

The role of rock fragment cover on soil erosion in conventional vineyards in Eastern Spain

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Soil erosion results in soil degradation and losses in crop production, specifically, in vineyards are active sources of sediments and water (Martínez-Casasnovas et al., 2005; Rodrigo Comino et al., 2016). Several studies confirm that the main causes of this degradation include lack of vegetative cover, widespread use of herbicides and sprays, and compaction by heavy machinery and trampling effect, suggesting the use of organic amendments and management of mulch covers as solutions (Prosdocimi et al., 2016). Local, inexpensive materials are easier to manage, less costly to apply, and more sustainable if already in the soil, such as the rock fragments. Rock fragments can improve soil quality by conserving the temperature such as the slates in German vineyards (Rodrigo Comino et al., 2015) or contributing to the forestation of degraded ecosystems (Jiménez et al., 2016), but no information exists from tilled vineyards.

Therefore, the main goal of this research was to determine the impact of soil cover and soil properties (slope, soil organic carbon, vegetation cover, soil water content, and rock fragments) on soil erosion in tilled vineyards. To achieve this goal, simulated rainfall experiments were carried out to avoid the spatial variability of natural rainfall (Cerdà, 1999, 1997). After performing the rainfall simulations and assessing the statistical analysis, our interest was focused on the impact of one concrete parameter: the rock fragment cover. The main reason was because experimental results showed significant correlations with runoff (positive) and sediment yield (negative). The results of our study show that the rock fragments at the pedon scale can act as mulch in Mediterranean vineyards, but a pavement of embedded rock fragments will trigger high runoff rates.

Acknowledgments

This research was funded by the European Union Seventh Framework Programme (FP7/2007-2013) under grant no. 603498 (RE CARE Project).

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