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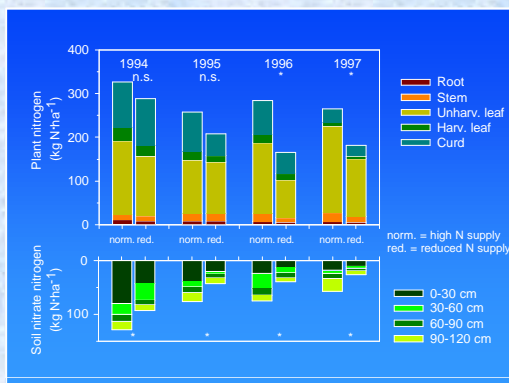
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## Objectives

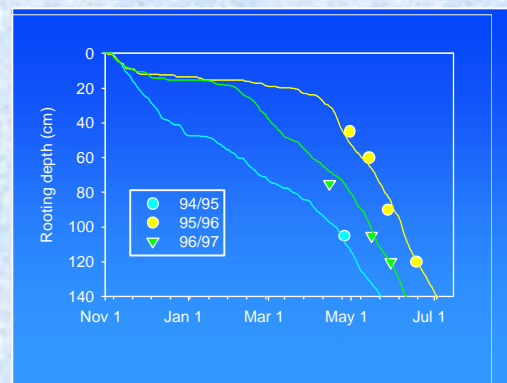
The nitrogen use efficiency (NUE) of vegetable and other intensive cropping systems is often low. In humid climates this is mainly due to leaching losses of nitrate left over as residual soil nitrate after harvest or released from the soil and from crop residues. Deep rooting crops like cereals may exploit deeply leached nitrogen. Their introduction at critical positions of a rotation, i.e. after vegetables, may be an option to decrease leaching losses. Here, the fate of large amounts of residual N left over from late autumn harvested cauliflower in a following winter wheat crop is examined.

## Approach

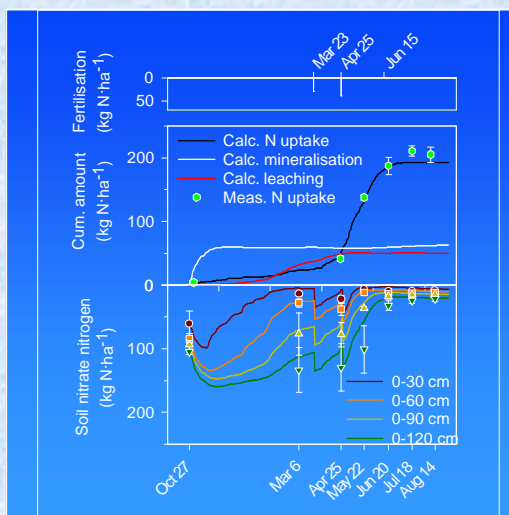
Data of a long term field experiment as well as simulation modelling were used to explore nitrogen leaching losses. The field experiment was conducted on a loess loam soil with comparably high water holding capacity. The model used in this study consists of several modules for calculation of evapotranspiration, soil water transport, vertical nitrogen transport, root growth, nitrate uptake rate of the root system and mineralisation. The modules were integrated within the HUME modelling environment. Alternative scenarios like the use of shallow rooting lettuce vs. winter wheat as a succeeding crop and of a sandy soil vs. a loess loam soil were investigated.



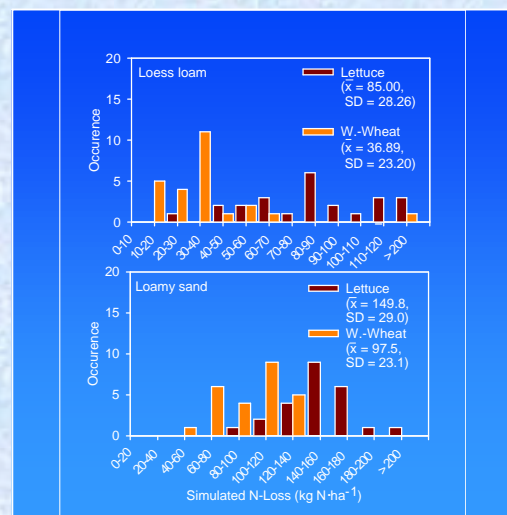
Nitrogen in different plant and soil compartments at harvest of cauliflower in late autumn in four years and two N supply rates (low/high)



Simulated (lines) and measured (dots) rooting depth of winter wheat following cauliflower for three successive seasons



Processes and components of the N budget in the soil plant system of winter wheat following cauliflower under reduced N supply



N losses after cauliflower followed by deep rooting wheat or shallow rooted lettuce during a 24 year simulation period using different soil types

## Conclusions

The root system of winter wheat was capable of taking up deeply leached nitrate when the N fertilisation strategy to winter wheat was appropriate (no late N dressing). Scenario calculations indicate that this drastically reduces leaching losses of nitrate compared to shallow rooting lettuce as a succeeding crop for cauliflower under conditions of sandy soils but even more on a loess loam soil.