Growth of Choctawhatchee Sand Pine Plantations in Georgia

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ABSTRACT. Surveys of established plantations of Choctawhatchee sand pine (Pinus clausa *var.* immuginata *Ward) on sandhills in 10 Georgia counties showed that the growth is nearly comparable to that observed on sandhills in Florida within the natural range of this variety. The observed growth is better than could be expected from other pine species on these excessively drained, infertile sites. Significant damage from insects, disease, or cold weather was not evident.*

Relying largely on observed performance in the sandhills of Florida, tree growers began planting sand pine in the fall line sandhills of Georgia almost 20 years ago. Hebb (1982) reported on sand pine performance in an early species comparison trial in Talbot County, Georgia. In this planting, Choctawhatchee sand pine was growing at a rate comparable to similar sand pine plantations in Florida. Reported here are the results of a survey of 17 separate plantations in 10 counties in Georgia. The objective of this survey was to answer the following questions:

(1) How does Choctawhatchee sand pine planted over a range of conditions in the Georgia fall line sandhills grow?

(2) Are there any problems (insects, diseases, ice, or cold damage) readily evident in Choctawhatchee sand pine plantations in Georgia that may limit its use for sandhills reforestation there?

The Choctawhatchee variety of sand pine is one of the southern pines with a natural range limited to the Florida Panhandle and the southeastern coastal region of Alabama. Test plantings of this variety of sand pine have been established in a number of areas in northern Florida. Sufficient information is now available which shows Choctawhatchee sand pine is the most productive of the 38 species of conifers that have been tested for sandhill reforestation (Brendemuehl 1981). On the basis of such information, Choctawhatchee sand pine is being planted on an operational scale in a number of areas in the Florida sandhills, and to a lesser extent in Georgia.

In both the fall line sandhills of Georgia and the sandhills of the Florida Panhandle, longleaf pine (*P. palustris* Mill.) once dominated and scrub oaks became dominant after the longleaf was harvested. Soils in both areas are excessively drained, infertile sands. The areas differ somewhat in terms of rainfall and length of growing season. Annual rainfall in the Georgia fall line sandhills averages 48 in., 10 in. less than the annual average recorded in northwest Florida (USDC 1970). The Florida sandhills receive the additional rainfall during the growing or warm season, April to September inclusive. The growing season is somewhat shorter in the Georgia fall line area than in north Florida, approximately 235 days as compared to 265 days.

METHODS

A number of Choctawhatchee sand pine plantations have been established in Georgia. Measurement plots were established in 17 plantations in 10 counties (Figure 1) that had fairly uniform stocking. From two to four 0.1-acre circular plots were established in each of the 17 different stands for a total of 46 plots.

Within each plot the dbh and total height of all sand pine trees were measured. Trees were also inspected for any signs of damage. The soil series and depth of sand to a less permeable layer were determined for each plot by taking three soil cores with a bucket auger.

RESULTS AND DISCUSSION

Some variation in height growth was evident, especially in the 7-year-old stands, where average height ranged from 9.5 ft. to 19.0 ft. (Table 1). The low height in the Telfair County plantation was due mainly to poor site preparation. Although the area was chopped and burned and the large oaks were injected, many large oaks survived and are still growing on the site. Choctawhatchee sand pine can tolerate considerable overtopping competion, but its growth rate is diminished (Outcalt and Brendemuehl 1984).

Five plantations received no site preparation prior to planting sand pine. These areas were either scrub oak sites underplanted to sand pine

Table 1. Characteristics of Choctawhatchee sand pine plantations surveyed in Georgia.

County	Site preparation	Soil series	Depth of sand	Density	Age	Height
			Feet	*Trees/acre*	*Years*	*Feet*
Sumter	Chop	Lakeland	15	475	6	12.7
Webster	Chop	Lakeland	12	540	6	12.9
Telfair	Chop & burn	Kershaw	10	450	7	9.5
Stewart	Chop	Lakeland	6	515	7	11.3
Taylor	Chop	Lakeland	8	505	7	12.7
Tattnall	Bulldoze & harrow	Kershaw	15+	285	7	15.0
Long	KG blade & bed	Kershaw	10	475	7	19.0
Taylor	Rootrake	Lakeland	8	640	8	15.8
Marion	Rootrake	Lakeland	11	575	9	17.7
Webster	Rootrake	Lakeland	9	315	9	22.0
Taylor	Rootrake	Lakeland	6	535	10	24.0
Marion	None	Lakeland	10	475	11	15.6
Washington	None	Vaucluse	14	380	11	35.0
Talbot	None	Lakeland	15+	470	13	30.2
Washington	None	Lakeland	13	300	13	44.1
Taylor	Shear & rootrake	Lakeland	8	305	16	36.9
Washington	None	Lakeland	11	390	19	48.9

without site preparation, or sites which had been previously used for agriculture and required no site preparation. The 11-year-old stand in Marion County was underplanted while the three stands in Washington county were probably planted on old fields, where growth rates are enhanced for lack of woody competition or presence of residual fertilizer.

