

# Early-sown winter cereals as substitute for nitrate catch crops

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## Introduction

Denmark has a temperate coastal climate with humid winter conditions. Thus, there is a high risk of nitrate leaching after harvest of e.g. cereals. To reduce this risk, catch crops grown in autumn are part of the Danish environmental legislation. But often farmers prefer to grow winter cereals instead of catch crops. Early-sown winter cereals may be able to substitute the effect of catch crops in reducing nitrate leaching losses<sup>1</sup>.



## Methodology

Field experiments were carried out 2015-16 on two sandy loam soils. Nitrate-N concentrations were measured in soil water extracted from 1 m soil depth by ceramic suction cups, permanently installed in the field (picture right).

Table 1. Sowing dates for two winter cereals at Foulum and Flakkebjerg, and sowing dates for fodder radish catch crop.

Treatment	Sowing date 2015	
	Foulum	Flakkebjerg
	Winter rye or fodder radish	Winter wheat or fodder radish
Early-sown winter cereal	3 September	2 September
Timely sown winter cereal	29 September	29 September
Fodder radish	4 September	6 August <sup>1</sup>
Bare soil	-	-

<sup>1</sup> Broadcasted before harvest of the main crop.

## Results

Table 2. Average nitrate leaching (kg N/ha) and nitrogen uptake in autumn (kg N/ha).

Treatment	Foulum		Flakkebjerg	
	Leaching <sup>1</sup>	N-uptake <sup>2</sup>	Leaching <sup>3</sup>	N-Uptake <sup>4</sup>
Early-sown winter cereal	15 D	18 A	20 C	12 B
Timely sown winter cereal	37 B	3 C	34 B	3 C
Fodder radish	17 D	18 A	10 D	27 A
Bare soil	45 A	-	47 A	-

<sup>1</sup> From 12 October 2015 to 4 May 2016 (percolation, bare soil: 724 mm).

<sup>2</sup> 28 October 2015.

<sup>3</sup> From 24 November 2015 to 17 May 2016 (percolation, bare soil: 583 mm).

<sup>4</sup> 5 November 2015.

## Conclusion

The study showed that at Foulum early-sown winter rye can reduce nitrate leaching to the same level as fodder radish when sown at the same time. At Flakkebjerg earlier sowing of fodder radish was more effective in reducing nitrate leaching than early-sown winter wheat.



Installation of suction cups at Foulum, 2015.