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The use of Mediterranean shrub to flight against the land degradation. The rainfall partitioning fluxes

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Desertification can be triggered by the lost of vegetation (Izzo et al., 2013). One of the impacts of the lack of vegetation is the increase in the effective rainfall and then higher soil and water losses. Vegetation can reduce the effective rainfall by interception. To recover the land that is affected by Desertification we must select plant species that will intercept the rainfall, but will not avoid the rainfall to reach the soil. This is why, studies on the plant rainfall interception are relevant to flight Land Degradation processes.
Soil erosion is highly dependent on the effective rainfall (Cerdà and Lasanta, 2005; Haile and Fetene; 2012; Miao et al., 2012, Prokop and Poręba, 2012). The amount of rainfall that reaches the soil surface and can contribute to detach and transport material is determined by the interception of plants. Interception is also a key factor of the watershed hydrology (Zema et al., 2012). The importance of the rainfall partitioning fluxes is related to the climatic conditions, as climate control the plant cover and the soil properties, and then the soil losses (Cerdà, 1998).
Although the shrubs has been seen as a key vegetation cover in semiarid lands to control the soil and water losses (Cerdà and Doerr, 2007) little information is available about rainfall interception in Mediterranean shrub vegetation, due to technical difficulties to measure them in such small-sized vegetation (Belmonte Serrato and Romero Diaz, 1998). The aim of this work was to assess the influence of different Mediterranean shrubs (Retama sphaerocarpa, Colutea arborescens, Dorycnium pentaphyllum, Medicago strasseri, Pistacia Lentiscus and Quercus coccifera) on rainfall partitioning fluxes (interception losses, throughfall and stemflow) in semiarid environments. The experiment was carried out under natural rainfall conditions with live specimens during two years, with automatic measurement of rainfall partitioning fluxes. In order to assess the influence of biotic and abiotic factors on rainfall partitioning fluxes and their seasonal variation, twenty rainfall events, ten small-size events ($P \leq 10$ mm) and ten major events ($P > 10$ mm), were selected. 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, 2011). Pistacia Lentiscus intercepted 21 % of the rainfall and Quercus coccifera 31 %. Species was the most important biotic factor, rainfall volume was the most significant abiotic factor. Stemflow percentages increased and interception losses percentages decreased as rainfall volume increased, both until a stable value reached when rainfall volume was greater than 10 mm. Stemflow and interception losses varied greatly in small events, consequently it is difficult to predict rainfall interception fluxes in semiarid regions, where small events are the most frequent ones. Rainfall volume events greater than 10 mm are much less frequent, but more rainfall is concentrated around the stem base, being during these events when species which used stemflow as an adaptive mechanism to aridity store water in deep soil layers. Stemflow reached their maximum values in autumn and winter, and their minimum values in summer, unlike interception losses, which were higher in summer, except for M. strasseri because it sheds all its leaves. Hydrologic impact of shrubs was very variable depending on the species, and its capacity to form dense communities. Therefore it makes this type of vegetation of great interest in the Mediterranean region, not only by the effect on soil protection (Garcia-Estringana et al., 2010), but also by the effect on hydrology and water availability in a region where water is a scarce resource and shrub vegetation is proliferating as a result of agricultural abandonment.

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