Soil fertility status under shifting cultivation in East Kalimantan with special reference to mineralization patterns of labile organic matter

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Abstract

We investigated soil fertility status under shifting cultivation in East Kalimantan with special reference to mineralization patterns of labile soil organic matter (SOM). The soils in this region were generally strongly acidic with high Al, low bases and low pH values. A 133-day incubation experiment using fresh soils revealed that NH_4^+ often accumulated during the course of N mineralization, indicating a delay of nitrification relative to N mineralization in these soils. Principal component analysis followed by stepwise multiple linear regression showed the contribution of soil physicochemical properties to mineralization patterns of SOM. Those results indicated that the overall SOM level positively contributed to the amount of readily mineralizable C and N, NH_4 at day 133, and NO_3 at day 133. The results also showed that the factors relating to soil acidity and P and K depletion, as well as accumulation of readily mineralizable C, contributed to suppress nitrification and accelerate NH_4^+ accumulation and possibly subsequent N immobilization. Our results suggest that it will be difficult to establish a cropping system without a long period of fallow unless very high amounts of fertilizer as well as liming are applied in these regions.

Keywords East Kalimantan - Nitrogen mineralization - Readily mineralizable soil organic matter - Shifting cultivation - Soil acidity