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OAK REGENERATION PRACTICES: OAK ENRICHMENT OR SUPPLEMENTAL PLANTINGS

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If natural advance oak reproduction is not present, a logical supposition is to plant oak seedlings to supplement or enrich the existing reproduction and culture those planted seedlings to a larger size. Unfortunately, planting oaks in existing natural stands has been mostly unsuccessful with poor survival. Few plantings exist today. Clark and Dey (weblink below) present a series of thorough protocols concerning seedling care, selection, and planting as possible explanations for poor seedling survival once planted. However, the planting environment and the maintenance of that environment for the growth and culture of shade-intermediate oaks are often disregarded. Dispersed, partial sunlight (20 to 35 percent full sunlight) that favors oaks and discourages intolerant and more tolerant species must be maintained for development of oaks. Effective site preparation is essential and control of competing vegetation several times is necessary to ensure that oak emerges into the overstory. Often, owners and practitioners set up the correct environment to plant oak initially but fail to maintain those environments afterward. The inherent slower growth of oaks necessitates that management actions for competition control continue and partial light conditions be maintained after planting to be successful.

Prominent shade-tolerant midstories should be removed to provide the partial light environments for shade-intermediate oaks to prosper and succeed in enrichment or supplemental plantings.
Photo Credit: *Wayne K. Clatterbuck*

Scraggly and weak white oak seedling in the deep shade of a closed canopy. This 8-year-old seedling is barely maintaining itself and will eventually die because of limited sunlight.
Photo Credit: *Wayne K. Clatterbuck*

Growth of seedlings (and trees) is balanced between the aboveground stems and leaves and the root system. Seedlings grow well in the nursery where growth components (water and nutrients) are generously provided, and competition is controlled. However, once a seedling is lifted from the nursery bed, usually more than half of the seedling's root system is not retained which stresses the seedling. With the diminutive root system, the aboveground portion is also af ected. The outplanted seedling either is stimulated to regenerate more roots quickly to sustain the top, or the top dies back, or both, so that the shoots and the roots re-establish equilibrium. After planting in more adverse environments compared to nurseries, height growth is minimal during the f rst growing season, allowing competitor species to have a growth advantage adversely impacting the planted oak seedling. The growth strategy of oak seedlings is to put its energy in root system development f rst, then top growth afterward as compared to many competitors where top growth is the priority rather than growth of roots.

The slower top growth strategy of oak seedlings, especially in the f rst year after planting, allows competitors to surpass the oak seedling growth.

The barrier to planting oak seedlings for most landowners is the cost. Estimated costs of supplemental/enrichment planting vary greatly depending on the number of oak seedlings planted per acre and the amount of vegetation to be controlled that inf uence planted oaks as well as providing the partial sunlight under which oak respond. The estimates below are based on planting 300 oak seedlings per acre at a 12-foot by 12-foot spacing and average site preparation and vegetation control/release treatments using a combination of mechanical and chemical treatments. Readers should realize that costs will increase with greater number of seedlings planted or decrease with a fewer number of seedlings. Vegetation control costs will also fuctuate on the amount and size of vegetation controlled. Cost estimates are within the average of costs reported by several universities in the mid-South United States and as referenced in the Clark and Dey publication.

Cost Item		Average Cost per Acre
Purchasing White Oak or Other Oak Seedligs	$1.00/seedling x 200 seedlings/acre of large, better-quality seedlings without culled, inferior seedlings as referenced by Clark & Dey	$200/acre
Cost of Planting Large, Better-Quality Seedlings Compared to Smaller Seedllings	$0.80/seedling x 200 seedlings/acre	$160/acre
Site Preparation, Vegetation Control, and Adjust Light Levels before Planting		$100.00/acre
Release, Vegetation Control, 2 or 3 years after Planting		$100.00/acre
Release, Vegetation Control, 6 to 10 years after Planting to Address Density Bottlenecks		$100/acre
Estimated Total		**$660/acre**

These reforestation costs can be of set somewhat by cost-share programs as well as reserving a proportion of timber sale revenues for reforestation. Even with these f nancial adjustments, initial costs of planting, as well as investment for long-term revenue, may be cost prohibitive for many landowners. Failure to create environments to culture oak seedlings after planting and allowing seedlings to fend for themselves often leads to other species supplanting the growth of oaks. Although developing advance oak reproduction is time consuming before the overstory harvest, many opportunities and options are available to naturally regenerate oak at less cost as suggested in this collection of fact sheets. Planting oak seedlings should be considered if less time is a priority in regeneration ef orts and increased costs are acceptable.

FURTHER READING

Clark, S.L., Dey, D.C. 2022. Enhancement planting of upland oaks. FOR-161. Lexington, KY: Cooperative Extension Service, University of Kentucky, Department of Forestry and Natural Resources. 12 p. (https://www.fs.usda.gov/research/treesearch/66238).

Morrissey, R.C., Seifert, J., King, N. Selig, M. 2007. Enrichment planting of oaks. FNR-225. Purdue Cooperative Extension Service, Purdue University, Department of Forestry and Natural Resources. West Lafayette, IN. 8 p. (https://www.extension.purdue.edu/extmedia/fnr/fnr-225.pdf).

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