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SOUTHERN FOREST EXPERIMENT STATION

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BARK THICKNESS OF 17-YEAR-OLD LOBLOLLY PINE PLANTED AT DIFFERENT SPACINGS

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SOUTHERN FOREST EXPERIMENT STATION

Diameter at breast height was the only variable affecting double bark thickness at d.b.h. and midpoint of the merchantable stem for young loblolly pine planted at five initial spacings on plots with site indices of 77 to 111 feet. Bark thickness at the 4-inch top was not correlated with breast-height diameter.

Additional keywords: *Pinus taeda* L.

Estimates of bark thickness are necessary for determining the volume of peeled wood and may be useful for calculating quantity of bark, a material now used for many purposes. This paper presents estimates of double bark thickness (DBT) and diameter inside bark to diameter outside bark ratios at breast height and the 4-inch top for 17-year-old loblolly pines.

METHODS

Data were collected during the first thinning of a 17-year-old loblolly pine (*Pinus taeda* L.) plantation growing on a cutover area in southwest Louisiana. Plots were planted by machine at spacings of 6 by 6, 8 by 8, 9 by 9, 10 by 10, and 12 by 12 feet. Estimated site indices (50-year base) range from 7'7 to 111 feet.

Measurements of double bark thickness at breast height, midway between breast height and the 4-inch top, and at the I-inch top were taken with a Swedish bark gage on opposite sides of each of 106 randomly selected felled trees. The trees were 4 to 11 inches in diameter at breast height (d.b.h.) and represented all spacings and site classes. Regressions that used site index, initial number of trees planted, and d.b.h. as independent variables were screened by Grosenbaugh's combinatorial process (1967) to develop the prediction equations.

RESULTS AND DISCUSSION

Double-bark thickness at breast height (DBTBH) was correlated with diameter at breast height outside bark (DBHOB) ; there were no well-defined curvilinear trends, and a linear model of the relationship was adopted. Use of site index, initial density, or both as independent variables did not improve the fit

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appreciably. The equation, DBTBH = 0.3989 + 0.1284DBHOB (in inches), was significant at the 0.01 level and accounted for 48.9 percent of the variation in DBTBH among the trees. The standard error is 0.20 inch. Values derived from the equation were within 15 percent of actual measurements for slightly more than two-thirds of the trees. Burton's (1962) estimates of DBTBH for unthinned loblolly pine plantations that were 5 to 25 years old are similar to those presented here (fig. 1).

Double bark thickness midway between breast height and the 4-inch top (DBTM) increased 0.04 inch for each l-inch increase in DBHOB (fig. 1). The equation, DBTM = 0.5368 + 0.0387DBHOB ($r^2 = 0.13$), is significant at the 0.01 level, and the standard error is 0.15 inch. DBTM ranged from 0.31 to 0.85 inch less than DBTBH, and the difference increased directly with diameter.

Double bark thickness at the 4-inch top averaged 0.53 inch for the 106 trees and did not vary with diameter at breast height.

The DIB/DOB ratios at breast height, calculated from predicted values, were:

D.b.h. class	*Ratio*
4	0.77
5	.79
6	.81
7	.81
8	.82
9	.83
10	.83
11	.84

The ratio at the 4-inch top was 0.87 for all diameter classes. DOB midway between breast height and the 4-inch top must be known to determine a ratio for that point. With an average ratio for the three points on the tree, volume inside bark for the merchantable bole can be determined using the STX or height accumulation computer programs (Mesavage 1971, Lohrey and Dell 1969). The ratios can also be used to develop inside bark taper curves.

LITERATURE CITED

Burton, J. D.
1962. Bark thickness in Tennessee loblolly plantations. USDA For. Serv., South. For. Notes 142, 4 p. South. For. Exp. Stn., New Orleans, LA.

Grosenbaugh, L. R.
1967. REX-FORTRAN-4 system for combinatorial screening or conventional analysis of multivariate regressions. USDA For. Serv. Res. Pap. PSW-44, 47 p. Pac. Southwest For. and Range Exp. Stn., Berkeley, CA.

Lohrey, R. E., and T. R. Dell.
1969. Computer programs using height accumulation for tree volumes and plot summaries. J. For. 67: 554-555.

Mesavage, C.
1971. STX timber estimating with 3P sampling and dendrometry. US Dep. Agric., Agric. Handb. 415, 135 p.

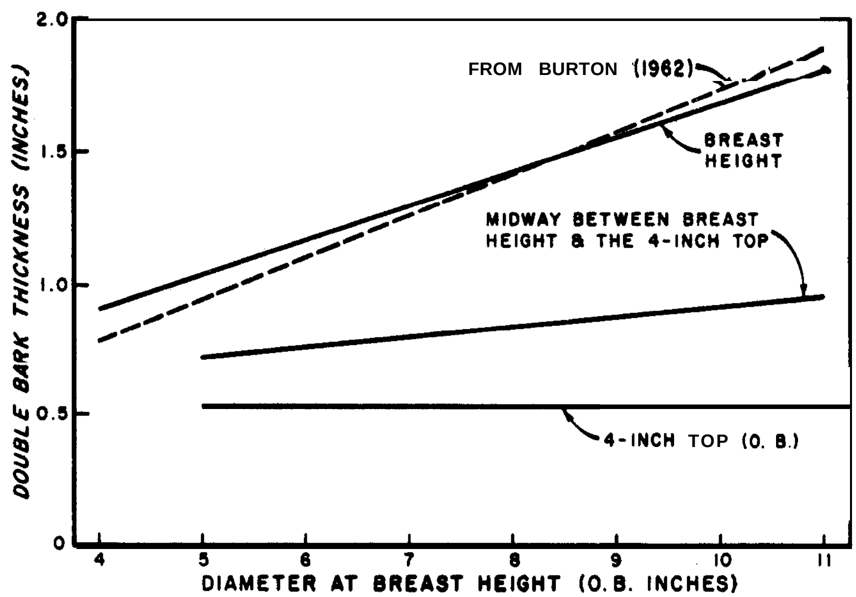

Figure 1.-*Relationship of double bark thickness at three locations on the (o.b.) at breast height.*