

CYPRESS MANAGEMENT: A FORGOTTEN OPPORTUNITY



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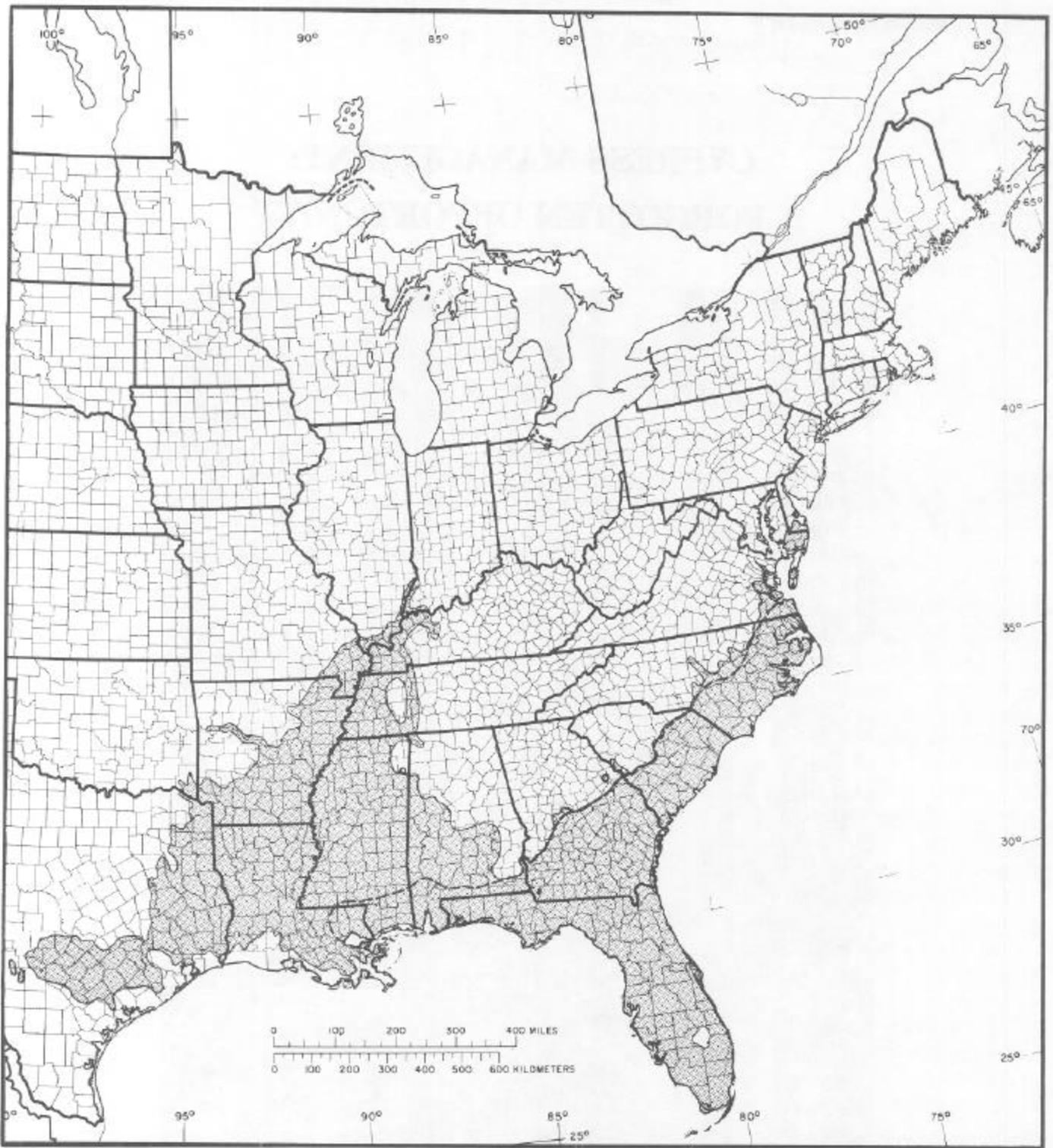


Figure 1.-The ranges of baldcypress and pondcypress. The broken line shows the northern limit of the variety pondcypress.

