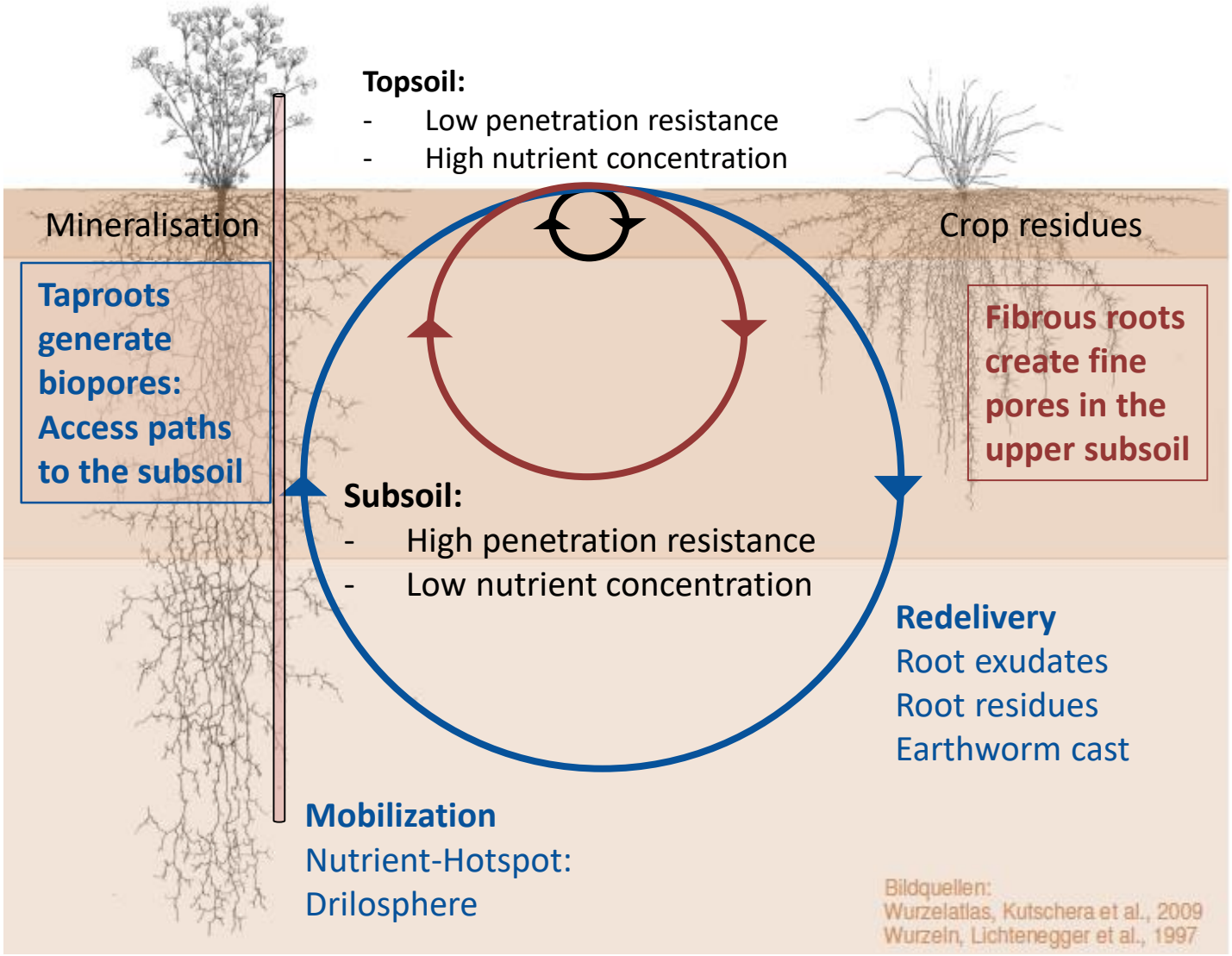
Crop sequence and nutrient acquisition: Optimized use of soil resources via complementary root growth?

