

# LSU FORESTRY NOTES

AGRICULTURAL EXPERIMENT STATION RESEARCH RELEASE

LOUISIANA STATE UNIVERSITY & A & M COLLEGE

School of Forestry and Wildlife Management

Baton Rouge, La. 70803

Note #83

August 1969

## EFFECTS OF GEOGRAPHIC SEED SOURCE ON THE FORM OF PLANTED LOBLOLLY PINE IN LOUISIANA

European foresters have long recognized that when seed are moved from one location to another, the possibilities of getting trees of good form, frost hardiness, and disease resistance are lessened. Early work on seed origin in the United States was conducted with Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) and ponderosa pine (*Pinus ponderosa* Laws.). The first work with loblolly pine (*Pinus taeda* L.) began in 1926 near Bogalusa, Louisiana.

A South-wide study currently under way, using the four commercially important southern pines, has the objective of mapping zones within which seed may be moved. The study with which this paper deals is part of the overall project but differs from it in that only loblolly pine seed sources from within Louisiana are represented.

The objective of this study was to test the effects of geographic seed source on certain bole and crown characteristics of loblolly pine. The study was conducted in a 6-year-old loblolly pine plantation located on the Louisiana State University agricultural experiment station near Clinton in East Feliciana Parish. The plantation was laid out in a randomized block design with four replications of the five seed sources: Washington, St. Tammany, East Feliciana, Vernon North, and Vernon South.

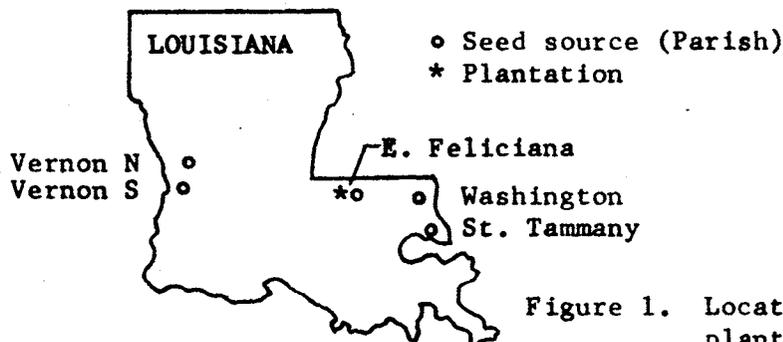


Figure 1. Location of seed sources and plantation.

Each plot in the plantation was established by a 6- by 6-foot spacing with 11 rows of 11 trees each. The central 49 trees (seven rows of seven trees) were routinely measured annually the first five years as part of the South-wide study. The two outside rows around each plot serve as border rows. For this study, the central nine trees in each plot were chosen for special measurement, with appropriate modification for selection of an alternate tree where one of the central nine was missing.

Measurements of height, diameter at breast height, bark thickness at breast height, height of natural pruning, fusiform rust, and crown width were made on each tree (Table 1). Certain within-crown characteristics on each tree were also studied. The whorls of branches which were 2, 3, and 4 years old were selected and the angle, diameter, and length of the longest branch in each primary whorl were recorded. Number of branches in each whorl, length of each internode, and diameter at two-thirds the height of the tree were also noted.

Table 1. Comparative measurements for trees from five loblolly pine seed sources at the end of the sixth growing season<sup>1/</sup>

Seed source	Height	Diameter	Bark thickness	Natural pruning	Fusiform rust	Crown width
Parish	Feet	Inches	Inches	Feet	Percent	Feet
Washington	15.1	2.9	0.31	3.5	70.9	6.5
St. Tammany	16.2	3.1	.29	4.1	66.3	6.5
East Feliciana	14.8	2.7	.27	3.4	29.8	6.3
Vernon North	14.9	3.0	.34	3.8	48.9	6.4
Vernon South	15.6	3.1	.32	4.3	31.1	6.6

<sup>1/</sup>Each value is the average of 4 replications.

Analyses of variance were used to determine if there were any statistically significant differences among seed sources with respect to the variables studied. Simple correlation coefficients were determined for all combinations of all variables except diameter at two-thirds height and incidence of fusiform rust.

No significant differences in bole or crown characteristics were found among the seed sources tested. This fact is very encouraging as it means in effect that any of the seed sources could be planted in East Feliciana Parish without any presumed loss of volume or quality due to the characteristics measured.

Differences in susceptibility to fusiform rust, however, were striking. The Washington and St. Tammany sources were the most heavily infected (significant at  $p = 0.01$ ), whereas the local East Feliciana source and Vernon South were least infected ( $p = 0.01$ ). In the middle was Vernon North with, unaccountably, a relatively high rate of infection. These results would suggest that use of seed from the extreme eastern part of the state should be avoided in this area because of probable loss of wood volume from mortality of trees infected with the rust.

High correlations were found for some combinations of variables. Height and diameter were highly correlated:  $r = 0.81$ . The tallest trees also had the widest crowns and the best natural pruning. Branch diameter and branch length were highly correlated and both were negatively correlated with branch angle. This means that trees with branches oriented more horizontally will tend to have smaller and shorter branches, and hence, produce fewer and smaller knots.

From the results of this study, the question of which seed source is best suited for planting in East Feliciana was not completely answered. High susceptibility to fusiform rust would probably rule out Washington and St. Tammany. Among the others the Vernon South source had the best overall performance. However, six years is too short a time on which to base any firm conclusions, and later examinations may reveal quite different results.