Cover picture.-An example of an old growth stand of cypress.

CYPRESS MANAGEMENT: A FORGOT OPPORTUNITY

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INTRODUCTION

Cypress, once one of the most highly prized of southern trees for its lumber, is now processed in only a few mills. While nearly disappearing from the market place the volume in standing second-growth indicates that cypress may one day retake its place as an important source of wood products. It is plantable and well adapted to growing in pure, even-aged stands. Freed of competition, it grows rapidly and prunes itself well in fully stocked stands.

Baldcypress' grows in the Coastal Plain from southeastern Texas to southern Delaware. Its range extends up the Mississippi Valley to southern Illinois and southwestern Indiana. A single variety, pondcypress' predominates in Florida and occurs in mixture with baldcypress from extreme eastern Louisiana to southern Virginia. In areas where both varieties occur they intergrade to such an extent that it is often difficult and sometimes impossible to distinguish between them. (figure 1).

Old growth cypress (cover photo), if grown in the deep swamps and along the major rivers in the coastal areas of the Southeast and along the Gulf of Mexico is known in trade circles as tidewater redcypress and considered to be especially resistant to rot. That growing in the "uplands" is called white or yellow cypress and, when untreated, is used where rot resistance is not essential. The lumber is always in good demand. Production peaked in 1913, when more than 1 billion board feet were milled. In 1954, sawmills cut 240 million board feet and today production is less than 200 million board feet per year.

The volume of cypress growing stock on commercial forest land, according to the most recent forest surveys, totals 5.5 billion cubic feet (155.7 million m³). The surveys included live trees at least 5 inches (12.7 cm) in diameter at breast height (d.b.h.). About 19.8 billion board feet of sawtimber is available, of which 36 percent is in trees 17 inches (43 cm) d.b.h. and larger. More than half of the volume grows in Florida and Louisiana. Much of it occurs in pure or nearly pure stands in ponds, bays, river swamps and old river beds.

An accurate estimate of the number of acres in cypress is impossible, as cypress is included in the oak-gum-cypress forest type. Estimates of the area in cypress range from 3 to 5 million acres (1.2 to 2 million ha).

REGENERATION

Artificial regeneration.-Stratified seed sown in the nursery in May germinates quickly and the seedlings develop rapidly. About 12 seedlings per square foot (77 cm²) of bed are desirable for good growth and survival. When kept well watered the seedlings are usually 30 to 40 inches (76 to 101.6 cm) tall at the end of the growing season.

When seedlings are lifted, the tap root should be at least 9 to 12 inches (23 to 30 cm) long. Place the seedlings in cold storage immediately. Plant them in the late spring when all danger of flooding is past. Growth is rapid if the seedlings are kept cultivated. Survival and growth of 1-0 stock with stem diameters 0.25 inch (6.4 mm) and larger at the upper end of the root collar is almost double that of 0.15inch (3.8 mm) seedlings. Clipping and deep planting to improve survival and growth on droughty sites have not proven beneficial.

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2 *Taxodium distichum*
T. distichum var. *nutans*

In one planting study, 67 percent of the 1-year-olds that had been submerged for less than 20 days during the start of the growing season survived. Survival was 55 percent for 1-year-olds submerged 20-29 days, and 31 percent for those submerged 30-45 days.

Nutria and swamp rabbits thwarted, in large part, the largest planting effort in southern Louisiana. Nutria uproot the seedlings, eat the succulent bark from the tap roots, and consume small roots. Rabbits clip off the seedlings above ground and eat the tender stems and branches. Nutria prefer to feed on seedlings in shallow water while rabbits usually eat nonflooded seedlings. Damage by the rabbits is offset somewhat by the resprouting of the seedlings.

Natural regeneration. -13aldecypress produces some seed almost every year, with good crops every 3 to 5 years. Cypress cones contain 18 to 30 seeds each. The seed have a thick, hard, outer seedcoat that requires softening for a considerable period before germination can take place. Soak the seeds in cold water for 90 days or more to overcome their natural dormancy.

