



Cover cropping under temperate conditions: influence of growth period and incorporation time

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INTRODUCTION

Cover crops (CC) are generally followed by spring sown crops which limits the use of winter cereals in a crop rotation. A change from winter cereals as e.g. winter wheat to a spring sown crop as barley often results in a reduction in grain yield. This study tested the potential for using fast growing CC that could allow for repeated winter wheat growing.

OBJECTIVES

- To test the potential for CC use in winter wheat and spring barley.
- To determine C and N decomposability of CC as influenced by species and developmental stage.

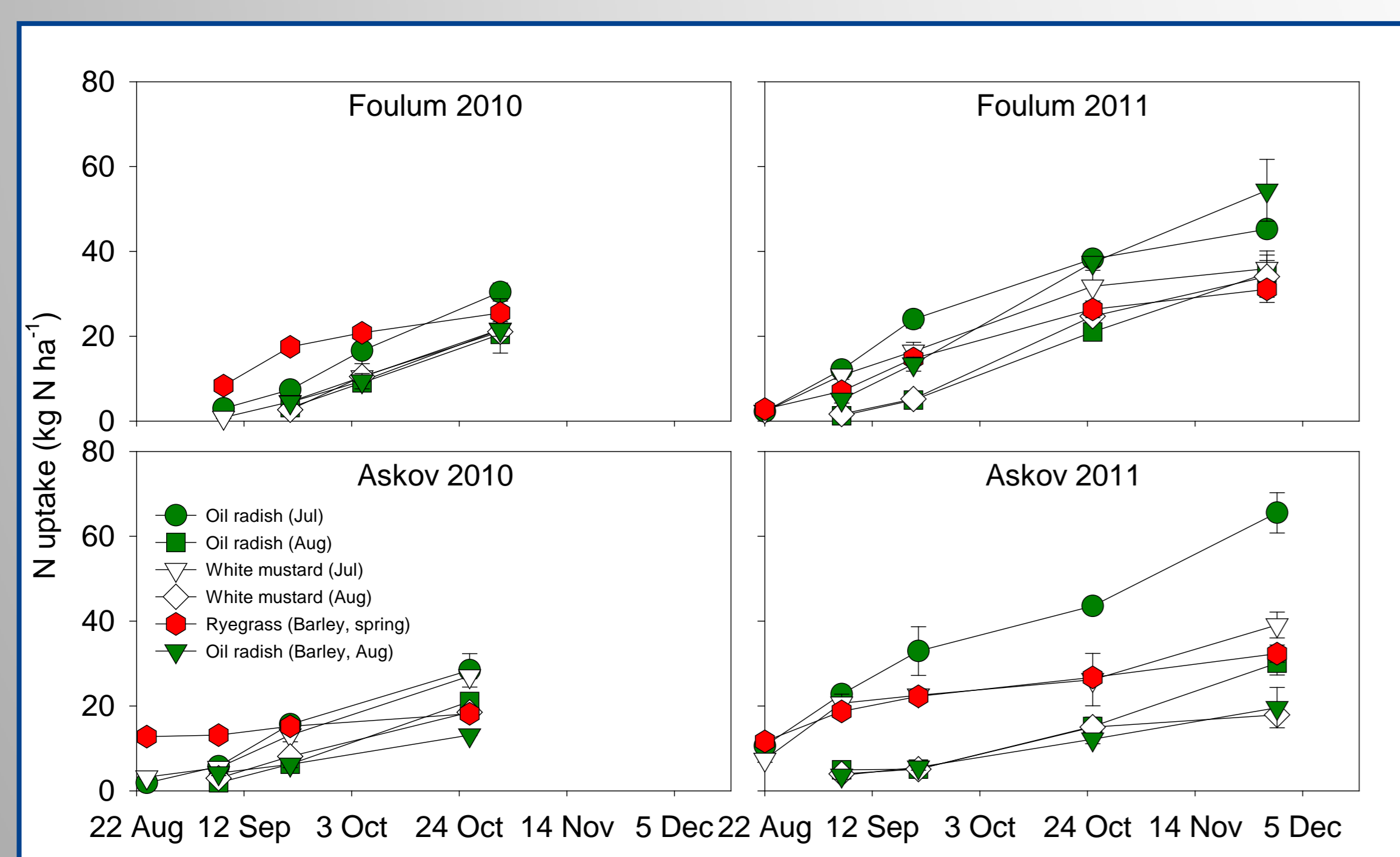
MATERIALS AND METHODS

Cruciferous CC crops were either broadcasted in winter wheat in July or sown in August after harvest of winter wheat or spring barley. Ryegrass sown in barley in spring was included. Nitrate leaching after incorporation of CC in September, late autumn or in spring was determined in lysimeters. Two years and two sites/soils were involved. Harvested CC biomass was incubated for determination of CO₂ evolution (20 C) and N mineralization (2 C and 10 C).

