



Nitrogen Efficiency and Environmental Impact from Different Strategies for Management of Green Manure Leys



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Introduction

Annual green manure leys are important nitrogen sources in organic farming systems without animals. The aim of this project was to elucidate the magnitude of ammonia emissions and leaching losses from cut plant material and to identify the factors affecting these losses under field conditions.

Materials and methods

Ammonia emissions and leaching from cut plant material were measured during a 3 year period in randomised block trials. A comparison was made between two different cutting strategies; frequent cutting (4 times per season) and less frequent cutting (2 times per season).



Fig. 1a. **Ammonia emissions** were measured continuously for two weeks after each cutting with passive diffusion samplers (PDS) exposed in ventilated chambers and in the ambient air.



Fig. 1b. In order to measure the **leaching losses**, precipitation water that passed through the cut plant material was collected, quantified and analysed for total N, P and C content.

Results and conclusions

- Both the emission dynamics and the level of ammonia emissions are strongly dependent on weather conditions. Ammonia emissions seem to occur primarily in conjunction with the decomposition of organic material during and after moist and warm periods.
- With the exception of nitrogen in 2001 and carbon in 2002, the leaching losses were the largest in the treatment with frequent cuttings. This cutting strategy also gave rise to a less efficient utilisation of the growth potential and the nitrogen fixation capacity of the ley.
- The mineral nitrogen content of the soil was low in both treatments, at all sampling occasions. This finding confirms that the ley is able to efficiently utilise any easily soluble mineral nitrogen in the soil.

Year	N loss via NH ₃ emissions kg ha ⁻¹	Leaching from cut plant material to soil (kg ha ⁻¹)		
		N	P	C
2001	7-8	32-38	7-11	640-680
2002	30-39*	45-52	13-15	480-510
2003	10-51	Ca 28	8-9	370-380

* Uncertain value due to many wet samplers

Table 1. Nitrogen loss via ammonia emissions and leaching of N, P and C from cut plant material to soil.

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