



## Riesling as a model to irrigate white wine grape varieties in arid climates

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### Abstract:

**Context and purpose of the study** - Regulated deficit irrigation (RDI) is a common viticultural practice for wine grape production. In addition to the potential improvement of water use efficiency, the adoption of this technique favors smaller canopies with higher levels of fruit sun exposure, enhancing quality attributes associated with red wine grapes such as smaller berries with higher tannins and anthocyanins. However, these quality attributes do not necessarily transfer to white wine grapes. The goal of this project was to assess whether partial rootzone drying (PRD) is more suited than RDI to grow high-end white wine grapes in arid climates, especially aromatic varieties, using Riesling as a model.

**Material and methods** - The performance of own-rooted Riesling grapevines in response to RDI and PRD was assessed for three years (2019-2021) in a drip-irrigated vineyard located in the arid (<200 mm annual precipitation) Yakima Valley of Washington, USA. Fully irrigated vines (FULL) were used as a non-stress control. The effect of irrigation on vine water status, water use efficiency, vine vigor, fruit sun exposure, yield, and fruit composition was evaluated. In 2019 and 2021 wines were made to evaluate their phenolic (HPLC) and volatile (GC-MS) composition.

**Results** – Compared with FULL, PRD saved 20% irrigation water while maintaining canopy growth (shoot length) and vine size (pruning weight) of Riesling vines. Unlike PRD, RDI resulted in smaller canopies, reduced vine size and increased sun exposure of the clusters. Water withholding reduced yield in both treatments, but PRD produced more fruit than RDI in 2020 and 2021. Fruit total soluble solids, pH and titratable acidity did not differ among the three irrigation treatments. GC-MS results for 2019 show that the wines separate by treatment. The analysis of wine phenolics is currently in progress and will determine whether higher levels of sun exposure due to RDI promote the accumulation of compounds related to bitterness or astringency. As high levels of water stress and sun exposure may be counterproductive for aromatic grapes like Riesling, PRD has potential to conserve water and maintain white wine grape quality in arid climates.

**Keywords:** Partial rootzone drying, Regulated deficit irrigation, Riesling, water use efficiency