

**PROJECT TITLE**

3D phenotyping of grapevine root system architecture with x-ray computed tomography

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**CONSORTIUM**

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# SUMMARY OF THE REPORT

Plant roots are crucial for water and nutrient uptake and contribute to response to environmental stress factors. As belowground part of the plant, investigation of roots is difficult and requires strong methodological and human efforts (Ollat et al. 2016, de Herralde et al. 2010). Therefore, capturing their complex three-dimensional morphology is a challenging task (Mooney et al. 2011).

Aim of this project was to investigate early adventitious root growth of four grapevine genotypes (GF.GA-47-42, Villard Blanc, V3125 and Börner) in two different soil types with x-ray micro computed tomography ( $\mu$ CT). The x-ray  $\mu$ CT system allows acquisition of precise three-dimensional data (resolution: 42  $\mu$ m) of adventitious root formation and describes root systems by measuring the following traits: primary root length, secondary root length, total root length, root system surface, root system volume and angles of adventitious roots emerging from the woody cutting. It was the first time that grape vine woody cuttings were investigated with x-ray  $\mu$ CT, offering an important initial step into 3D phenotyping of grapevine roots. Furthermore, this experiment extended a two dimensional data set coming from previous rhizotron experiments with the same set of genotypes.