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Grapevine survival strategies and training system as an adaptation measure under Mediterranean climate

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The Mediterranean wine regions are characterized by a marked intra (and inter) annual climate variability, where high water deficits in the atmosphere and soil can develop, particularly during the summer. In addition, the climate change scenarios point to an intensification of these environmental conditions in the near future. Thus, the combination of survival strategies, which include the ability to reduce water losses, increase absorption or control dehydration, becomes an important tool for crop water management. Adaptation measures involving cultural practices must also be adopted to ensure the sustainability of the wine sector. One of the main adaptation viticultural practice is the selection of the training system. In this context, mature vines trained to two different systems in the Douro Demarcated Region (NE Portugal) were selected and several measurements (e.g. weather variables, soil moisture, leaf water potential, leaf area index, sap flow and trunk diameter fluctuations) were performed under variable soil water availability. The results highlight the key role of plant survival strategies, such as stomatal control and adjustment of the total leaf area, in order to reduce transpiration, as well as a nocturnal rehydration. Furthermore, and in terms of water dynamics, the results point to the effect of the shorter length of the hydraulic pathways of the Guyot-trained vines, in contrast to the higher trunk and the permanent horizontal cordon of the vines trained to spur pruned cordon. The research findings support the selection of the Guyot as a training system that is better adapted to the projected climate change in Mediterranean wine-producing regions.