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## Use of vegetation indices for irrigation management in commercial vineyards

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Water availability in vineyards plays an integral role in the sustainability of high-quality grapes and prevention of devastating crop losses. Stem water potential ( $\Psi_{\text{stem}}$ ) reflects consistently vineyard water status, serving as an aid in irrigation management. However, some drawbacks make the  $\Psi_{\text{stem}}$  little used in commercial vineyards. It requires a pressure chamber, contracting a gas supplier, the need for one or two technicians to carry out the measurement, and the small size of the sample obtained limits the use to control large areas that normally present high intra-field variability.

The objective of this work was to establish a relationship between the  $\Psi_{\text{stem}}$  and the hyperspectral vegetation indices. Four irrigation doses were imposed in a commercial vineyard.  $\Psi_{\text{stem}}$  was measured five days during three-time intervals a day in 2019. The data for the calculation of vegetation indices can be taken quickly by means of a multispectral camera mounted on a UAV, be recorded and processed later. Two different indexes were calculated: NDVI and TCARI/OSAVI.

A total of 12 flights have been made, in addition to 320 measured data for the  $\Psi_{\text{stem}}$ , on 5 different dates at three different time intervals (morning, noon and afternoon) during 2019. There was a significant linear correlation ( $R^2 = 0.69$ ,  $P < 0.001$ ) between the TCARI / OSAVI and the  $\Psi_{\text{stem}}$ . Despite the fact that the most widely used is the NDVI, in this study, the TCARI/OSAVI has obtained a tighter adjustment in all cases than NDVI.

The relationship allows estimating the  $\Psi_{\text{stem}}$  from the index (TCARI/OSAVI), which allows the knowledge of the vineyard water status of a larger area, improving the irrigation management in a more functional way for commercial plantations.

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