

MWP – Young Researcher Abstract 2026

Project title: Role of root presence and root exudation in soil nitrogen availability in boreal forest soils	
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Abstract (approx. 200 words): The boreal forest is a crucial terrestrial carbon sink. However, the future capacity of this ecosystem to absorb the currently increasing atmospheric carbon dioxide (CO₂) concentrations is difficult to predict, as potential increases in plant biomass by CO₂-fertilization might be restricted by the availability of the growth limiting nutrient, nitrogen, in soil. Plants can in turn influence soil nitrogen availability through root exudation. By releasing energy rich compounds into the rhizosphere plants trigger diverse soil microbial processes that consequently lead to changes in nutrient cycling. In my research I investigate how root presence and root exudation affect nitrogen availability in forest soils and how aspects such as long-term fertilization with inorganic nitrogen and increased CO₂ modulate these responses. Combining experiments with pine seedlings and simulated root exudation via microdialysis, allows me to study these processes on fine temporal and spatial scale, while also maintaining ecologically relevant conditions. We found that fertilization is a major factor determining on how different nitrogen compounds respond to root exudation. By studying these processes and their underlying mechanisms at the root scale, my results can contribute to improving future predictions of the boreal forest carbon storage, which is critical for climate research.	
Key words: nitrogen, forest soils, microdialysis, root exudation	