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Increasing microbial diversity and nitrogen cycling potential of burnt forest soil in Spain through post-fire management

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Microbial diversity and function in soils are increasingly assessed by the application of molecular methods such as sequencing and PCR technology. We applied these techniques to study microbial recovery in post-fire forest soils. The recovery of forest ecosystems following severe fire is influenced by post-fire management. The removal of burnt tree stumps (salvage logging) is a common practice in Spain following fire. In some cases, the use of heavy machinery in addition to the vulnerability of soils to erosion and degradation make this management potentially damaging to soil, and therefore to the ecosystem. We hypothesized that tree removal slows down the recovery of soil biological communities including microbial and plant communities and contributes to soil degradation in the burnt affected area. The study area is located in "Sierra de Mariola Natural Park" in Alcoi, Alicante (E Spain). A big forest fire (>500 has) occurred in July 2012. The forest is composed mainly of Pinus halepensis trees with an understory of typical Mediterranean shrubs species such as Quercus coccifera, Rosmarinus officinalis, Thymus vulgaris, Brachypodium retusum, etc. Soil is classified as a Typic Xerorthent (Soil Survey Staff, 2014) developed over marls. In February 2013, salvage logging (SL) treatment, with a complete extraction of the burned wood using heavy machinery, was applied to a part of the affected forest. Plots for monitoring the effects of SL were installed in this area and in a similar nearby control (C) area, where no SL treatment was done. The recovery of soil bacterial and fungal communities post-fire with and without tree removal was analysed by using Next-Generation sequencing and the abundance of functional genes, related to nitrogen cycling, in the soil was estimated using quantitative PCR (qPCR). We will present the methods used and the results of our study in this PICO presentation.