Biogeosciences Discuss., 9, C9431–C9434, 2013
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Biogeosciences Discussions

Interactive comment on "Dynamics of microbial communities during decomposition of litter from pioneering plants in initial soil ecosystems" *by* J. Esperschütz et al.

J. Esperschütz et al.

schloter@helmholtz-muenchen.de

Received and published: 3 May 2013

There should be a comment on the litter decomposition in the course of the experiments. In Calamagrostis, it seems that it was very low in the beginning, than fast between weeks 4 and 15 and later none or very low. Also with Lotus, the decomposition between week 15 and 30 seems to be close to zero. What is the reason for that? We can assume two major reasons. One is linked to the environmental conditions present at the sites (mainly low water availability). More than in well developed soils, processes and turn overrates in the soil material of the "Chicken Creek catchment" are obviously linked to the direct climatic conditions present at the site due to the

low capacity to store water. Thus the low precipitation during the autumn period might have a stronger influence on the degradation of plant litter compared to other sites with more developed soil ecosystems Furthermore of course during the degradation of litter the ratio of easily degradable compounds to more complex compounds decreases, thus degradation rates slow down significantly. Again the specific properties of “young” soils may influence degradation in this phase more than well developed soils do, as degradation of lignin etc requires well developed microbial network structures as well as a high nutrient status of the soil, both properties which do exist only to a low degree in developing soils. These aspects have been included in the revised version in the discussion

I am not sure what is the source of the observation of high levels of the FA 18:3 and 18:2w6,9 in the initial phases of decomposition. Both of these FA are common in many litter types and the authors should clearly show what is their content in their litters. At best, the PLFA signature of the litter should be added. Although the authors claim that there is little litter material mixing into soil, the FA can perhaps leach from the litter. The best would be to demonstrate if this can occur. As we measured phospholipid fatty acids (PLFA) in our study and not pure neutral lipids, a high content of “free” PLFA is quite unlikely. Zelles et al. (1999) calculated the average half time of free PLFA in soil to less than 1 day due to their high energy status and the subsequent fast degradation. Thus we assume that the measurement of an individual PLFA is strongly connected to the respective organisms, they are indicative for. This point has been included in the discussion section

Minor comments: Abstract L12: delete "bulk" done

Abstract L13: delete "process" done

14985 L5: change "closed" to "close" done

14988 L6: "the soil moisture (0-5 cm)" - rephrase, the meaning is unclear rephrased to “the soil moisture in the top soil”

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14992 L6: in Fig. 2, the interpolation of the litter decomposition data fits poorly, in fact, there is almost zero decomposition between weeks 15 and 30; please connect means with straight lines We used the same fitting like in a previous microcosm-experiment (Esperschütz et al., 2011); a connection of single points would make the graph hard to interprete; thus we did not change the graph in the revised version

14992 L9: I can not see the data from week 10, so you can not speak about rates before / after week 10. 10 weeks has been changed to four weeks in the revised version

14992 L18: Include zero line in Fig. 3 or consider its transformation into log-scale The graphs have been changed according to the suggestion of the reviewer (zero line included and transformation into log-scale)

14993 L9: There is high microbial biomass but low litter mass loss; can it be distinguished if the microbial biomass comes mainly on expense of the litter leachate or is there some contribution of the priming effect of the leachate? as original carbon contents are very low in the original soil samples, we do not think that priming plays a major role in biomass formation in this study (which is indeed in contrast to what might be observed at well developed ecosystems with higher carbon contents in soil)

14994 L19: rephrase, the amount of applied litter can not change has been changed to "During the experimental period of 30 weeks, a significant portion of the applied plant litter of L. corniculatus as well as C. epigejos had been degraded"

14995 L12-L13: unclear, rephrase 1 has been rephrased to "Consequently during the first four weeks of incubation the fast degradation rates of L. corniculatus plant litter might be linked to large amounts of water soluble plant litter components, rich in nitrogen content. Those compounds could be used by microbes colonising the litter material to increase their activity and biomass (Aneja et al., 2006; Hopkins et al., 2007; Poll et al., 2008)"

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4995 L25-L26: how much water soluble material was there in your litter We did not measure the amount of WEOC in our initial plant material. However WOEC development is a highly dynamic process and is strongly linked to microbial activities, thus to answer this question not a simple value but a in depth time series on WEOC in litter material during degradation would have been needed.

14997 L25: explain what does "sustainable" mean here Fig 3. Caption: delete "were" after "are deleted

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/9/C9431/2013/bgd-9-C9431-2013-supplement.pdf

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Interactive comment on Biogeosciences Discuss., 9, 14981, 2012.