



RESEARCH

 University of Kentucky
Department of Forestry and Natural Resources

WHITE OAK TREE IMPROVEMENT

PRINCIPAL INVESTIGATORS: Laura DeWald, UK Department of Forestry and Natural Resources, and Dana Nelson USDA Forest Service, Southern Research Station

PROJECT GOAL: To quantify genetic variation in white oak and improve traits that have direct economic impacts for white oak dependent spirits and forest industries.

PROJECT DESCRIPTION: The project involves three phases each building on one-another to ultimately characterize and store genetic variability of white oak and develop improved seedlings.

Phase 1 - Collecting and Archiving Genetic Material

This phase initiated in 2019 will remain active for the next several years to collect acorns from the entire geographic range of white oak. The Kentucky Division of Forestry is donating nursery bed space and expertise to grow seedlings to be used in progeny testing and grafting.

Phase 2 - Progeny Testing:

Seedlings will be out-planted in progeny tests to evaluate parent tree traits of interest to spirits and aligned industries and traditional forest industries. Tests sites will be established throughout the region, locations are being determined and partners are needed.

Phase 3 - Seed Orchard Establishment:

In 4 years, parents of superior progeny, identified through progeny testing will be used to create grafted seed orchards using material stored in the clone banks. Open and controlled pollination will be used to provide acorns to produce seedlings that will be available for out-planting by stakeholders. Traits will be selected for that provide resistance to insects and diseases and to improve ecological success and economic value.



Unimproved Improved
10 year old white oak growing on the same site (photo by Laura Dewald)

PROGRESS: In 2019 over 17,000 acorns representing 91 parent trees and 9 states were collected and planted in the Kentucky Division of Forestry nursery to provide seedlings for progeny testing and clone back establishment. In 2020, over 150 grafts will be produced, and acorn collections will continue.

IMMEDIATE NEEDS: Acreage and funds to establish progeny tests (15-year commitment, 10-20 acres/test) and for clone banks (5-10 acres in perpetuity). An advisory committee of stakeholders (federal and state agencies, forest products industries, distilleries, academic institutions and non-profit organizations) to provide guidance to the project.

FUNDING AND RESOURCES:

- University of Kentucky: Over \$500,000 has been allocated by the University of Kentucky's Agriculture Experiment Station
- External: \$20,000 per year has been provided by USDA Forest Service, Southern Research Station