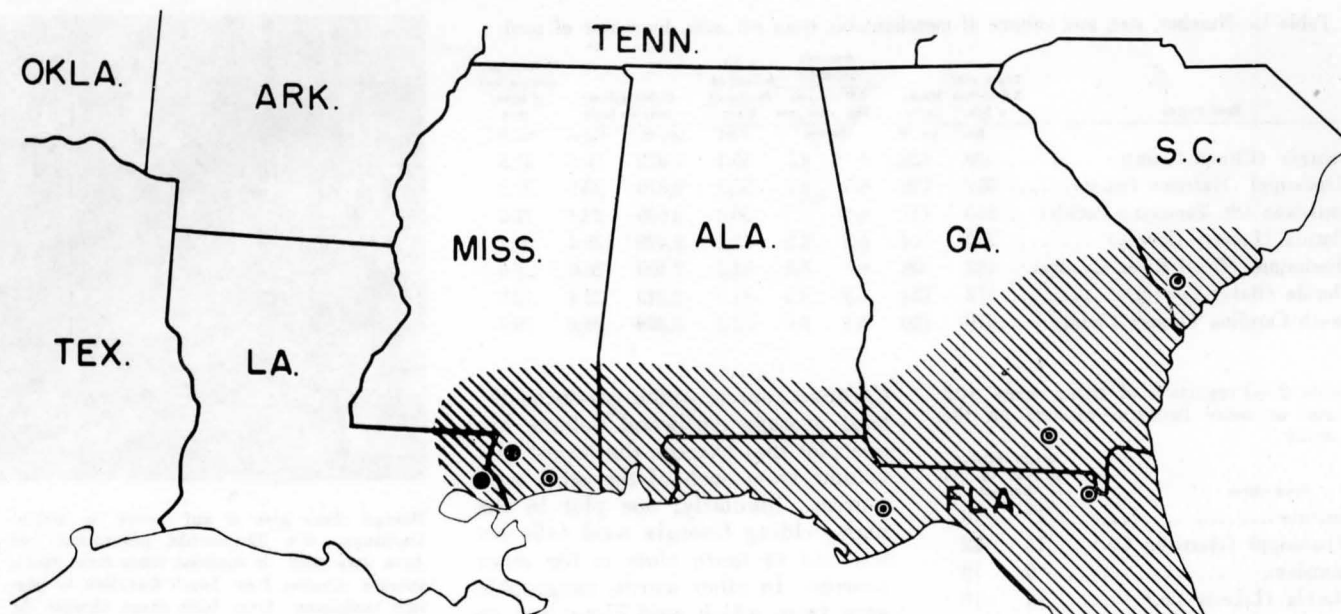




Location of seven geographic seed sources used in the Louisiana test are shown together with the natural range of slash pine.

# Where Should We Get Slash Pine Seed for Louisiana?

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**S**LASH pine, like many of the early settlers, came to central and southwest Louisiana from east of the Mississippi River. It is flourishing in plantations 100 to 200 miles west of its natural range, which extends from South Carolina through the Gulf South to the eastern edge of Louisiana's Florida Parishes. In fact, it does so well that most planting on former longleaf pine land west of the Mississippi River is with this species.

Seed for these plantations came from northeast Florida to Louisiana. Does the place where seed originates affect its survival or growth in Louisiana? This question is timely and important. Huge quantities of slash pine seed are imported into Louisiana each year for use in direct seed-

ing and nurseries, and many of the plantations that were established 25 to 30 years ago are beginning to produce seed in commercial quantity.

Foresters in the 1920's recognized that geographic races of the southern pines may exist. With a planting made at Bogalusa, Louisiana, in 1926-27, P. C. Wakeley demonstrated that geographic seed source is important in the growth and yield of planted loblolly pine. That early experimental planting led to a more comprehensive study which included loblolly, longleaf, shortleaf, and slash pine grown from seed collected at widely dispersed locations within the range of each species. During the winter of 1936-37 plantations were established under Wakeley's supervision in several parts of the South. One was on the Palustris Experimental Forest near Alexandria. This

article discusses the growth and yield of slash pine in that plantation after 22 years.

## The Plantation Today

Despite some early adversities, the plantation is well stocked and appears fairly typical of unthinned slash pine plantations in central Louisiana. It got off to a good start—survival after two years averaged more than 90 per cent. When the trees were six years old, a wildfire scorched most of them but did not kill many. In 1947 and 1951, glaze ice caused some loss of trees, but the damage was not related to seed source.

Seed was collected for this study at the locations shown in Figure 1. Seedlings were grown in the Stuart Nursery and planted on 0.4-acre plots, each containing 400 trees spaced about 6½ feet apart. Three blocks were planted with seedlings

\*Now with International Paper Company, Bainbridge, Georgia.

