

Final Faculty Grant Report

Title: Using molecular tools to identify fungal pathogens that cause wilt disease in *Hydrophyllum*

Grant Received: April 2007

Principle Investigator: Deborah Marr, Department of Biological Sciences

The main goals of this grant were to learn molecular techniques used in identifying microscopic fungi and culturing techniques required to identify species of *Fusarium*, a fungal pathogen. I am refining these techniques to identify undescribed *Fusarium* species that are infecting species of *Hydrophyllum* (an understory herb).

In June 2007, I attended a week-long workshop at Kansas State University. The workshop provided participants training in morphological, genetic, and molecular techniques used to identify and characterize strains of *Fusarium*. This workshop was perfect for learning the techniques required to isolate and culture these fungi from plant tissue and get an introduction to the molecular techniques (for example, isolating DNA, learning which genes were most useful in identifying major fungal groups vs. species of *Fusarium*, and tips on sequencing DNA).

I isolated *Fusarium* species from root and stem tissue from *Hydrophyllum appendiculatum* and *Hydrophyllum canadense*, and began a fungal isolate collection. I was also able to refine the protocol for isolating DNA, but need to work out more glitches with the PCR protocol (method for isolating specific genes within the genome) and DNA sequencing protocol.

One interesting result from this work so far is that one of the isolates appears to be closely related to *Fusarium lateritium*. Initial work (using less specific genetic markers) had suggested that other species of *Fusarium* were present. This result highlights the importance of using appropriate techniques (and multiple techniques) for identifying *Fusarium* species. More work is needed to sort out the complex of *Fusarium* species associated with *Hydrophyllum*. The results of this work will be publishable, and the grant gave me an opportunity to learn new skills needed to move my research into a new direction.

Two undergraduates worked with me on culturing fungi, isolating DNA, and refining PCR techniques (July 2007-November 2007). Both students were seniors graduating in December 2007 and they needed course credit (L490) to meet graduation requirements; therefore, the research assistant salary portion of the grant was not spent. I have an undergraduate (sophomore) working with me in Summer 2008 who could use the salary support. I am requesting permission to extend the Undergraduate Research assistant salary part of the grant until August 2008.