Mean residence time of leaf nitrogen and leaf longevity of hinoki cypress (*Chamaecyparis obtusa*) under nutrient-poor soil

*Asami Nakanishi¹, Yoshiyuki Inagaki²

¹Field Science Education and Research Center, Kyoto University, ²Shikoku Research Center, Forestry and Forest Products Research Institute

Mean nitrogen residence time of plants is decided by nitrogen resorption and leaf longevity. However, there is little knowledge about intra-specific variation in leaf longevity and mean nitrogen residence time along a soil nitrogen gradient. We evaluated the effects of nitrogen resorption and leaf longevity on mean residence time of leaf nitrogen (leaf-N MRT) of hinoki cypress under different soil nutrient status.

Mean nitrogen residence time of leaf nitrogen in organic horizon ($A_0$N-MRT) was used as the index of soil nutrient status. $A_0$N-MRTs ranged 5.4 to 38.3 years that were longer than those in other stands of hinoki cypress. Leaf longevity and leaf-N MRT increased as $A_0$N-MRT increased. Leaf production and leaf-fall nitrogen mass decreased with increasing $A_0$N-MRT. There were no significant relationships between $A_0$N-MRT and nitrogen resorption, leaf biomass, leaf nitrogen mass, nitrogen concentrations of fresh-leaf and leaf-fall. Nitrogen resorption was higher than that in other stands of hinoki cypress. It was suggested that nitrogen resorption did not significantly correlate with $A_0$N-MRT because of high resorption rate in all plots. These findings indicated that hinoki cypress under nutrient-poor soil to maximize mean residence time of leaf nitrogen increased nitrogen resorption before leaf-fall first, and additionally, altered leaf longevity by changing leaf production along a soil nitrogen gradient.

Keywords: mean residence time of leaf nitrogen, leaf longevity, leaf production, hinoki cypress, organic horizon