Miriam Athmann

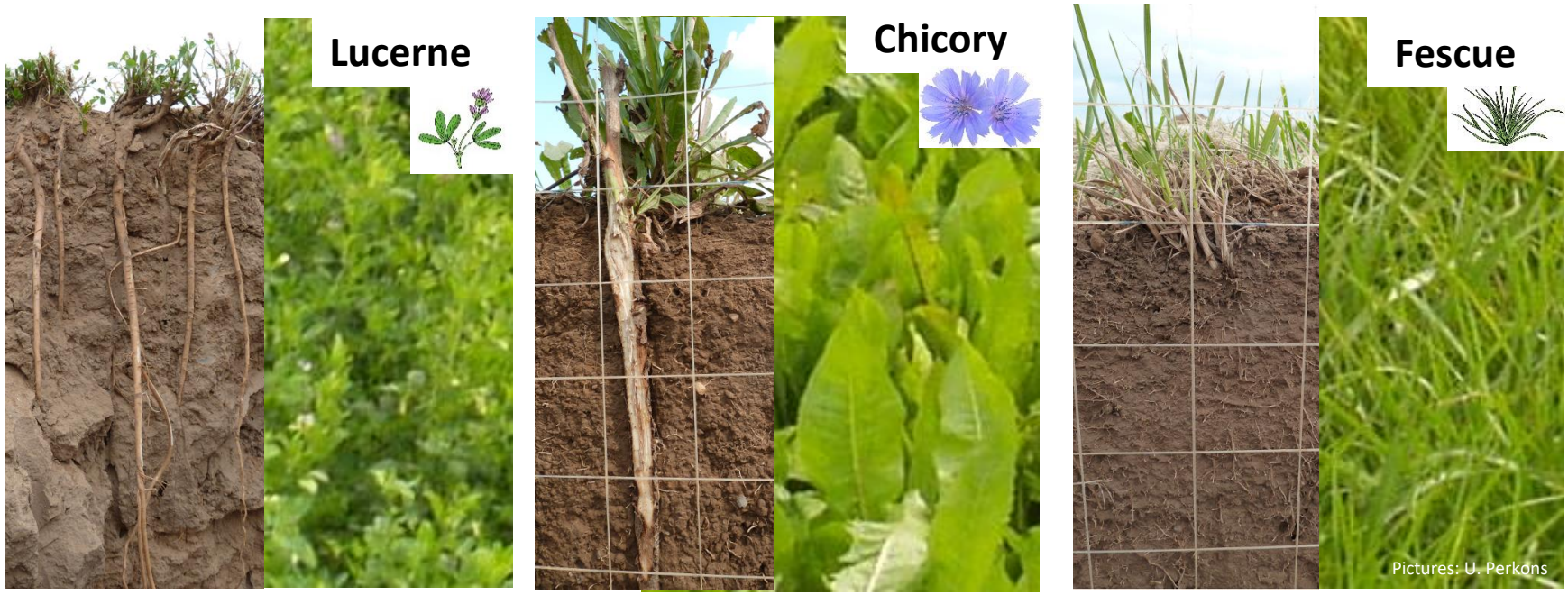
Institute for Crop Science and Resource Conservation, Agroecology and Organic Farming Group, University of Bonn, mathmann@uni-bonn.de

