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This stand of Nuttall oak was direct seeded 12 years ago with 5x10 foot spacing in a three-acre opening.

Studies show steps to more success planting oak forests

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As Ann Nestelroad observes in a preceding article, acorns sown 6 inches deep can germinate and produce seedlings. I believe, however, that the best oak establishment comes from acorns sown 1 to 2 inches deep in open areas. Deep sowing does not substantially reduce acorn depredation by rodents, but two ongoing studies at Stoneville, Mississippi, indicate that sowing in larger forest clearings may.

Both studies involved completely cleared blocks of about three acres within the natural forest. One test was in the Mississippi Delta, the other in the silty uplands near Vicksburg, Mississippi. In the Delta

study, rodents destroyed acorns sown in the understory and in small forest openings (40 to 90 feet), but they did little damage in the three acre blocks.

The study area in the silty uplands, prepared similarly, produced similar results — little damage in a large, completely cleared opening.

Fast-growing seedlings and sprouts of other trees were present in both areas. But in the Delta the problem of non-oak competition may have been reduced considerably because we mowed a 5-foot swath between the 10-foot rows. Blocks were mowed once a year for the first five years

and after the 10th year.

Planting Oak Seedlings

Planting is another alternative for forest farmers who wish to increase the amount of oak on their lands. But, as with natural regeneration, planted oaks must compete with other trees and herbaceous plants. To do so, seedlings must show rapid early growth or competitors must be held back.

Experimental plantings of northern red oak from Tennessee and northward have been on upland sites and in recently clear-cut areas. Results have been inconsistent, but about 50 percent survival and a foot of annual height growth after 5 to 10 years in the field are not uncommon.

Spot weed-control around individual trees, top and root pruning at planting time, fertilization, and older and larger planting stock have all failed to produce a significant increase in early growth.

I estimate that 11 northern red oak seedlings would have to be planted to have one "successful" tree after eight years. A successful seedling is one that will grow to 80 percent of the height expected from a northern red oak sprout on the same site.

Ongoing research at Stoneville is aimed at improving early height through planting nursery-grown trees that are up to three years old, 10 to 15 feet tall, and 2 inches in diameter at the root collar. Trees were top-and root-pruned and planted in 9-inch diameter auger holes. Potential benefits are rapid early growth and a planting height beyond the normal browsing range of deer.

Containerized planting of oak is just beginning, but the problems are similar to those encountered with other forms of oak regeneration. In a preliminary test, I found early growth rates of oak to be too slow to be competitive. I assume that a larger container and a longer propagation period might offer the best opportunities for increasing early growth of containerized oaks. Other researchers have also gotten poor results from field plantings of containerized seedlings.

Benefits of Weed Control

Oak plantings with complete weed control have been successful in the bottomlands of the Midsouth and along the Atlantic Coast. Using straddle-cultivation and disking (weed control techniques developed for eastern cottonwood), researchers at Stoneville have established several successful oak plantings on plots ranging from 20 to 200 acres.

Covering five different sites, plantings include five different southern red oaks and thousands of seedlings. Clearly, oak can be successfully planted. Best results are from seedling species more than 24 inches tall and at least 0.3 inch at the root collar.

Patterns of growth are also becoming clearer. Oaks average only a foot or two of

annual height growth the first or second years in the field. Then, usually during the third and fourth year, growth increases to about 3 or 4 feet per year.

This good growth continues until at least age eight. The slow growth during years one and two is no different from the growth exhibited by natural or direct seeded oaks, so transplant shock is not apparent. One species that seems to start growing fast right away is Shumard oak. Our tests with this species, however, are limited to a couple of locations.

Site Selection is Critical

After oaks are harvested from a site, the same species can be planted back with assurance. But plantings on old fields or in cleared areas where oaks are not found can lead to problems.

For example, we planted Nuttall, cherrybark, and water oak on a moist, fertile bottomland soil with a pH of 7.5, and all three species failed, presumably because they were unable to extract iron from the soil. On the same site, a planting of Shumard oak survived and is growing extremely well.

In central Arkansas, we planted Nuttall, cherrybark, and water oak on a Coastal Plain soil with a pH of 5.2 and a low phosphorous content. All three species had excellent survival and growth. Cherrybark

and water oak had been growing in the general area, but not Nuttall, a species normally found in very low, wet areas.

Our experience from this and other tests indicate that oaks normally found in areas inundated for extended periods can be successfully planted on higher, better drained soils, but the opposite is not true. Even lowland oaks can be killed by extended growing season inundation during the first year in the field. But, thereafter, they appear more tolerant of standing water.

Planting combined with complete weed control is relatively dependable for increasing the oak component. But oak plantings may cost a great deal with clearing the most expensive item. Some projections, based on a 36-year period of comparison, indicate that plantings of oak and three other hardwood species can produce at least 50 percent more volume at one-third the cost of systems of natural regeneration.

Is there a way for forest farmers to increase the amount of desirable oak on their property? For most situations there probably is. But high costs and the time required to get the job done may not yet be attractive to many landowners. Research is continuing, though, over a wide area, and the more we learn about the problem, the more likely we will be able to find simpler, less expensive solutions. □