7. PROGRESS REPORT ON LOBLOLLY SEED SOURCE STUDY AT BOGALUSA

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During the period December 27-30, 1926, there was established on the lands of the Great Southern Lumber Company by the Southern Forest Experiment Station a small loblolly plantation consisting of pine seedlings grown from four different geographic sources of seed. The seed for this study was collected in the fall of 1925 from Livingston Parish, Louisiana; Montgomery County, Texas; Clarke County, Georgia; and Howard County, Arkansas. All seedlings were grown in the Little Buffalo nursery of the Great Southern Lumber Company in Bogalusa, thus eliminating many possible nursery variables.

The original plantation consisted of two 1/2-acre blocks with the trees within each block planted in this order: Row 1, Louisiana; Row 2, Texas; Row 3, Georgia; Row 4, Arkansas. Six rows were planted from the seedlings of each seed source. 'There was no randomization of treatments and some questions may be raised concerning the possible effect of competition as a result of this systematic arrangement of rows. Further historical data concerning this plantation are available on pages 14 and 15 of USDA Agricultural Monograph 18, dated 1954.

At 22 years these plantations were thinned by arbitrarily taking the odd numbered trees from one row and the even numbered trees from the next, etc. This was done to give maximum spacing and to some degree minimize unequal competition which then existed. Trees were removed regardless of size, crown class, rust infection, etc., numbered position within the row being the only criterion for thinning.

This past year each of the trees within this plantation has been systematically remeasured by personnel of our Management Section cooperating with Phil Wakeley of the Southern Station. The following data have been extracted by Phil Wakeley from our IBM card summaries and are presented very briefly for your consideration at this time.

1. Total height. Figure 1 shows the average total height of trees within each one-inch diameter class, plotted by the geographic source of seed. It is at once evident that from 6" to 12" DBH the Louisiana source exceeds in total height the Arkansas source by 6 to 8 feet, Georgia source by 5 feet, Texas source by 1 foot.

The average total height for all trees of each source ran: Louisiana, 59.1'; Texas, 50.5'; Georgia, 49.6'; and Arkansas, 42.1', a spread of 17.0'. In the case of pulpwood height, measurements were to a 4" diameter outside the bark. Note on the same chart that the Louisiana source has an even larger merchantable spread than in the total height figures. Actually, the local trees by diameter class exceed in merchantable height the Arkansas source by 9" - 10", the Georgia source by 5'; and the Texas source by 3' - 4', a net difference of one or two sticks of pulpwood per tree of the same DBH class.

2. Diameter breast high. Assuming that the trees left after thinning were representative of the total population, the total average increase in diameter during the 6 years since thinning has been as follows: Louisiana, 1.4"; Texas, 1.0"; Georgia, 1.5"; and Arkansas, 0.5". Local source trees have made a diameter growth increase of nearly 3 times that of the lowest in this test.

The average diameter breast high for the four seed sources is: Louisiana, 8.1"; Texas, 6.2"; Georgia, 6.7"; and Arkansas, 5.2". This gives the local seed a spread of 2.9" above the lowest.

3. Average pulpwood per tree. The effect of increase in diameter as well as the effect of greater pulpwood length of the individual trees by diameter classes is reflected in the average pulpwood content per tree. The average for the Louisiana stock ran .104 cords; for Texas, .038; for Georgia, .055; and for Arkansas, .019 cords.

This indicates that the average Louisiana seed source trees contain three times as much pulpwood per tree as the Texas source, twice as much as the Georgia, and approximately five times the volume of the average Arkansas trees.

