

## YIELD OF A CHOCTAWHATCHEE SAND PINE PLANTATION AT AGE 28

**Abstract.**—A little-known tree, Choctawhatchee sand pine (*Pinus clausa* [Chapm.] Vasey), seems well adapted to the infertile, droughty soils common to the sandhills of Florida which now produce little value. Published yield data based on plantation-grown Choctawhatchee sand pine are not available. One 28-year-old plantation of this race of sand pine, growing on very deep, sandy soil, was located in a search that covered all of west Florida. This plantation has produced about 32 cords of wood per acre.

### INTRODUCTION

Only one plantation of the Choctawhatchee race of sand pine (*Pinus clausa* [Chapm.] Vasey) of merchantable size is known to exist. It was planted in 1938 and is located on the Eglin Air Force Reservation in northwest Florida. In years past this plantation drew passing notice mainly as a novelty, for the species was considered unimportant, useless. But sand pine will produce "paperwood" (Martin 1962), and is adapted to the sandhills where little else of commercial value will grow (Burns 1968). This plantation serves as an example of what might be expected from Choctawhatchee sand pine planted on droughty, infertile, sandy sites.

### HISTORY AND DESCRIPTION

During the winter of 1937-38, a planting of sand pine covering about 2 acres was made on a portion of the Choctawhatchee National Forest (now Eglin Air Force Reservation) in northwest Florida. Seedlings were dug as small wilding stock in an area 20 miles from the planting site and transported to the site in baskets. There the bare-rooted stock was bar planted at a 6- by 8-foot spacing by a three-man Forest Service crew amid scrub oaks (*Quercus laevis* Walt. and *Q. incana* Bartr.), wiregrass (*Aristida stricta* Michx.), and scattered longleaf pine (*P. palustris* Mill.).

This plantation lies about 11½ miles north of the Gulf in the W½, NE¼, Sec. 29, T. 1 N., R. 24 W. in Okaloosa County, Florida. Okaloosa

County enjoys a mild climate. The growing season lasts approximately 260 days, during which time the average monthly temperature rarely exceeds 80° F. Winter temperatures are moderate, averaging 50° F. for the period December to February, inclusive. On the average, 60 to 64 inches of rainfall can be expected annually with the greatest proportion coming during the growing season.

The plantation is situated on gently rolling topography with an overall slope from north to south of 13 feet. Tree height and topographic profile appear related. The shortest trees were found at the highest elevations within the plantation. Trees were taller on lower portions of the slope, and tallest on a comparatively level area near the south end of the plantation.

Within the plantation stems are straight, very few are forked, and branches are small and persist almost to the ground (fig. 1). Eastern gall rust (*Cronartium quercum* Hedgc. and Hahn) infects the limbs of several trees but does not appear to be of consequence on boles.

Soil within the plantation is classified as Lakeland sand. Profile examinations were made to a depth of 19½ feet at seven points within this plantation. Soil horizons characterizing these profiles are 93 to 95 percent sand-sized particles, have a pH of 4.4 to 5.2, and are very low in ammonium acetate extractable (pH 4.8) phosphorus, potassium, calcium, and magnesium. The A-horizon of this soil is thin, ranging from 1 to 3 inches in depth and containing from 1 to 1.8 percent organic matter.

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Figure 1.—Choctawhatchee sand pine at age 28; average diameter 7.7 inches, average height 54 feet.

### TREE MEASUREMENTS

Measurements of trees in the interior of this stand included diameter at breast height (d.b.h.), total tree height, height to a 4-inch diameter outside bark, age, and single-bark thickness. Tree d.b.h. within the plantation ranged from 1 to 13 inches and averaged 7.24 inches. Most trees fell in the 6- to 9-inch classes (fig. 2).

Paired 4-mm. increment cores taken 90° apart at d.b.h. were obtained from every tenth tree in each row. Specific gravity determinations were made from these cores according to the procedures described by Smith (1954). Core sections containing rings 11 through 20 were

used as a means of standardization. Specific gravity of the trees sampled, excluding border-row trees, averaged 0.51.

Form class measurements were taken from a randomly selected sample of trees. They ranged from a low of 64 to a high of 89 percent and averaged 78 percent. The sample was not large enough to establish clearly a form class—d.b.h. relationship.

