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Catch crops in spring barley on sandy soils: nitrate leaching and residual value

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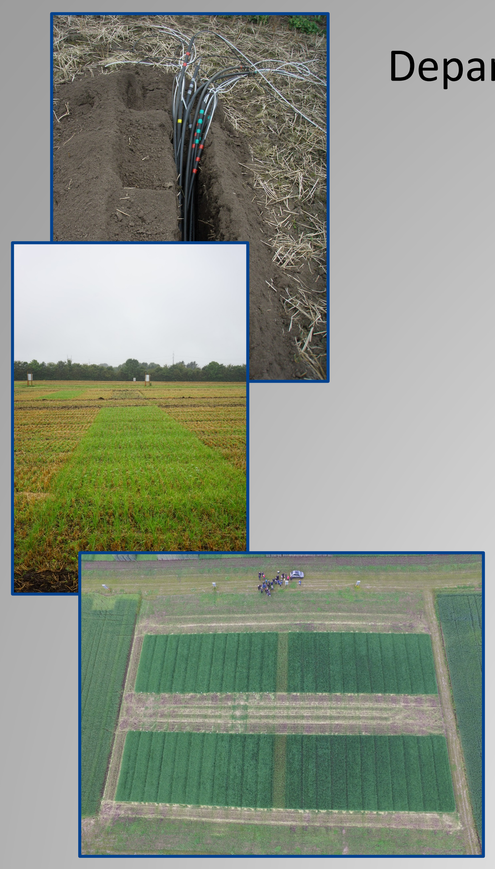


INTRODUCTION

In many temperate areas with excess rainfall, preventive measures have been introduced to reduce nitrate leaching in fall and winter. With more than 60% of the land farmed, Denmark has implemented a series of policy action plans for protection of its vulnerable water environments.

Cultivation of catch crops (CCs) is one of the most important initiatives and CCs are required by law on a certain proportion of farmland. As the use of CCs is widespread and is even expected to increase in the future, an accurate determination of potential leaching reduction and residual value is essential.

OBJECTIVES

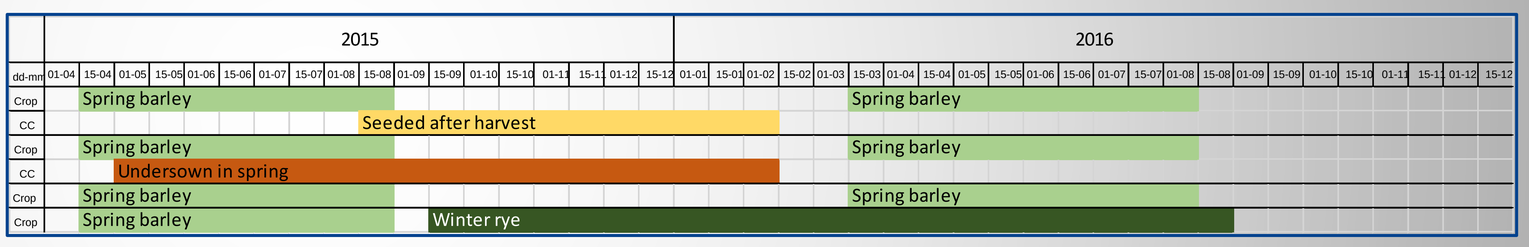
- To test the effect of CCs on nitrate leaching in spring barley cropping.
- To compare the potential nitrate leaching reduction by CCs with that of winter rye.
- To determine the residual value of CCs in the following year (bare soil).

CONCLUSIONS

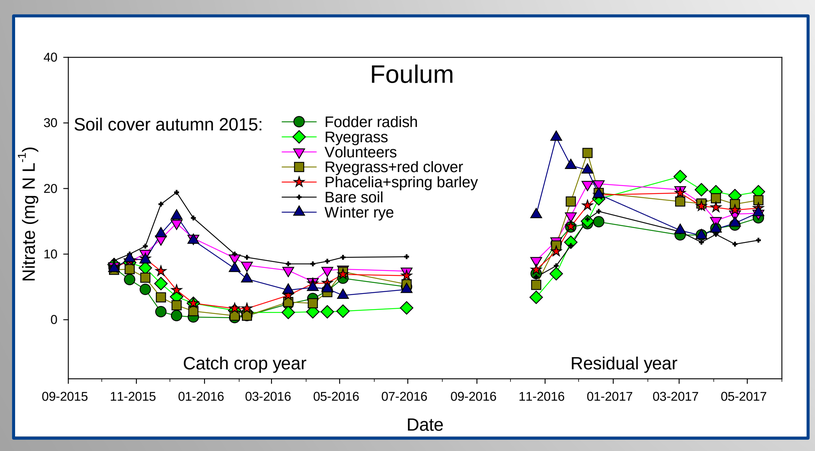
- N uptake in ryegrass and fodder radish CCs ranged from 25-59 kg N ha^{-1} in late autumn.
- Winter rye held 2-5 kg N ha^{-1} at the same time.
- Reduced N leaching was reflected in increasing fall N uptake and indicated 60-80% N retention in late N uptake and N in roots.
- The residual effect of CCs on yield, N uptake and N leaching was generally low or absent.

