Title: Inoculation Protocol Development for *Lecanosticta acicola* to Screen Seedlings

Location: Auburn University

Duration: 3 years

Cost: $71,890.00

Project leader and Cooperators:

Lead: Dr. Lori Eckhardt (Auburn University, Forest Pathologist / Entomologist)

Cooperator: Dr. Irene Barnes (FABI, Mycologist / Population Geneticist)

Cooperator: Dr. Scott Enebak (Auburn University, Forest Pathologist)

Project Background:

Industrial wood plantations in the southeastern United States are crucial for the economic sustainability of the region (Wear and Greis 2002). The sustainability and profitability of these industrial wood plantations relies on optimal tree growth. However, the progressive arrival of new, and migration of endemic, insect pests and pathogens into these forest ecosystems results in significant economic impacts that require management response.

At the same time, understanding the impact of pests and/or diseases on forest productivity, and development of control measures are critical and technically challenging. In part, this may be attributed to complexities of pest/pathogen/host associations as a whole, as well as the dynamic nature of current growing conditions. Contemporary agricultural research is often conducted in controlled conditions over short periods focusing on robust responses to isolated effects. Understanding tree responses to pests and diseases is more difficult requiring prolonged *in situ* observation of interaction among causal agents, environment, and biological processes.

Justification:

Pine forests and industrial wood plantations in the southeastern U.S. are crucial for the economic sustainability of the region. In 2020, Alabama forestry sales of forest products and related sectors totaled more than $11 billion. The sustainability and profitability of these pine forests and industrial wood plantations rely on optimal tree growth. However, the continued introduction of

non-native insect pests and fungal pathogens, as well as the movement of native forest pests into forest ecosystems, can result in significant economic impacts. Costs associated with damage caused by non-native pests and pathogens within forests throughout the U.S. in 2000 were estimated as being valued at approximately $4.2 billion annually. Consequently, insect pests and fungal diseases are an issue of concern to the forest industry.

There has been an increase of reports throughout Alabama and the southeastern U.S. of a suite of needle blight pathogens over the past ten years. This problem may not only occur on a large regional scale but also on isolated acreages, which is important as the majority of the seven million acres of pines in Alabama are privately owned. With over one-third of the counties in Alabama currently affected, it is estimated that a 50% needle blight infection rate in Alabama's susceptible loblolly pine trees could result in economic losses of $2 billion. An investment in the mitigation of forest pests, such as those associated with needle blight, require adaptive management geared to prevention and remediation that provide economically sound solutions.

Project Objectives:

The primary objectives of this project are:

1. Develop a method of propagation for *Lecanosticta acicola*
2. Develop an inoculation protocol for *Lecanosticta acicola*
3. Develop a seedling screening protocol

Predicted Project Outcomes:

Allow for resistance screening of seedling to *Lecanosticta acicola*

Budget:

Proposed Study (Inoculation Development)			
Graduate Assistants (MS Student)	$18,000.00	$18,000.00	$18,000.00
GA Benefits	$ 630.00	$ 630.00	$ 630.00
Travel/Mileage	$ 1,000.00	$ 2,000.00	$ 2,000.00
Supplies/Equipment	$ 5,000.00	$ 5,000.00	$ 1,000.00
Total Operating Costs	**$24,630.00**	**$25,630.00**	**$21,630.00**
Total Operating Cost			**$ 71,890.00**

Fee Schedule Options:

Total Cost of Project

Figured by Year

	YR1	YR2	YR3
Full Members	$6,568.00	$ 6,832.00	$ 5,768.00
Associate Members	$3,284.00	$ 3,416.00	$ 2,884.00
Maintaining Members	$1,642.00	$ 1,708.00	$ 1,442.00

Divided evenly between Years

	YR1	YR2	YR3
Full Members	$6,388.00	$ 6,388.00	$ 6,388.00
Associate Members	$3,194.00	$ 3,194.00	$ 3,194.00
Maintaining Members	$1,597.00	$ 1,597.00	$ 1,597.00

Deficit of Project – Deficit occurs in year 3 ($42,826)

Divided evenly between Years

	YR1	YR2	YR3
Full Members	$3,808.00	$ 3,808.00	$ 3,808.00
Associate Members	$1,904.00	$ 1,904.00	$ 1,904.00
Maintaining Members	$ 952.00	$ 952.00	$ 952.00