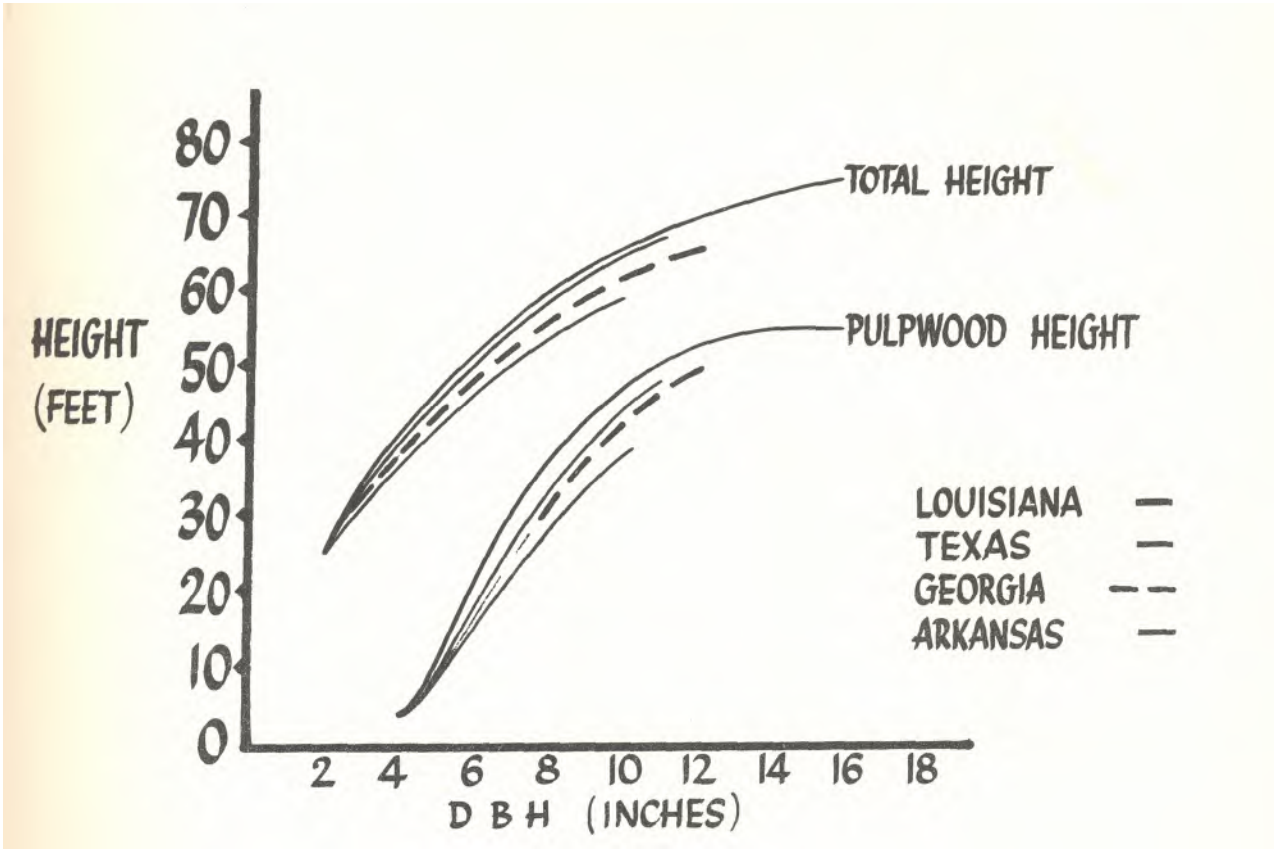

Figure 1.--Total height and pulpwood height, by geographic source of seed. Twenty-eighth year remeasurement. Bogalusa, La.

4. Volume per acre. The volume per acre at the present time is shown in figure 2. Please note the spread in volume per acre from the Louisiana seed source at 32.2 cords to Georgia at 15.3 cords; Texas, 11.3 cords; and Arkansas, 5.7 cords. To this should be added the 1922 thinning per acre which would bring the volume up to 50.7 cords for Louisiana; 23.2 cords for Georgia; 22.6 cords for Texas; and 12.7 cords per acre for the Arkansas seed source. These total production figures in growth per acre to date show that the Louisiana trees have grown 1.81 cords, while the Texas trees have produced 0.81 cords; the Georgia, 0.83 cords; and the Arkansas, 0.45 cords per acre per year for the period since outplanted. From these figures have been deleted the border or outside-row trees, so that this is a conservative presentation of the data. The annual growth spread of 1.36 cords times the average price of pulpwood gives considerable weight to the significance and to the advantages to be gained by seed-source selection.

5. Form class. Figure 3 shows the form class measurements which were taken on this examination. Please note that with two exceptions it has taken trees from other sources longer to reach a given diameter breast high and also that when they have attained this diameter, they are of a lower form class and therefore contain less pulpwood as has been indicated in the averages presented previously.

