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Ensuring the sustainability of cool-climate Shiraz ‘peppery’ style in the context of climate change

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Cool-climate Shiraz is gaining increasing popularity in the past decade for its stylistic savoury and spicy aroma. Black peppery spiciness has been considered as the key identifier of high quality cool climate Shiraz in many Australian cool-climate wine regions. Rotundone, an oxygenated bicyclic sesquiterpene, was firstly identified by Australian researchers as the primary compound responsible for this iconic characteristic. In the past four years, the University of Melbourne partnered with Australian wine industry, and conducted frontier researches on this compound. We investigated the influence of ‘terroir’ and grapevine physiological responses on the production of rotundone in Shiraz grape and wine with a range of vineyard management factors which can be manipulated to increase its occurrence. We have established models to link historical climate factors with rotundone, and used this model to predict future production. The model allows real-time estimation of rotundone production during growing season and in the final wine by measuring grapevine phenological stages and cumulative heat during grape ripening. This enables adoption of precision irrigation and canopy management strategies for achieving favourable or mitigating adverse impacts of climatic change, with the aim of maximising the rotundone concentration of grape berries. Furthermore, integrated with climate projection models, we are able to predict the production of rotundone in wine in future vintages. This research allows iconic cool climate Shiraz styles to be preserved, and allows modelling of new grape growing regions in a changing climate. This report will introduce the latest progresses on the research of rotundone and associated sesquiterpene compounds and give practical instructions on how to manipulate vineyard rotundone production, which are especially important to maintain the sustainability of cool climate Shiraz style.