

Competition for inorganic-N between soil microbes and plants?

*Keisuke Koba¹

1. Center for Ecological Research, Kyoto University

We all know that there must be competition for nitrogen, especially for inorganic nitrogen between soil microbes and plants in terrestrial ecosystems. Despite the long history of this topic, our understanding is still insufficient, especially for the modeling approaches for the projection of the ecosystem functions. Here we applied stable isotope natural abundance technique to the forested ecosystems in Japan to figure out how $\delta^{15}\text{N}$ of plants, soil nitrogen, and soil microbial biomass (SMB) can tell us about the intact N competition between plants and soil microbes.

In this talk, I will present our new $\delta^{15}\text{N}$ data of plants, soil nitrogen, and SMB in the forested ecosystems in Japan which illustrates that $\delta^{15}\text{N}$ of SMB was totally different from $\delta^{15}\text{N}$ of plants. $\delta^{15}\text{N}$ of SMB was higher than $\delta^{15}\text{N}$ of other N, i.e. bulk soil N, extractable organic and inorganic N, and plants. Since $\delta^{15}\text{N}$ of SMB is controlled by the balance of N assimilation and N excretion (Collins et al. 2008; Shinoda et al. 2018), the higher $\delta^{15}\text{N}$ of SMB is attributed to the soil N assimilation with N excretion (N mineralization). In other words, SMB utilized soil organic N with N mineralization. Since $\delta^{15}\text{N}$ of plants shows the plant's reliance on soil inorganic nitrogen, it is likely that there was no obvious competition for nitrogen between SMB (utilizing organic nitrogen) and plants (utilizing inorganic nitrogen). This is my quite preliminary data interpretation and I look forward to the discussion on our $\delta^{15}\text{N}$ data in the talk.

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