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Wildfire effects on microbial abundance in different plant communities in Sierra Nevada (Granada, Spain)

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The main objective of this work is the study of the effect of wildfire on soil microbial abundance in three different plant communities associated with different altitudes in “Sierra Nevada” (Granada, Spain). The abundance of 2 microbial groups (aerobic bacteria and filamentous fungi) was measured by dilution plate count technique using selective media and Fungi/Bacteria ratio was calculated. Samples were collected in three areas located on the Sierra Nevada Mountain between 1300 and 2000 m over sea level which were affected by a large wildfire in 2005. Two samplings were carried out 8 and 13 months after fire and samples were collected in both burned and unburned (control) zones in each plant community area. Area A is located at 2000 m altitude and is composed of alpine vegetation formed by creeping bearing shrubs. Area B is located at 1800m and it is formed by *Quercus rotundifolia* forest. Area C, at 1300 m altitude, is an area with tall grass and shrubs which was also affected by another wildfire 25 years ago.

Microbial abundance showed significantly higher values in burned over unburned areas in both groups, Fungi and Bacterial, and in each sampling and plant community. We observed significantly different responses to fire incidence among plant community areas. Bacterial abundance in first sampling showed a general increase with fire but this increase was significantly higher in B than in A or C. Nevertheless, fungal abundance shows a slighter increment than bacterial. In the second sampling, bacterial abundance increases in burned areas with regard to the controls but this increment was significantly higher in B than in the other areas. Fungal abundance variation be-

tween burned and control areas in second sampling did not show significant differences among plant communities although the increase in C was much more marked than in A or B. Statistically significant differences were found in Fungi/Bacteria ratio response to fire among different plant communities in both samplings. Area A did not show variation between burned and unburned samples in 1^{st} sampling and showed an important decrease in 2^{nd} sampling; area B showed an important decrease in the ratio in both samplings; area C increased the ratio values in 1^{st} sampling and kept similar values in the 2^{nd} one.

It is probable that fire intensity and severity were different in the 3 plant communities and this caused different immediate and post-fire responses in microbial populations among the plant communities studied. But also, the variations in the response of microbial abundance and the Fungi/Bacteria ratio after the presence of fire could be influenced by the possible presence of the different microbial communities associated with each plant community which is determined by altitude distribution. Nutrients input via ash deposition could explain the generalized increase in microbial abundance months after fire and the higher increment in bacterial over fungal abundance could also be mainly due to the increment of pH as a consequence of the incorporation of ash into the soil.

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