Cypress is site exacting and establishes itself only where there is abundant moisture. The seedbed must be very moist for 1 to 3 months. Good seedbeds are sphagnum moss or soft, wet muck. Once established, the young seedling grows rapidly and its moisture requirements diminish. It grows best on deep, loose, well drained, rich sandy or clayey loam soils. While older seedlings can withstand flooding for short periods, newly germinated cypress seedlings can be killed by submergence for as little as 2 or 3 days.

Naturally seeded trees often reach heights of from 8 to 14 inches (20 to 36 cm) in the first season, and from 16 to 24 inches (41 to 61 cm) in the second season. The seedlings can endure partial shading, but require a good degree of overhead light for normal growth.

Stumps 10 to 14 inches (25 to 36 cm) in diameter can generally be counted on to sprout vigorously if the tree is cut in the fall or winter. They should be no older than 40 to 60 years.

GROWTH

Planted cypress grow rapidly. In three growing seasons, cypress planted in a yard, weeded and

watered, were 12 feet (3.7 m) tall. More than 60 years ago, W. R. Mattoon measured secondgrowth cypress in Maryland and Louisiana. The trees grew in areas having abundant overhead light. His data are summarized in tables 1 and 2.

Another study showed good growth for a difficult Sharkey clay site in Washington County, Mississippi. The cypress seedlings were planted at a spacing of 6 x 10 feet (1.8 x 3 m). The site was about 20 percent ridge, 20 percent slough, and the rest flat slough. The trees were cultivated three or four times each year for the first four growing seasons. After the fourth year, annual mowing for the next 6 years was the only cultural treatment. Survival at age 21 averaged 41 percent; average diameter was 6.1 inches (15 cm); and volume per acre 1,299 cubic feet (90.9 m³/ha). Diameters of the best 10 percent averaged 11.1 inches (28 cm) with the two largest trees 14.0 inches (35.6 cm) and 60 and 63 feet (18.3 and 19.2 m) tall.

Survival in an unthinned 41-year-old cypress plantation established by the Tennessee Valley Authority on abandoned crop land along Yellow Creek in Tishomingo County, Mississippi averaged 70 percent. The dominants were 69 feet (21 m) tall. A stand table per acre follows.

D.B.H <i>(inches)</i>	Trees <i>(number)</i>	Volume <i>(cu. ft.)</i>	Basal area <i>(sq. ft.)</i>
4	35	35	3.04
5	160	304.0	21.76
6	200	660.0	39.20
7	195	1,092.0	52.06
8	160	1,296.0	55.84
9	70	756.0	30.94
10	40	544.0	21.80
11	<u>10</u>	<u>160.0</u>	<u>6.60</u>
	870	4, 843.5	231.24

Three half-acre growth plots were established in a 70- to 85-year-old cypress stand in the Lee Creek bottom on the Tallahatchie Experimental Forest near Abbeville, Mississippi. One plot was left unthinned; the second thinned from below to approximately 200 square feet of basal area (b.a.) per acre (46 M²/ha); and the third (with many more stems per acre) thinned from below to approximately 150 square feet

b.a. per acre (34 m²/ha). The diameter of all cypress 4.6 inches (10.2 cm) and larger was measured periodically at 6 feet (1.8 m) (to get above the butt swell) to the nearest tenth-inch. The number of logs to a merchantable top (6 inches; 15 cm) d. i .b. or larger) for trees 7.6 inches (18 cm) d.b.h. and larger was estimated to the nearest half-log. Detailed measurements were taken on 10 crop trees on each plot. Following is a summary of the data collected.

