

SINGLE GENOTYPE ISOLATES OF THE FUSIFORM RUST FUNGUS: PROCESS AND PROGRESS

CS Burdine¹, KE Smith^{1,2}, BD Bartlett¹, JM Davis² and CD Nelson¹

Valuable timber is degraded and destroyed every year in loblolly pine (*Pinus taeda*) and slash pine (*P. elliottii* var. *elliottii*) plantations across the southern United States by fusiform rust (caused by *Cronartium quercuum* fsp. *fusiforme*, *Cqf*). Research indicates that a gene-for-gene system determines the host-pathogen interaction and subsequent infection and disease development. Additional research has indicated that multiple interacting gene pairs are responsible for the interactions between host and pathogen genotypes. Furthermore it has been shown that genes in the fungal pathogen can defeat (i.e., be virulent to) corresponding resistance genes in the pine host. Thus when these genes are present in high frequency in the pathogen population, host resistance can be overcome in the field. Knowledge of these interactions and outcomes, combined with awareness of which fungal genotypes are present, are critical in determining the pine families that should be used to reforest specific areas. At the Harrison Experimental Forest (Saucier, MS) an inventory of *Cqf* genotypes, informative for specific host-pathogen interactions, are being increased and stored for ongoing and future research. In our system, juvenile northern red oaks (*Quercus rubra*) are inoculated with a specific isolate of *Cqf* and kept in optimal conditions for spore development inside environmental growth chambers. Once uredinial pustules begin to develop, urediniospores from a single pustule are then transferred on to another juvenile oak and allowed to develop. The harvested spores from these re-infections are kept separate for each so called single-uredinial-pustule line (SUP). DNA is isolated from each SUP and analyzed with specific DNA markers (i.e., simple sequence repeats, SSRs) to verify the SUP's identity (same genotype as starting genotype) and purity (a single genotype). The SUPs developed and verified in this manner have been used in a variety of research projects and continue to be useful for current and future work in fusiform rust research.

¹ Southern Research Station, Southern Institute of Forest Genetics, USDA Forest Service, Saucier, MS

² School of Forest Resources and Conservation, University of Florida, Gainesville, Florida