MATERIALS AND METHODS

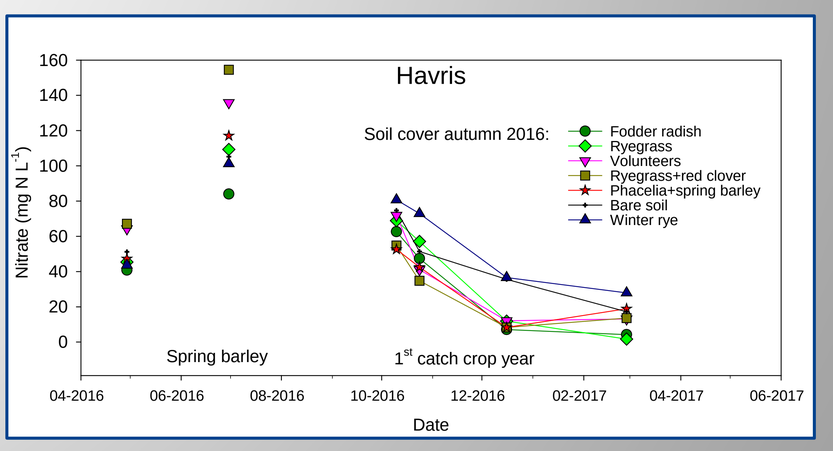
- Two field experiments on sandy soils (Foulum, Havris).
- Year(s) with CCs followed by a residual year.
- CC production, nitrate leaching, main crop yield.



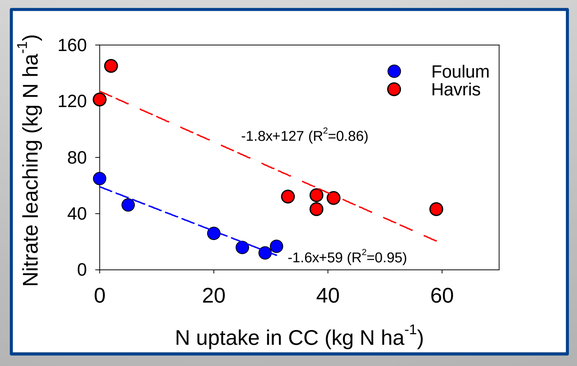
RESULTS



Autumn cover	Total N uptake (kg N ha^{-1})	
	Foulum	Havris
Fodder radish	29[a]	59[a]
Ryegrass	31[a]	38[b]
Volunteers	26[a]	33[b]
Ryegrass+red clover	25[ab]	38[b]
Phacelia+spring barley	20[b]	41[ab]
Winter rye	5[c]	2[c]



Autumn cover in CC year	CC year	Residual year	Total
	Leached nitrate, Foulum (kg N ha^{-1})		
Fodder radish	12[c]	48[a]	60[b]
Ryegrass	17[c]	61[a]	77[b]
Volunteers	52[a]	64[a]	115[a]
Ryegrass+red clover	16[c]	62[a]	78[b]
Phacelia+spring barley	26[bc]	60[a]	86[ab]
Bare soil	65[a]	51[a]	116[a]
Winter rye	46[ab]	74[a]	120[a]



Periods	Growth season	Autumn/winter
Autumn cover	Leached nitrate, Havris (kg N ha^{-1})	
Fodder radish	52[a]	43[b]
Ryegrass	64[a]	53[b]
Volunteers	77[a]	52[b]
Ryegrass+red clover	79[a]	43[b]
Phacelia+spring barley	62[a]	51[b]
Bare soil	74[a]	121[a]
Winter rye	65[a]	145[a]

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