

15N natural abundances and N use by plants in forested ecosystems

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Supply of nitrogen to plants often limits the primary productivity for plants in terrestrial ecosystems (Vitousek and Howarth 1991). Thus, the better understanding on how plants can utilize this limiting resource is quite important to project the changes in ecosystem functions with environmental changes such as the increase in nitrogen deposition and in CO₂ concentrations. We applied the isotopic approach to get insights into the niche differentiation for nitrogen uptake in the forest where nitrogen is considered to strongly limit the plants' productivity. In two plots (control and 50% cut), we sampled soils and plants for the measurements of nitrogen isotopic signatures (d¹⁵N). In soils collected from these two plots, nitrate pool sizes were quite small, while considerable amount of ammonium existed. Plants d¹⁵N varied among species; the dominant species (Hinoki) showed the low d¹⁵N, while other understory species had higher d¹⁵N. We compared d¹⁵N of plants with d¹⁵N of ammonium in the soil and found that Hinoki utilized the ammonium in organic soil with low d¹⁵N, while other understories utilized ammonium in deeper soil, suggesting the niche differentiation for N utilization in these plots. We will present the results of water isotopes to investigate if similar niche-differentiation for water uptake can be determined or not in these plots in the poster.