B-65 Characterization of non-exchangeable ammonium nitrogen in rice growing soils of Sri Lanka

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Ammonium nitrogen (NH_4^+-N) trapped in interlayer spaces of clay minerals is frequently termed as non-exchangeable or fixed NH_4^+-N form of soil nitrogen. Amount of fixed or non-exchangeable NH_4^+-N varies from soil to soil and depends on soil type, clay content and other soil environmental conditions. Quantification of non exchangeable form of nitrogen in our soils has not been done adequately. Therefore, the objectives of the present study are; (1) to characterize non exchangeable NH_4^+-N in rice growing soils and (2) to examine release and fixation pattern of nitrogen in soil under rice cultivation in greenhouse conditions.

13 soils were collected from different agricultural areas of Sri Lanka. Rice plants (BG-300) were established in pots filled with soil and maintained in flooded condition in a greenhouse. Recommended fertilizers were applied except nitrogen. Soil sampling was done before and after rice establishment. All soil samples were analysed for non exchangeable NH_4^+-N using a method described by Silver & Bremen (1966).

Results showed that fixed or non-exchangeable NH_4^+-N in studied soils varied from 12 to 28% of total nitrogen. As we anticipated, the amounts of non-exchangeable NH_4^+-N were highly correlated with the clay content of the soils. Therefore, it can be deduced that the amount of non-exchangeable NH_4^+-N in a given soil depends on the clay content. Release of fixation of non-exchangeable NH_4^+-N during the rice growing period was also monitored. No significant difference of the amounts of non-exchangeable NH_4^+-N extracted before and after rice cultivation was observed. This relatively unchanged pattern of non-exchangeable NH_4^+-N during the growing period could be attributed to the experimental conditions such as short time period of experiment and the use of no nitrogen fertilizer practice.