Evaluation of Effects of Range and Interspeciation on Hydrophobic Compound Presence and Intensity in Longleaf Pine, Loblolly Pine, and Sonderegger Pine

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The Pre-Euro-American settlement of the gulf coastal plain was marked by vast areas of longleaf pine (*Pinus palustris*) savannah in upland areas that corresponded to the high fire frequency demanded by the relevant ecotype. Lower lying areas tended toward bottomland hardwoods and loblolly pine (*Pinus taeda*). Colonization of the southeastern U.S. impacted the forest resources in the region, and the "cut out and get out" harvesting practices that swept the south from 1850 to 1926 effectively removed a majority of native southern forests. After the "cut-out and get-out" harvesting, the more rapidly growing loblolly pine eventually came to be the favored species for commercial regrowth (Boyer 1990). However, great interest has developed in recent years in the re-establishment of longleaf pine savannahs.

One of the interesting aspects of reforesting the south was the noted hybridization among southern pines. Most important for the scope of this research is the species interactions between longleaf and loblolly pine. The degree of hybridization was apparent enough that it was classified as a distinct species in 1922 by H.H. Chapman who distinguished the species by naming it after a state forester in Louisiana, V.V. Sonderegger. Incidentally, this species is also called the "bastard pine." Of particular interest to modern foresters is the question of how this trend of hybridization will affect the make-up of modern southern forests and how these effects will impact overall forest health, particularly in regard to fire resistance, drought hardiness, and anticipated changes in climate.

Methods

Sites will be chosen based on presence of target species in the over and under stories. Once the sites have been established, samples will be taken from three overstory and three understory species from each site. Once the samples have been collected, they will be stored at 5° C until

being further processed. Processing will be conducted by drying the needles at 21° C for ten days at which point they will be ground into powder using a home blender. Ten grams of the powder will then be placed in an extraction tube for processing in a *Dionex ASE 200 Accelerated Solvent Extractor*. Further processing will entail samples being analyzed via high pressure liquid chromatography (HPLC) in order to isolate and quantify presence of hydrophobic compounds within each sample. Results will be compared to pure control samples of each species obtained from ArborGen and Weyerhaeuser.

Discussion

With the advent of climate change, a great deal of interest has developed regarding the future of forest in the southeastern United States. The role of hybridization between southern yellow pines is being increasingly examined in order to determine if hybridization may increase the survivability of forests as ecological conditions shift. However, much is still not understood about the mechanisms and genetic triggers that determine the survivability of southern yellow pines in the presence of increased stressors. The isolation of potential compounds and the examination of the potential for each compound acting as a trigger for a specific response to and individual stressor is thus of great interest in the event that genetic modification of species in the future may suppress the negative effects of climate change on forest integrity in the southeastern United States.

About the Student

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