



Determination of soil cover and management factor (C) for RUSLE and evaluation of erosion risk in vineyards at five vine growing regions across Europe with different soil management intensities.

Jose Alfonso Gomez (1), Marcella Biddoccu (2), Gema Guzmán (3), Peter Strauss (4), Annegrete Nicolai (5), Daniela Popescou (6), Claudiu Bunea (6), Silvia Winter (7), Johann Zaller (8), and Eugenio Cavallo (2)

(1) Inst.for Sustainable Agriculture. CSIC., Agronomy, Cordoba, Spain (joseagomez@ias.csic.es), (2) Institute for Agricultural and Earthmoving Machines (IMAMOTER) – National Research Council of Italy (CNR), Torino, Italy, (3) University of Cordoba. Spain, (4) Institute for Land and Water Management Research, Austrian Federal Agency for Water Management, Petzenkirchen, Austria, (5) Universite de Rennes 1, Station Biologique de Paimpont. France, (6) Faculty of Horticulture U.A.S.V.M. Cluj-Napoca. Romania, (7) Institute of Integrative Nature Conservation Research and Division of Plant Protection, University of Natural Resources and Life Sciences Vienna, Vienna, Austria, (8) Institute of Zoology, University of Natural Resources and Life Sciences Vienna, Vienna, Austria

Vineyards present some of the largest erosion rates reported in agricultural areas in Europe. Prodescimi et al. (2016) highlight the great variability in the erosion rates measured in different erosion studies partly due to differences in experimental approach, climate and soil. Moreover soil management practices classified within the same category change in subtle, but relevant details across areas (Gómez, 2017).

For erosion studies, the Revised Universal Soil Loss Equation RUSLE (Dabney et al., 2012) is commonly adopted to estimate rates of water erosion on cropland under different forms of land use and management. The literature shows a wide variability among soil cover and management (C) factors for vineyards from different sources (e.g. Auerswald and Schwab, 1999; Novara et al., 2011) which complicates their interpretation and extrapolation outside the area where they were developed.

This paper presents a first version of the analysis of erosion risk in vineyards under different soil management scenarios using a simplified erosion prediction model based on RUSLE, ORUSCAL. ORUSCAL is designed to calibrate RUSLE for a broad range of management conditions in vineyards with limited datasets. The model and different calibration strategies were previously evaluated using a long-term dataset from a vineyard in Northern Italy (Gómez et al., 2017). The analysis has been carried out in five wine growing areas across Europe: Spain (D.O. Montilla-Moriles); Italy (Monferrato area, Piedmont region), France (AOC Coteaux-du-Layon, Loire); Austria (Carnuntum and Leithaberg region,) and Romania (Târnave vineyards, Transylvania). The soil type, climate and vineyard management information (bare soil through herbicide or tillage and cover crops) included into the model were gathered in the context of the VineDivers project (www.vinedivers.eu) from available databases, field surveys and farmers interviews.

This study aims to provide a comparison of erosion risk under the average conditions present in these five wine growing areas across Europe, and to explore the reasons for the relative differences among them as well as providing estimations of C values valid for different soil management and vine growing areas across Europe.

Keywords: vineyard, erosion, soil management, RUSLE, model.

References

- Auerswald K. and Schwab, S. 1999. Erosion risk (C factor) of different viticultural practices. *Vitic. Enol. Sci.*54: 54 – 60.
- Dabney S.M., et al. 2012. The application of the Revised Universal Soil Loss Equation, Version 2, to evaluate the impacts of alternative climate change scenarios on runoff and sediment yield. *J. Soil Water Conserv.* 67: 343 – 353.
- Gómez, J.A. 2017. Sustainability using cover crops in Mediterranean tree crops, olives and vines – Challenges and current knowledge. *Hungarian Geographical Bulletin* 66(1): 13 – 28.
- Gómez, J.A., et al. 2017. A proposal for soil cover and management factor (C) for RUSLE in vineyards with different soil management across Europe. *Geophysical Research Abstracts* Vol. 19, EGU2017-3845.

Novara A., et al. 2011. Soil erosion assessment on tillage and alternative soil managements in a Sicilian vineyard. *Soil Till. Res.*117: 140 – 147.

Prosdocimi, M., et al. 2016. Soil water erosion on Mediterranean vineyards: A review. *Catena* 141: 1-21.