

Piyanun Wiwatwittaya 2012 : Response of Cassava Grown on a Chatturat Soil to Phosphorus Fertilizer. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Miss Suphicha Thanachit, Ph.D. 72 pages.

A study was conducted to examine the response of cassava KU50 variety grown on a Chatturat soil in Sikheu district, Nakhon Ratchasima province to six rates (0, 4, 8, 12, 16 and 20 kg P<sub>2</sub>O<sub>5</sub>/rai) of P fertilizer and to compare to predicted yields obtained from various crop modelling. This was in order to gain the rate of P fertilizer suitable for growing cassava. Experimental design was Randomized Complete Block with three replications. All treatments received 20 kg N/rai and 20 kg K<sub>2</sub>O/rai. All fertilizers were split equally and applied at one and three months after planting. Cassava yield and plant parameters were harvested and investigated at nine months of age. Phosphorus concentration and P uptake in above ground biomass and tuber were undertaken at the time of harvesting.

Result revealed that the rate of P fertilizer had statistically different effect on fresh tuber weight and P uptake in tuber. The application of 4 kg P<sub>2</sub>O<sub>5</sub>/rai resulted in the highest fresh tuber yield of 5.9 ton/rai and tended to give the highest starch yield of 1.8 ton/rai. An increase of P fertilizer tended to cause a reduction of tuber yield although the application at the rate of 16 kg P<sub>2</sub>O<sub>5</sub>/rai induced the highest accumulation of this nutrient in tuber.

Using Linear Response Plateau model (LRP), cassava responded to low rate of P fertilizer (3.8 kg P<sub>2</sub>O<sub>5</sub>/rai) giving fresh tuber yield of 4.9 ton/rai due to a moderate level (15 mg/kg) of available P. This model could effectively be used to predict the yield of cassava, which the yield predicted was similar to those obtained from the experiment when applied at the rate of less than or equal to 3.8 kg P<sub>2</sub>O<sub>5</sub>/rai. When increased the rates to 8-20 kg P<sub>2</sub>O<sub>5</sub>/rai, the predicted yield was 60-128% higher than that of the actual yield. Mitscherlich-Bray model was the best at predicting yield in almost all rates of P application compared to those retrieved from the experiment, especially at the rate of 4 kg P<sub>2</sub>O<sub>5</sub>/rai which gave the fresh tuber yield of 5.9 ton/rai. Phosphorus Decision Support System program (PDSS) could not be used for cassava yield prediction owing to predicted values being considerably higher than the actual yield.

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Thesis Advisor's signature