

SCREENS FOR RESISTANCE TO *AMYLOSTEREUM AREOLATUM* INFECTION IN LOBLOLLY PINE

John Michael Bordeaux and Jeffrey F.D. Dean

Warnell School of Forestry and Natural Resources
University of Georgia, Athens, GA 30602

ABSTRACT

The wood wasp *Sirex noctilio* and its symbiotic fungus *Amylostereum areolatum* constitute an exotic pathosystem recently introduced into North America (Borchert et al. 2006, Dunkle 2005). Capable of killing living, healthy trees, *S. noctilio* has ravaged pine plantations of the Southern Hemisphere and poses an immediate threat to the conifer forests of the United States, notably the commercially important loblolly pine (*Pinus taeda* L.) (Borchert et al. 2006).

We are working to develop screening methods for identifying resistance to *A. areolatum* fungal challenge in *P. taeda* and other southern pine species. In lieu of testing mature trees, we will use model systems, including pine seedlings, tissue explants, and cultured pine cells. A variety of defense responses to fungal challenge, including accumulation of phenolic compounds, size of lesions, release of active oxygen species, and electrolyte leakage, will be quantified. The goal for this work will be to establish a reliable system for screening *P. taeda* genotypes for innate resistance. Identification of genetic resistance in loblolly or other southern pine species should enable tree improvement programs to mitigate the risk to our commercial pine forests from future *S. noctilio*/*A. areolatum* outbreaks.

Isolating the effects of *A. areolatum* from those of its insect vector and quantifying their expression represents a meaningful step forward in our knowledge of this pathosystem. Multiple players (wasp, fungus, tree, parasitic nematodes, parasitoids, and possibly others) all contribute to the responses observed in the *Pinus* host. The effects of the combined *S. noctilio*/*A. areolatum* pathosystem on host trees are well documented. However, the effects of *A. areolatum* alone have not been well characterized on North American pine species. Better understanding of the specific interactions between individual players in this pathosystem will enable us to pursue multiple approaches to subverting key interactions, which should provide a more powerful approach to tree protection. Findings from this study will help establish key steps in the specific interaction of *A. areolatum* with native pines.

Literature Cited

- Borchert, D.F.; Fowler, Glenn; Jackson, Lisa. 2006. **Organism pest risk analysis: risk to the Conterminous United States associated with the woodwasp, *Sirex noctilio* Fabricius, and the symbiotic fungus, *Amylostereum areolatum* (Fries: Fries) Boidin.** Raleigh, NC: USDA APHIS-PPQ-CPHST-PERAL: 1-46.
- Dunkle, R.L. 2005. **Detection of the European wood wasp, *Sirex noctilio* (Fabricius), in New York.** USDA APHIS. p.1.