Nutrient acquisition from the subsoil



Optimizing the crop sequence for subsoil resource use

1. Influence soil structure via taprooted precrops and anecic earthworms



2. Study root and shoot growth by following crops

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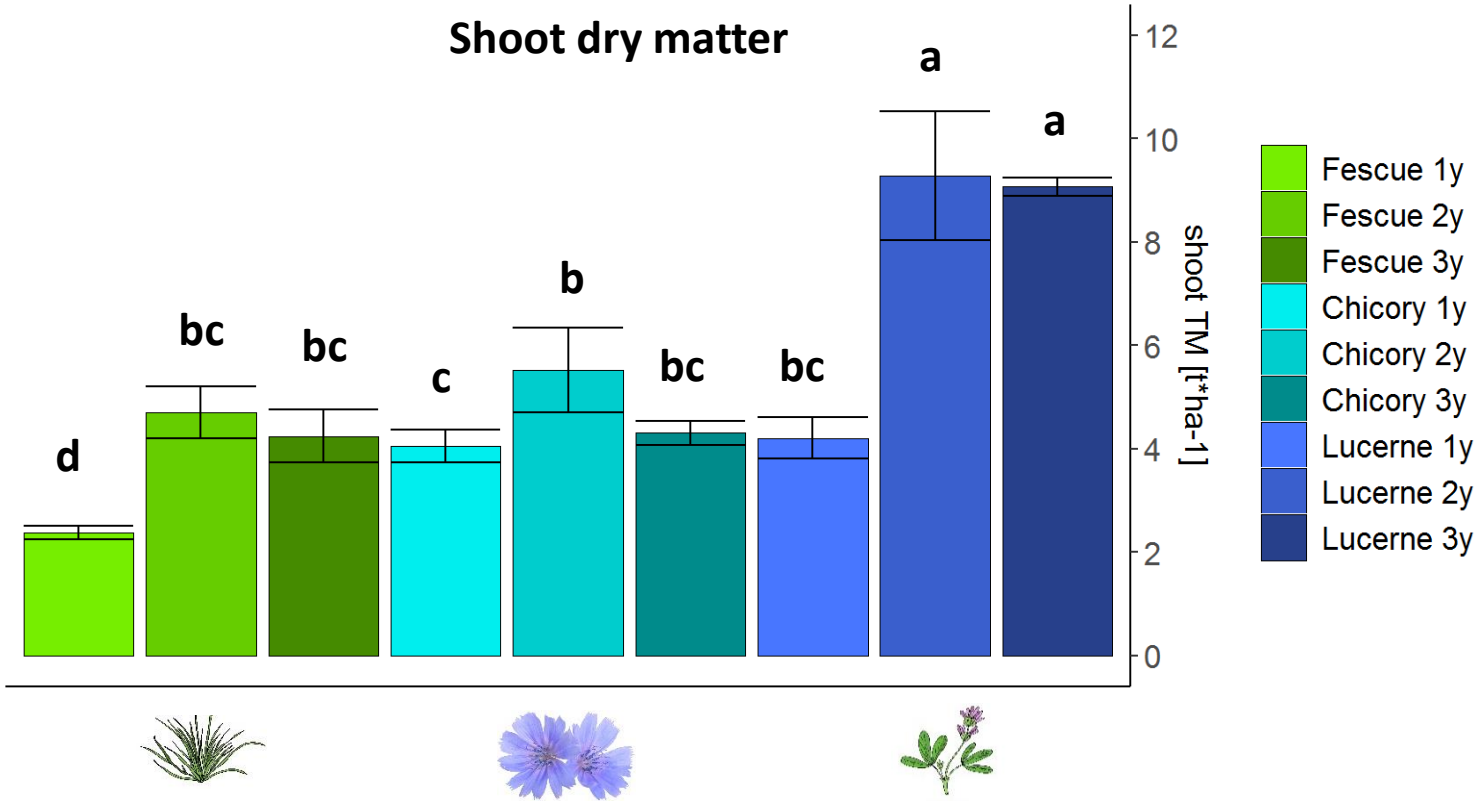
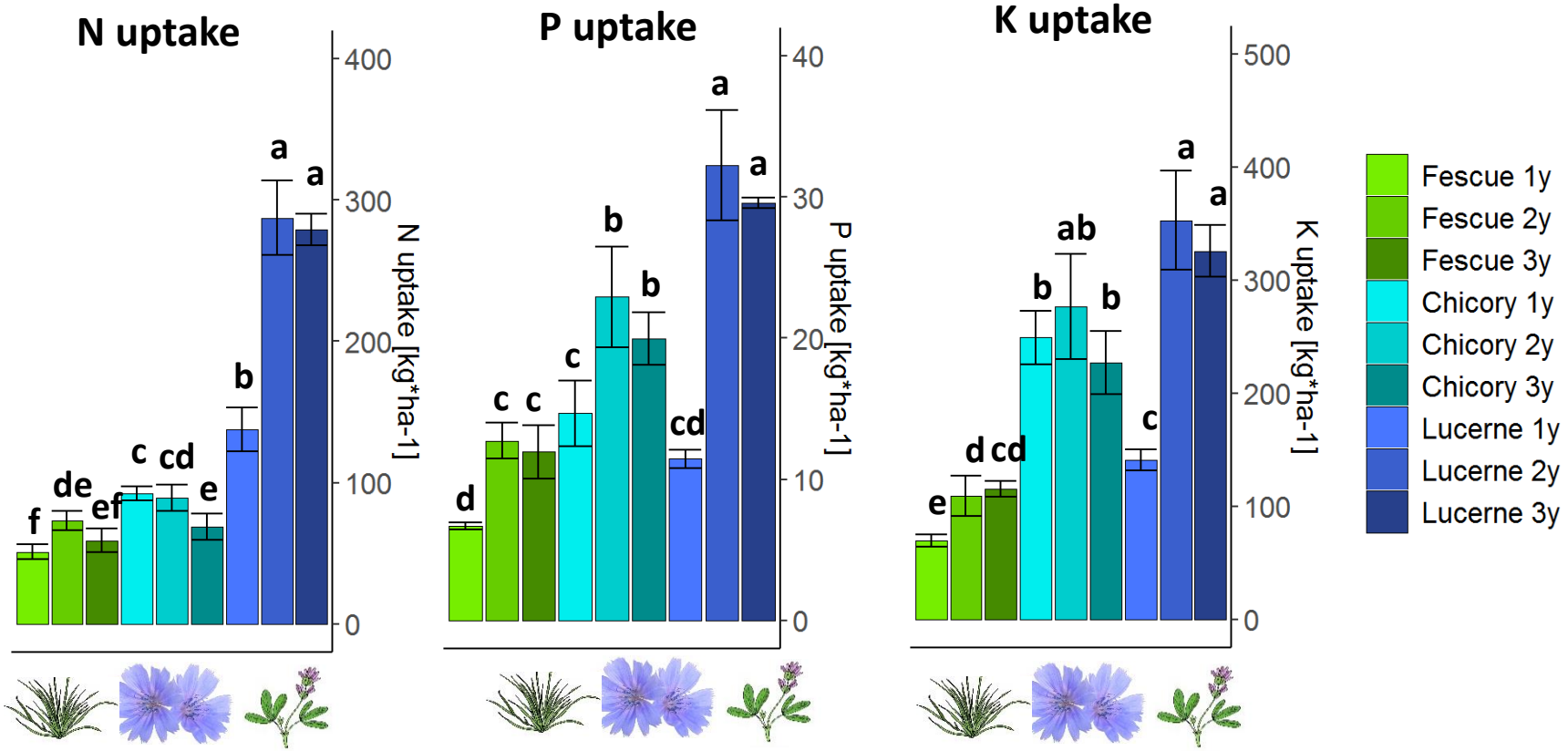
Precrop yield and nutrient uptake



