

Impact of prescribed fire in soil properties after 5-years: experimental study.

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Abstract (100-400 words)

Wildfires are a serious problem in areas with a Mediterranean climate owing to the hot summers and drought conditions providing perfect conditions for wildfire, especially when there are large amounts of fuel accumulation and continuity between forested areas. In the Mediterranean, high severity fires that spread rapidly are common and difficult to be extinguished. Thus, the identification of tools to reduce fire spread and minimize their incidence and effects is crucial. Preventive forestry is a good tool for achieving forest structures with lower amounts of fuel and a greater resistance to fire. Prescribed fire is the planned use of fire under predetermined weather, fuel and topographic parameters to achieve clearly defined objectives as controlling fire regimes by managing fuel, counteracting the disappearance of biomass-consuming land management practices and reducing the overall fire risk. Normally, prescribed fires are low intensity fires and, if managed adequately, do not cause any damage to trees, especially in Mediterranean ecosystems where trees are resilient to fire. Besides, prescribed fires usually have different impacts on soils, water resources, biodiversity, the risk-reduction of wildfires and carbon storage. Prescribed fires usually are of low/moderate severity. Because of this, the effects of prescribed fires on soils properties may vary from one site to another. The objectives of our study are to: i) determine the impact of the prescribed fire just after and ii) 5-years later with respect to natural conditions. To do this, in 2011, a prescribed fire was conducted in one experimental area of Mediterranean rangeland. After the fire, soil samples (0-5 cm of depth) were taken in burned and unburned plots in order to analyse: pH, electrical conductivity (EC), soil organic carbon, cationic exchangeable capacity (CEC), aggregate stability (AS), and hydrophobicity. The results indicated that: i) prescribed fire only had significant effects in CEC just after the fire; 5-years after, there were no significant differences between the unburned and burned plots, but two soil properties significantly changed when burned soil samples from 2016 and 2011 were compared: EC and AS in the fraction of 0.053-0.125 mm. In general, the soil properties were not substantially modified by the prescribed fire, supporting the idea it is a very useful tool with very low impact for managing Mediterranean rangelands in order to reduce fuel accumulation and fire risk.