



Role of grassed alleys on vineyard carbon budget

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The environmental sustainability of viticulture can be enhanced with the application of conservative management practices (e.g. grassed inter-row), which can lead to an increase of soil carbon sequestration. However, studies on vineyard carbon budget and its partitioning are still very scarce. In Mediterranean woody crops, inter-row tillage is frequently used to limit water loss by grass cover transpiration and capillary rise, nevertheless in Northern Italy vineyard alleys are often grassed. In this context, the partitioning of vineyard net ecosystem CO₂ exchange (NEE) into soil and vine components deserves a special attention.

From January 2015 to September 2016, we monitored ecosystem carbon fluxes with the eddy covariance method and soil surface carbon fluxes with an automated chamber system in a grass covered vineyard in North Eastern Italy. At the site, soil has low permeability and tillage is performed in alternate alleys during autumn and winter, in order to improve water infiltration.

The vineyard showed to be a sink of CO₂, absorbing around 230 gC m⁻² at the end of the measurement period. However, the carbon sequestration would have been much greater if no tillage were performed in winter, with an additional potential uptake of about 120 gC m⁻². The monthly course of carbon fluxes reveals that the herbaceous vegetation suffered summer water stress well before vines, thus reducing water competition during drought periods. These results could be useful to improve conservative agricultural strategies and vineyard management, confirming that grass cover plays an important role in the carbon budget.