INTEGRATING CLIMATE AND GENETIC EFFECTS OF LOBLOLLY PINE BY UNIVERSAL RESPONSE FUNCTIONS

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Loblolly pine is adapted to grow across wide environmental gradients of soil and climate. The degree of genetic differentiation selected for by climate is understudied. Current knowledge suggests, like annual crops, that mean monthly minimum winter temperature, is a key variable for seed movement. Important questions remain about the risks associated with moving local germplasm sources to different climatic zones, and whether additional climatic variables such as rainfall will become more important. To address these questions we are analyzing the relationship between the geographic origins of loblolly germplasm. In 1982-1983, seven provenance-progeny tests wild seed originating from Florida, Gulf and southern Atlantic coast were established in Alabama, Florida, Georgia and Mississippi and tree height, stem diameter and volume and disease traits were measured at years 5, 10, and 15. In the winter of 2001-2002, ten Florida Wild-Seed tests were established in Florida, Georgia, South Carolina, and Alabama, and tree height, stem diameter and disease traits were measured at year 6. With data from both these tests, different statistical methods are being evaluated to develop new universal response functions. Our goal is to create a more robust set of seed deployment guidelines by creating universal response functions with different variable selection methods, and generate maps for matching optimum genetic materials with appropriate planting sites.