



Faculty of Science



# Model simulation of cropping system NUE as affected by genotype variation in NUE based on different plant traits

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# Crop vs. Cropping system



Eucarpia 26 Sep 2013  
Dias 2



## Eurotate model

Simulating effect on cropping system level by changing plant traits affecting NUE, such as:

- Reduced leaf litter loss
- Increased HI
- Reduced N% in vegetative parts
- Increased rooting depth
- Root distribution

Based on experimental data from experiments at University of Copenhagen and University of Newcastle





## Field experiments



# Crop rotation

Spring barley – Spring barley – **Winter oilseed rape**



Winter wheat – Spring barley – Winter oilseed rape



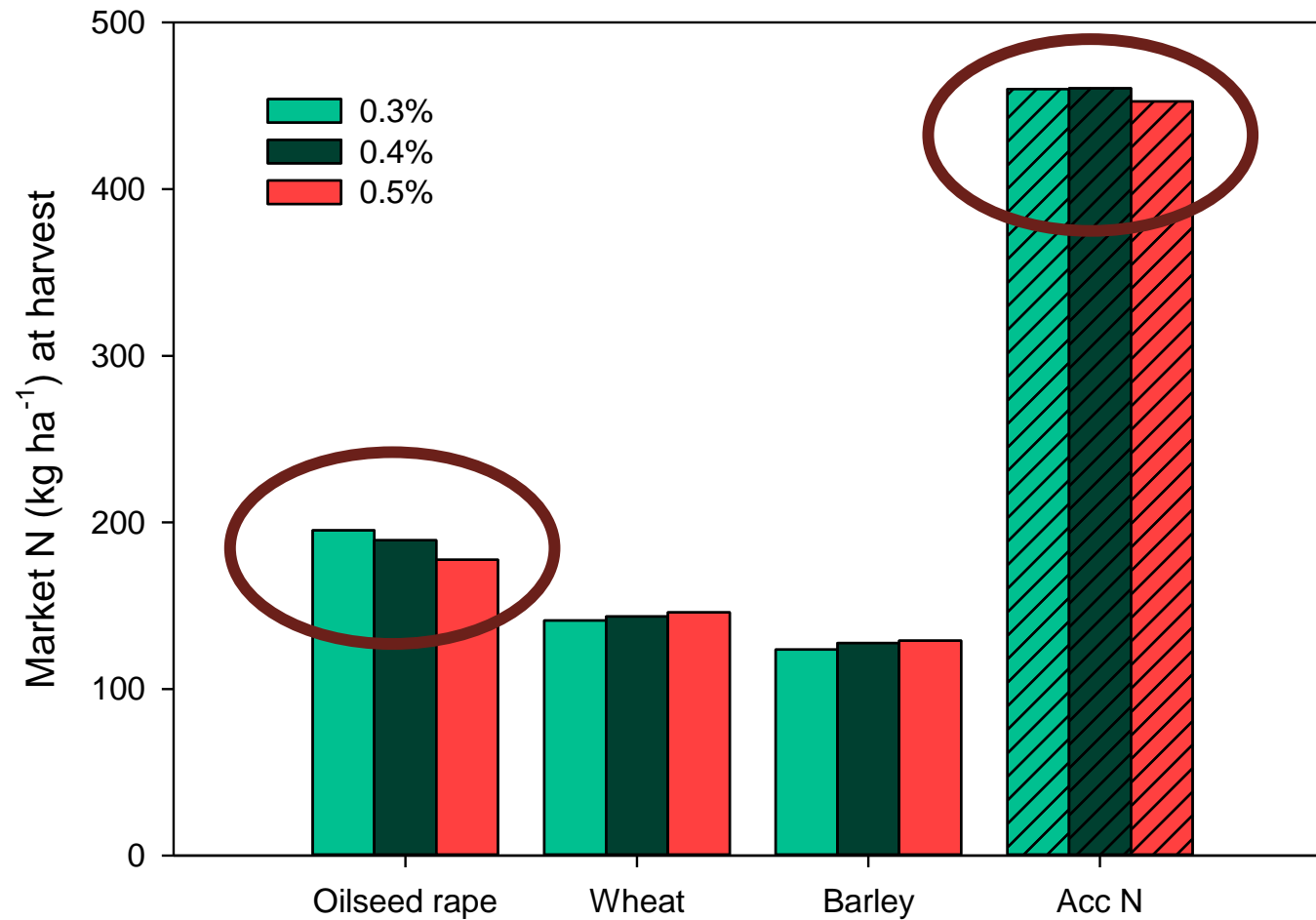
## Litter loss rate - % of total biomass day<sup>-1</sup>



