

White Oak Genetics and Tree Improvement Program

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An eastern US project focused on developing improved white oak (*Quercus alba*) and understanding its genetic potential has been established at the University of Kentucky. The project is working with forest, wood, and distilling industries and forestry, conservation, and wildlife agencies and organizations to answer a wide variety of questions associated with genetic variation in white oak. Any interested individual or organization is welcome to join the White Oak Genetics and Tree Improvement collaboration. See <http://white-oak-genetics.ca.uky.edu/get-involved> to learn more.



Unimproved Improved
10-year-old white oak growing on the same site

The project is aligned with and supports the goals of the White Oak Initiative (www.whiteoakinitiative.org) and the James B. Beam Institute for Kentucky Spirits focusing on traits that have economic and ecological value. The goals of the project are to (1) provide a sustainable supply of improved white oak seedlings to meet current and future demands, (2) improve our ability to conserve and restore white oak to achieve a variety of ecological, conservation and economic goals at regional and national levels, and (3) provide genetic resources for academic and industrial research and development. There are three major phases to the project. Phase 1 began in 2019 and site preparation for Phase 2 is underway with planting starting in 2021.

Phase 1 - Collecting and Archiving Genetic Material: White oak genetic material is being collected from the entire geographic range of white oak. Acorns are planted and seedlings are grown at the Kentucky Division of Forestry's Morgan Co. nursery. Twigs (scions) from the trees that acorns were collected from are grafted to create a clone bank to conserve genetic material of the parent trees. After selection based on nursery performance, the goal is to have 300 seed sources moving to Phase 2 (progeny testing).



Geographic Range of White Oak

The 2020 acorn collecting effort is currently being organized and the project can use your help! All we need from each person is a one-gallon plastic bag filled with acorns collected from the ground from under one tree. Postage and an address label are provided to get the collection to Univ. KY. Go to <http://white-oak-genetics.ca.uky.edu/get-involved> to learn more, and contact Laura.DeWald@uky.edu if you can help collect!

Phase 2 - Progeny Testing: Seedlings grown from the acorn collections will be planted in progeny tests to evaluate traits of interest to stakeholders. Depending on the trait, identification of superior performance can occur within 3-15 years. Two large progeny tests are being established in Kentucky and several smaller regional progeny tests will be established throughout the range of white oak to evaluate local adaptation, non-local genetic superiority, and genetic X environment interactions. Planting will begin in March 2021 using the best seed sources from the nursery, and will continue until the geographic range of white oak is represented.

Partners throughout the range of white oak are needed to host a regional progeny test. See <http://white-oak-genetics.ca.uky.edu/get-involved> to learn how your organization can be involved. The land area needed varies depending on number of seed sources included, but approximately 22 seed sources can be evaluated in a one-acre progeny test.

Phase 3 – Seed Orchard Establishment: Parents who produced superior progeny in the progeny tests will be used to create grafted seed orchards using material stored in the clone banks. Natural or controlled pollination will result in improved seedlings that will support ecological success in the forest and/or increased economic value for wood products industries. State nurseries are a logical place for locating seed orchards because they are the most effective way to deploy improved seedlings. However, other types of landowners can also participate.

Initial funding for the white oak genetics project has been provided by Univ. KY Dept. Forestry and Natural Resource, KY Agriculture Experiment Station, USDA Forest Service Southern Research Station and KY Division of Forestry