[JJ] Evening Poster | B (Biogeosciences) | B-BG Biogeosciences & Geosphere-Biosphere Interactions

[B-BG03]Microbial ecology in earth and planetary sciences

convener:Michinari Sunamura(University of Tokyo Dept. of Earth &Planetary Science), Natsuko Hamamura(Kyushu University), Keisuke Koba(京都大学生態学研究センター, 共同), Yuki Morono(Kochi Institute for Core Sample Research, Japan Agency for Marine-Earth Science and Technology)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
Microbes have exerted the great influences on earth environments through the history of earth. Microbial ecology is a study of interaction between microbes and surrounding environments. Research target of Microbial ecology covers most of environments on the earth and planet, e.g. soil, subsurface, subseafloor, ocean, river, lake, air, space, volcano, fault and earthquake, minerals, and more. In this session , we aim to exchange informations of microbial distribution, population dynamics, function, effect on material cycles between microbial ecologist and earth&planetary scientist. We hope effective discussion from interdisciplinary approaches in this session.

[BBG03-P03]High diversity and spatio-temporal variations in fungal spore communities

*Carles Castaño[1,2], Jonàs Oliva[3], Josu Alday[1], Juan Martínez de Aragón[4], Javier Parladé[5], Joan Pera[5], José Antonio Bonet[1,4] (1.University of Lleida. Department of Crop and Forest Sciences, 2.Forest Bioengineering Solutions S.A. , 3.Department of Forest Mycology and Plant Pathology, Swedish University of Agricultural Sciences, 4.Centre Tecnològic Forestal de Catalunya, CTFC-CEMFOR, 5.Protecció Vegetal Sostenible, IRTA, Centre de Cabrils)
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Fungal spore dispersal and deposition are important mechanisms for fungal communities to establish and colonize new forest ecosystems. However, information on the spatio-temporal dynamics of the airborne fungal communities and the factors affecting spore deposition are still scarce.

In this study, we used simple spore traps placed in forest plots to sample fungal spores weekly, simultaneously to fungal fruiting body samplings during the autumn season. Trapped spore samples were quantified by qPCR and analyzed by metabarcoding of the ITS2 region to study the fungal community composition. We also quantified the spores from a target edible fungal species, *Lactarius vinosus*, by qPCR using a specific hydrolysis probe. Our aim was to describe the spatio-temporal dynamics of the deposited spore community, to understand how rainfall events may affect spore deposition and to study whether trapped fungal spores reflect the fruiting body community.

Our results showed that spore community is hyperdiverse. We detected 12 different fungal functional guilds, with mycorrhizal and plant pathogens being the most diverse. Spore community composition changed considerably over time due to the emergence of ephemeral fruiting bodies and rapid spore deposition (lasting from one to two weeks). Community compositional changes across sampling weeks were higher than across sampling plots. Average number of spores recorded each week was 7.1 M spores × plot^{-1} × week^{-1}, with a peak of almost 60 M spores during an extreme rainfall event. Although spore deposition in traps also occurred in absence of rainfall events, both fungal diversity and fungal spore abundances were positively correlated with precipitation events. Especially high was the correlation between rainfall and spore abundances of soil saprotrophs, represented mostly by puffballs (e.g. *Bovista*, *Lycoperdon*). The spores of 37 fungal species that produced fruiting bodies in the study plots were identified. For many

species, the emergence of epigeous fruiting bodies was followed by a peak in the relative abundance of their airborne spores. There was significant positive correlation between fruiting body yields and spore abundance in time for five out of seven fungal species. There was no relationship between fruiting body yields and their spore abundance at plot level, indicating that some of the spores captured in each plot were arriving from the surrounding areas.

Our results provide new insights on the large functional diversity associated to spore deposition and shows that this deposition may be driven by rainfall events. This approach could also help in identifying the hidden diversity of the airborne fungal spores circulating in the atmosphere. Further research could help to identify the spore deposition patterns for most common fungal species.