Year	Thinned Check	Thinned to 200	to 10
--- Number trees/a ---			
1958	222	146	240
1976	190	140	212
--- b. a. /a ---			
1958	265	199	155
1976	303	260	204
--- volume (bd. ft./a) ---			
1958	54,000	45,602	29,958
1976	70,068	63,570	43,892

Periodic annual growth per acre for the three treatments was 893, 998, 774 board feet (International 1/4inch rule), respectively. The average surviving crop tree on the three plots at roughly 100 years was 21.2 inches (53.8 cm) d.b.h., 119 feet (36.3 m) tall with 81 feet (24.7 m) of bole free of live limbs, and a merchantable length of 88 feet (26.8 m). Eighteenyear increases in crop tree characteristics were 3.2 inches (8.1 cm) in d.b.h., 7 feet (2.1 m) in height, 11 feet (3.4 m) in bole free of live limbs, and 4 feet (1.2 m) in merchantable height.

Frequently, cypress is mixed with hardwood on muck swamp sites. In a study in Florida, a fully stocked stand of cypress, water tupelo, swamp blackgum and sweetgum was thinned from below at age 60+. Thinnings were made to three basal areas: 100, 70, and 40 square feet per acre (23, 167 and 9 m²/ha) of merchantable basal area (trees with a

diameter of 6.6 inches (16.8 cm) or larger above bottle neck. The average merchantable tree left after thinning ranged from 11 to 13 inches (28 to 33 cm). An unthinned check with 168 square feet (39 m²/ha) b.a. was left.

The 10-year growth (including ingrowth) for the control, 100 b.a., 70 b.a., and 40 b.a. treatments was 1.5, 1.4, 1.5, and 0.9 cords/acre/year. Average 10-year diameter growth was 1.2, 1.6, 1.9, and 1.9 inches (3, 4, 4.8, and 4.8 cm), respectively. While growth on individual trees on the check plot was slower, total growth was about the same as on the 100 b.a. and 70 b.a., because of the greater number of trees.

MANAGEMENT

Cypress grows in a wide range of temperatures. Its natural range extends from below the frost line in southern Florida northward to Delaware. More than 90 percent of the total cypress stand is found at an elevation of less than 100 feet (30.5 m) above sea level.

Cypress thrives in a wide variety of soils, including muck, clays and the fine sands. The best sites are well-drained, fine sandy loams supplied with an abundance of soil moisture. Avoid planting cypress over shallow limerock, hardpan or other shallow, impervious soil layers. See figure 2. While the trees may survive, growth will be slow and may never produce merchantable stands.

On upbuilding lands, cypress is clearly receding before bottomland hardwoods. However, on young alluvial land in the early stage of succession it is the dominant species and advances over all associated swamp hardwoods. Tupelo gum' is the most common associate of cypress.

Cypress requires overhead light for normal growth. It cleans itself readily of branches in well stocked stands. Its thin bark offers little protection against fire. It is seldom if ever thrown by wind. The stem above the basal swell does not differ greatly in its taper from that of southern pine. Stands that regenerated naturally following a clearcut are, for the most part, overstocked. Because of the overstocking, growth is often slow and many stands have stagnated.

Table 1. - Height of second-growth cypress on the basis of age.

Age	Maryland ¹			Louisiana ²		
	Maximum	Average	Minimum	Maximum	Average	Minimum
<i>Years</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>
10	26	11	3	24	17	9
20	44	22	7	45	31	17
30	58	33	12	61	43	26
40	71	46	18	75	54	34
50	82	60	25	86	65	43
60	91	72	32	97	74	51
70	99	81	39	—	83	60
80	106	88	44	—	92	69
90	113	95	50	—	101	78
100	119	101	54	—	109	86

¹Based on sectional age counts of 68 trees, also total heights of 221 additional trees, 6 to 103 years old.

²Based on sectional age counts of 42 trees, 38 to 89 years old.