CONCLUSIONS

- A maximum of 66 kg N ha⁻¹ was taken up by CC.
- The potential for N uptake was highest for broadcasting seeds in July.
- The reduction in nitrate leaching after incorporation of CC in September was about half the size of the reduction found for CC incorporated in late autumn or spring.
- C evolved after 208 days of incubation at 20 C corresponded to 45 to 66% of applied C.
- Mineralization of N was strongly related to CN ratio of the applied CC biomass

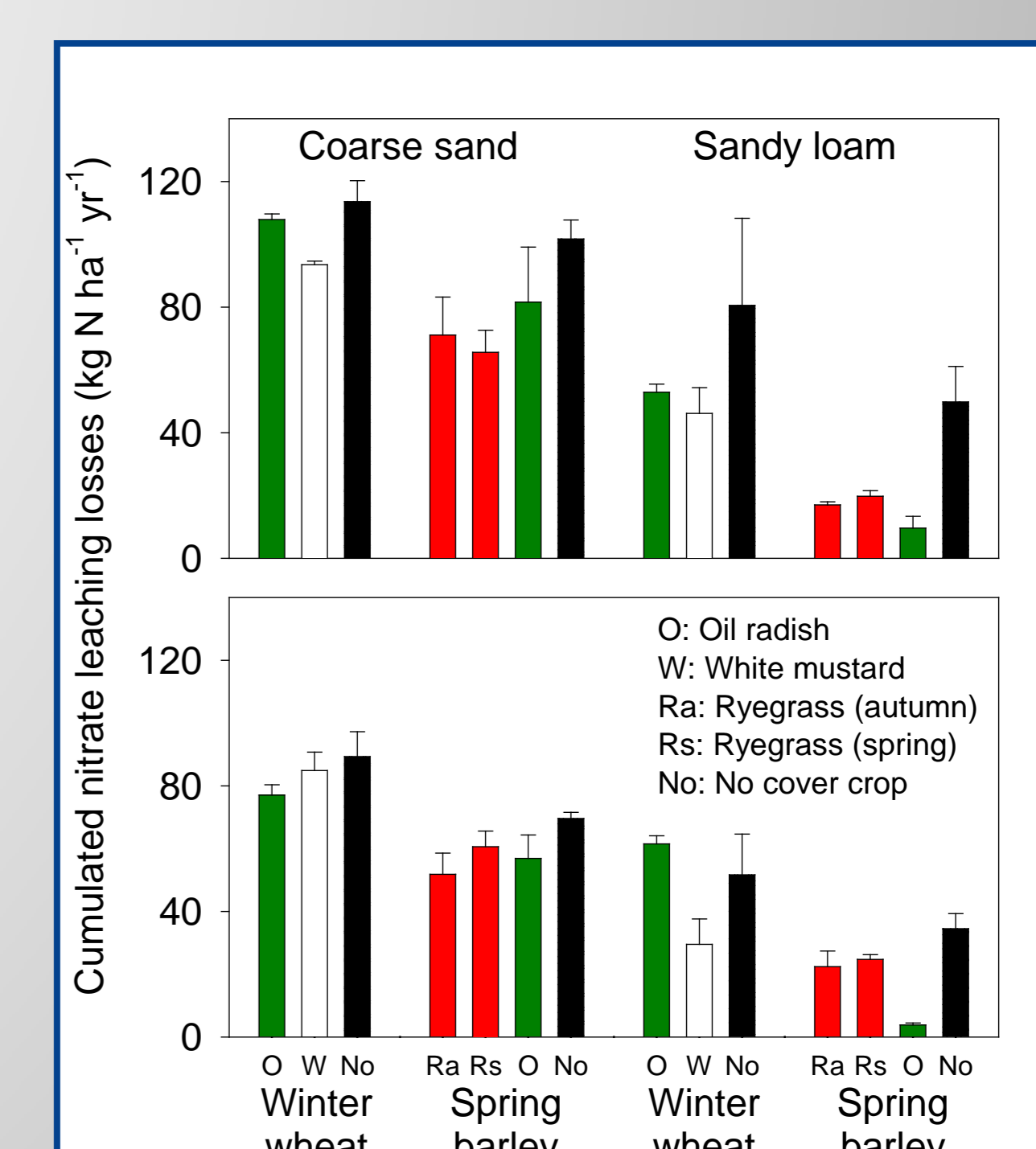
COURSE OF N UPTAKE



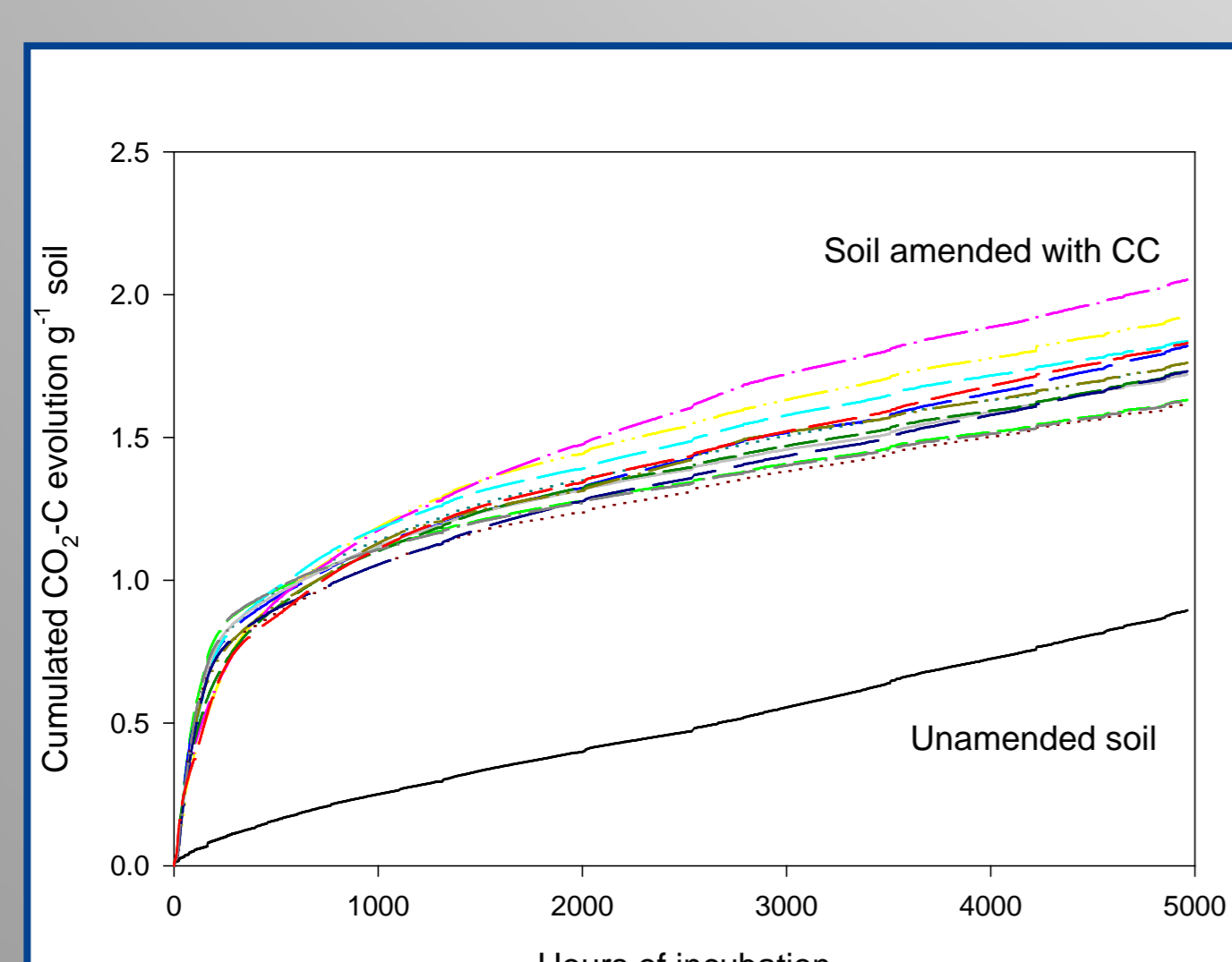
N UPTAKE SEPTEMBER AND NOVEMBER

Main crop before cover crop	Cover crop	Sowing time for cover crops	N uptake in CC (kg N ha ⁻¹)		
			September	November	
Foulum	Winter wheat	Oil radish	July	15.7 ^a	45.2 ^a
	Winter wheat	White mustard	July	10.5 ^a	35.9 ^a
	Winter wheat	Oil radish	Aug	-	34.9 ^a
	Winter wheat	White mustard	Aug	-	34.0 ^a
Spring barley	Ryegrass	April	-	31.0 ^a	
	Oil radish	Aug	-	54.4 ^a	
Askov	Winter wheat	Oil radish	July	24.3 ^a	65.5 ^a
	Winter wheat	White mustard	July	17.8 ^a	39.1 ^b
	Winter wheat	Oil radish	August	-	30.1 ^b
	Winter wheat	White mustard	August	-	17.9 ^c
Spring barley	Ryegrass	Spring	-	32.3 ^a	
Spring barley	Oil radish	August	-	19.6 ^a	

NITRATE LEACHING



CO₂ DEVELOPMENT



N MINERALIZATION

