

Harrison Experimental Forest (HAR)

The Harrison Experimental Forest (HEF) was established in 1934 as a field site for research on reforestation methods and wood preservation treatments. The forest is located near the Gulf of Mexico on the DeSoto Ranger District of the DeSoto National Forest (30°38' N, 89° 03' W, elevation 70 m) or about 30 km north of Bilxoi and Gulfport, Mississippi. Original buildings at the experimental forest headquarters were built by the CCC and WPA in 1934 and are candidates for the National Register of Historic Places.

Early research at the HEF concentrated on southern pine regeneration studies, as well as investigation of various wood preservatives. Fencepost trials testing preservatives have been evaluated for more than 60 years. The use of water spray to preserve wood stored prior to processing was developed at the HEF. In addition long-term termiticide trials have been conducted on the HEF for many years. [Place photo of longleaf pine/saw palmetto ecosystem near here]

In 1954 the Southern Institute of Forest Genetics (SIFG) was established at the HEF shortly after Phil Wakeley initiated the South-wide Southern Pine Seed Source Study (SSPSSS). This study includes 130 individual field experiments at 60 locations (including the HEF) ranging from Texas to Missouri in the west and from Florida to Pennsylvania and New Jersey in the east. These experiments tested growth and survival of 103 seed sources for the four major southern pine species. Since shortly after the inception of SSPSSS, scientists at SIFG have taken the leading role in analysis and evaluation of the experimental results. Currently a database is being developed to include the complete SSPSSS data set, which contains records for 165,696 trees. Approximately 80 experiments have data collected over 25 years and 12 experiments have data obtained throughout 40 years. At present fewer than 10 experiments remain in the field and these are more than 50 years old. Several important long-term field tests of control-pollinated families of longleaf pine and loblolly pine were also planted on the HEF in the 1960-70s. A longleaf pine data set for one of these investigations is included in the NSF LTER Trends Project. This experiment tests the field performance of a diallel cross of 13 longleaf pine trees planted on two sites in 1960.

In 1994 four new laboratories were built on the HEF and equipped for molecular genetic analyses. Molecular and field genetic studies continue today involving five scientists, six technicians and numerous national and international cooperators.

Site Description and Characteristics The HEF comprises 1,662 ha of forest land having soils and topography representative of the vast longleaf pine forest type that once covered about 12.5 million ha across the southeastern US. Soils on the forest are mostly well-drained, fine-sandy loams of the Ruston and McLaurin series. However, a Eustis sandy loam soil type predominates in the Longleaf Pine/Saw Palmetto Research Natural Area. Overall the soils are low in cation-exchange capacity, organic matter, and nutrients, and are similar to the lateritic soils of the tropics. The major vegetative community on the forest is of the longleaf pine/bluestem type. The climate is temperate-humid subtropical, with mean annual precipitation of 1,751 mm, distributed relatively uniformly throughout the year. Mean minimum and maximum temperatures are -7.9 C and 36.4 C, respectively. A weather station (Saucier Exp Forest, NOAA 227480) has been maintained and monitored on the HEF since 1954.

Research Focus SIFG's mission is to provide scientific understanding of the effects of genetics, environment, and their interactions on the function and management of southern forest ecosystems. Assessment of results from the SSPSSS continues today, providing seed-source guidelines for planting southern pines throughout the region. Species comparisons among the southern pines planted on the HEF as early as the 1950s-60s, are ongoing and have demonstrated species differences in growth trajectories and stand dynamics. Some of the earliest genetic information on longleaf and loblolly pines was generated from plantings consisting of 100s of control-pollinated families and 1000s of trees that were established by SIFG scientists. [Place pollination photo near here] Many of those studies began in the 1960s-70s and some continue today. The HEF is home to a large collection of southern pine genotypes that serve as a source of germplasm for genetic experiments as well as for gene conservation.

Research on the biology and more recently the genetics of the southern pine-fusiform rust pathosystem has been conducted at the SIFG since the disease was first identified as a serious threat in southern pine plantations. Important contributions to understanding the pathogenicity and variability in both the host and pathogen populations have been made by SIFG scientists. Research on the inheritance of tree growth, stem form and disease resistance of forest trees has provided guidance for tree improvement programs across the South. Investigations conducted on reproductive biology of southern pines and seed production methods have helped make southern tree improvement programs cost-effective.

Recent research utilizing DNA markers is being used to help incorporate blight resistance into the American chestnut, aiding the effort to reestablish this species as a component of eastern US hardwood forests. DNA markers are also being used in population genetic studies to help develop effective conservation programs for threatened and endangered species and to develop genome maps of important economic and ecologic traits in the southern pines.

prepared and submitted by C. Dana Nelson and James H. Roberds
USDA Forest Service, Southern Research Station
Southern Institute of Forest Genetics
Harrison Experimental Forest
23332 Mississippi 67
Saucier, MS 39574
dananelson@fs.fed.us
jroberds@fs.fed.us