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Sostenere il pianeta, boschi per la vita

Ricerca e innovazione per la tutela e la valorizzazione delle risorse forestali

Abstract-Book: Comunicazioni Orali

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Post-fire rehabilitation of forest soils through integrated bioremediation strategies: a case study

Post-fire rehabilitation decisions in forest management, including bioremediation, must take into account the degree of protection needed by the assets at risk, treatment costs, availability of treatment materials, short and long term effects of treatment applications, and the likelihood of treatment success in the specific area being considered from time to time. The choice to rely on natural recovery processes and not to implement any rehabilitation treatment may in fact be often an inefficient alternative. Only in the Mediterranean basin, over the last thirty years, forest ecosystems have experienced an increasing incidence of fires. There is no doubt that negative effects of the fire begin to fade when the vegetation is able again to re-establish itself on burnt soils. The natural re-colonization can be however a very slow process. Combustion generates in fact dangerous contaminants including polycyclic aromatic hydrocarbons (PAHs). Thus, removal of these compounds is a pre-requisite to accelerate environmental restoration of fire-affected areas. Surprisingly, the accumulation of PAHs remains one aspect scarcely weighted so far in dealing with forest soils impacted by fire. These compounds not only represent an actual toxicological hazard for people who - for various reasons - may operate on a burnt land but are also an obstacle to the restoration of biodiversity, due to their strong toxicity to both plant and animal organisms. Bioremediation can therefore be regarded to as an effective approach in post-fire management of burnt areas. However, since the microbial communities in wildfire-affected soils normally suffer a drastic reduction and/or inhibition, resulting in a lower soil biological reactivity, stimulation of the microbial degradation of PAHs sounds as an interesting hypothesis for woodland management, hitherto unexplored on wildfire-impacted areas. Progress may result from the development of specific biotechnological formulations for application in forest soils crossed by fire. Here two different bioremediation strategies, namely soil bioaugmentation by means of the addition of a mycelial suspension of a *Trichoderma* sp. strain and soil biostimulation through the dispersion of a commercial landfarming formulation to enhance the native hydrocarbonoclastic microbial community by simply adjusting soil nutrients, were compared to verify the biotreatability of wildfire-generated toxic hydrocarbons (BTEX, LMW PAHs and C_{12-40} hydrocarbon fraction).

Parole chiave: Bioaugmentation, Bioremediation, Biostimulation, Natural attenuation, PAHs, Toxic hydrocarbons, Trichoderma sp., Wildfire-impacted forest soils

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