RELATIONSHIPS BETWEEN RELATIVE TRANSPERSION OF GRAPEVINES AND PLANT AND SOIL WATER STATUS IN PORTUGAL'S DOURO WINE REGION

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Abstract:
In NE Portugal, winegrapes are a major crop being an important source of income for local farmers. Located in deep valleys, protected by mountains, the climate in the Demarcated Region of Douro is characterised by scarce rainfall and large evapotranspiration losses during the summer season. A study was undertaken to evaluate the effect of different water availability on soil and plant water status. One thermal dissipation technique (‘Granier’ method) was used to continuously monitor sap flow of trickle irrigated and traditional rain-fed grapevines for two years (2008-09), in a commercial mature vineyard planted with the wine grape cultivar ‘Moscatele Galego-Branco’ (syn. ‘Muscat à Petits Grains’). Relative transpiration (RT) was calculated as the ratio between sap flow of stressed rain-fed plants and well-watered ones. Predawn leaf water potential (Ψp) and soil water content (SWC) within a 1.5 m soil profile were also measured as stress indicators for irrigation management. Additionally, leaf area, yield and must quality were assessed. RT values ranged from 1.0 in early summer (before irrigation supply) to about 0.5 (2008) or 0.4 (2009) towards harvest in agreement with increasing soil water depletion and decreasing Ψp values. RT showed a closer relationship with Ψp as compared with SWC, suggesting that Ψp is a better indicator of water availability that can be used when irrigation is implemented in the region.