

# Nitrogen from Hairy Vetch (*Vicia villosa* Roth) as Winter Green Manure for White Cabbage in Organic Horticulture

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## ABSTRACT

The effect of the nitrogen (N) supply from hairy vetch, grown as winter green manure, on white cabbage was investigated in field trials performed on an organic farm in north-west Germany over two years. Hairy vetch was either used as green manure or harvested. One of two bare soil fallow treatments was supplied with hairy vetch shoot mass to serve as a reference. In 2002 and 2003, hairy vetch and weeds accumulated 136 and 178 kg ha<sup>-1</sup> of shoot N and yielded 3.79 and 4.72 t ha<sup>-1</sup>, respectively. After ploughing and planting white cabbage (*Brassica oleracea* L. *convar. capitata* var. *capitata f. alba*) at the beginning of June, the amount of soil mineral N (SMN) in the topsoil layer was investigated biweekly for about 6–8 weeks until canopy. In 2002, a maximum of 121 kg SMN ha<sup>-1</sup> for the green manure hairy vetch treatment was reached within 2 weeks, whereas in 2003 a maximum of only 60 kg SMN ha<sup>-1</sup> was observed, due to an exceptionally dry and warm season. In 2002, white cabbage shoot yielded an average 4.4 t DM ha<sup>-1</sup> (range 3.9–5.1 t ha<sup>-1</sup> DM) and had accumulated 153 kg N ha<sup>-1</sup> (range 129–178 kg N ha<sup>-1</sup>). Mean fresh matter yield (FM) of a single head was only 1.2 kg ± 0.1 kg due to severe pest damage. In the following year, the mean head yield was 5.1 kg FM (range 3.4–6.4 kg) and head yield per hectare was 5.8 t DM (range 4.6–7.5 t DM ha<sup>-1</sup>) with a mean head N uptake of 182 kg ha<sup>-1</sup> (range 136–237 kg N ha<sup>-1</sup>). The relationship between the weighted arithmetic daily mean of SMN for the first 6–8 weeks after the hairy vetch harvest date and the N uptake of cabbage at two sampling dates was significant, as were most correlations between presented core parameters. Although only about 27% of the N supplied in the green manure was apparently recovered in cabbage shoot at final harvest, a balanced field N budget can be ensured by using hairy vetch as a basic N source for a subsequent white cabbage cash crop.