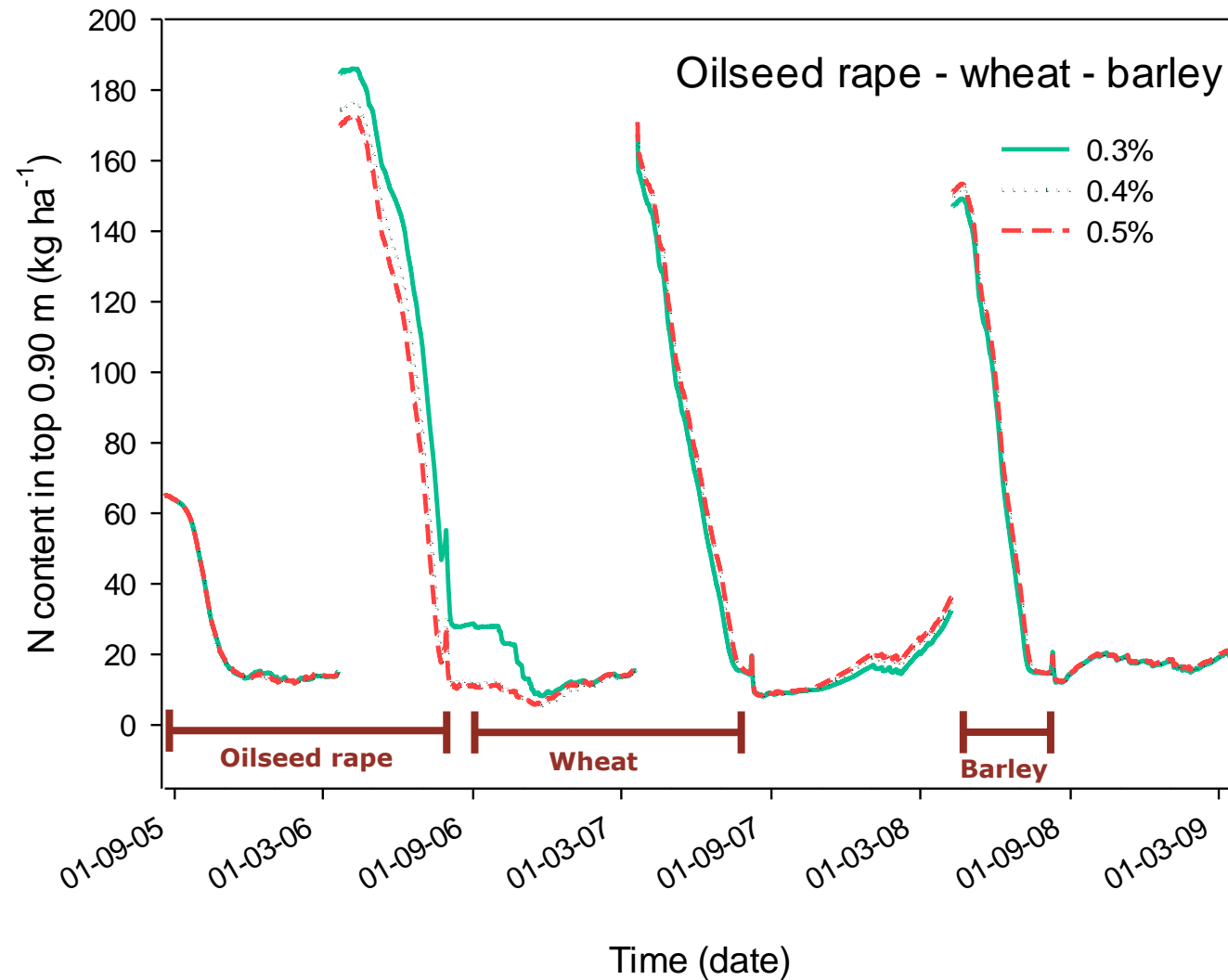
Genotype	Litter loss rate	
	April	June
1	0.45%	0.35%
2	0.65%	0.35%
3	0.90%	0.25%

