study was to assess the yield response of paddy for varying levels of inherent available soil P in Alfisols and Ultisols. Surface soil (0-15 cm depth) P content was measured in 71 paddy fields in three districts of Sri Lanka, namely Anuradapura, Kurunegala and Polonnaruwa. Experiment plots (3x6 m) at each site comprised of ample application of N, P and K and an omission treatment plot of P. Total yield of each plot was recorded at the end of the season. The available P showed a large variability (range=from 2.7 ppm to 34.2 ppm, CV=78%) meanwhile 31% of the experimental sites were below the optimum soil P level for paddy (5 ppm). Omission plot treatments did not show a clear yield response for added P. Very low correlation coefficient between the yield of the omission treatment with the inherent P level (0.05), indicated that inherent P level will not determine the yield. The yield response was plotted against the Olsen P, and very low R² value (0.03) indicated the Olsen P content does not clearly reflect the actual P requirement in every experimental sites. Short term availability of P from soil reserves cause to mask the effects of spatial variability on yield response and it was concluded that further studies are required to assess P dynamics to take SSNM decisions.

Keywords: Paddy, Phosphorus, Site specific nutrient management

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