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Evaluation of the effect of *Xylella fastidiosa* on leaf ionome and calcium-related gene expression profiles of infected olive trees

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Xylella fastidiosa (*Xf*) is a xylem-limited bacterial plant pathogen that is responsible for Olive Quick Decline Syndrome (OQDS), a devastating disease reported in Salento (Apulia, Italy). Field observations show that olive cv. 'Leccino' show milder symptoms when compared to the highly susceptible cv. 'Ogliarola'. A prior transcriptome analysis of 'Leccino' and 'Ogliarola' cultivars in response to infection by *X. fastidiosa* 'De Donno' strain has revealed that a Calcium-Dependent Protein Kinase (CDPK1) gene is upregulated in Ogliarola infected leaves. Moreover Ca accumulation in leaves have been associated with symptomatic tobacco, blueberry, grapes and pecan plants infected with *Xf*. Calcium is a critical second messenger and its cellular distribution can trigger diverse physiological processes including stress response and plant defence. Based on these observations we pursued a study of the ionome and CDPK1 gene expression profiles of symptomatic and asymptomatic infected leaves of cv. Leccino and Ogliarola from three orchards. Comparison between the two cultivars reveals changes in ionome and CDPK1 gene expression. 'Leccino' symptomatic leaves had significant ($p < 0.01$) higher Ca concentration as compared to asymptomatic leaves, while differences for the susceptible cv. "Ogliarola" were non-significant ($p > 0.2$). In addition sodium levels were higher in symptomatic leaves of both varieties. qRT-PCR confirmed that CDPK1 expression in 'Ogliarola' is significantly increased relatively to 'Leccino' trees grown in the same field and the increase is higher in symptomatic leaves. The impact of these changes on disease progression will be discussed.

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