On average over the year  $\sim 0.4\%$

## Litter loss - total N harvest

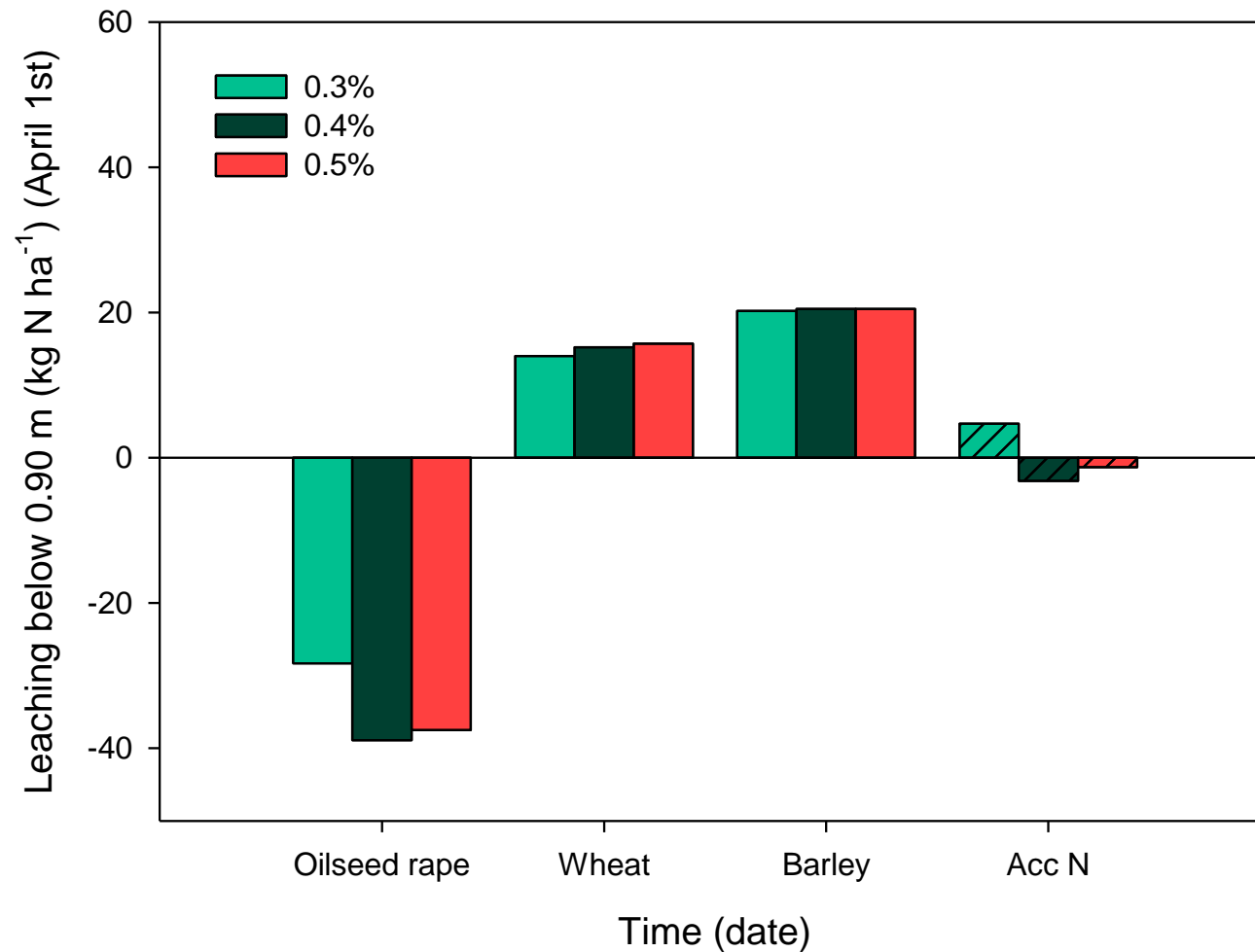


