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UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



Riassunti dei lavori  
presentati al

# IX Convegno Nazionale di Viticoltura

Conegliano (TV)  
13-15 giugno 2022



Gruppo di lavoro  
Viticoltura

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RIASSUNTI DEI LAVORI PRESENTATI AL  
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Massimo Gardiman, Federica Gaiotti, Franco Meggio

## **Soil biological activity in an organic vineyard managed with green manure in Northern Italy.**

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Green manure in viticulture provides to several functions. Cover crops reduce soil erosion, mineralization rate of organic matter and loss of nutrients, which are temporarily immobilized by the cover crops and made available for vineyards after mowing. Legumes, frequently found in green manure mix, provide nitrogen in a form available for the profit crop. Carbon fixation in green manure biomass contributes to atmospheric CO<sub>2</sub> sequestration, reducing greenhouse effect and increasing soil organic carbon and consequently soil fertility. Furthermore, green manure represents an agricultural practice able to enhance both epigeal and hypogeal biodiversity, contributing to maintaining the equilibrium of ecosystem.

The study is part of a multidisciplinary project funded by GAL GARDAVALSABBIA2020 with the general goal of improving production systems in a perspective of environmental sustainability, protection of soil fertility and resilience to climate change. A part of the research involves the study of soil biological activity in an organic vineyard in Padenghe sul Garda (BS) managed between rows with different mixes of green manure, in order to understand their effect on soil fertility. In 2021 the vineyard was divided into four plots: a control covered with permanent grass (C); a thesis with green manure consisting of a balanced mix of *Poaceae* and *Fabaceae* (T1); a thesis with the same mix of T1 added with horse manure on the row (T1+M); a thesis with green manure consisting mainly of *Poaceae* (T2). Soil respiration, considered a good estimator of overall (autotrophic and heterotrophic) biological activity and soil quality, was monitored *in situ* during the vegetative cycle using a portable CO<sub>2</sub> gas analyzer supplied with a soil respiration chamber. The analyses of five enzymatic activities, playing a significant role in organic residue decomposition and nutrient cycling in soil, were carried out in laboratory by biochemical methods on air-dried fine earth fraction of topsoil samples collected in summer and autumn.

The cumulative soil respiration was found statistically higher in T2 than in C. In middle spring, characterized by optimal conditions of soil temperature and humidity, green manure practice displayed its maximum effect on overall metabolic activity, showing a significant increase of CO<sub>2</sub> flux in all three theses with green manure compared to control. Generally, horse manure added to T1 mix did not determine changes in soil respiration compared to green manure only in T1. All enzymatic activities showed a seasonal trend depending on temperature and water availability. Although no significant differences were found overall between theses, a tendency to diversification appeared already in the first months of study, sometimes showing a tendential increase in the theses with green manure compared to the control.

These preliminary results highlight how green manure practices determine small changes in biological indicators already in the short-term investigation, which could increase in the medium and long term.