QUATITATIVE GENETICS OF RESIN DEFENSE IN LOBLOLLY PINE

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Oleoresin that flows from the stem of pine trees is the primary defense against bark beetles and a potential source of bioenergy. We estimated the heritability of resin flow and chemical composition with clonal trials. We sampled oleoresin from 7600 individuals representing ~1000 loblolly pine genotypes derived from a partial diallel of 43 parents and 70 full-sib families that were clonally replicated at 3 sites in Georgia and Florida. We determined the dry mass of resin that flowed from a $1cm^2$ wound in the stem over 24 hours and used fourier transformed infrared spectroscopy (FT-IR) as a high-throughput method to assess wet oleoresin chemical composition. Oleoresin chemical composition was under stronger genetic control (α-pinene H^2 = 0.71) than resin mass (H^2= 0.17). Genotype x site interaction was minimal for resin chemical composition (r_B>0.95) and modest for resin mass (r_B=0.71). This work sets the stage for future research on the genes that control resin-related traits and breeding for enhanced resistance to bark beetles.