

Substantial water uptake into detached grape berries occurs through the stem surface

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Abstract

Background and Aims: Water uptake through the stem surface contributes to total water uptake of submerged grape berries (*Vitis vinifera* L.). The objective was to identify the site of this uptake.

Methods and Results: Uptake of water and a fluorescent dye was studied using a single berry + stem system. To identify the site of water uptake, the cut end of the stem and selected regions of the stem surface were coated with a silicone sealant. Water uptake was determined gravimetrically. After immersing in dye solution, the stem and the receptacle region of the stem/berry junction fluoresced, but the exocarp did not. Fluorescence of vascular bundles in stem and berry indicated that the dye taken up was transported into the berry. Selective coating of the various stem parts revealed that at steady state (96 to 144 h), the stem/berry junction (0.11 ± 0.04 mg/h), receptacle (0.09 ± 0.03 mg/h) and the remaining stem surface (0.08 ± 0.03 mg/h) contributed approximately equally to total water uptake in the whole stem region (0.24 ± 0.05 mg/h), which in turn accounted for 55% of uptake of a berry + stem (0.43 ± 0.05 mg/h).

Conclusions: Stem/berry junction, and periderms of abscission zones and lenticels represent regions of preferential water uptake into detached grape berries.

Significance of the Study: Extrapolating from the single berry system to an intact bunch on a grapevine demonstrates that water uptake through the stem tissues inside a compact bunch may contribute to berry cracking under vineyard conditions.