ENVIRONMENTALLY CREATED IMMUNITY AGAINST PIERCE'S DISEASE

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ABSTRACT
Pierce's disease (PD) is caused by a xylem limited gram-negative *Xylella fastidiosa* (*Xf*) bacterium. Various species of sharpshooters, including the important glassy-winged sharpshooter (GWSS), transmit *Xf*. Currently, there is no cure for PD. Use of bacteriophage could be a good strategy for the management of PD. Here we are presenting the results of study use of apparent bacteriophage for the management of PD.

INTRODUCTION
Strains of *Xylella fastidiosa (Xf)*, a gram-negative bacterium, cause a number of important plant diseases including Pierce's disease (PD) in grapevine, citrus variegated chlorosis (CVC) in citrus, phoney peach disease, periwinkle wilt, and leaf scorch disease in plum, elm, maple, sycamore, and coffee (Hopkins 1989).

The principle vector for the transmission of *Xf* is the glassy-winged sharpshooter (GWSS) (*Homalodisca vitripennis*). The pathogen attaches to the cibarium and precibarium of sharpshooters by means of an extracellular matrix (ECM) and is transmitted from infected plants to healthy plants when the sharpshooters feed (Brlansky et al. 1983).

Phages have been reported to be used for the plant protection against different plant bacteria (Jones et al. 2007). Svircev et al. (2006) controlled fire blight of pear by utilizing a strain of *P. agglomerans* for delivering and sustaining a mixture of four phages, which were able to lyse strains of both *P. agglomerans* and *E. amylovora,* the causal agent of fire blight. Certain grapevines in PD areas appear to be resistant to the disease near other grapevines that show symptoms. We hypothesize that a bacteriophage survives in the soil and from there gets acquired by the plant where it kills the *Xf.*

OBJECTIVES
1. To isolate suspected bacteriophages for possible use in the management of PD.

RESULTS
Field observation has led us to suspect that an environmentally created immunity grapevines can impart resistance to PD. This resistance is not inherent to the plant but thought to form when certain combinations of environmental conditions are present in way that imparts symbiotic /apparent bacteriophage type immunity to the grapevine.

To test our theory we chipped up late season cane material and added it to water and soil from around the base of grapevines in vineyard showing apparent resistance to PD. This material was dried and then water was added. The resulting infusion was then filtered (using 0.2 µm filters) to remove all bacteria and fungi including their spores but allowing viral particles to pass through. We added the resulting liquid to PD3 media along with *Xf* bacteria and then allowed the mixture to incubate for 10 days. The finished product was clear indicating that our potion had inhibited bacterium growth. To test the potion further we autoclaved some and then repeated the test, this time *Xf* grew normally.

Currently we are continuing the study in the greenhouse. If *Xf* can be prevented from reverting downward in affected grapevine, the flush of pathogen the following spring will be prevented. By reducing the rate of downward movement of the PD bacterium we hope to provide a tool for reducing the number of chronic infections in grapevine which leads to vine death.

Since downward migration of the bacterium is directly correlated with chronic infections of grapevine. This is due to the fact that the bacterium must reach areas of the plant that are not trimmed away annually in order to find permanent residence. These areas are generally in the root ward direction from the point of infection.

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