

ABSTRACT

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The study consisted of two experiments conducted concurrently at the Multiple Cropping Center (MCC) and Mae Hia Agricultural Research Station and Training Center (MH) Faculty of Agriculture, Chaing Mai University during 2001-2002. The objectives were to examine the influence of N-fertilizer split-application (a total rate of 20 kg N rai^{-1}) on growth and yield performance of paddy rice, Klong Laung 1 cultivar. Changes in soil NH_4^+ and NO_3^- in each fertilizer treatment were also investigated.

Results indicated that rice yields obtained from MH experimental plots which had relatively high organic matter and total N contents, were not statistically different among fertilizer treatments. On the other hand, at the MCC plots with considerably low organic matter and total N, the three equal split-applications of nitrogen resulted in the highest grain yield (830 kg rai^{-1}). In addition, it was found that on the average, rice yields obtained from MH were considerably higher as compared to those received from MCC plots, regardless of N-fertilizer treatment. Nevertheless, nonsignificant relationships were observed among grain yields, plant nitrogen contents, and soil $\text{NH}_4^+/\text{NO}_3^-$ concentrations.

At both MH and MCC experimental plots, concentrations of NH_4^+ and NO_3^- in surface and subsoils tended to decrease 1-3 months after rice planting for all treatments. Particularly, the NO_3^- concentration decreased rapidly to almost 0 mg N kg^{-1} within the first month (submerged condition). Upon drainage, however, both NH_4^+ and NO_3^- in the soil tended to increase 1-2 months after rice harvesting. Considering the very low NH_4^+ (0.03-3.42 mg N kg^{-1}) and NO_3^- (0.00-1.94 mg N kg^{-1}) concentrations noted in the surface water and subsoil, the application methods and N-fertilizer rate used in the experiment were unlikely to have any adverse effect on the environment.