

Characterization of olive tree varieties with differences in resistance to *Xylella fastidiosa*: Histological differences associated to pathogen resistance

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Xylella fastidiosa is a Gram-negative, xylem-limited bacterium with a broad range of host plants, including economically important crops such as grape, olive and citrus. In olive, this pathogen causes the olive quick decline syndrome (OQDS) due to the occlusion of the xylem vessels, blocking water movement. Symptoms of OQDS can manifest from leaf scorching to the drying out of leaves, fruits, and twigs. In susceptible varieties, infestations of *X. fastidiosa* have caused significant drying out, leading to the widespread death of trees. Bacterial cells attach to vessel walls, forming a biofilm matrix that, jointly with active host plant responses to the presence of the pathogen, e.g., gums, pectin gels, and tylose deposition, contribute to vessel occlusion. It has been suggested that anatomical differences in xylem vessels could be associated with *X. fastidiosa* susceptibility in olive. Sabella et al. (2019) reported that a susceptible cultivar displayed a higher number of large-diameter vessels than a resistant genotype. Cell wall composition could also contribute to plant resistance to xylem pathogens. We previously found that cell walls from wild olive genotypes resistant to *Verticillium dahliae* were enriched in phenolic compounds and displayed a different lignin composition than susceptible genotypes (Coto-Elena et al., 2023). In this research, we characterized the xylem of two selected olive cultivars, Leccino, partially resistant to *X. fastidiosa*, and Arbequina, highly susceptible. Microscopy and histological analyses of branch sections showed significant differences in the number and size of the xylem vessels between both genotypes. Contrary to the previous results reported by Sabella et al. (2019), Leccino, the resistant genotype, displayed a higher number of vascular bundles, and these bundles also have larger diameters than Arbequina. These contradictory results could indicate that the size of xylem vessels may not be a good indicator of *X. fastidiosa* tolerance. Cell walls from both genotypes have been isolated, and experiments are in progress to determine differences in cell wall composition using spectroscopy techniques such as FT-IR and Raman spectroscopy.

Coto-Elena, J, Characterization of secondary cell-wall modifications in selected wild olive clones resistant to the defoliating *Verticillium dahliae* pathotype. XVI Plant Cell Wall Meeting, 2023

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