



Rainfall simulations to study the types of groundcover on surface runoff and soil erosion in Champagne vineyards in France

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In the literature, grass cover is often considered to be one of the best methods of limiting runoff in the vineyards; But results can vary, especially when the plot area is $<2 \text{ m}^2$. However, in any study to our knowledge, the way grass cover is structured in the inter-row is taken into account to explain the variability of runoff and soil loss. The objective of this study, conducted in Champagne vineyards in France, was to quantify the influence of the cultivation practices in the inter-rows of vines and determine the influence of the density of the grass cover in the wheel tracks on the surface runoff and soil erosion in experimental plots of 0.25 m^2 under simulated rainfall. Three types of ground cover were studied. In the bark-and-vine-prunings plots, the runoff coefficient ranged from 1.3 to 4.0% and soil losses were $<1 \text{ g/m}^2/\text{h}$. In the bare soil plot, the highest runoff coefficient of the study was found (80.0%) and soil losses reached $7.4 \text{ g/m}^2/\text{h}$. In the grass cover plots, the runoff coefficient and amount of eroded soil were highly variable: the runoff coefficients ranged from 0.4 to 77.0%, and soil losses were between less than 1 and $13.4 \text{ g/m}^2/\text{h}$. Soil type, soil moisture, slope and agricultural practices did not account for the variability. In fact, the density of grass cover in the wheel tracks explained a portion of this variability. The lack of grass in the centre of the inter-row allowed for a preferential flow and created an erosion line in the wheel tracks where the soil was compacted. This study showed that grass cover in a vineyard was not necessarily sufficient to reduce surface runoff and prevent soil erosion. To be effective, the grass cover must be dense enough in the wheel tracks of agricultural machinery to avoid runoff coefficients close to those achieved with bare soil.