The role of molecular ecophysiology in terroir expression

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Terroir is a complex concept which associates soil, climate, grape variety and cultural practices that include the training system and oenological techniques. It is a type of social construction with man at its centre. The typicality of a wine is also a social construction which is the result of an agreement among specialists vis à vis a given quality of the wine whose references are the wine's origins (e.g. terroir) and taste. The wines' 'origins' refer both to its physical place of origin and to a historical continuity. Taste results from the interaction of several factors. The blending of wines from several different grape varieties grown either in the same terroir or in different terroirs in order to arrive at a 'typical' wine, identifiable as such by specialists or even the consumer illustrates the degree of complexity of the terroir concept and of the identification of typicality.

In the context of a molecular approach to viticultural terroirs associated with physiological and biochemical approaches, one of our current major priorities is to develop a deeper understanding of the influence of certain primary environmental factors (water and temperature) in conjunction with vine architecture (training system, plant bunch micro-climate) on the development and maturation of grapeberries.

The mechanisms that enable the vine to elicit an appropriate response to a given environmental signal depend on the ability of the grape variety in question to detect and decode the applied stimulus in order to activate the appropriate genetic stimuli. Molecular biology techniques that are used to dissect the regulatory networks activated when a grape variety is exposed to different stresses involve the identification and functional characterisation of so-called 'initiator' or 'early-response' genes. Activation of the genes that code for proteins involved in signal pathways and the regulation of genetic expression, results in the activation of so-called 'secondary response' genes that are responsible for the vine's ability to adapt to its environment. New data obtained on the role of these genes in integrated approaches would appear to be of fundamental importance and opens the way to applied solutions, such as the treatment of vines with elicitor-type molecules or the development of genetically modified organisms.