Table 2. - Ten-year diameter increase of second-growth cypress in Maryland, based on age¹

Age	Diameter breast high			Diameter outside bark at 20 feet above ground		
	Maximum	Average	Minimum	Maximum	Average	Minimum
<i>Years</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
10	5.1	1.1	0.4	3.5	—	—
20	10.0	3.5	1.2	7.8	2.1	0.2
30	14.2	6.2	2.2	11.2	4.5	1.0
40	17.6	8.7	3.3	13.8	6.7	1.9
50	20.5	11.1	4.4	15.6	8.7	3.0
60	23.2	13.3	5.8	16.9	10.4	4.1
70	25.8	15.3	7.2	17.9	12.1	5.4
80	28.6	17.3	8.9	18.9	13.6	6.9
90	30.8	19.3	11.0	19.8	15.0	8.6
100	33.3	21.3	13.2	20.6	16.1	10.3

¹Based on decade measurements on 237 stumps of trees 7 to 101 years old



Figure 2.-The variability in height growth in this baldcypress plantation indicates areas of shallow soils over an impervious layer.

Management of this species has been largely limited to commercial clearcutting or highgrading. In spite of past treatment, thousands of acres of second-growth stands occur throughout the natural range. Cypress is ideally suited for lands that are in intermittently flooded. Besides the indigenous sites, it should do well within the flood-control pool areas of the numerous reservoirs in the southern Coastal Plain States and also in the sump areas along the major streams. You can probably grow cypress on more than 500,000 of the approximately 1 million acres (202,000 of the 404, 600 ha) between the Conservation (permanent) Pool and the Flood Control Pool of the Corps of Engineers reservoirs.

Plant cypress on an 8- by 8-foot (2.4 by 2.4 m) spacing. Control competing vegetation at an early age by herbicide, water control or cultivation. If under-planted in a hardwood stand, deaden the overstory to obtain the full sunlight needed. Early planting efforts in Louisiana achieved spotty success because the landowner did not kill the competing vegetation. Several other problems are illustrated in figure 3.

Where there is a seed source, natural regeneration may be obtained by controlling the water level. However, a large part of the cypress volume and area is in ponds, bay heads, and along small streams where water control is impossible. Such sites can be

either planted during a low water cycle or regenerated by leaving seed trees. Because the seed is distributed by water movement, the seed trees can be left along the edge of the clearcut where they can be easily harvested when the area is regenerated. Deadened culls and unmerchantable species within the harvested area. If a good seed catch is not obtained in the first year, plant before other vegetation takes over the site.

Thin young stands - plantations or natural - at 15 to 20 years for posts if there is a market. Once the boles have pruned naturally it is essential to release the better stems for rapid diameter growth. Lower limbs are persistent where initial stocking is 300 trees or less per acre (741/ha, or less). Manage the stand much like loblolly pine. However, higher basal areas can be carried than with pine. How much higher is **unsupported** by evidence. The second thinning, 10 years after the first, should be for barn poles and other small material. Subsequent harvests will be for sawlogs. See figure 4.



Figure 3.-This cutover, burned over tract is typical of many once occupied by fine stands of old growth cypress. Wires, grazing and water tables modified by drainage have all contributed to lack of cypress regeneration.

Recommended Management for Natural Stands

Lacking long term research information, management recommendations must be based on a combination of relatively limited studies and general experience. The two alternatives are:

One Cut.-Cypress inherently can tolerate high basal areas over long periods. When thinning is not practical, grow until the stand reaches the desired size (see table 2), then clearcut. Remove or deaden all residual stems 2 inches and larger. If natural regeneration fails, plant and release as necessary.

Periodic Cuts.-For periodic income and to shorten the time to reach a given diameter, thin from below. A good guide is to thin to 100 square feet (23 m²/ha) of basal area. If for economic reasons, a heavier cut is required leave at least 70 square feet (16 m²/ha) of basal area.

UTILITY

Cypress lumber cut from virgin timber - trees as much as 800 to 900 years old - was highly resistant to decay. But second-growth trees do not have this high decay resistance. Treat second-growth cypress with a wood preservative if it is to be used in structures in contact with the ground.

Cypress lumber has superior working qualities, good paint retention, good resistance to wear, and nails well. The knots are generally small and sound. Cypress can be used in place of southern pine lumber. It has 80 percent or better of the static bending strength of loblolly pine. Cypress is not used for pulpwood, but can be used for posts and poles if treated with a preservative.



Figure 4.-Thinning studies such as this one in Florida should provide information to aid in developing management guides for cypress in the future.

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