

Effects of biota on bio- and physicochemistry in the rhizosphere of deciduous tree species and its impact on carbon flow to the soil

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The rhizosphere is a region of high activity between roots, fungi, microorganisms and animals. In the environment of roots the turnover of biomass is very high. Therefore, in the rhizosphere many different carbon and nitrogen compounds arise. The main object of the study is highlighting the influence of two deciduous tree species, beech (*Fagus sylvatica* L.) and ash (*Fraxinus excelsior* L.), on the carbon and nitrogen dynamics in this highly active zone. Beside the effects of the tree species, the influences of other biotas, especially earthworms, litter and mycorrhiza, on the soil are examined. In the rhizosphere are studied. In addition, the C and N input into the soil by litter decomposition is examined. Different experimental approaches investigate the effects on CO₂ efflux, O₂ consumption, and pathways of N₂O, low molecular organic acids and other compounds in the root-soil interface. This study emphasizes the rhizosphere mainly in a laboratory experiment using novel two-species double split-root rhizoboxes at defined soil temperature and soil moisture. In these rhizoboxes the root-soil interface can be analyzed highly resolved. The spatial and temporal patterns of the above mentioned parameters can be detected on a small scale. For measuring O₂, CO₂ and pH, novel optical noninvasive sensors (optodes) are used. The poster will introduce the novel rhizobox system equipped with noninvasive optical sensor technology for bioprocess analysis in the rhizosphere. The intention of the project is bringing a better understanding of bio- and physicochemical processes driven by the rhizobiota network of two contrasting temperate tree species. This can contribute to our knowledge of plant- and litter-mediated C cycling and C storage in forest soils, in regard to estimate their possible role as long-term carbon sinks.

Keywords: rhizosphere, carbon flow, soil biota, beech, ash