



Solar radiation levels and interaction with grapevine diseases

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The aim of this study is to understand the relationships between different light environments and severity of grapevine (*Vitis vinifera*, cv. Sangiovese) diseases. The research was carried out in the experimental farm of Mondeggi Lappeggi, located in the northern part of the Chianti region in Tuscany (Central Italy, Lat. 43°47' N, Long. 11°35' E). It was conducted in two years using two methodologies. In the first time, during the 2006 vegetative season, the experiment was performed in vineyard. Two light environments were applied to induce differences in total polyphenolic content in grapevine leaves and to assess if the resistance to downy mildew (*Plasmopara viticola*) was affected. Shaded environment was obtained using 70% shading nets placed 3 m above ground. The canopy microclimate, evaluated as air and leaf temperature, relative humidity, leaf wetness and different wavelength of solar radiation was measured. Leaf epidermal polyphenols, mainly flavonoids, under the two light regimes were non-destructively measured during the growing season by the dualix optical device. Epidermal polyphenols were found to be considerably higher (80%) in sunny leaves with respect to shaded ones independently from leaf age. Both full developed shade and sun leaves were then inoculated with a sporangial suspension of downy mildew and infection severity was assessed as percentage of leaf infected area. Downy mildew development showed to be inversely correlated with epidermal polyphenolic content with 15% and 5% of severity value on shaded and sunny leaves respectively. In the second year, during the vegetative season 2007, the study was arranged using

two years old plants set in the three different light conditions and cultivated in pots. The light environments were obtained using 90% and 50% shading nets fixed on tunnels and full light condition. To evaluate the responses to the different wavelengths, UV light filters were also arranged above of vines. The experiment was integrated with stilbene leaves content measurements to complete the data obtained during 2006, exploring structural (phenols) and non structural (stilbenes) polyphenolic response.