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Qualitative comparison of soil erosion, runoff and infiltration coefficients using small portable rainfall simulators in Germany, Spain and France

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Small portable rainfall simulators are considered as a useful tool to analyze soil erosion processes in cultivated lands. European research groups of Spain (Valencia, Málaga, Lleida, Madrid and La Rioja), France (Reims) or Germany (Trier) have used different rainfall simulators (varying in drop size distribution and fall velocities, kinetic energy, plot forms and sizes, and field of application)to study soil loss, surface flow, runoff and infiltration coefficients in different experimental plots (Valencia, Montes de Málaga, Penedès, Campo Real and La Rioja in Spain, Champagne in France and Mosel-Ruwer valley in Germany). The measurements and experiments developed by these research teams give an overview of the variety in the methodologies with rainfall simulations in studying the problem of soil erosion and describing the erosion features in different climatic environments, management practices and soil types.
The aim of this study is: i) to investigate where, how and why researchers from different wine-growing regions applied rainfall simulations with successful results as a tool to measure soil erosion processes; ii) to make a qualitative comparison about the general soil erosion processes in European terroirs; iii) to demonstrate the importance of the development a standard method for soil erosion processes in vineyards, using rainfall simulators; iv) and to analyze the key factors that should be taken into account to carry out rainfall simulations.
The rainfall simulations in all cases allowed knowing the infiltration capacity and the susceptibility of the soil to be detached and to generate sediment loads to runoff. Despite using small plots, the experiments were useful to analyze the influence of soil cover to reduce soil erosion and to make comparison between different locations or the influence of different soil characteristics.