The impact of the soil temperature on root physiology and metabolic pathways during grape maturation and on fruit composition

Project ID: NWGICHD5

The interaction between the soil environment and variety/rootstock impacts on nutrient uptake and root processes, therefore the vineyard floor and soil management is crucial for grapevine development and fruit composition. The proposed project will examine the influence of soil temperature on key metabolic pathways of the root system. Recent research has shown that abiotic factors change the composition of primary metabolites in permanent and temporary sinks. The research will consist of studies under controlled conditions to gain an enhanced understanding of the mechanism of soil temperatures on root processes and metabolites and how these relate to grape composition.

We seek a highly motivated PhD candidate with a high level Honours or Masters qualification in biochemistry or plant physiology. The project will be based at the Wagga Wagga campus of Charles Sturt University with some research undertaken at CSIRO in Adelaide (CSIRO Agriculture & Food). The candidate will develop further skills/techniques in plant physiology biochemistry. The work will be in collaboration with CSIRO using their root research facilities for complementary studies; therefore a scholarship top up from CSIRO might be obtained, depending on the level of qualification.

References

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- Holzapfel, B., Smith, J.P., Greer, D., Dunn, G. and Hardie, J. 2016. Effects of modifying root temperature in field grown Cabernet Sauvignon on carbohydrate reserve dynamics and vine development. Acta Hort. (ISHS) 1115, 87-93.
- Field, S. K., Smith J. P., Holzapfel, B. P. Hardie, W. J. and Emery, R. J. N., 2009. Grapevine response to soil temperature: Xylem cytokinins and carbohydrate reserve mobilisation from budbreak to anthesis. Am. J. Enol. Vitic. 60:164-172.

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