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Stochiometry, Microbial community composition and decomposition, a modelling analysis

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Enzyme activity based litter decomposition models describe the decomposition of soil organic matter as a function of microbial biomass and its activity. In these models, decomposition depends largely on microbial and litter stoïchiometry. We, used the model of Schimel and Weintraub (Soil Biology & Biochemistry 35 (2003) 549–563 largely relying on the modification of Waring B et al. Ecology Letters, (2013) 16: 887–894) and we modified the model to include bacteria, fungi and mycorrizal fungi as decomposer groups assuming different stochiometries.
The model was tested against previously published data from a fire chronosequence from northern Finland. The model reconstructed well the development of soil organic matter, microbial biomasses, enzyme actitivies with time after fire.
In a theoretical model analysis we tried to understand how the exchange of carbon and nitrogen between mycorrhiza and the plant as different litter stoïchiometries interact. The results indicate that if a high percentage of fungal N uptake is transferred to the plant mycorrhizal biomass will decrease drastically and does decrease, due to low mycorrhizal biomasses, the N uptake of plants. If a lower proportion of the fungal N uptake is transferred to the plant the N uptake of the plants is reasonable stable while the proportion of mycorrhiza of the total fungal biomass varies.
The model is also able to simulate priming of soil organic matter decomposition.