

Soil

Abstract 67

INNOVATIVE SOLUTIONS TO ASSESS AND PROTECT THE QUALITY OF VINEYARD SOILS

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As long as that complex system we use to call soil is so intimately linked to humankind for nutrition, the assessment of soil quality is essential to guarantee food production and safety. Besides, the increasing and unstoppable soil consumption and degradation, on a global scale, make both the protection and the preservation of soil quality and its ecological functions mandatory, along with the development of suitable and sustainable restoration strategies.

In this study, conceived within and funded by the Agritech National Research Centre, the soil quality of three Apulian vineyards (i.e. two located in the district of Bari, one in the district of Taranto) is under investigation. All vineyards produce the Allison seedless table grape variety, are trained by tendone trellis system and fertigated, but show different productivity.

Seeking a link between soil quality and grape production, multiple soil characteristics have been taken into account, including chemical, physical, biological and phytosanitary parameters. In particular, all vineyard soils are investigated for: pH, OC, total N, CEC, available P, carbonates, CO₂ e N₂O emission (chemical indicators); bulk density, texture, hydraulic conductivity, electrical conductivity, temperature, humidity (physical indicators); enzyme and microbial activity, and QBS-ar, this latter based on the abundance of micro-arthropods in soil (biological indicators). Phytopathogens are also constantly monitored. Both traditional analytical methods and innovative technologies are used, including ad hoc developed equipment for in field measurements (e.g., photoacoustic sensors and robotic systems).

Furthermore, in one of the vineyards (Turi, BA), which locally showed slightly different soil characteristics and productivity, an extensive investigation has been set up in order to assess the spatial variability of a selected number of soil properties in relation to grape production. This will provide a sufficiently large dataset for multivariate statistical analysis, with the aim of computing a multifactorial soil quality index (SQI) able to monitor and evaluate the quality of vineyard soils.

After the first soil sampling in fall '23, other samplings are scheduled (June '24 and fall '24) to appreciate possible variations in soil indicators over time or with seasonality, especially for biological indicators. The completion of soil sampling and analysis by the end of the year, along with the acquisition of productivity data will allow to comprehensively assess the quality of the soils under investigation, thus posing the bases to propose sustainable strategies for soil quality improvement.

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