IN VITRO STUDY OF THE EFFECTS OF GRAPE XYLEM SAPS AND CELL-WALL CONSTITUENTS ON GROWTH AND VIRULENCE-RELATED GENE EXPRESSION OF *XYLELLA FASTIDIOSA*

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Pierce's disease (PD) of grapevines is caused by the xylem-inhabiting bacterium *Xylella fastidiosa (Xf).* The widely cultivated *Vitis vinifera*-based grape cultivars are susceptible to PD. However, grape species *V. aestivalis*, *V. arizonica, V. shuttleworthii, V. simpsonii, V. smalliana,* and *Muscadinia rotundifolia*, are highly resistant to PD. In this study, we investigated the effect of PD resistant and susceptible grape xylem sap and several cell-wall constituents on bacterial growth, biofilm formation, and virulence-related gene expression *in vitro*. Xylem sap from susceptible grape species provided better support for bacterial growth and biofilm formation compared to xylem sap from resistant grape species. Bioassay of *Xf,* co-cultured in PW medium with various purified cell-wall constituents, demonstrated that cellulose, xylan, laminarin, and glucan significantly promoted bacterial growth whereas lichenan strongly suppressed growth. A study of pathogenicity and virulence-related gene expression using RT-PCR revealed that glucanase, protease, and a number of virulence genes were expressed differentially in response to treatment with xylem sap from resistant and susceptible grape species. This preliminary study suggests that differences in xylem cell wall properties and chemical composition of xylem sap between PD resistant and susceptible grape species may effect development of PD.