



A COMPARISON OF TREE GROWTH AND DEVELOPMENT
BETWEEN A
SHORTLEAF AND LOBLOLLY PINE PLANTATION
GROWING ON NASON SOIL
IN ORANGE COUNTY, VIRGINIA

KEEP VIRGINIA GREEN



PREVENT FOREST FIRES

DIVISION OF FORESTRY
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

A COMPARISON OF TREE GROWTH AND DEVELOPMENT

BETWEEN A

SHORLEAF AND LOBLOLLY PINE PLANTATION

GROWING ON NASON SOIL IN ORANGE COUNTY

The pine plantations on the J. E. Taylor tract located approximately six miles south of Orange on the west side of Secondary Road No. 629 are some of the oldest and most extensive plantings in Virginia. Much of this planting was done on Nason silt loam which has a low natural fertility and is described as a light clay silt loam. The Nason soil type is common in Orange County and is one of the major soil types within the county.

Shortleaf and loblolly pine comprised most of the pines planted with some of the older plantings being nearly 30 years old. Shortleaf pine occurs naturally in Orange County whereas loblolly pine does not. However, the natural range of loblolly pine would not have to be extended much in order to include Orange County and loblolly pine is generally accepted as a suitable species for planting in the county.

Since both shortleaf and loblolly pine can be recommended for planting within Orange County the question naturally arises as to which of the two species to recommend. The Taylor tract affords an opportunity to compare the two species to date on the same soil type (Nason) and also allows a comparison for a similar period of growth (in our case, both plantations were 21 years old).

Random 1/5-acre circular plots were taken in both the shortleaf and loblolly pine plantations and field data taken, the summaries of which will follow. The loblolly pine plantation has been marked for a pulpwood thinning and will be thinned in the near future. Two of the 1/5-acre plots taken will not be thinned so that these plots may be used as check or control plots. The shortleaf pine plantation will not yet afford a commercial pulpwood thinning operation; therefore, it was not marked.

It should be borne in mind that the stand and stock tables and summaries which follow are for shortleaf and loblolly pine plantations, each planted on Nason soil and each 21 years old. Topography and slope of the plantations is similar. Also, spacing of the plantations was the same with 1,000 to 1,100 trees per acre being planted on each (spacing was roughly 6' x 7').

Shortleaf Pine
(Site Index 90)

Stand and Stock Table (Per Acre):

DBH (Inches)	No. Trees	Avg. Merch. Ht. (Ft.) <u>4" top</u>	Volume Avg. Tree (Cu. Ft.)	Volume Per Dia. Class (Cu. Ft.)	Basal Area (Sq. Ft.)
3 and under	27				1.3257
4	82	6 ⁴ / ₄	0.49	40.18	7.1586
5	225	18 ¹⁶ / ₁₆	1.89	425.25	30.6900
6	325	24 ²⁰ / ₂₀	3.38	1,098.50	63.8300
7	178	29 ¹⁵ / ₁₅	5.28	939.84	47.5794
8	25	33 ⁵ / ₅	7.57	189.25	8.7275
9	3	35	9.97	29.91	1.3254
	865			2,722.93 30.25 cords	160.6366

Summary (Per Acre):

Age	No. Trees	Avg. DBH	Cu. Ft. Volume (Rough)	Volume Std. Cords (Rough)	Basal Area (Sq. Ft.)
21	865	5.8	2,723	20.8 30.25	160.6

Loblolly Pine
(Site Index 105)

Stand and Stock Table (Per Acre):

DBH (Inches)	No. Trees	Avg. Merch. Ht. (Ft.) <u>4" top</u>	Volume Avg. Tree (Cu. Ft.)	Volume Per Dia. Class (Cu. Ft.)	Basal Area (Sq. Ft.)
3 and under	17				0.8347
4	94	5 ⁴ / ₄	0.436	40.98	8.2062
5	145	16 ¹⁸ / ₁₈	1.73	250.85	19.7780
6	166	26 ²⁸ / ₂₈	3.60	597.60	32.6024
7	159	33 ²⁰ / ₂₀	5.87	933.33	42.5007
8	128	39 ¹⁷ / ₁₇	8.35	1,068.80	44.6848
9	55	41 ⁹ / ₉	11.44	629.20	24.2990
10	15	44 ⁶ / ₆	14.90	223.50	8.1810
11	6	48 ² / ₂	19.44	116.64	3.9600
	785			3,860.90 42.9 cords	185.0468

Summary (Per Acre):

Age	No. Trees	Avg. DBH	Cu. Ft. Volume (Rough)	Volume Std. Cords (Rough)	Basal Area (Sq. Ft.)
21	785	6.6	3,861	42.9	185

⁴ Basis on number hts. taken with Abney Level

Comments and Observations:

Shortleaf pine plantation — the form of the pines was good with little or no damage to date from weather, insects or otherwise. Some of the larger pines have an abundant cone crop. The stand appears to be more or less stagnated with very little height differential regardless of diameter. The average total height of the stand (weighted) was 40 feet (basis, 60 trees). The stand needs a heavy thinning but it is not practicable as yet.

Loblolly pine plantation — form generally good but somewhat rougher than the shortleaf plantation. Mechanical injury due to sleet storm apparent in some stems but recovery has been good. Stand vigorous and healthy.

Average total tree height (weighted) was 52' (basis, 87 trees). The thinning which will be made should benefit the stand. Pines under 5" DBH will not be cut because they are too small and the amount of ingrowth which results on these trees should be interesting.

Figures taken indicate that 14 cords per acre will be thinned from the plantation cutting on the average 295 pines per acre leaving a residual stand of 28.7 cords with a basal area of 119 square feet.

A Comparison to date between the Plantations:

	<u>Shortleaf Pine</u>	<u>Loblolly Pine</u>
Age (years)	21	21
Number trees (per acre)	865	785
Avg. D.B.H. (inches)	5.8	6.6
D.B.H. range in inches, up to	9	11
Avg. total height (feet)	40	52
Vol. Cu. Ft. Rough to 4" top (per acre)	2,723	3,861
Vol. Std. Cords (per acre)	30.3	42.9
Avg. annual growth (std. cords per acre)	1.44	2.04
Basal Area in sq. ft. (per acre)	161	185
Survival to date (per cent)	87	74

Summary:

The J. E. Taylor plantations in Orange County offer a splendid opportunity to compare tree growth and development between a shortleaf and loblolly pine plantation of equal age, planted similarly, and both growing on Nason soil.

To date, the loblolly pine plantation has outgrown the shortleaf pine plantation. It is interesting to note that after thinning 14 cords per acre from the loblolly plantation (which is roughly the difference now in pulpwood volume per acre between the two plantations) that a residual volume of 29 cords will be left in the loblolly plantation, or nearly the same pulpwood volume per acre as the unthinned shortleaf pine plantation (30 cords).

Henry W. Bashore and R. L. Marler
Virginia Division of Forestry

September 21, 1955

Shortleaf Pine	Age (years)
21	21
785	865
8.6	9.3
11	9
32	40
108.6	2,723
12.9	30.3
210	1.44
185	161
74	87