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Combined drought and virus infection trigger aspects of respiratory metabolism related to grapevine physiological responses

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ABSTRACT

In the Mediterranean region, grapevines usually deal with drought during their summer growth season. Concurrently, grapevines are hosts to a large number of viruses from which grapevine leafroll associated virus-3 is one of the most widespread and provokes considerable economic losses in many vineyards. However, information concerning grapevine metabolic responses to the combination of drought and viral infection is scarce. Gas-chromatography coupled to mass-spectrometry based metabolite profiling was used in combination with growth analysis, viral loads and gas exchange data to perform an integrative study of the effects of individual and combined stress in two Majorcan grapevine varieties at two experimental years. Metabolic responses of both varieties to the combination of water stress and virus infection were specific and not predicted from the sum of single stress responses. Correlations between respiration, biomass and key metabolites highlight specific adjustments of respiratory and amino acid

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