## Litter loss - N content in top 0.9 m

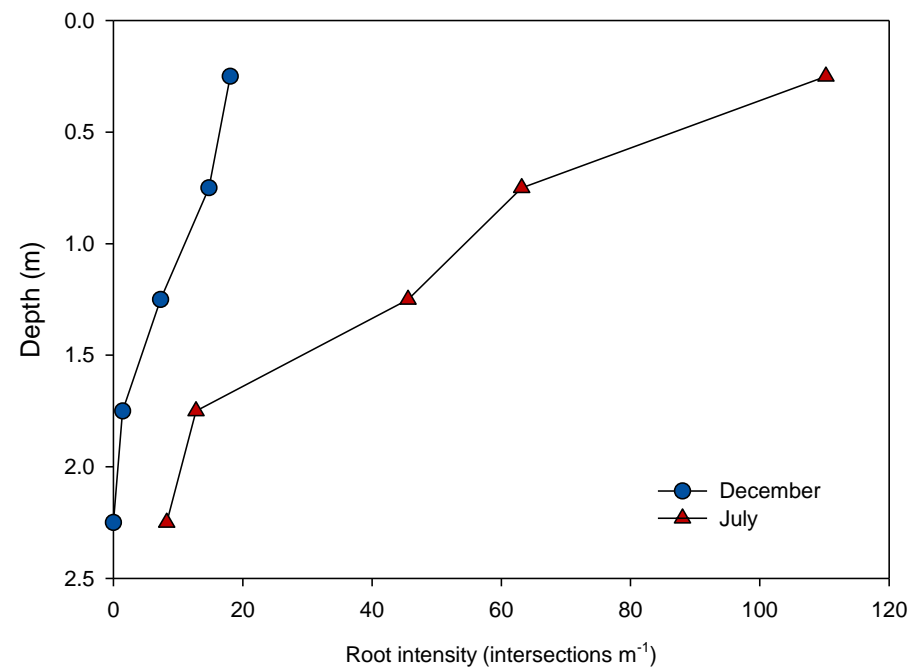
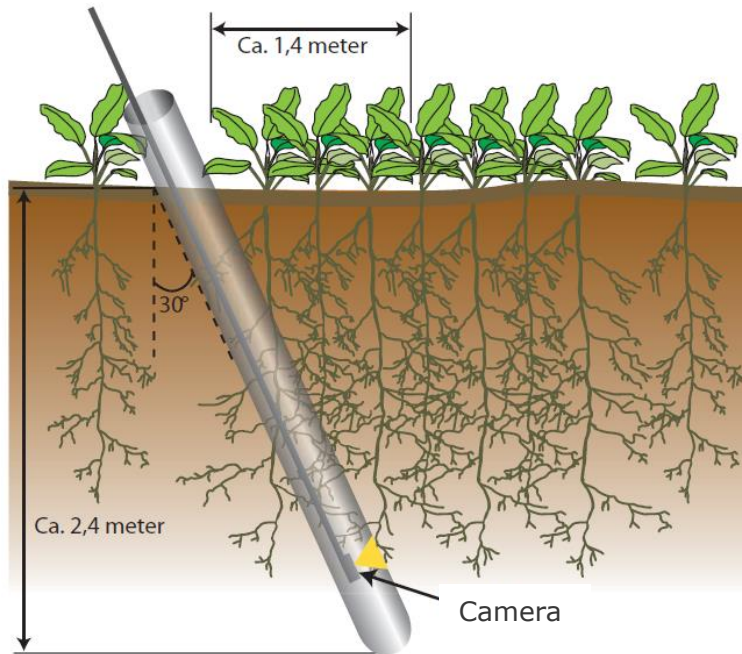




