



Does plant biodiversity influence the formation of dissolved organic carbon?

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The maintenance and improvement of groundwater quality is an issue that becomes more and more important in times of global climate change. Rainwater is filtered through soil before entering the groundwater resources. During this filter process organic and inorganic compounds are exchanged between the soil and the soil solution and dissolved organic matter (DOM) is formed. This organic matter is known to contain different functional groups complexing for example heavy metals. Thus, heavy metals can be mobilized and harm the environment. Hazardous compounds, such as herbicides and pesticides, used on agricultural fields are also absorbed on DOM, transported with the water flow, and take effort to be removed. So far we have only limited knowledge how biodiversity of plants influences the formation of dissolved organic matter and if more divers ecosystems can conserve or improve ground water quality.

Several biodiversity experiments investigate so far mainly the role of plant diversity on biomass growth and production as response variable of an ecosystem. In spring 2002 the "Jena Experiment" was set up to investigate the role of biodiversity on ecosystem function and functioning. About 90 plots were installed with plant mixtures from monocultures to 60 species of grassland communities. Species were chosen to achieve 4 different functional groups, i.e. grasses, small herbs, tall herbs and legumes, to be able to detect the importance of functionality beside the species number.

The export of organic compounds from the field is investigated by biweekly collection of soil solution in depths of 10, 20, 30 and 60 cm. Measurements of DOC in the soil solution revealed a strong dependency on biological activity. During the growing season from April to October DOC concentrations are generally higher than in winter time. The average concentrations on different plots are dependent on the species number

and functional groups. DOC concentrations in autumn are strongly linked to the root biomass that was built up during summer time. Small herbs show a significant trend to increase organic carbon export through the soil profile. In contrast decreases the exported DOM with increasing species number and functional groups. Consequently is plant biodiversity positively influencing the carbon loss from grassland ecosystems and is therefore improving the groundwater quality.