6. Rust infection. The 28th year remeasurements indicate that on the residual stand, after the 22-year thinning had been made, are present many trees containing fusiform stem cankers. These trees were tabulated to check earlier measurements and are summed up as follows: Louisiana, 2.2%; Texas, 2.1%; Georgia, 25.0%; Arkansas, 22.0% of the trees with stem cankers. In addition to this high susceptability indicated by number of stem cankers it was noted that there was a considerable number of new or relatively new branch cankers on the trees, particularly those from the Georgia and Arkansas source. The contributing effect of these trunk cankers to mortality as well as their susceptability to wind breakage is a further point in favor of proper seed selection.

Summary

This test at Bogalusa laid out by the Southern Forest Experiment Station in cooperation with the Great Southern Lumber Company, although small in size, has made a substantial contribution to our knowledge concerning geographic source of seed. The data presented exclude the outer rows of the sample, thus reducing to a minimum the effect of border trees. In the light of the figures presented and making a generous allowance for the effects of competition by the plantation arrangement, local results emphasize the desirability of the selection of local Louisiana seed for future loblolly plantation stock in our Washington Parish area for maximum production per acre.

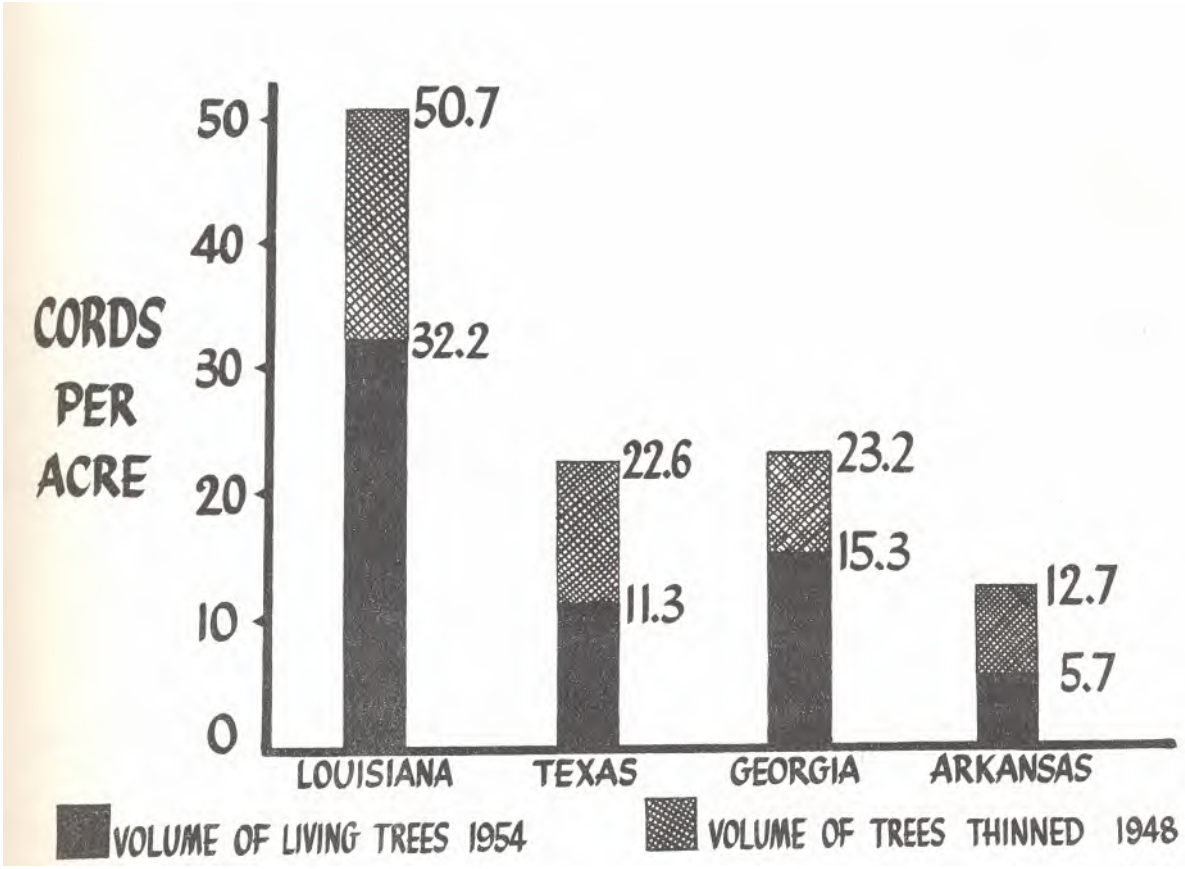

Figure 2.--Total production per acre, by geographic source of seed. Twenty-eighth year remeasurement. Bogalusa, La.

