



## Assessment of physiological traits of olive trees infected by *Xylella fastidiosa* subspecies

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The detection of the diseases caused by the plant pathogenic bacterium *Xylella fastidiosa* (*Xf*) is diffculted by the occurrence of asymptomatic infections, its long incubation period and non-specific and diagnostic symptoms. Early detection of infected plants based on the assessment of changes in physiological plant traits due to bacterial infection might be an important tool for pathogen detection, disease management and breeding for resistance to *Xf* in woody crops. Therefore, the objectives of this study were to evaluate the susceptibility to four Spanish *Xf* strains and the response to infection of three olive cultivars widely grown in Spain by measuring plant physiological traits with different leaf-level sensors and *Xf*-specific molecular diagnostic assays. Leaf measurements and petiole samplings were taken at the inoculation point, and at 5, 10, 15 and 20 cm above the inoculation points at 1, 3, 6, 12 and 18 months post-inoculation. Additionally, sampling of wood tissue was performed at 8 month post inoculation at the same plant sections of leaf sampling. Molecular diagnosis based on two qPCR tests was used to determine the presence and colonization level of the bacteria into the olive xylem tissues. The Dualex Scientific leaf clip sensor and two spectrometers (PolyPen RP400 and DLP NIRscan nano) covering the range of the electromagnetic spectrum from 340 and 1700 nm were used for leaf measurements to detect physiological changes. The Spanish strain XYL1961 from *Xf* subsp. *pauca* ST80 showed the highest colonization in the different olive cultivars as compared to strains from *Xf* subsp. *multiplex* from ST81 and ST6 from Spain and the Italian strain 'DeDonno' from *Xf* subsp. *pauca* ST53. On the other hand, from a total of 70 vegetation indices calculated related with chlorophyll, carotenoid and flavonoids content and structural related indexes a set was selected to discriminate between olive plants infected by *Xf* from those non-inoculated even in the absence of visible disease symptoms.

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