D-D1-13

Effect of Nitrogen Fertilizer Rate at Panicle Initiation Stage on Yeild and Nitrogen Use Efficiency of Spring Rice at Thai Nguyen Province, Vietnam

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The objectives of this study were to determine nitrogen fertilizer rate at panicle initiation stage (PIS) for high rice growth, yield and N use efficiency. An experiment was conducted at Experimental Station of Thai Nguyen University of Agriculture and Forestry, Vietnam. The experiment included three N rates (0, 30, 60 kg N/ha) at panicle initiation stage and two N rates (0, 30 kg N/ha) at tillering stage (TS). One rice variety (Khang Dan) was used in the experiment. Yield and yield component of treatment with 30 kgN/ha applied at TS were not significantly different from those of the treatment with no N application. Application of 60 kgN/ha at PIS significantly increased number of panicle/m2, grain yield and protein content compared to the no N application. Total plant N uptake measured at harvest was not significantly different between treatments with 30 kgN/ha and without N application at TS. Nitrogen uptake efficiency from N applied at PIS depended on N rate applied at TS and ranking from 56.6 to 77.9%, if no N application at TS. In average of both no N and 30 kgN/ha applied at TS, application of 30 kgN/ha at PIS had NUE of 68.8-77.9% and agronomic N use efficiency (ANUE) of 21.6 to 24.3kg grain/kg applied N which were higher than those of treatment with 60 kgN/ha applied at the same stage.

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Fate of Heavy Metals Supplied through Irrigation Water in Paddy Field

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The heavy metal pollution of irrigation water provokes serious concerns on the safety of agricultural products and the contamination of soil and ground water. To assess the fate of heavy metals polluted in irrigation water, We conducted a field experiment in 2006 where rice was irrigated throughout the growing season with water comprising three kinds of heavy metal (Cd, Pb and As) and four levels of their concentration. Heavy metals were analyzed for four soil layers (0-5, 5-10, 10-20 and 20-30 cm) and rice plant at harvest and calculated the distribution of applied heavy metals. Rice plant absorbed 0.1 to 7.2% of the total heavy metals supplied through irrigation, decreasing with the increasing concentration treated. Heavy metals accumulated more in the upper soil layer, showing the highest concentration in 0-5 cm soil layer. Heavy metals in irrigation water increased the soil heavy metal concentration significantly even at the WHO recommended irrigation water standard (As and Pb). At low concentration treatment, a majority of heavy metals (91-100%) accumulated in the upper soil layer of 30 cm. However, at higher concentration treatment the proportion of heavy metals accumulated in the upper soil layer was decreased, increasing the proportion (8.4-52.8%) of leaching loss below 30 cm soil layer. The results imply that the heavy metals in irrigation water not only contaminate the soil and agricultural products but also have the potential menace to pollute the ground water.

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