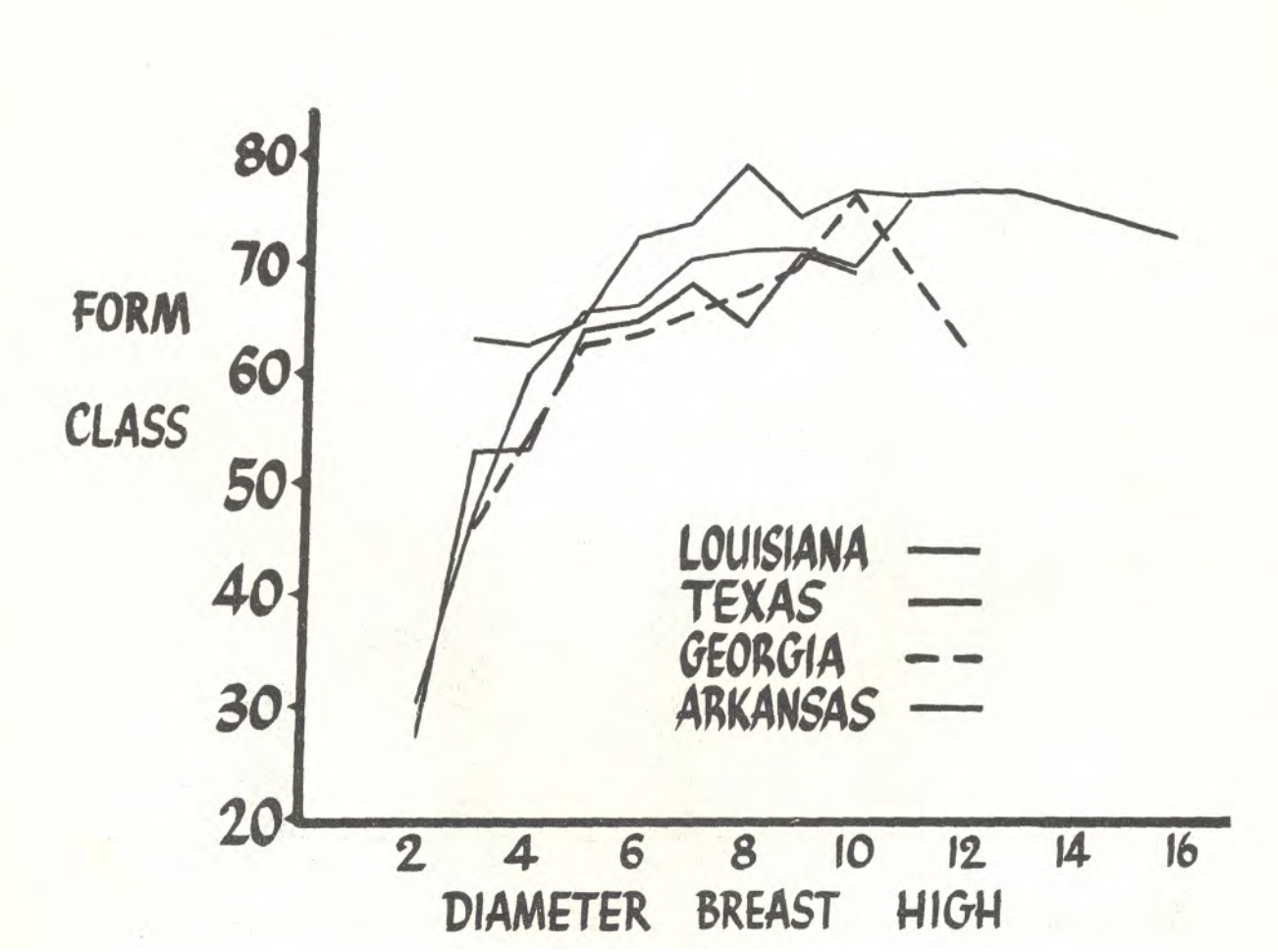

Figure 3.--Form class over d.b.h., by geographic source of seed. Twenty-eighth year remeasurement. Bogalusa, La.