

6. The Impact of browsing by large herbivores on carbon cycling in naturally regenerating forest

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The understanding of plant-soil C fluxes, and the variables and processes that drive and constrain them, is a key current research interest in soil ecology. Browsing is ubiquitous in forest ecosystems and has been shown to have substantial effects on processes that control ecosystem functioning and carbon dynamics; indirectly by altering the quantity and quality of organic matter, plant carbon dynamics, fine root turnover and the flow of exudates from the roots. This study hypothesizes that the effects of browsing on naturally regenerating *Betula pubescens* will influence belowground microbial communities and therefore, soil respiration; also that the timing of browsing, e.g. summer vs. dormant, will influence this response. This project investigates this both in the field, utilizing a long term simulated browsing experiment in the Highlands and in a controlled mesocosm study. In the field Soil, CO₂ flux and soil samples were taken temporally and soil biological properties analyzed. The mesocosm study is subject to intensive CO₂ flux sampling and will incorporate isotopic analysis to partition autotrophic and heterotrophic respiration. Thus far the results from the field suggest that browsing in late summer has a positive feedback on soil respiration.