Geophysical Research Abstracts
Vol. 17, EGU2015-9752-2, 2015
EGU General Assembly 2015

Effect of rainfall intensity and rain drop distribution on runoff and soil erosion on vineyards inter-rows with different soil management

Marcella Biddoccu (1,2), Stefano Ferraris (2), Andrea Pitacco (3), and Eugenio Cavallo (1)

(1) Italian National Research Council (CNR), Institute for Agricultural and Earthmoving Machines, Torino, Italy (m.biddoccu@ima.to.cnr.it), (2) Interuniversity Department of Regional and Urban Studies and Planning, Politecnico e Università di Torino, Viale Mattioli 39, 10125 Torino, Italy., (3) University of Padova, DAFNAE, Padova; Italy

Vineyard is reported as one of the European agricultural crop where the runoff and soil erosion rates are the highest. In sloping vineyards, in particular, primary roles in determining high runoff and soil erosion rates are played by the alignment of vine-rows along the slope, soil cultivation and management, and traffic of machinery. Runoff and soil erosion processes are deeply related to climate, especially to rainfall intensity and precipitation pattern, along with the soil moisture content and soil surface conditions. Most of the European vineyards are grown in the Mediterranean area, where these aspects assume a specific pattern.

A study was carried out to evaluate the role of rainfall intensity and raindrop size in generating runoff and soil erosion in vineyards, in relation to soil management.

The study was conducted in the "Tenuta Cannona Experimental Vine and Wine Centre" of Regione Piemonte, located in the Alto Monferrato hilly vine-growing area (NW Italy). Runoff and soil losses caused by natural rainfall events were monitored on two large (1221 m^2) vineyard plots in the period May-November 2014. The plots are managed with different inter-row soil management techniques: tillage (T) and controlled grass cover (GC). An optical disdrometer was installed in the plots.

Few rainfall events were observed occurred during summer and autumn, before the grape harvest and the execution of new tillage/mulching operation in autumn, triggering runoff events of different magnitude. For example, a summer storm with 1-min rainfall intensity of about 91 mm h^{-1}gave a negligible amount of runoff (less than 1% of rainfall) in both plots . During a later similar rainfall runoff rates achieved 22% of rainfall and sediment yield of 290 kg ha^{-1} in the CT plot while it was 2% and 7 kg ha^{-1} in the GC plot. In the GC plot, in summer and early autumn rainfalls, runoff was less than 2% and sediment yield was lower than 10 kg ha^{-1}.

The two plots had a different evolution of the soil surface conditions in terms of grass cover, soil water content, and compaction due to machinery traffic. The first results of the study show that runoff in the two plots varies in relation to the these aspects and to the rainfall characteristics. Further analysis of the data is required to reach more consistent results.