

**INITIAL CHANGES OF PHOSPHORUS AND POTASSIUM IN LOW-LAND PADDY SOILS AND RESPONSES OF RICE PLANTS (*ORYZA SATIVA* L.) UNDER FERTILIZED AND UNFERTILIZED CONDITIONS**

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Phosphorous (P) and potassium (K) are two important nutrients for rice plant. At present the availability of these nutrients, both in terms of quality and quantity, have declined while the prizes are increasing. Under such instances it is important to understand efficient mechanisms in rice plants to take up P and K in addition to the mechanisms in soil to store and supply to rice plants. Therefore, an experiment was conducted to study the P and K dynamics in soil and to identify the plant responses for P and K fertilization in a major low land paddy soil. Four fertilizer treatments (recommended P and K, (P1K1) (P2O5 45 kg ha<sup>-1</sup> and K2O 35 kg ha<sup>-1</sup>), recommended P and without K fertilization (P1K0), recommended K and without P fertilization (P0K1), and without both P and K fertilization (P0K0)) were used. Urea and ZnSO<sub>4</sub> were applied for all the treatments as recommended. Four replicates were arranged in a randomized complete block design at the Rice Research and Development Institute at Batalagoda during 2012 yala and 2012/13 maha. Soil samples were collected at the beginning of the experiment and after two seasons of cultivation from top 20 cm, whereas plant samples were collected at the correct physiological maturity stage in both seasons. Solution and available P and K concentrations in soil and tissue P and K concentrations were tested. In the soil solution P concentration was reduced when P fertilizer was not applied, however, the available P (Olsen-P) concentration was not changed. Instead, the P buffering capacity in P unfertilized soil was increased. Responses observed for soil K was different from P. Although the plant DW was unaffected, the height of plants was lower in P and K unfertilized plots (P0K0) than that in standard P and K fertilized plots (P1K1). Furthermore, tissue P concentration was reduced, while K concentration was unaffected. The relative amounts of P and K taken up by P and K unfertilized plants were less than those of the plants under standard P and K application. These responses in soil and plants are required when deciding and designing P and K fertilizer application plans for lowland rice cultivation.

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