



NEW PLANT PHENOTYPING TECHNOLOGIES IN A CHANGING CLIMATE

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Climate change is altering the environments in which grapevine develops. Determining responses to environmental changes will require an understanding of the environmentally induced variation in the phenotype of individual vines. This issue is even more crucial in scenarios of high environment variability occurring under climate change. In this work, new plant phenotyping technologies and tools are presented to address several key grapevine traits. Hence, new, non-invasive sensing technologies, including computer vision, thermography, spectroscopy, chlorophyll fluorescence and hyperspectral imaging were compared with traditional methods and tools used in viticulture. Computer vision systems were powerful tools to assess the grapevine yield components. Hence, the number of flowers per inflorescence could be estimated using a smartphone app based on computer vision technologies. Plant water status can be assessed using thermal imaging or NIR spectroscopy as non-destructive technologies. Variety discrimination can be performed using hiperespectral imaging under lab conditions and by NIR spectroscopy under field conditions. Grape colour can be appraised in the field using optical and portable chlorophyll fluorescence based sensors. Moreover, several non-invasive sensors can be embedded and mounted on a vehicle or in a robot for field high-throughput plant phenotyping, enabling the assessment of multiple viticultural features simultaneously. New multi-sensor plant phenotyping mobile platforms are proposed for vineyard monitoring for the wine industry.

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