Different letters: significant differences (Tukey-Test, α<0.05). Precrops grown 2007-2009, Data from 2009.

Precrop yield and nutrient uptake



Different letters: significant differences (Tukey-Test, α<0.05). Precrops grown 2007-2009, Data from 2009.

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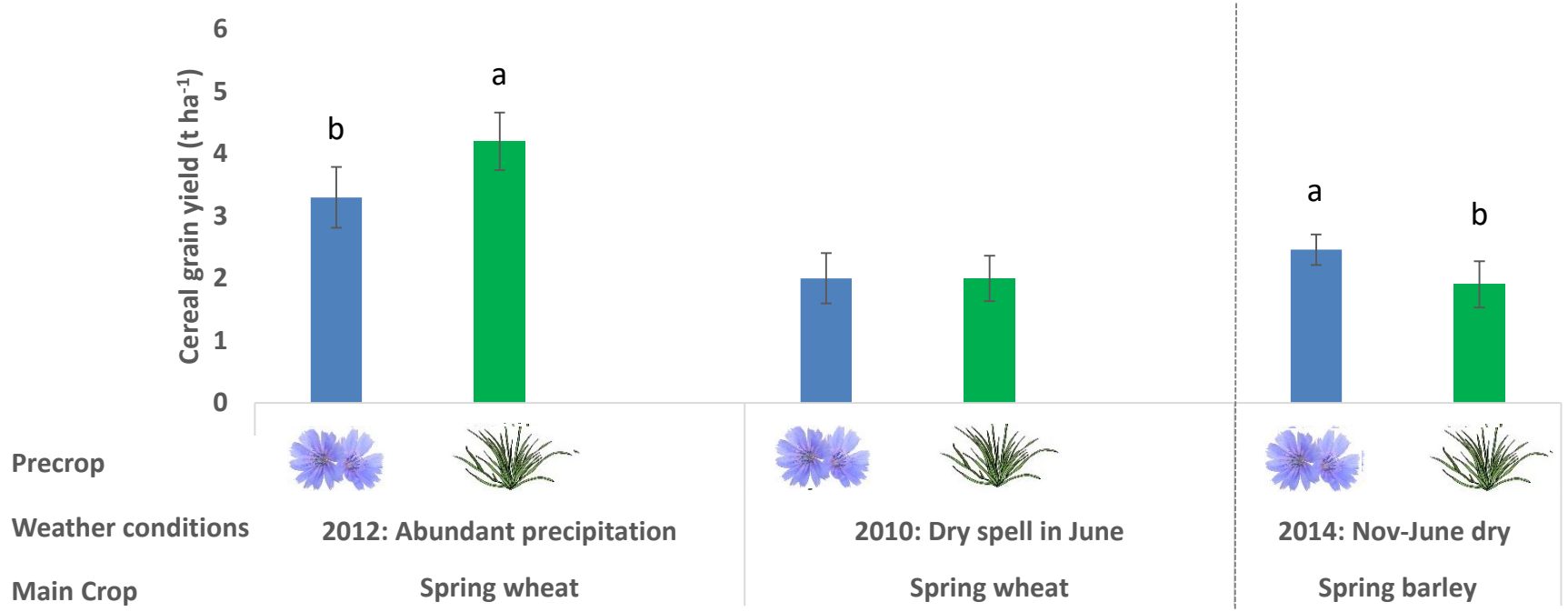
Yield of following crops

II. Modeling on the field scale with 100 weather scenarios

Model: SIMPLACE coupled with R-SWMS, weather generator LARS-WG



Different letters: significant differences (Tukey-Test, α<0.05)

Seidel et al. 2019, Soil and Tillage Research; Kautz et al. 2015, GPW

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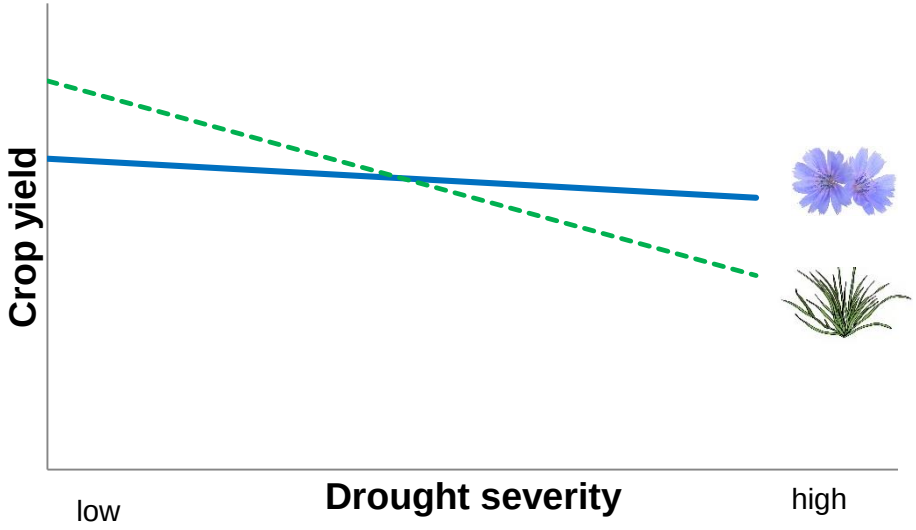
Conclusion

