



Integrated observations of CO₂ fluxes in vineyards to support the management of soil organic matter

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Vineyard soils are subjected to a substantial depletion of the organic fraction due to the transition to intensive farming systems, the reduction of row spacing and the fast evolution of vineyard mechanization. The use of cover crops, grassed inter-rows and organic fertilization can all contribute to the increase, stabilization and protection of soil organic matter. However, a clear picture of carbon fluxes in the soil-plant-atmosphere system is still lacking, especially in vineyards. A detailed knowledge of these processes is also of primary importance to correctly predict the impact of future climate scenarios on viticulture and understand whether these ecosystems can act as source or sink of greenhouse gases. Even if it is commonly believed that agricultural crops cannot be net carbon sinks, woody perennials can behave differently. In fact, they grow a permanent structure, stand undisturbed in the same field for decades, originate abundant pruning debris, and are often grass-covered.

Within the framework of the LIFE project VITISOM (VITiculture Innovative Soil Organic Matter management: variable-rate distribution system and monitoring of impacts, LIFE15 ENV/IT/000392) two integrated observatories of ecosystem CO₂ fluxes have been established in Northern Italy, to disentangle the vineyard carbon budget in the mid-term. This knowledge can be of great value to better manage organic fertilization and soil fertility in vineyards.