Table 1.—Number, size, and volume of merchantable trees per acre, by source of seed.

| Seed source                        | Trees over<br>3.6 inches<br>d.b.h. | Basal<br>area | Average<br>diameter |                | Total<br>height of<br>dominant<br>trees | Cubic volume<br>outside bark |      | Volume per<br>square foot<br>of basal<br>area |
|------------------------------------|------------------------------------|---------------|---------------------|----------------|-----------------------------------------|------------------------------|------|-----------------------------------------------|
|                                    |                                    |               | All<br>trees        | 100<br>largest |                                         |                              |      |                                               |
|                                    |                                    |               | No.                 | Sq. ft.        |                                         | Inches                       | Feet |                                               |
| Georgia (Clinch County) .....      | 530                                | 129           | 6.7                 | 8.7            | 55.1                                    | 2,820                        | 30.6 | 21.8                                          |
| Mississippi (Harrison County) .... | 552                                | 126           | 6.5                 | 8.7            | 55.5                                    | 2,810                        | 30.5 | 22.3                                          |
| Louisiana (St. Tammany Parish) ..  | 580                                | 127           | 6.3                 | 8.5            | 56.0                                    | 2,696                        | 29.3 | 21.0                                          |
| Florida (Liberty County) .....     | 520                                | 119           | 6.5                 | 8.5            | 53.1                                    | 2,428                        | 26.4 | 20.4                                          |
| Mississippi (Pearl River County) . | 452                                | 106           | 6.5                 | 8.5            | 54.2                                    | 2,400                        | 26.0 | 22.6                                          |
| Florida (Baker County) .....       | 572                                | 124           | 6.3                 | 8.3            | 51.6                                    | 2,340                        | 25.4 | 18.9                                          |
| South Carolina (Jasper County) ..  | 570                                | 120           | 6.3                 | 8.0            | 53.2                                    | 2,300                        | 25.0 | 19.4                                          |

Table 2.—Proportion of living trees with one or more fusiform cankers on the trunk.

| Seed source                   | Stems infected<br>In 1959 In 1946<br>Percent |      |
|-------------------------------|----------------------------------------------|------|
|                               | 1959                                         | 1946 |
| Georgia .....                 | 17                                           | 18   |
| Mississippi (Harrison Co.) .. | 14                                           | 22   |
| Louisiana .....               | 9                                            | 13   |
| Florida (Liberty Co.) .....   | 13                                           | 19   |
| Mississippi (Pearl River Co.) | 18                                           | 18   |
| Florida (Baker Co.) .....     | 15                                           | 18   |
| South Carolina .....          | 15                                           | 12   |

from each of the seven sources, for a total of 21 plots. The site is open, cutover land on a minor slope, and is fairly uniform from plot to plot. Internal and surface drainage are fairly good, and the site index is about 85 feet at age 50. Numerous large stumps, still visible, indicate that the area once supported a heavy stand of longleaf pine.

In the summer of 1959, density, volume and diameter of the trees, together with frequency of fusiform rust infection, were measured on 1/5-acre samples in the center of each plot. Total height was measured on ten dominant and co-dominant trees selected at random on each plot. In addition, diameter and merchantable height were measured on enough trees to permit calculation of separate ratios of cubic volume to basal area for each seed source. This method was better than using a local volume table that might not be applicable in all sources.

### Growth and Yield

Merchantable wood volume, tree diameter, and other pertinent information are summarized in Table 1.

Although the data suggest that some seed sources may be slightly superior to others, none of the differences are statistically significant. The differences among individual plots within a seed source are at least as great as the differences between seed sources. For example, the South

Carolina source, which produced the least average cordwood volume has one plot that exceeds the lowest plot volume from each of the other seed sources. Similarly, one plot in the high-yielding Georgia seed falls below one or more plots in the other sources. In other words, geographic area from which seed came had no effect on cordwood growth.

Number of trees per acre and average tree size, which are the principal items influencing volume per acre, also were about equal for the seven seed sources. Georgia trees were slightly larger, averaging 6.7 inches d.b.h. The minor differences in diameter were caused mainly by stand density, which ranged from 452 to 580 trees per acre.

Total height of dominant and co-dominant trees did not vary greatly between seed sources. It ranged from 52 feet for trees originating in Baker County, Florida, to 56 feet for those grown from seed collected in south-east Louisiana. On some individual plots heights reached 60 feet; on others, it averaged only 50 feet.

### Fusiform Rust Infection

Much doubt has been expressed about the advisability of planting slash pine in areas where fusiform rust is common. While no practical method for delineating such areas has been developed, the lower Coastal Plain in Louisiana and Mississippi has generally been considered a high hazard area. Evidences for this belief in central Louisiana are scattered plantations of slash pine that have been virtually ruined by the disease. There has been concern, too, that trees grown from seed collected in areas where the disease is not serious may be highly susceptible when planted in Louisiana.

In the Palustris planting, each tree on the fifth-acre sample plots was examined for trunk cankers in 1946 and again in 1959. As Table 2 shows,



Though slash pine is not native to central Louisiana, this 22-year-old plantation has done very well. It contains trees from seven sources ranging from South Carolina to eastern Louisiana. Trees from these sources do not differ significantly in growth or susceptibility to fusiform rust. Here, the trees at right are from South Carolina seed, those on the left from Louisiana.

the percentage of cankered trees did not vary significantly among seed sources.

Trees from a Mississippi source had the highest rate of infection—18 per cent with trunk cankers. Even this is not considered serious for an unthinned stand at 22 years of age. The lowest rate, 9 per cent, was in the Louisiana seed source. There is no geographical significance in these high and low rates, because the seed came from adjacent counties on the boundary of the two states. Except for trees from South Carolina, the proportions of stem infections declined between 1946 and 1959. Evidently, the death of cankered trees exceeded the number of new infections. Cankering high on the tree stem has not been a serious problem in central Louisiana plantations.

### Conclusions

While firm conclusions should not be drawn from a single test, these results support the views of many forest geneticists that no well-defined geographic race of slash pine exists. This has practical significance to owners of plantations in central and southwest Louisiana, where there is no true local seed source. It strongly suggests that seed from native stands in the region of South Carolina to Florida and west to Louisiana, or from plantations established with seed from these sources, may be used with confidence.