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**Nitrogen Uptake by Cover Crops and Inorganic Nitrogen Dynamics in
Andisol Paddy Rice Field**
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Abstract

Paddy field rice can conserve N in the soil under flooded conditions. However, residual soil N represents a potential environment concern when fields are no longer flooded. Winter annual grass cover crops may provide an alternative means to conserve residual soil N following rice harvest. A two years field experiment was conducted at the Ibaraki University of Experimental Farm, to compare dry matter and N uptake by rye (*Secale cereale* L.), oat (*Avena sativa* L.), triticale (*Triticum secale* L.), wheat (*Triticum aestivum* L.) and fallow (no cover) in relation to soil residual N level.

Dry matter and N accumulation by the following April were in the descending order of rye>triticale>wheat= oat>fallow, while residual soil N levels followed the reverse order. Residual soil N level exerted the greatest influence on cover crop DM accumulation, with differences in N levels becoming more pronounced by the April sampling date. On 17 April, DM differences between the low and high residual soil N levels were 3.45 vs 6.82Mgha⁻¹ for rye (98% increase), 1.15 vs 1.45Mgha⁻¹ for oat (26% increase), 1.49 vs 1.99Mgha⁻¹ for wheat (34% increase), and 1.70 vs 2.98Mgha⁻¹ for triticale (75% increase), respectively.

Cover crop N accumulation followed patterns similar to those for DM, but was mainly influenced by main effect factors. Residual soil N level again exerted the greatest influence on N accumulation. Between species, N accumulation for rye was greater than oat and wheat across all planting dates. By 8 March, the greatest N accumulation occurred with rye (14.0kgNha⁻¹), with other species accumulating 5.4 to 7.5kgNha⁻¹. Cover crop N

accumulation increased appreciably from 10 March to 17 April.

These results demonstrated that grass cover crops have a great potential for controlling soil residual N. However, additional research will be needed to determine the contribution of cover crop N to subsequent rice growth.

Key words

[Cover crop](#), [Paddy field](#), [Nitrogen](#), [Rye](#), [Wheat](#), [Triticale](#), [Oat](#)

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