

Long-Term Selection for High and Low Oleoresin Production in Loblolly Pine

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In pines of the southeastern United States abundant flow of constitutive oleoresin is the primary course of action that provides trees with the means to successfully resist attack by southern pine beetle (*Dendroctonus frontalis* Zimmermann). This bark beetle is the most destructive insect pest of pine forests of this region, and currently, little is known about genetic properties of host resistance against attacks by this mid-bole inhabiting insect. Recent research, however, has revealed that substantial genetic variation exists in oleoresin yield in populations of loblolly pine (*Pinus taeda* L.), and that the phenotypic distribution for this trait is characterized by a large proportion of trees with low oleoresin yielding capacity. Given this information, it is reasonable to conjecture that the resin yielding ability of loblolly pines can be drastically changed in both positive and negative directions through a program of selective breeding. To test this hypothesis and to obtain information about the genetic characteristics of this form of resistance to bark beetle herbivory, geneticists at the Southern Institute of Forest Genetics together with entomologists in the US Forest Service's Southern Research Station have initiated a long-term genetic selection experiment to determine whether high and low oleoresin yielding lines can be developed in loblolly pine. Initial selections have been made from a base population that includes progeny from trees that survived earlier southern pine beetle infestations. Crosses among these selections are planned to produce individuals for the second generation of selection. In this report, we describe this selection experiment as well as predictions concerning outcomes that could result from the first generation of selection.