



Influence of Mycorrhizae on Rate of Nitrogen Isotopes Fractionation in Soil-Plant System

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We studied nitrogen isotopes fractionation in plant-soil system in four mountain tundra ecosystems in the Khibiny Mountains. The ecosystems consisted of a toposequence beginning with the sedge meadow (SM) at the bottom of the slope, followed by the grass meadow (GM) on the lower slope, the *Betula nana* dominated shrub heath (SH) on the middle slope, and the shrub-lichen heath (SLH) on the ridge and upper slope. The inorganic nitrogen concentration in the soils from the studied ecosystems were significantly different; the SLH soil was found to contain the minimum N-NH₄⁺ and N-NO₃⁻, while in the soils of the meadow ecosystems these concentrations were much higher.

Intensity of mycorrhizal infection was estimated based on ergosterol concentration in plant roots. Nitrogen isotopes fractionation was expressed as the difference between $\delta^{15}\text{N}$ of the plant leaves and total soil N.

We found close positive correlation between ergosterol concentration and intensity of nitrogen isotopes fractionation for two heath ecosystems: the greater the concentration of ergosterol in the roots, the more difference in $\delta^{15}\text{N}$ of plant leaves and soil N. The opposite trend is found for GM: the increase in the concentration of ergosterol in roots leads to decrease in the difference between $\delta^{15}\text{N}$ of plant leaves and soil N. The most nitrogen-rich SM community was characterized by the absence of a pronounced dependence between N isotopes fractionation and ergosterol concentration. It should be noted that the absolute values of N isotopes fractionation were smaller in this community in comparison with other ecosystems. We think that the obtained results can be interpreted as follows: in conditions of nitrogen deficiency (heaths ecosystems) mycorrhiza are likely actively involved in the fractionation of nitrogen isotopes. In the case of more nitrogen-rich communities (meadow ecosystems) mycorrhiza probably provides more complete access to the pool of nitrogen in the soil. Therefore, the isotopic composition of nitrogen in the leaves of plants and soil nitrogen lines in meadow community.

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