All of the plantations but one were on Lakeland or Kershaw soils, which are droughty acid sands of low fertility. These soils cover extensive areas of the sandhills region and are well suited to growing sand pine (Brendemuehl 1984). The 11-year-old stand in Washington County was growing on a Vaucluse soil. This is a better soil with a higher clay content and better nutrient and moisture supplying characteristics, as shown by the superior height of the trees. The depth of sand ranged from 6 to greater than 15 ft. Although our work in Florida indicates that site quality decreases as the depth of sand increases, no such relationship was evident in this case. Any effect due to the depth of sand was masked by variation from other factors, such as location and site preparation.

Figure 1. Georgia counties where Choctawhatchee sand pine plantations were sampled.

Average yield by age class is given in Table 2. Only data from stands which had received some type of site preparation were used to develop this table. Yields were quite good and considerably better than could be expected from other species on these dry, infertile sites. It also agrees very well with the growth rate of trees in the Talbot County, Georgia study, where Choctawhatchee sand pine averaged 14.5 and 36.0 ft. tall at ages 7 and 15, respectively (Hebb 1982).

It appears that average heights of Choctawhatchee sand pine in Georgia may be slightly

Table 2. Average yield by age class for Choctawhatchee sand pine plantations planted on site prepared areas in Georgia.

Age	Density	Diameter	Height	Volume[1]
Years	*Trees/ac*	*Inches*	*Feet*	*Cu. ft./ac*
6	505	1.86	12.8	68
7	445	2.11	13.5	105
8	640	2.52	15.8	191
9	445	3.60	19.9	299
10	535	4.07	24.0	625
16	305	6.59	36.9	1461

[1] Stem volume outside the bark to a 1-in. top.

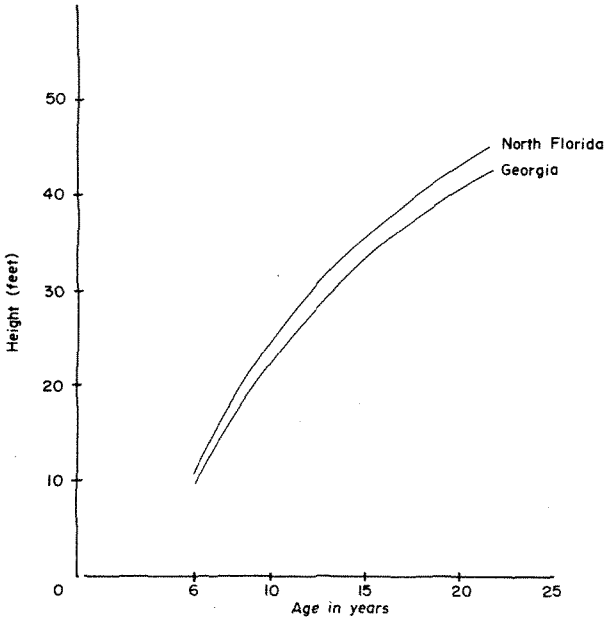

Figure 2. Average heights of Choctawhatchee sand pine growing in north Florida and Georgia sandhills plantations.

lower than those in north Florida (Figure 2). This seems reasonable since the growing season is somewhat shorter and precipitation is less in Georgia. The difference, however, is not great.

The only damage noted in the survey of the various stands was some tip moth feeding in the 6- and 7-year-old stands in Webster, Stewart, Taylor, and Tattnall counties. This is relatively common on Choctawhatchee sand pine stands in north Florida. Although the tip moth feeding does result in some growth loss in young stands, the actual amount is quite small (Burns 1966).

CONCLUSIONS

Choctawhatchee sand pine seems well suited to the sandhills of Georgia where it has outperformed all other pine species tested. Growth rate will vary with location, soil, and silvicultural practices, but it should be quite good. There are no indications of any major diseases or pests or other problems that could limit its growth potential on these sites.

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