Twenty-Year Results of Planted Cherrybark Oak on Old Fields in Brown Loam Bluffs

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Twenty years after planting, dominant/codominant cherrybark oaks averaged 55 to 65 feet tall.

Cherrybark oak (*Quercus flacata* var. *pagodifolia* Ell.) is a favored hardwood species in the deep loess soil areas of the brown loam bluffs either where erosion has not occurred or where at least 6 inches of topsoil remains; however, the species has not been listed as being suitable for planting (*3*). Five 19- or 20-year-old cherrybark oak plantings described here were successful. These were planted on old fields of Memphis and Loring soils in the loess hills northeast of Vicksburg, Miss.

Methods

Plantings ranged in size from less than an acre to almost 10 acres. From one to four plots per area were measured, with plot sizes of either 0.05, 0.07, or 0.10 acre. Diameters at breast height (d.b.h.) of all trees greater than or equal to 2.0 inches were tallied. Heights of five or six dominant or codominant planted oaks per plot were measured, as were heights of other species comparable to the tallest oaks. Soil pits were dug and descriptions made in each area.

Results and Discussion

Areas 1 to 4 were 1962 plantings-20 years old-while area 5 was planted in 1963 (table 1). Area 4 was in pasture at the time of planting while the other areas were old fields. The planting sites were disked before planting.

The soils on the plots are a Memphis-Loring complex. The principal soil variation is the presence (Loring) or absence (Memphis) of a fragipan and the intensity of its development. The fragipans, however, appeared to have had little effect on the growth of the planted cherrybark. Textures were mostly silt loam in the *A* horizons and silty clay loam in the *B* horizons. These loess soils are extremely erodible, and 50 to 100 years of agricultural use has caused the loss of about 8 inches of soil from their surfaces as estimated by the proximity of the fragipan to the surface. However, the topsoil, as represented by depth above the first 8 horizon, varied from 8 to 23 inches between areas. Value for pH varied from 4.0 to 4.6 in the upper 24 inches.

Oak survival could not be determined for the areas. The sites were machine planted, but not cross-marked in a square or rectangular pattern. Spot samples across the areas indicated variation between (from 8 to 12 feet) and within (from less than 7 to about 10 feet) row spacings. Apparent nominal spacings varied from approximately 7 by 8 feet (778 trees per acre, area 5) to 9 by 10 feet (484 trees per acre, area 1). By areas, number of oaks per acre after 19 to 20 years ranged from 155 to 565, with an average of 346 trees

Table 1.—*Average plot data for planted cherrybark oak at five locations after 19 (area 5) or 20 years*

		All trees			Dominant/codominant trees		
Area	Species	Trees/acre	D.b.h.	Basal area	Trees/acre	D.b.h.	Ht
			In	*Ft²/acre*		*In*	*Ft*
1	Oak	332	5.4	57	60	7.6	58
	Other	2	3.9	< 1	—[1]	—	—
2	Oak	155	7.8	54	60	9.5	65
	Other	90	5.4	16	5	8.0	64
3	Oak	565	5.1	88	83	7.4	55
	Other	—	—	—	—	—	—
4	Oak	375	5.4	67	100	7.4	63
	Other	285	4.5	40	20	7.2	62
5	Oak	400	4.5	50	100	6.2	55
	Other	340	3.8	32	30	6.7	55

[1] – = not applicable or not available.

per acre, based on all 13 plots.

Average oak d.b.h., by areas, ranged from 4.5 inches—where stocking was greatest—to 7.8 inches-where stocking was lowest; the larger dominant/codominant trees ranged from 6.2 to 9.5 inches d.b.h.

The largest individual oaks by areas varied from 8.6 inches d.b.h. and 59 feet tall to 13.9 inches d.b.h. and 76 feet tall. Average heights of the dominant/codominant oaks ranged from 55 to 65 feet. A sample of the dominant/codominant oaks over all areas averaged 16 feet maximum crown diameter, 51 percent live crown ratio, and 12 feet of clear bole length. In area 5, several of the planted oaks were southern red oak (*Quercus falcata* Michx.), rather than cherrybark oak, but on each plot a southern red oak was among the dominant/codominant component.

Other species in the dominant/codominant category were sweetgum *(Liquidambar styraciflua* L.), yellow-poplar *(Liriodendron tulipifera* L.), black cherry (*Prunus serotina* Ehrh.), and sassafras (*Sassafras albidum (Nutt*.) Nees). Other species measured on the plots were white ash *(Fraxinus americana* L.), boxelder (*Acer negundo* L.), blackgum (*Nyssa sylvatica* Marsh.), flowering dogwood (*Cornus florida* LJ, American elm (*Ulmus americana* L.), winged elm (*U. alata* Michx.), hickory (*Carya* spp.), red mulberry (*Morus rubra* L.), persimmon (*Diospyros virginiana L*.), red maple (*Acer rubrum* L.), and sumac *(Rhus spp.).*

The appearance of the cherrybark oak plantings is good. The trees have good form and are in a position to continue development and therefore be the major sawtimber component in the future. As there was no weed control in the year of establishment or thereafter, the oaks have developed without the aid of human beings. Intensive culture is required for eastern cottonwood (*Populus deltoides* Bartr. ex Marsh.) plantations; and disking for weed control has resulted in significantly greater heights, diameters, and survival for several different planted hardwoods compared to mowing or no weed control on both Sharkeyclaysoil (*4*) and Commerce silt loam soil (*5*) during the first 4 years of tree growth. However, the plantations in this study indicate good oak development is possible on old field loess soils without vegetative control following planting.

Potentially, these sites can probably produce 100-foot trees in 50 years. From site index curves for cherrybark oak, 55- and 65-foot trees at age 20 approximate 100- and 120-feet site indices at age 50; from soil series data, Memphis-Loring soils with at least 6 inches of A horizon' have an estimated site index range of 95 to 105 feet (*2*). However, an objective-subjective site evaluation method (*1*) only provided a site index determination of about 75 feet. Considering the present development of the trees, the latter method does not seem to be suitable for these sites.

Planting of cherrybark oaks on abandoned fields in the loess hills appears to be a reliable method for establishing a valuable oak component. Recommendations for plantation establishment would be to disk before planting and to use large, vigorous seedlings with at least 3/8-inch root collar diameters (*6*). Three hundred trees per acre at a 12- by 12-foot spacing would provide for a minimum of 100 sawtimber-size trees (14 in. d. b. h.) at 100 square feet of basal area if only one-third of the trees survived.

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