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Laura DeWald

White Oak Tree Improvement – what is it and why are we doing it?

by Laura DeWald

Tree improvement is the selection of trees to create offspring with desired characteristics (disease or insect resistance, fast growth rates, high quality wood, etc.). The goal is to produce high quality seedlings that will be successful competitors and become adult trees, thus providing important ecological and wildlife values to the forest, and economic values for trees being harvested.

Currently, white oak seedlings are not competing successfully in the forest. Forest management techniques are being used to address this problem, but we can facilitate these efforts through tree improvement. Thus, a white oak improvement program was initiated at the University of Kentucky in collaboration with the US Forest Service and Kentucky Division of Forestry (KDF).

What are the steps in a white oak tree improvement program?

Step 1: Collect acorns from trees with desired characteristics and plant in a nursery. Because white oak occurs across the entire eastern US, it will take many volunteers and 3 to 5 years to accomplish this step.

Step 2: Identify best seedlings from each acorn collection and transplant them into progeny tests to evaluate the parent trees. “Best” = good competitors in the forest, and thus selected seedlings have larger diameters and are tall and straight with few side branches. Once growing in progeny tests, trees are evaluated for a wide variety of ecologically and economically valuable traits. This can happen for white oak within 7 to 15 years. Progeny tests are located across the US to help us understand how far white oak seed can be safely moved, how white oak will respond to changing climates, and to identify superior locally adapted versus superior seed sources that perform well across a wide geographic range.

During Step 2, twigs (called scions) from parent trees the acorns were collected from are grafted onto seedling root stock to create a clone bank to store the parent tree genetics.

Step 3: Grafted white oak seed orchards are created using scions from the clone bank using a mixture of parents

that produced superior offspring in progeny tests. Mating among these superior grafted parents will produce genetically diverse, superior performing seedlings. Grafted seed orchards using different sets of superior parents are established across the eastern US to ensure the best seed sources for different regions. Grafted white oak can start producing acorns in 7 years (versus 20+ years in the forest).

Step 4: Acorns from seed orchards are grown in nurseries and produce superior seedlings that are available to landowners for transplanting into woodlands.

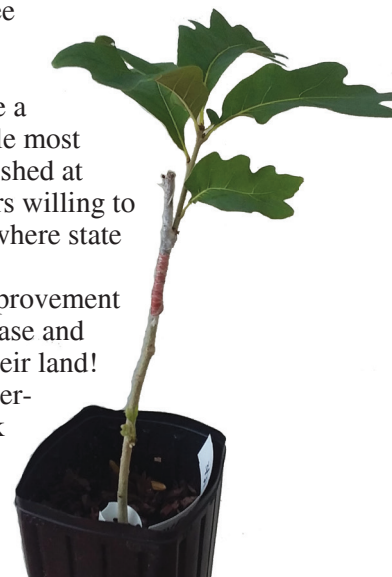
How can you participate in the white oak tree improvement program?

We need help collecting acorns and scions from high-quality trees, and to spread the word about this effort. We need help finding volunteer tree climbers to collect scion material.

We need landowners across the eastern US who are willing to have a progeny test on their land and while most seed orchards will likely be established at state nurseries, we need landowners willing to have a seed orchard on their land where state lands are not available.

Deployment – white oak tree improvement will fail if landowners don’t purchase and plant the superior white oaks on their land!

If you, or you know someone interested in helping with the white oak tree improvement effort, please contact Laura.DeWald@uky.edu to discuss the details of what is involved, time commitment, resources, etc.



The White Oak Genetics Project is working to identify and plant superior white oak trees.

About the Author:

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