Geophysical Research Abstracts
Vol. 14, EGU2012-8321-1, 2012
EGU General Assembly 2012

Effect of Leaf Litter Diversity on Dissolved Organic Matter Export in a Deciduous Forest Soil

A. Scheibe* (1), V. Eißfeller (2), C. Langenbruch (3), J. Seven (4), and G. Gleixner (1)

(1) Max Planck Institute for Biogeochemistry, 07745 Jena, Germany (*ascheibe@bgc-jena.mpg.de), (2) University of Göttingen, Department of Ecology, 37073 Göttingen, Germany, (3) University of Göttingen, Department Soil Science of Temperate and Boreal Ecosystems, 37077 Göttingen, Germany, (4) University of Göttingen, Department of Forest Botany and Tree Physiology, 37077 Göttingen, Germany

We investigated sources and fate of dissolved organic matter (DOM) in soils in order to understand the effect of tree diversity on below ground processes. We established a leaf litter exchange experiment in the National Park Hainich (Thuringia, Germany) in December 2008. Labeled (^{13}C) and unlabeled leaf litter of beach (*Fagus sylvatica*) and ash (*Fraxinus excelsior*) were exposed to study the decomposition process. Soil water was collected biweekly with glass suction plates (1 μm pore size, UMS, Munich, Germany) in 5 cm soil depth and pH, conductivity, DOC and anions (Cl^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-}, F^-) were determined. The ^{13}DOC values were measured using high performance liquid chromatography - isotope ratio mass spectrometry (HPLC-IRMS).

The values of conductivity and pH in the soil water indicate slower decomposition processes for leaf litter of beech in comparison to ash leaf litter. The conductivity was correlated with the Cl^- ion during the first spring, which suggests the export of carbon due to leaching processes. However during the summer the conductivity correlated with the NO_3^- ions, which indicates mineralization as driving process.

Surprisingly, the contribution of litter ^{13}C into the dissolved carbon pool was very low. The highest contribution with up to 8.6% DOC labeled by ash litter derived carbon was found in the first 3 month of application. However, in the mean only 1.2% and 2.6% of DOC was labeled by carbon of the beech and ash litter, respectively. This represents in total only up to 0.41% of labeled litter carbon that was added. The higher percentages of ash litter derived ^{13}C in DOM of soil water compared to beech indicates a positive effect of litter quality on decomposition. However, we did not find a faster decomposition or higher ash litter derived carbon export in mixed (ash and beech litter) treatments, which would indicate food selection or biodiversity effects.