Estimation of water stress in olive orchards through remote sensing data analysis

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Olive is the main fruit tree in Spain representing 50% of the fruit trees surface, around 2,751,255 ha. Due to its adaptation to arid conditions and the scarcity of water, regulated deficit irrigation (RDI) strategy is normally applied in traditional olive orchards and recently to high density orchards. The application of RDI is one of the most important techniques used in the olive hedgerow orchard. An investigation of the detection of water stress in nonhomogeneous olive tree canopies such as orchards using remote sensing imagery is presented.

In 2018 and 2019 seasons, data on stem water potential were collected to characterize tree water state in a hedgerow olive orchard cv. Arbequina located in Chozas de Canales (Toledo). Close to the measurement's dates, remote sensing images with spectral and thermal sensors were acquired. Several vegetation indexes (VI) using both or one type of sensors were estimated from the areas selected that correspond to the olive crown avoiding the canopy shadows.

Nonparametric statistical tests between the VIs and the stem water potential were carried out to reveal the most significant correlation. The results will be discussing in the context of robustness and sensitivity between both data sets at different phenological olive state.

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