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# Mediterranean shrub vegetation: soil protection vs. water availability

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Soil Erosion and Land Degradation are closely related to the changes in the vegetation cover (Zhao et al., 2013). Although other factors such as rainfall intensiy or slope (Ziadat and Taimeh, 2013) the plant covers is the main factor that controls the soil erosion (Haregeweyn, 2013). Plant cover is the main factor of soil erosion processes as the vegetation control the infiltration and runoff generation (Cerdà, 1998a; Kargar Chigani et al., 2012).
Vegetation cover acts in a complex way in influencing on the one hand on runoff and soil loss and on the other hand on the amount and the way that rainfall reaches the soil surface. In arid and semiarid regions, where erosion is one of the main degradation processes and water is a scant resource, a minimum percentage of vegetation coverage is necessary to protect the soil from erosion, but without compromising the availability of water (Belmonte Serrato and Romero Diaz, 1998). This is mainly controlled by the vegetation distribution (Cerdà, 1997a; Cammeraat et al., 2010; Kakembo et al., 2012). Land abandonment is common in Mediterranean region under extensive land use (Cerdà, 1997b; García-Ruiz, 2010). Abandoned lands typically have a rolling landscape with steep slopes, and are dominated by herbaceous communities that grow on pasture land interspersed by shrubs. Land abandonment use to trigger an increase in soil erosion, but the vegetation recovery reduces the impact of the vegetation. The goal of this work is to assess the effects of different Mediterranean shrub species (Dorycnium pentaphyllum Scop., Medicago strasseri, Colutea arborescens L., Retama sphaerocarpa, L., Pistacia Lentiscus L. and Quercus coccifera L.) on soil protection (runoff and soil losses) and on rainfall reaching soil surface (rainfall partitioning fluxes). To characterize the effects of shrub vegetation and to evaluate their effects on soil protection, two field experiments were carried out. The presence of shrub vegetation reduced runoff by at least 45% and soil loss by at least 59% in relation to an abandoned and degraded soil (bare soil) (Garcia-Estringana et al., 2010a). D. pentaphyllum, M. strasseri and C. arborescens were more effective in reducing runoff and soil loss (at least 83% and 97% respectively) than R. sphaerocarpa (45% and 59% respectively). Pisctacia Lentiscus L reduced the soil losses in 87% and the runoff rates (68%) meanwhile Quercus coccifera L reached a larger reduction (95% and 88 %) in comparison to herbicide treated agriculture soil. So, all shrub species protected the soil, but not in the same way. In relation to rainfall reaching the soil surface, great differences were observed among species, with interception losses varying between 10% for R. sphaerocarpa to greater than 36% for D. pentaphyllum and M. strasseri, and with stemflow percentages changing between less than 11% for D. pentaphyllum and M. strasseri and 20% for R. sphaerocarpa (Garcia-Estringana et al., 2010b). Rainfall interception on Pistacia Lentiscus and Quercus coccifera were 24% and 34% respectively for the two years of measurements. The integration of the effects of Mediterranean shrub vegetation on soil protection and rainfall partitioning fluxes facilitates understanding the effects of changes in vegetation type on soil and water resources. From this perspective, the interesting protective effect of D. pentpahyllum and M. strasseri, reducing intensely runoff and soil loss contrasts with the dangerous reduction in rainfall reaching the soil surface. Soil protection is essential in semiarid and arid environments, but a proper assessment of the effects on water availability is critical because of water is a scant resource in these kinds of environments. Pistacia Lentiscus and Quercus coccifera shown both a high capacity to intercept rainfall, increase infiltration and reduce the soil losses. We suggest to apply similar research programs into recently fire affected land as the role of vegetation after the fire is very dynamic (Cerdà 1998b).

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