Geophysical Research Abstracts
Vol. 19, EGU2017-12433, 2017
EGU General Assembly 2017

Soil management and green water in sloping rainfed vineyards

María José Marqués Pérez (1), Marta Ruíz-Colmenero (), Andrés García-Díaz (), and Ramón Bienes Allas ()

(1) Autonomous University Madrid, Geology and Geochemistry, Madrid, Spain (mariajose.marques@uam.es), (2) Arid Ecology Lab. School of Biological Earth and Environmental Science. University of NSW. Sydney 2052. Australia, (3) Applied Research Department, Finca "El Encín" - IMIDRA, Alcalá de Henares, 28800 Madrid, Spain

Improved crop production in areas with restricted water availability is of particular interest. Farmers need to maximize the water use efficiency when the possibilities of further extension of irrigation are limited and water is becoming scarce and expensive. Water in rainfed crops depends on rainfall depth and soil characteristics such as texture and structure, water holding capacity, previous moisture, infiltration, soil surface conditions, steepness and slope length. Land management practices can be used to maximise water availability. In previous studies the unwillingness of farmers to change their practices towards more sustainable use was mainly due to the worry about water competition. This work is aimed at understanding the influence of management practices in the water partitioning of this land use.

This study was conducted in a sloping vineyard in the centre of Spain. A rain gauge recorded rainfall depth and intensity in the area. Three different soil management practices were considered: 1) traditional tillage, 2) permanent cover and 3) mowed cover of cereals, both sown in the strips between vines. Two moisture sensors were buried at 10 and 35 cm depths. Three replicates per management practice were performed.

It is expected that the lack of tillage increase the potential for litter to protect the soil surface against raindrop impact and to contribute to increasing soil organic carbon, and the corresponding increase in infiltration and water holding capacity.

The analysis of two years of daily records of rainfall, runoff and soil moisture are intended to establish any influence of management practices on the partitioning of water. Particularly, the so-called "green water" was estimated, i.e. the fraction of rainfall that infiltrates into the soil and will be further available to plants. Soil characteristics such as texture, structure, moisture, infiltration were established.

In addition simulated rainfalls carried out in summer and winter over bounded plots having different management practices allowed the record of runoff per minute and further influence in soil moisture. After rainfalls soils were at field capacity and progressively dried in undisturbed conditions.

Particle size analysis shows that this soil has 58 % sand, 18% silt and 24% clay, corresponding to a Sandy Clay Loam texture. Total porosity in the topsoil ranges from 49 to 51%, although according to previous studies only the 28% is effective to stock water in their micro and mesopores. In the upper 35 cm these soils are able to store from 0.05 to 0.25 m3 of water per m3 of soil depending on the seasons. At the same time, variations of runoff / infiltration were also noticed depending on the seasons and treatments.