



N₂ fixing legumes in intensively managed grassland are less affected by drought than non-fixing species

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Background

Drought is expected to **strongly impair forage production of intensively managed grassland**.

Cropping of plant functional types resisting drought can be an important **adaptation option** for forage production.

Aim

To test whether the two functional traits " **symbiotic N₂ fixation**" and " **deep rooting**" increase the plant's ability to resist drought periods.

Material & Methods

Functional groups	Shallow roots	Deep roots
Symbiotic N-fixation	 <i>Trifolium repens</i> L.	 <i>Trifolium pratense</i> L.
No symbiotic N-fixation	 <i>Lolium perenne</i> L.	 <i>Cichorium intybus</i> L.

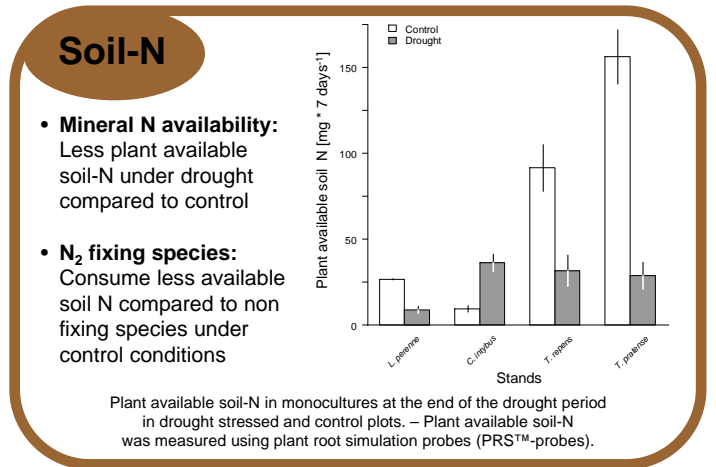
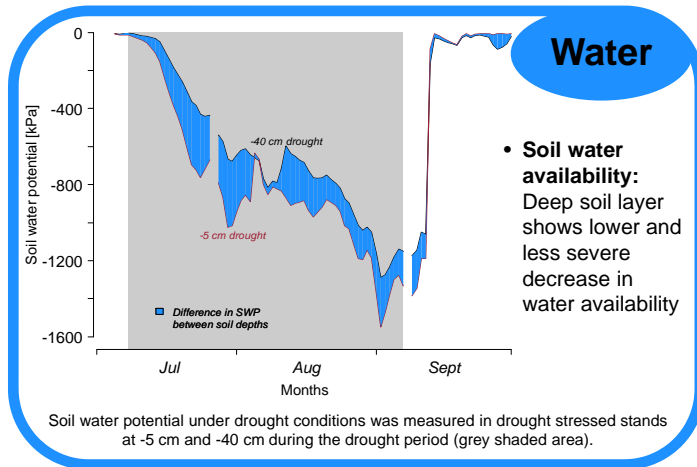
A field experiment was established with monocultures of four model plant species representing different functional groups.



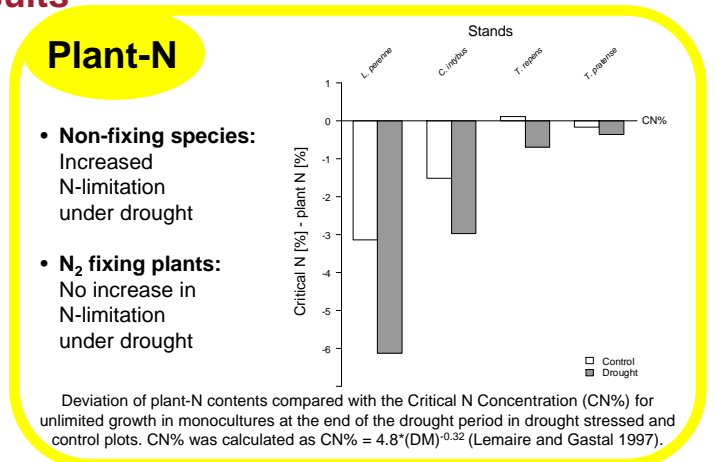
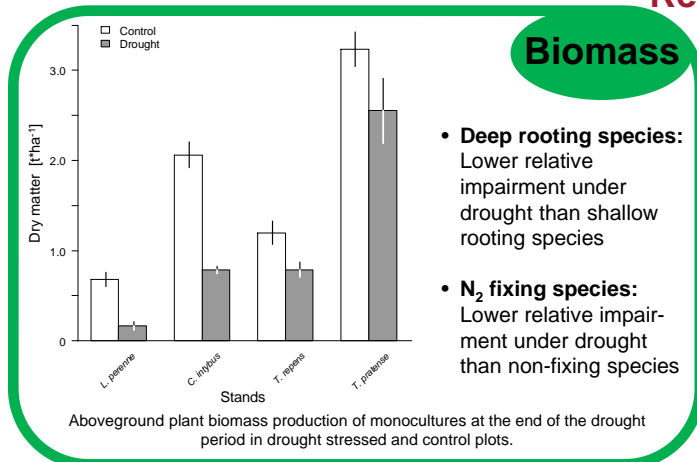
A ten-week drought period with complete exclusion of precipitation was simulated by using rainout shelters. Effects of drought were studied by comparing drought and control plots.

Conclusions

- The functional traits "symbiotic N₂ fixation" and "deep rooting" increase the plant's ability to resist drought periods.
- More detailed examinations on the effect of drought stress on water uptake and N-nutrition of plants will help to explain the importance of these functional traits for adapted grassland management under drought stress.



Results



Reference: Lemaire G, Gastal F. 1997. N uptake and distribution in plant canopies. In: Lemaire G, ed. Diagnosis of the nitrogen status in crops. Berlin Heidelberg: Springer-Verlag, 3-44.