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THE IMPACT OF FIRE ON SOIL ORGANIC MATTER AND ITS ECOLOGICAL IMPLICATIONS

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In the Mediterranean Area, vegetation fires are one of the most frequent soil disturbing evidences. In the article the implications of the fires on the ecological function of soil organic matter (SOM) are analysed.

Key words: fires, implications, soil organic matter.

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ЕКОЛОГІЧНЕ ЗНАЧЕННЯ ТА ВПЛИВ ПОЖЕЖ НА ОРГАНІЧНУ РЕЧОВИНУ ҐРУНТУ

Природні пожежі в Середземномор'ї є найчастішою причиною деструкції ґрунту. У даній статті аналізується вплив пожеж на екологічну функцію органічної речовини ґрунту.

Ключові слова: пожежі, наслідки, органічна речовина ґрунту.

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ЭКОЛОГИЧЕСКОЕ ЗНАЧЕНИЕ И ВЛИЯНИЕ ПОЖАРОВ НА ОРГАНИЧЕСКОЕ ВЕЩЕСТВО ПОЧВЫ

Естественные пожары в Средиземноморье являются наиболее частой причиной повреждения почвы. В данной статье анализируется воздействие пожаров на экологическую функцию органического вещества почвы.

Ключевые слова: пожары, последствия, органическое вещество.

In the Mediterranean Area, vegetation fires are one of the most frequent soil disturbing evidences, but their implications on the ecological function of soil organic matter (SOM) are still far from being well understood. For example, the response of SOM content to fire depends is highly variable and depends on fire intensity, vegetation type, fuel load as well as texture and even slope. Whereas, high intensity fire can lead to complete destruction of the organic layer and the humic material in the topsoil, moderate and prescribed wildfire result in minor alterations. Here increases of organic C and N due to input of partly charred material or litter from decaying trees are frequently observed. However, many of those alteration in C and N can still be registered over a longer time period after a fire. The combustion of plant residues releases important plant nutrients. In case the fire occurred before the vegetation period, they can be recovered and contribute to a quick developing of a new plant cover. On the other hand, without such a plant cover, heavy rain falls will result in their quickly loss due to leaching and erosion. Fire transforms biogenic material into pyrogenic organic material (PyOM), thus altering both the chemistry but also the quantity of source material of the SOM pools. This will have implications on the turnover of SOM and on the potential of soils to serve as a C sink within the global C cycle. Compared to SOM formed via biodegradation and humification, PyOM has some important qualitative differences in its molecular structure. Whereas biological processes lead to carboxyl-containing macromolecular products, thermal treatment removes external O-groups, yielding hydrophobic materials with comparatively reduced solubility and colloidal properties. Increased soil hydrophobicity, however, alters soil water distribution and water infiltration and with that affects soil water and nutrient availability. The lack of polar groups is expected to change sorption properties and therefore retention of soil cations, nutrients or pollutants

which can promote their leaching. It can also affect interactions between SOM, clay and metal oxides and thus the stability and formation of aggregates. On the other hand, recent studies indicated that fast oxidation of PyOM can occur. This oxidation may be responsible for the observed fast disappearances of water-repellence in fire-affected soils. Thus, if enough time is left between the single PyOM applications, the negative impacts with respect to hydrophobicity may be limited.

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