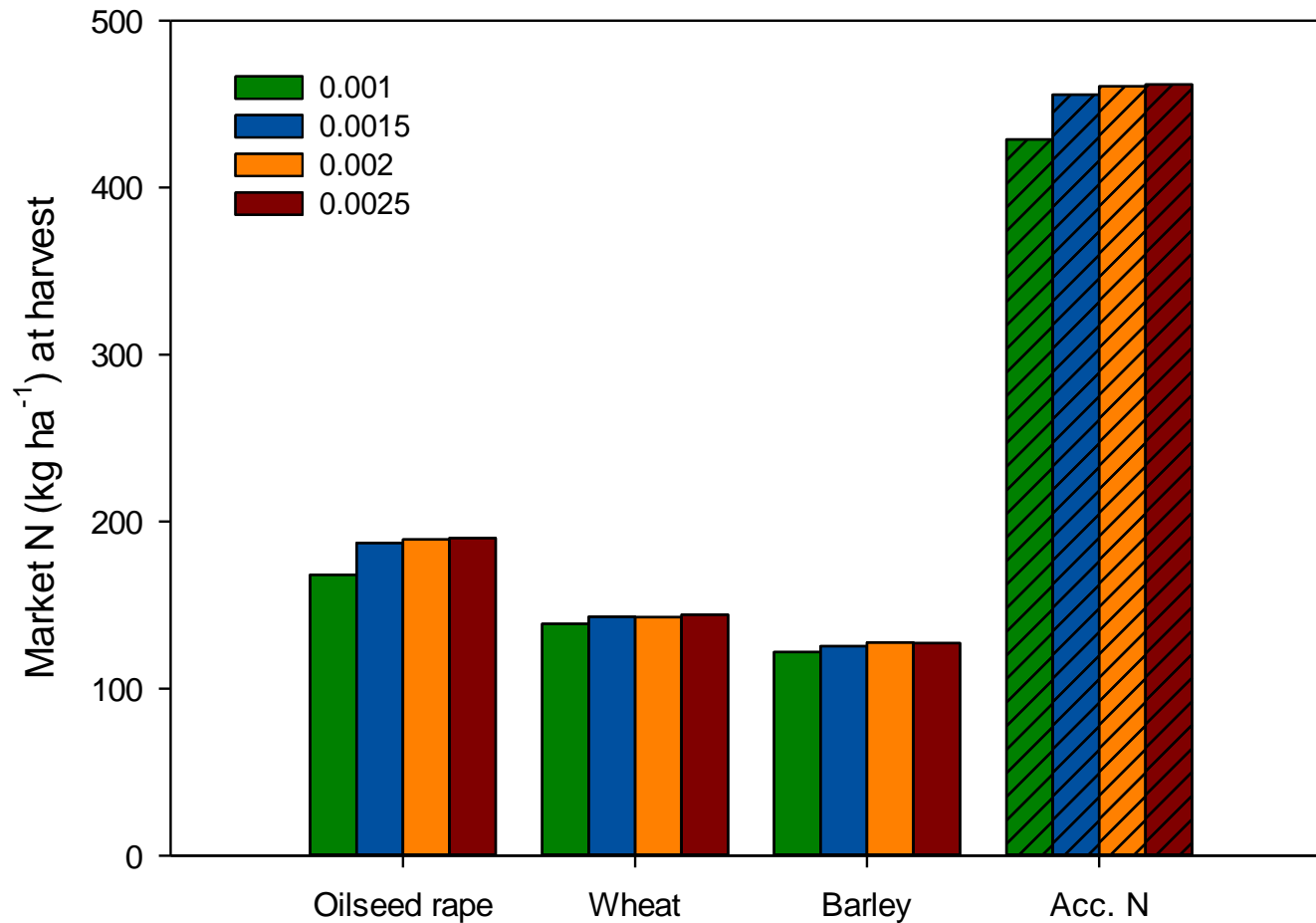
## Litter loss - leaching below 0.9 m



## Root penetration rate

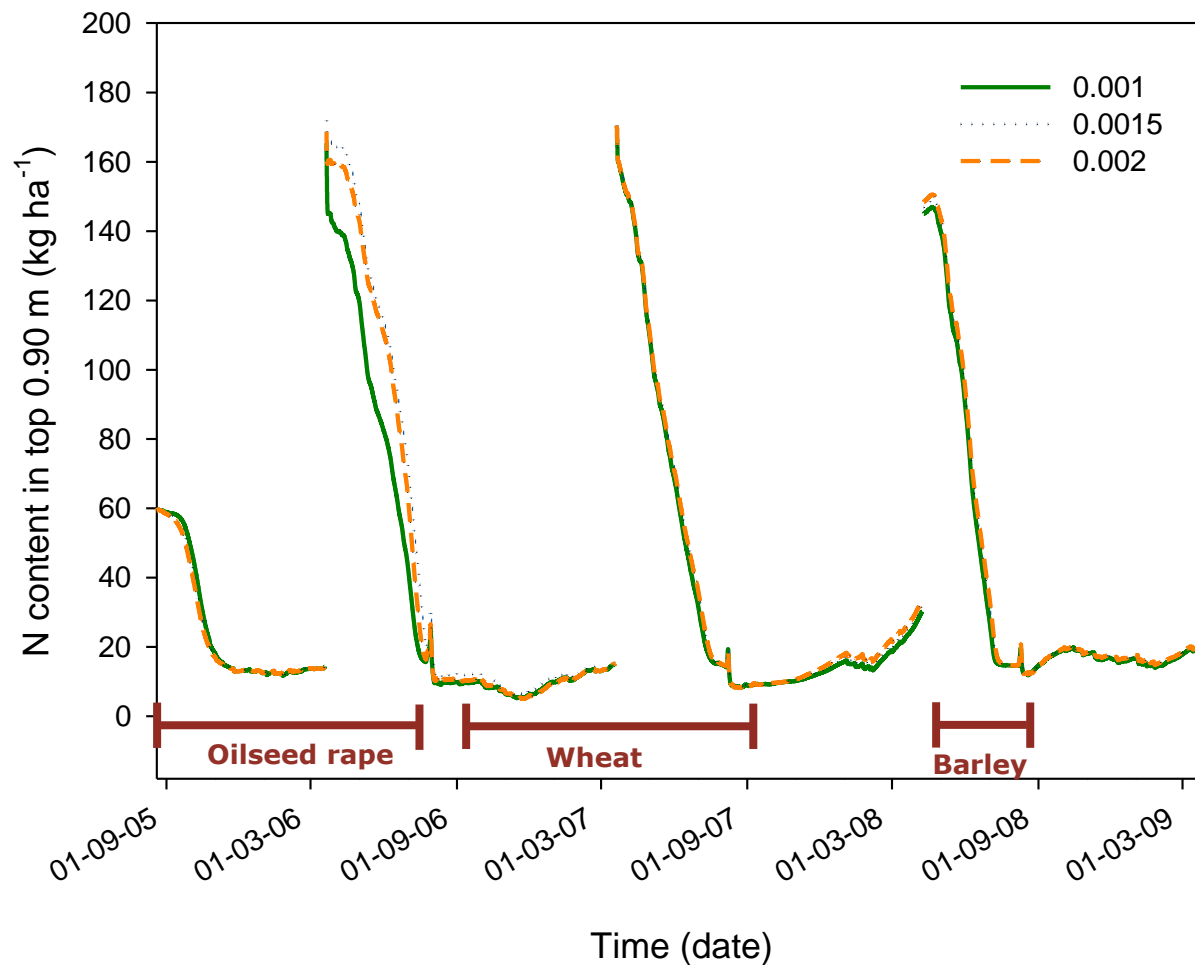


## Root penetration rate (m