



The ash in forest fire affected soils control the soil losses. Part 1. The pioneer research

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After forest fires, the ash and the remaining vegetation cover on the soil surface are the main protection against erosion agents. The control ash exert on runoff generation mechanism was researched during the 90's (Cerdà, 1998a; 1998b). This pioneer research demonstrated that after forest fires there is a short period of time that runoff and surface wash by water is controlled by the high infiltration rates achieved by the soil, which were high due to the effect of ash acting as a mulch. The research of Cerdà (1998a; 1998b) also contributed to demonstrate that runoff was enhanced four month later upon the wash of the ash by the runoff, but also due to the removal of ash due to dissolution and water infiltration. As a consequence of the ephemeral ash cover the runoff and erosion reached the peak after the removal of the ash (usually four month), and for two years the soil erosion reached the peak (Cerdà, 1998a).

Research developed during the last decade shown that the ash and the litter cover together contribute to reduce the soil losses after the forest fire (Cerdà and Doerr, 2008). The fate of the ash is related to the climatic conditions of the post-fire season, as intense thunderstorms erode the ash layer and low intensity rainfall contribute to a higher infiltration rate and the recovery of the vegetation. Another, key factor found during the last two decades that determine the fate of the ash and the soil and water losses is the impact of the fauna (Cerdà and Doerr, 2010).

During the last decade new techniques were developed to study the impact of ash in the soil system, such as the one to monitor the ash changes by means of high spatial resolution photography (Pérez Cabello et al., 2012), and laboratory approaches that show the impact of ash as a key factor in the soil hydrology throughout the control they exert on the soil water repellency (Bodí et al., 2012). Laboratory approaches also shown that the fire severity is a key factor on the ash chemical composition (Pereira and Úbeda, 2010) and Pereira et al., 2012). Some of the new research challenges related to ash impact in the fire affected soils are related to the ash redistribution after the fire, the impact of ash in soil and water chemistry, the temporal changes of soil erosion, the control ash exert on vegetation recovery and the role to be played by ash in the best management of fire affected land. Those topics needs new ideas and new scientists such as Paulo Pereira show in the Part II of this abstract.

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