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Comparison of Cabernet sauvignon responses to different Italian pedo-climatic environment of southern Italy

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Water deficit is one of the most important effects of climate change able to affect agricultural sectors. In general, it determines a reduction in biomass production, and for some plants, as in the case of grapevine, it can promote fruit quality. However, high water stress should be avoided for any crop. Then, the monitoring and management of plant water stress in the vineyard is critical as well as the knowledge of how each specific cultivars react to it.

In this sense, a multidisciplinary study was carried out to compare the Cabernet sauvignon grapevine responses to different pedoclimatic conditions of southern Italy, in three areas devoted to high-quality wine production of Campania, Molise, and Sicilia regions. This study reports the preliminary results of the Italian National project "Influence of agro-climatic conditions on the microbiome and genetic expression of grapevines for the production of red wines: a multidisciplinary approach (ADAPT)"

In each site, the environmental characteristics were characterized and the soils described through a pedological survey. During 2020, soil water content and the principal weather variables (e.g., temperature, rainfall, solar radiation, etc.) have been monitored by means of in situ stations, while plant responses collected by means of field campaigns (LAI, LWP, grapes acidity, sugar content). Moreover, due to COVID-19 pandemic, vegetational indexes (NDVI, NDVII, RENDVI) derived from Sentinel 2A images have been used to support the plant status monitoring.

The agro-hydrological model SWAP was used to solve the soil water balance in each site and to derive the Crop Water Stress Index (CWSI) during the growing season (April- October).

The CWSI index has been compared with data collected on plant status (e.g., leaf water potential, vegetational indexes from remote sensing) and correlated to grapes quality (e.g., sugar content,

acidity).

The first results have demonstrated how local pedoclimatic conditions strongly affect grapes quality production on Cabernet sauvignon in southern Italy, furnishing important information regarding how this cultivar adapts and reacts to pedo-climatic variability. This last information is useful for planning future actions to support the vine growing resilience in southern Italy. In this way, at the end of ADAPT project, the collected information for the next two years will be used to realize a robust model calibration in order to analyze the plant response under future climate scenarios RCP (4.5 and 8.5).

Keywords: cabernet sauvignon, CWSI, terroir, SWAP, quality