dd<sup>-1</sup>) – total N harvest

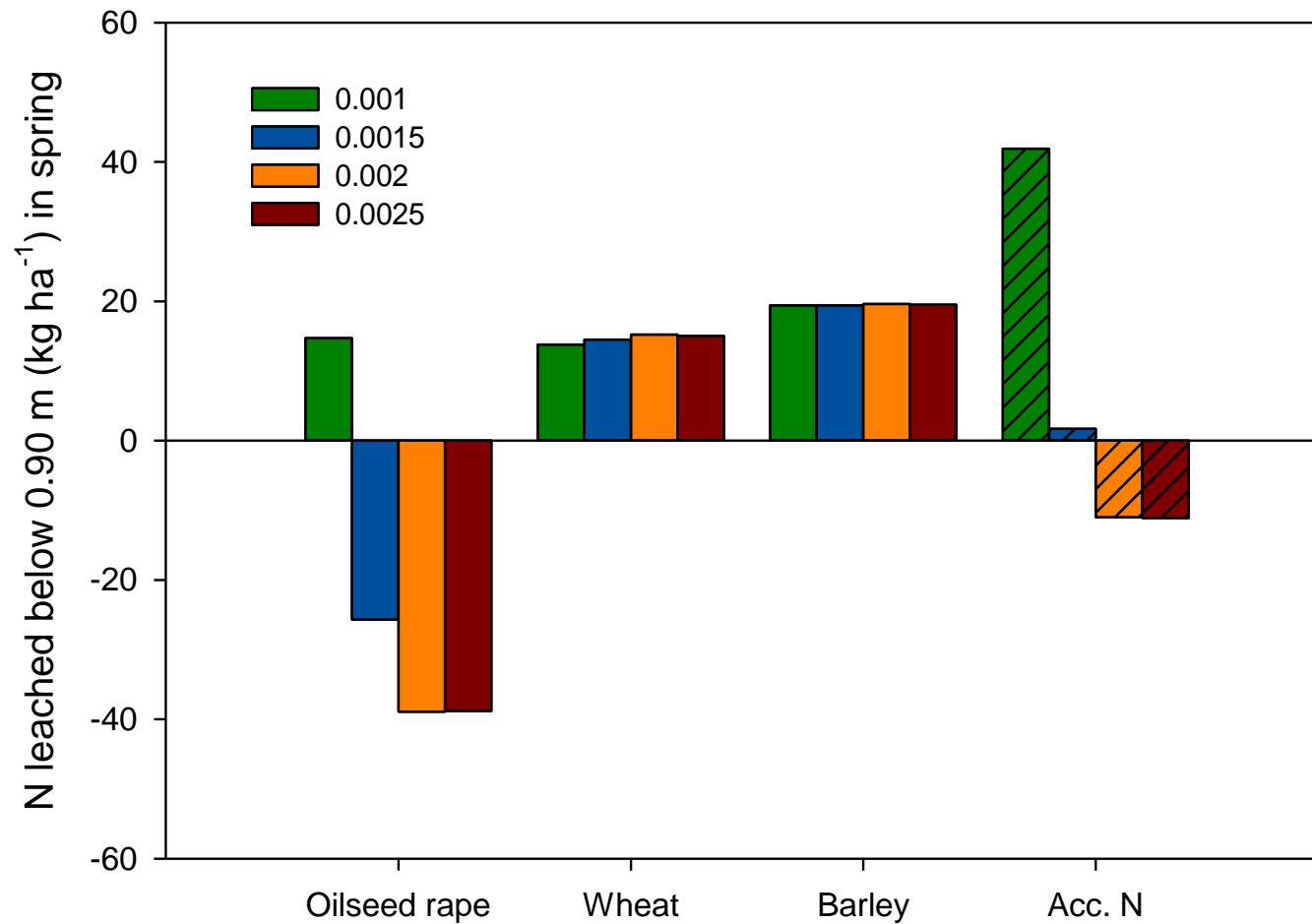




## Root penetration rate - N content in top 0.9 m

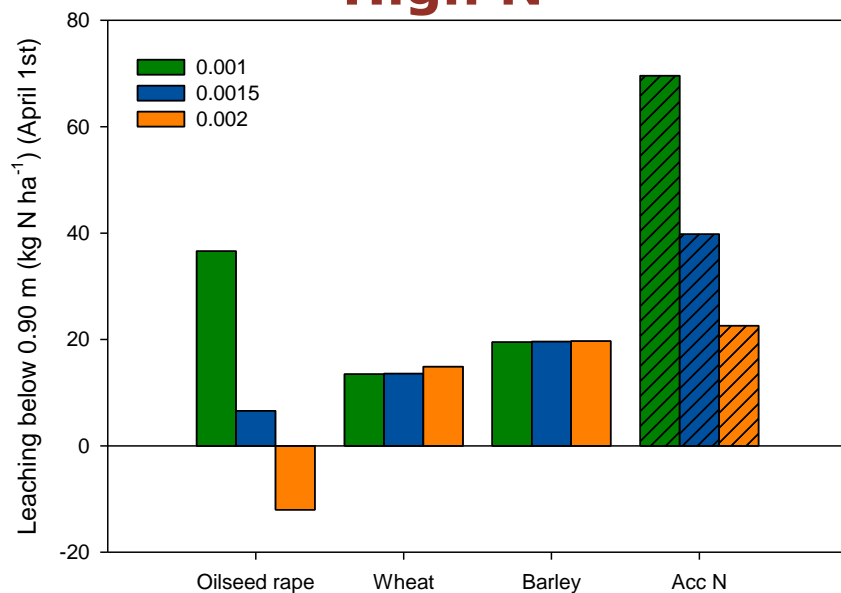


