Geophysical Research Abstracts
Vol. 15, EGU2013-731, 2013
EGU General Assembly 2013

Soil microbial abundance, activity and diversity response in two different altitude-adapted plant communities affected by wildfire in Sierra Nevada National Park (Granada, Spain)

Gema Bárcenas-Moreno (1), Lorena Zavala (1), Antonio Jordan (1), Erland Bååth (2), and Jorge Mataix-Beneyto (3)

(1) MED_Soil Research Group, Department of Crystallography, Mineralogy and Agricultural Chemistry, University of Seville, Spain(gbarcenas@us.es), (2) Microbial Ecology, Department of Biology. Lund University. Sweden, (3) GEA- Grupo de Edafología Ambiental – Environmental Soil Science Group. Department of Agrochemistry and Environment. University Miguel Hernández. de Elche, Spain.

Plant communities can play an important role in fire severity and post-fire ecosystem recovery due to their role as combustible and different plant-soil microorganisms interactions. Possible differences induced by plant and microorganisms response after fire could affect the general ecosystem short and long-term response and its sustainability. The main objective of this work was the evaluation of the effect of wildfire on soil microbial abundance, activity and diversity in two different plant communities associated to different altitudes in Sierra Nevada National Park (Granada, Spain).
Samples were collected in two areas located on the Sierra Nevada Mountain between 1700 and 2000 m above sea level which were affected by a large wildfire in 2005. Two samplings were carried out 8 and 20 months after fire and samples were collected in both burned and unburned (control) zones in each plant community area. Area A is located at 1700m and it is formed by Quercus rotundifolia forest while area B is located at 2000 m altitude and is composed of alpine vegetation formed by creeping bearing shrubs.
Microbial biomass measured by Fumigation-Extraction method followed the same trend in both areas showing slight and no significant differences between burned and unburned area during the study period while viable and cultivable bacteria abundance were markedly higher in fire affected samples than in the control ones in both samplings. Viable and cultivable filamentous fungi had different behavior depending of plant vegetation community studied showing no differences between burned and unburned area in area A while was significantly higher in burned samples than in the control ones in area B.
Microbial activity monitoring with soil microbial respiration appears to had been affected immediately after fire since microbial respiration was lower in burned samples from area A than in unburned one only 8 months after fire and no significant differences were observed between burned and unburned samples in area B.
Soil microbial community composition studied by Principal Component Analyses (PCA) of the PLFA pattern revealed both fire and seasonal effects.
General overview of the results could lead to think in a slight negative or even positive effect of fire on soil microbial parameters studied, mainly in zone B. Nevertheless if we calculate the ratio between C-biomass and organic-C we find lower ratio in fire-affected samples than in the control ones in both areas, showing the most marked effect on area B which remain with this tendency 20 months after fire.

Acknowledgements:
This research was supported by the CICYT co-financed FEDER project CGL2006-11107-C02-01/BOS. We are grateful for the Sierra Nevada National Park support during the study.