The tree measurements were subjected to regression analysis, and the relationships between d.b.h. and (1) total tree height, (2) merchantable height, and (3) double-bark thickness were tested. Equations developed from the regressions are:

1. Total tree height =  $-12.73189 + 19.66016 \text{ d.b.h.} - 1.94780 \text{ d.b.h.}^2 + 0.06783 \text{ d.b.h.}^3$   
 $R^2 = .78$
2. Merchantable height =  $-47.26138 + 16.85121 \text{ d.b.h.} - 0.80507 \text{ d.b.h.}^2$   
 $R^2 = .80$
3. Double-bark thickness =  $0.03113 + 0.01823 \text{ d.b.h.} + 0.00135 \text{ d.b.h.}^2$   
 $R^2 = .57$

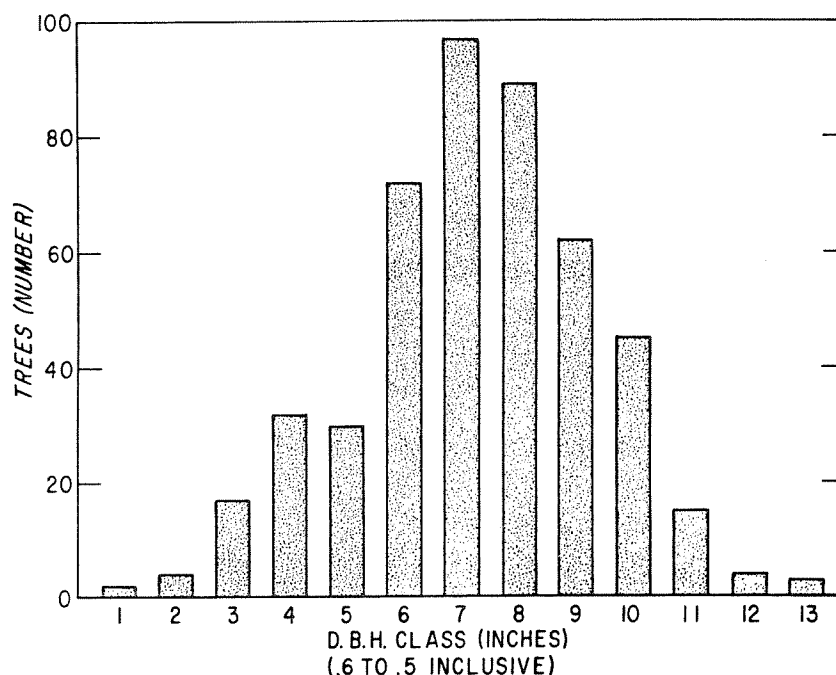


Figure 2.—Diameter frequency distribution at plantation age 28.

The cubic-foot and cordwood volumes of trees 5 inches d.b.h. and larger in the interior stand were computed (table 1); and heights developed by the regression values were applied to tabular values of (a) Mesavage (1947), (b) Minor (1950), and (c) Bennett, McGee, and Clutter (1959). For comparative purposes, a local volume table was computed by the cone-frustrum formula and values from table 49, page 1.73 of the Forestry Handbook (Anonymous 1955). Where applicable, a 77 or 78 form class and a 4-inch o.b., small-end diameter were used in the

computations. Merchantable length was considered to be 0.5 foot less than merchantable height (stump allowance), and a rough cord to contain 74.1 cubic feet inside bark (Mesavage 1947).

The authors readily recognize that the information presented is based on a very small plantation. At the same time, a need has been expressed for the information included in this Note. As more data become available, the information presented will be either substantiated or modified accordingly in subsequent publications.

Table 1.—Cubic foot and rough cord approximations of trees 5-inches d.b.h. and larger

D.b.h. class (inches)	Total tree height	Merchantable length	Trees	Mesavage tables 15 & 29	Minor tables		Bennett et al. table 2	Local volume table
					3A	3B		
	--- Feet ---		Number		----- Cubic feet -----			
5	45	16	30	51	67	48	40	53
6	50	24	72	230	270	214	201	238
7	53	31	97	485	538	455	437	508
8	54	36	89	623	676	602	566	654
9	56	39	62	564	601	532	539	585
10	57	40	45	495	570	498	504	511
11	58	40	15	225	231	197	211	197
12	60	38	4	67	75	60	70	57
13	63	35	3	55	69	49	66	45
Total			417	2,795	3,097	2,655	2,634	2,848
Trees per acre			360	—	—	—	—	—
Rough cords <sup>1</sup>				37.7	41.8	35.8	35.5	38.5
Cords per acre <sup>2</sup>				32.5	36.1	30.9	30.6	33.2
Average annual growth, cords/acre				1.16	1.29	1.10	1.09	1.19

<sup>1</sup>74.1 cubic feet inside bark/cord.

<sup>2</sup>Interior stand comprises 1.159 acres.

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