# INFLUENCE OF HOST XYLEM CHEMISTRY ON REGULATION OF *XYLELLA FASTIDIOSA* VIRULENCE GENES AND HOST SPECIFICITY

**Principal Investigator:**
Donald A. Cooksey
Dept. Plant Pathol. & Miocrobiology
University of California
Riverside, CA 92521

**Cooperator:**
Jianlong Bi
UC Cooperative Extension
Salinas, CA 93901

**Reporting Period:** This project is awaiting receipt of funding.

**ABSTRACT**
This project follows our previous work on virulence gene regulation in *Xylella fastidiosa (Xf)* and other plant pathogens using DNA microarray techniques (Shi et al., 2007; 2009; Shi and Cooksey, 2009). Virulence genes in bacterial pathogens of plants and animals are regulated by complex pathways that are often responsive to environmental and host signals. We have studied several of these regulatory pathways in *Xf* and have begun to understand the regulation of specific virulence genes that contribute to functions, such as growth, biofilm formation, gum formation, and motility, which are important for this pathogen to cause disease. At the end of that project, we began to look at the effect of different host xylem fluids on expression of virulence genes. Our work with a Pierce's disease (PD) strain of *Xf* showed that several virulence genes were more highly expressed in xylem fluid of grapevine vs. xylem fluid of citrus, a non-host plant for the PD strain (Cooksey, 2008). This finding suggests that host range of *Xf* may be influenced by differential expression of virulence genes in response to different host xylem chemistry. This proposal is to further explore that hypothesis with several strain/host combinations and to investigate components of xylem fluid that are responsible for either inducing or repressing virulence in *Xf*.

**LAYPERSON SUMMARY**
We have shown that genes involved in disease induction by a Pierce's disease (PD) strain of *Xylella fastidiosa (Xf)* were expressed differently in sap of a susceptible plant (grape) vs. a resistant plant (citrus). This raises the possibility that the host range of different strains of *Xf* is in part due to differential regulation of bacterial genes in response to differences in chemical components of plant sap. We propose to further test this idea by examining gene expression in *Xf* grown in sap with several different strain/host combinations for which we have already defined whether the particular combinations result in susceptibility, resistance, or tolerance. We will also examine specific chemical components of plant sap that influence bacterial gene expression, with the goal of discovering components that could be used for practical disease control by reducing expression of genes necessary for disease induction.

**OBJECTIVES**
1. Assess virulence gene expression of several different host-range strains of *Xf* in the xylem fluid of a comment set of plant hosts.
2. Assess the influence of specific components of plant xylem fluids on the expression of virulence genes of *Xf*.

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**FUNDING AGENCIES**
Funding for this project was provided by the University of California Pierce's Disease Research Grants Program.