

Temporal and spatial root growth dynamics of *Lolium perenne* L. after defoliation

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The influence of grassland management on the key parameters of root growth dynamics such as rooting depth, root dry matter and root length density is still not well understood. In particular the interaction with environmental factors such as air and soil temperature, soil-water content and irradiation are difficult to quantify with simple empirical methods. Mechanistic dynamic plant-soil models can provide useful tools for such studies. The parameterization of complex models, however, requires extensive data collection in field experiments. The objective of this paper was to analyse the impact of defoliation on changes of perennial ryegrass root biomass and root length density.

The study is based on data collected in a one-year field experiment (2008) at the experimental farm Hohenschulen of the University of Kiel in Northern Germany. A one-factorial block design with three replicates was used for the field trial, where root growth dynamics of a three-year old ley (cultivar 'Premium') were investigated in defoliated and non-defoliated plots. Destructive samples were taken above- and belowground 0, x, xx, and xx days after the first cut in spring. Root core samples (7 layers, 0-70 cm depth) were thoroughly rinsed to allow the determination of root dry matter, root length and derived values for root length density or specific root length. Root length was quantified using the software package WinRhizo 2003®. In addition, C and N content of above- and belowground samples were analyzed. Results for root biomass and root length density will be presented.

Keywords: *Lolium perenne* L., defoliation, dynamic root growth, rooting depth, root length density