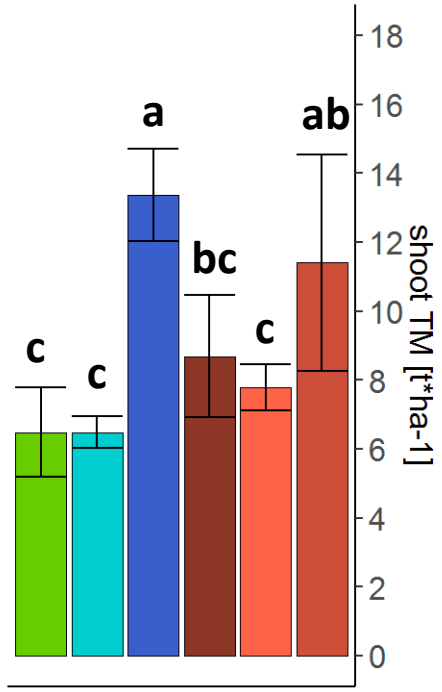
With deeprooting precrops, yield stability and thus static resilience is increased - through structural and microbial changes in the subsoil.



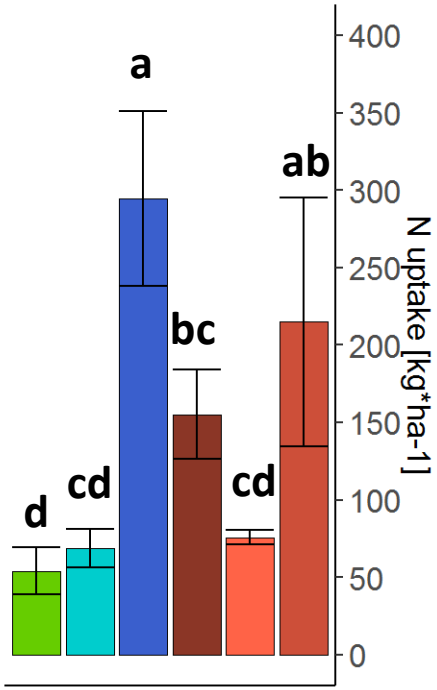
Graph from Döring et al. 2015, Journal of the Science of Food and Agriculture

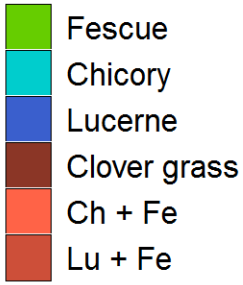
Soil resource use 2.0: Complementary root growth

Shoot biomass

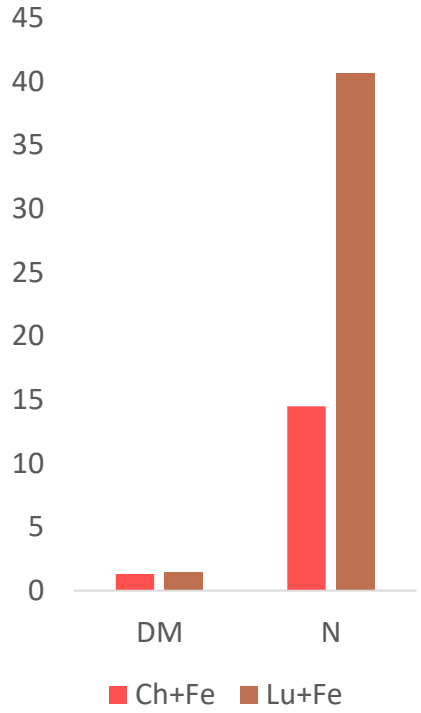


N uptake





Mixing effect



Different letters: significant differences (Tukey-Test, α<0.05). Crops were grown 2018 and 2019, only 2019 data is shown.

Thank you for your attention!