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Relationship soil-water-plant after the dry season in dry Mediterranean areas

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Preliminary studies have determined the existence of a pluviometric gradient around Mediterranean system, which varies from 240 to 1 100 mm mean annual rainfall. This gradient has an incidence in the physical, chemical and hydrological properties in soils with the same litology. Empiric results conclude that humid eco-geomorphological systems are controlled by biotic processes, whereas in arid eco-geomorphological systems, are abiotic factors which have more importance in soil degradation processes.

The study area of the present work is located in Málaga (Andalusia, Spain), in the southern part of the Natural Park "Sierra Tejeda, Almijara y Alhama". There, the mean annual temperature is around 18 ºC and the mean rainfall is 650 mm. Predominant vegetation corresponds to the termomediterranean serie Smilaci Mauritanicae-Querceto Rotundifoliae Sigmetum, typical of basic soils.

The aim of this study is to analyse the immediate hydrological response of the soil under different vegetation covers, through the analysis of certain properties, all this, under subhumid ombrotipe. A random choice of ten representative plants has been done. These plants, with different sizes, were located in the same Southern slope.

The soil samples were taken right beside the plant log, and also within a distance of 0.4 to 1 metre from them, depending on the plant size. The sampling was carried out between the end of the dry season and the beginning of the wet one, after a 20% of the mean annual rainfall had rained. The physical, chemical and hydrological analyzes -both in the field and the laboratory- were: exchange-base, total carbon, cation exchange capacity, soil infiltration capacity, salt content, hydrophobia, organic matter, soil organic carbon, total nitrogen, wetting profile in bared soil, wetting profile under vegetation cover (shrubland), and p.H.

Literature reveals that rainfall affects significantly the edafogenetic factors, regarding the pluviometric gradient level. In the present study, from a 20% accumulated rainfall of the total mean, not considerable incidences can be found. Furthermore, after the dry season, rainfall event higher than 0.5 mm are necessary in order to observe changes in soil wetting profile. However, for intense rainfall episodes, the hydrological soil response –observe by its wetting profile- in bare soil is 24 hours, and 48 hours in soils vegetation cover.

Secondly, soil hydraulic conductivity – measured with a minidisc infiltrometer at different distances from the selected plants- shows that soil infiltration capacity does not follow a determined patter. This could be due to the significant stony character of the studied area soil/presence of stones in of the studied area soil.

Finally, not major differences regarding soil organic matter have been observed, either at species level or temporal level, from the selected plant.