

Soil Temperature and Climate Change: Implications for Mediterranean Vineyards

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Abstract

More frequent and extreme temperatures and droughts pose challenges to the wine sector in Mediterranean Europe. Soil is crucial to sustain the equilibrium of ecosystems, economic growth and people's prosperity worldwide. In viticulture, soils are a major component of the terroir and do influence vine's growth, yield and berry composition. Soil temperature (ST) affects soil's physical, chemical and biological processes and also crop growth. The impact of ST becomes even stronger when dealing with row crops such as grapevine, when considering the increased exposition to radiation. However, the impact of ST on crop performance remains poorly described, especially for extreme climatic conditions. A better understanding of the role of ST in vineyards can help to better manage and predict the performance of vines, plant-soil relations and soil microbiome under extreme climate scenarios. In addition, climatic and thermal data (of plants, soil) can be integrated into Decision Support Systems (DSS) to support vineyard management. Improved soil characterization, improved practices of soil management and imaging (e.g. thermography) can be combined to support management. Strategies to mitigate the impacts of climate change, optimize ST variation and vine thermal microclimate (leaf and berry) are proposed and discussed, with emphasis on Mediterranean systems.

Keywords: row-crops, soil and canopy management, thermal sensing, water, sustainability