

Fungal role in post-fire ecosystem recovery in Sierra Nevada National Park (Spain)

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Fire effect on soil microorganisms has been studies for decades in several ecosystems and different microbial response can be found in the bibliography depending on numerous intrinsic and extrinsic soil factors. These factors will determine preliminary soil microbial community composition, subsequent pos-fire initial colonizers and even post-fire growth media characteristics that microbial community will find to start recolonisation.

Fire-induced soil bacterial proliferation is a common pattern found after fire, usually related to pH and C availability increased. But when original soil pH is not altered by fire in acid soils, microbial response can be different and fungal response can be crucial to ecosystem recovery.

In this study we have compile data related to high mountain soil from Sierra Nevada National park which was affected by a wildfire in 2006 and data obtained by laboratory heating experiment, trying to elucidate the ecological role of fungi in this fragile ecosystem. On the one hand we can observe fire-induced fungal abundance proliferation estimated by plate count method 8 and 32 months after wildfire and even in a short-term (21 d) after laboratory heating at 300 °C. Six years after fire, fungal abundance was similar between samples collected in burnt and unburnt-control area but we found higher proportion of species capable to degrade PAHs (laccase activity) in burnt soil than I the unburnt one.

This finding evidences the crucial role of fungal enzymatic capacities to detoxify burnt soils when fire-induced recalcitrant and even toxic carbon compounds could be partially limiting total ecosystem recovery.