## Root penetration rate – leaching below 0.9 m

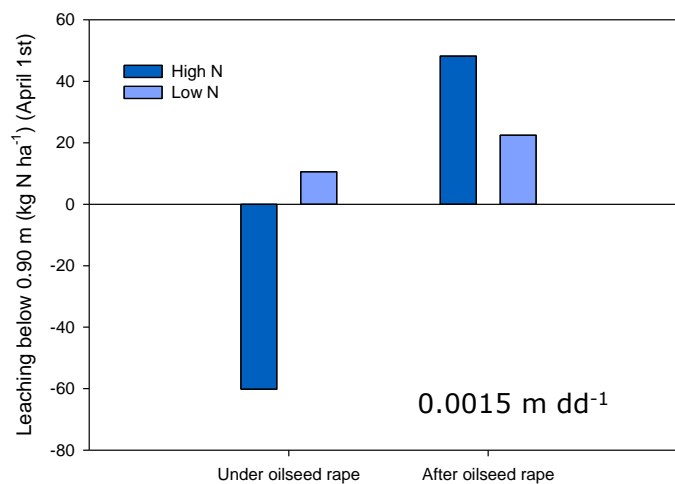
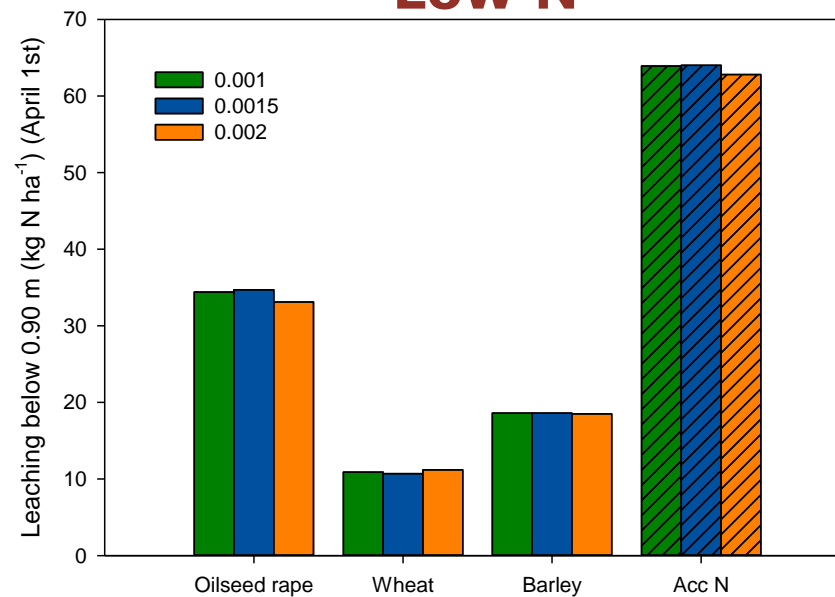


# Root penetration rate

## High N



## Low N





# Conclusions

- Important to consider not only the single crop but the entire cropping system
- The effect on cropping system level is generally low
- $G \times E \times M$





Thank you for your attention