

Wasana Khaokaew 2006: Ammonium Release in some Paddy Soil Series and Response of Rice on Nitrogen Fertilizer Simulated by DSSAT program in Saraburi Soil Series. Master of Science (Agriculture), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Professor Tasnee Attanandana, D.Agr. 95 pages.
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Fertilizer management is one of the key factors for high yielding of rice including good variety and suitable soil management. Nitrogen fertilizer application on rice is one of the crucial factors for maximum profit. Ammonium release or accumulation after submergence was known to be the index of nitrogen supplying capacity of the soils. The data is useful for effective fertilizer application. The study on ammonium release of 18 soil series which are the representative paddy soils in the lower North, Central Plain and Northeast of Thailand was performed. And the response of rice on nitrogen fertilizer on Saraburi soil series and the critical level of ammonium in soil for rice produce were also done. The work comprises 5 experiments: (1) Amount and pattern of ammonium accumulation. The results showed that ammonium contents of all soils studied increased with time of submergence. The ammonium content reached the peak at 28 days of submergence. The amount released was higher with higher total nitrogen and pH of the soils. The amount released of the soils followed the equation, $Y = A - Be^{-ct}$ except four soils series, this might be due to the discontinuous release of ammonium at the first 28 days of submergence. The amount of ammonium release depends on soil total nitrogen. (2) Comparison of the temperature of soil incubation on ammonium release. The higher ammonium content incubated at 40 °C was observed compared to the ammonium content at 30 °C incubated temperature. A highly significant correlation was observed between the amounts of ammonium released at the two temperatures. (3) Comparison of extractable ammonium using four different extracting solutions was investigated. There was high significant correlation between Mehlich I and 0.25 M H₂SO₄ extractable ammonium and the ammonium released at two weeks of incubation. (4) Critical level of ammonium study. The critical level of ammonium was found at 12.53 mg/kg with air dry soil. (5) Response of rice on nitrogen fertilizer in Saraburi soil. The results showed that Suphanburi 1 rice variety responded at 4.40 kg N/rai with 790 kg/rai of rice yield.

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