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Apparent Nitrogen Mineralization Rates of Several Green Manures Incorporated in Soil and the Application Effects on Growth of Komatsuna Plants

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Abstract

Apparent nitrogen mineralization rates and the availability of released nitrogen to komatsuna plants succeeding green manures (GMs) incorporated to soil were investigated using a pot experiment to develop a reasonable crop rotation system that decreases environmental loads by ensuring nutrient cycling. Four GM residues—hairy vetch (HV), sunflower (SF), crotalaria (CR), and upland rice (UR)—were mixed with soil, respectively, to produce 200kg N ha⁻¹. Furthermore, a fertilizer (F) plot with the same N amount of chemical fertilizer applied and a control (C) plot with no amendment were set. Komatsuna plants were grown for 75 days under the treatments in a plastic green house. Plants were sampled five times to determine their dry weights and nitrogen contents. Dry weight yields of komatsuna were highest in F plot, with those of HV and SF plots following, although that of UR plot was less than that of C plot. The N content of komatsuna showed similar results. Absorbed N, as derived from the amendments, was greatest in F plot, followed by HV and SF plots, although the UR plot had less than control. Regarding apparent nitrogen mineralization rates which were calculated by subtraction method, significant differences were found between HV and CR, and HV and UR plots, and between SF and CR, and SF and UR plots, but not between HV and SF. Inorganic nitrogen in soil was higher in HV and

SF plots than CR and UR plots. The residues of HV and SF demonstrated preferred characteristics as GMs for a nitrogen supplier to succeeding crops.

Key words

[green manure](#), [hairy vetch](#), [sunflower](#), [crotalaria](#), [upland rice](#), [apparent nitrogen mineralization rate](#), [Synchronization](#), [recovery rate](#), [C/N ratio](#)

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