

Leaching of DOC from different cover in old-growth forest at Oshirakawa

馬情 (岐大・流圏センター)・飯村康夫・Vilanee Suchewaboripont・吉竹晋平・大塚俊之 (岐大・流圏センター)・加藤正吾・小見山章 (岐大・応用生物)

Introduction

Coarse woody debris (CWD) is a significant component of forest ecosystems, often accounting for 7% to 20% of the total forest carbon(C) in mature forests (Harmon et al., 1990; Delaney et al., 1998; Alberti et al., 2008). It affects soil cycling through the dissolution of organic C (Spears et al., 2003; Hafner and Groffman, 2005). Accurate estimates of CWD quantity and quality is crucial for the assessment of the multiple functions of CWD in forest ecosystems. DOC's crucial function in the belowground carbon cycle is also being recognized (Jandl and Sollins, 1997 ; Moore, 1997). Numerous studies have shown that the largest increase in the flux of DOM occurs when percolating water passes through the forest floor (McDowell and Likens, 1988; Qualls et al., 1991;Currie et al., 1996;Michalzik et al., 2001).This research is to estimate CWD quantity and quality and explore whether leaching DOC from CWD may strongly effect the soil carbon sequestration.

Materials and Methods

Experiments were carried out in old-growth deciduous broad-leaved forest at Oshirakawa, Gifu, Japan (36°9'N,136°49'E,1,330m a.s.l.). It was more 300 years old forest and the vegetation was dominated by *Fagus crenata* and *Quercus mongolica var.crispula*. We measured the length plus two diameters of each piece of CWD in 1ha plot, distributed it for different decay classes from I to IV under visible conditions, and mapped them. Soil solution was collected using a tension-free lysimeter in three replicates under the several CWD and litter floors, respectively, beneath 0 and 25 cm depths. Throughfall was collected using a precipitation collector in twelve replicates. Samples were collected once per month. The concentrations of DOC were determined using a TOC analyzer.

Results

CWD was estimated for 30.3 Mg C ha⁻¹, distributed in 355 pieces with a total volume of 75.8 m³ ha⁻¹.The area covered of CWD was 602.5 m² ha⁻¹. CWD decay class is almost in classIII and classIV (Fig.1). The leaching DOC concentration which under CWD decay classIV layer is higher than under litters and CWD decay class II layers (Table 1). So the DOC concentration is not only depend on the forest floor but also depend on the CWD decay class.

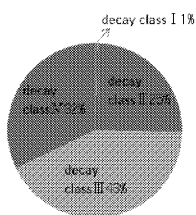


Fig.1 The ratio of different decay class

Table1 The concentration of DOC in different soil depths from different forest floor

Soil depth (cm)	CWD decay class II C concentration (ppm)	Litter C concentration (ppm)	CWD decay class IV C concentration (ppm)	Litter C concentration (ppm)
0cm	28.3	40.2	68.8 ± 10.5	45.6 ± 1.1
25cm	13.9 ± 1.2	19.9 ± 6.7	28.0 ± 5.5	28.7 ± 10.1