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Title:

Reindeer grazing changes horizontal and vertical root trait distribution in boreal pine forests

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Abstract:

In northern ecosystems, large herbivores shape ecosystem processes and carbon dynamics. Little is known about the horizontal and vertical response to grazing belowground. Here, we compared horizontal and vertical distribution of roots, community root traits, and soil microclimatic conditions between <50-year reindeer exclusions and neighboring grazed sites in pine forests in northern Finland.

Reindeer grazing reduced fine root biomass, but the effect was strongest in the topsoil and diminished with soil depth. While root biomass remained constant horizontally, root community traits did not. Further away from the tree, soil explorative traits were generally lower. Reindeer grazing led to an even stronger decline with tree distance. This coincided with less shrub cover in the open under reindeer grazing. Moreover, reindeer grazing, and tree distance affected soil microclimatic conditions. Overall, our study alludes to spatially heterogeneous effects of reindeer grazing belowground.