

Application Effects of Legumes on Growth, Yield of Vegetables and Nitrogen Dynamics by Using ¹⁵N Tracer

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Objectives

- To evaluate the application effects of **legumes** on **vegetables** growth and yield.
- To clarify the **nitrogen dynamics** in the soil amended with legumes by **¹⁵N tracer** method.

Materials and Methods

Crop Vegetables
Komatsuna (<i>Brassica rapa</i> var. perviridis)
Radish (<i>Raphanus sativus</i> var. sativus)



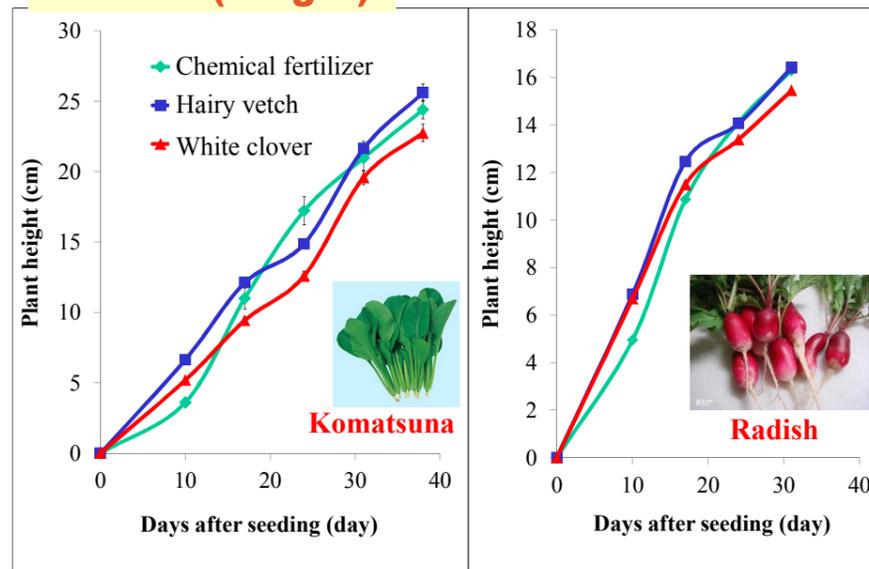
Komatsuna Radish

Treatments	Application rates	C (%)	N (%)	C/N
Chemical fertilizer (NH ₄ Cl)	76.4g m ⁻² (20 gN m ⁻²)	0	26.2	0
Hairy vetch (<i>Vicia villosa</i> Roth.)	376g DW m ⁻² (19.0 gN m ⁻²)	41.8	2.75	13.9
White clover (<i>Trifolium repens</i>)	368 DW m ⁻² (17.6 gN m ⁻²)	44.7	3.49	13.0



Labeled with ¹⁵N

Growth (Height)



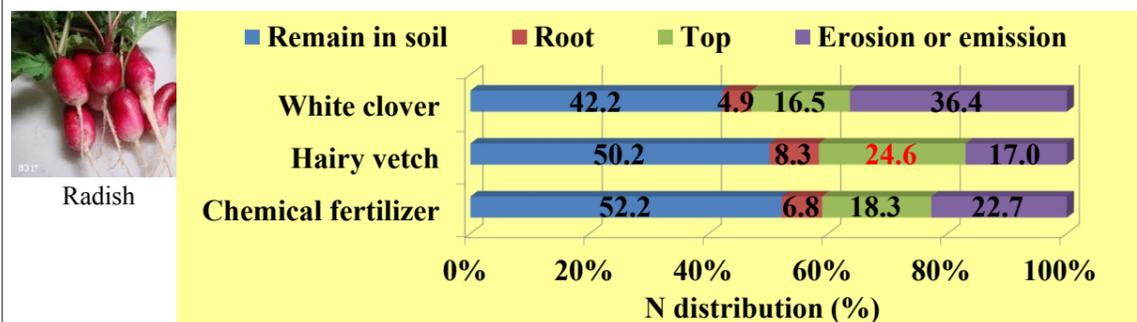
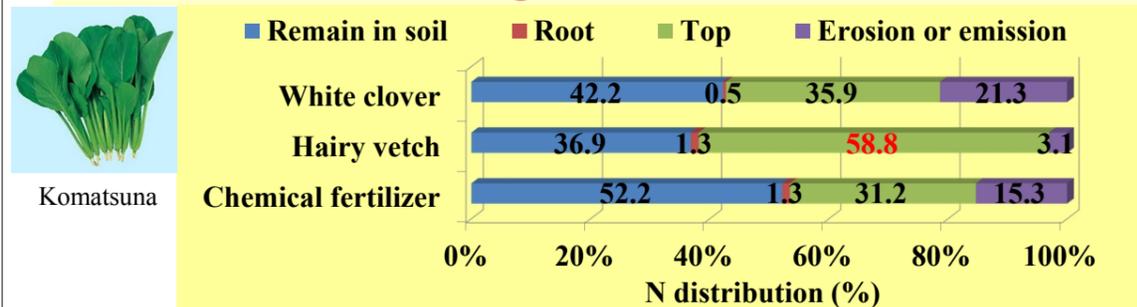
Komatsuna yield

Treatments	Leaf length (cm)	Root length (cm)	No. of Leaves	Leaf weight (g plant ⁻¹)	Fresh weight (g plant ⁻¹)
Chem. Fert.	24.4 a	13.9 a	8.33 a	25.9 b	27.2 b
Hairy Vetch	25.6 a	13.0 a	8.24 a	32.8 a	34.0 a
White clover	22.8 a	11.1 a	7.93 a	23.4 b	24.2 b

Radish yield

Treatments	Leaf weight (g plant ⁻¹)	Root weight (g plant ⁻¹)	Fresh weight (g plant ⁻¹)	Root length (cm)	T/R ratio
Chem. Fert.	6.47 a	5.52 a	12.0 a	4.73 a	1.17 a
Hairy Vetch	5.57 b	3.57 b	9.14 b	3.60 b	1.56 b
White clover	4.82 c	2.49 c	7.31 c	3.69 b	1.94 c

Fate of N from the Legumes and Chemical Fertilizer



Conclusions

- Komatsuna and radish showed **different responses on N sources**. Especially, **komatsuna prefer N from the legumes**.
- N recovery** of komatsuna was **higher in hairy vetch** than that in white clover and chemical fertilizer.
- It assumed that **hairy vetch** and **white clover** were **useful organic materials as basal fertilizer** for the vegetables as well as chemical fertilizer.

Acknowledgement

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