Litter decomposition of Sasa bamboo and tree in forest ecosystem of northern Hokkaido

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As component of chemical cycling in forest ecosystem, biomass of plant and litterfall, litter decomposition at soil play an important role of chemical cycling. Considering biogeochemical cycling of forest ecosystem in Hokkaido, Sasa which dominate major proportion as understory vegetation is considered that it has strong relation to these cycling. However, the studies treating understory vegetation, Sasa is still limited at this point. Atmospheric nitrogen deposition that is current increasing is essential nutrient for living and a change of nitrogen supply to forest ecosystem be expected to effect on process of biogeochemical cycling including litterfall and litter decomposition. In this study, we investigated litter decomposition of Sasa including nitrogen cycling for understanding role of Sasa in forest of ecosystem of Northern Hokkaido.

This study was conducted at the Nakagawa Experimental Forest of Hokkaido University, located in northern Hokkaido. The forest is cool-temperate forest of natural forest and dominated by birch (*Betula ermanii*) and maple (*Acer mono*) and Sachalin Fir(*Abies Sachalinensis*). The understory vegetation is dominated by Sasa(*sasa senanensis*). Litter decomposition experiment was conducted using a litterbag method. We established two sites including control site and treatment site (experimental addition of nitrogen from 2001, 50 kgN ha^{-1} y^{-1}). We collected litter from two sites and regulated litterbags. And then, We placed litterbag (from both sites) at control plot in November 2005.

Remaining mass of Sasa leaf and culm at first year in the control site were higher (above 60 %) than those of tree leaf (ranging from 30 to 40 %). Although nitrogen contents of initial litter of Sasa was higher than that of tree, the decomposition rate of Sasa was significantly higher than that of tree. In addition, the decomposition rate of Sasa culm and leaf was almost comparable, while the nitrogen content of initial litter of Sasa leaf was higher than that of Sasa culm. The nitrogen content in tree leaf increased with the time during the decomposition, indicating that the net nitrogen immobilization in tree leaf was occurred along with the litter decomposition. On the other hands, the nitrogen content in Sasa leaf decreased with the leaf decomposition, causing the net mineralization of nitrogen from Sasa leaf. These results suggested that there are some unique and unknown mechanisms of carbon and nitrogen in Sasa leaf and culm is existed not only based on the initial balance of carbon and nitrogen content, but based on other factors like lignin and silicon contents in Sasa litter. In nitrogen-treatment site, nitrogen content in tree leaf was higher than that in the control site. The nitrogen in tree leaf in the treatment site was net released during the litter the decomposition, indicating that the initial nitrogen contents in tree leaf strongly controlled net nitrogen budget of litter layer. We also found the effect of litter mixing (Sasa and tree) on the litter decomposition. The mixing of litter decreased the carbon mineralization and increased nitrogen mineralization, suggesting the co-existance of the litter species is very important for the pattern of carbon and nitrogen in litter during the litter decomposition.