

Phahon Ruksumruad 2011: Use of Phosphorus Sorption Characteristic for Determining Rate and Type of Phosphorus Fertilizers for Growing Rice on Acid Sulfate Soils with Residual Lime.

Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science.

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A study on the response of rice, RD. 43 variety, grown on acid sulfate soils with residual lime to rates of phosphate calculated from P adsorption characteristics such as P adsorption capacity (P_{max}), half of P_{max} , 0.2 mg P L^{-1} (PBC) and the rate of 157 mg kg^{-1} recommended by DOA and to different types of phosphate, including TSP and RP was conducted, employing four replications. Rice seedling at 15 days old was planted in pot under greenhouse cover. Urea and KCl at the rates of 0.81 and 0.31 g kg^{-1} were used as top dressing for all treatments and the former at the rate of 0.81 g kg^{-1} was also additionally applied at flowering stage.

The acid sulfate soils, Ongkaruk (Ok) and Bang Nam (Bp) Priew soil series, had field pH of 5.0 and 8.5, respectively. The former soil had almost twice higher phosphate adsorption than did the latter soil with the value of 802 mg kg^{-1} compared to 424 mg kg^{-1} but the adsorption content at the concentration of 0.2 mg P L^{-1} in soil solution was rather similar (398 and 327 mg kg^{-1} , respectively).

Rice grown on acid sulfate soils with residual lime clearly responded to P fertilizer when applied P with height, number of tillering and seed yield being higher than those without P fertilization. The rice grown on Ok soil series of which the soil remained very acidic responded well to TSP, giving a 192 g of seed per pot whereas the other soil responded slightly to this P fertilizer. Phosphorus application at P_{max} induced the plant to reach flowering stage faster than did the other rates and gave the highest yield of 143 g per pot when grown on Ok soil series while rice grown on Bp soil series only responded to P at the rate of PBC in the case of vegetative growth. Phosphorus application at recommended rate gave the highest seed yield of 109 g per pot which was similar to the yield of 102 g per pot when applied at PBC rate.

The use of TSP tended to lower P adsorption in these soils than did the use of rock phosphate. Likewise, the high rate of P application can decrease more P adsorption than can the low rate. Applying P at $\frac{1}{2} P_{max}$ resulted in the lowest amount of P at PBC and no P application tended to give the highest content of P at PBC.

Student's signature

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