

State and Federal Programs for Southern Forest Tree Improvement

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When the first Southern Forest Tree Improvement Conference was held in 1950, state and federal agencies were probably devoting less than 4 professional man-years to tree improvement in the South annually. Then, the only full-time public research project was an effort to breed slash pine at Olustee, Florida, for high gum yield. There were also some Tennessee Valley Authority and Southern Forest Experiment Station studies that required the part-time services of professional people. Things differ today --- federal and state agencies now devote more than 35 professional man-years per year to research and action programs. In addition, these agencies cooperate with each other and with universities and industrial organizations to avoid duplication and do as much as possible with available funds.

RESEARCH PROGRAMS

Most of the 13 Southern states have chosen to support the private and federal research programs within their borders rather than initiate extensive programs of their own. One notable exception is the Texas Forest Service which has one of the oldest tree improvement research projects in the South. Since 1951, its efforts have been directed mainly toward developing loblolly pine that has good form, grows rapidly, has high-quality wood, and is resistant to droughts. Much important information has been learned. Because the Texas Forest Service is a part of the Texas A & M University System, however, the work might be regarded as part of a university program.

A staff officer in the Division of Forestry in Virginia now does full-time applied research into problems related to the Commonwealth's tree improvement program.

The Georgia Forest Research Council does not employ scientists directly, but it finances projects at the University of Georgia, contributes substantially to the work of the Southeastern Forest Experiment Station at Macon, cooperates with the Georgia Forestry Commission, and helps to publish and disseminate important research.

Among federal agencies, TVA and the U. S.

Forest Service have extensive forest research programs. The TVA program has been under way many years and has accomplished much. Within the last 5 years, TVA has centered its attention on hardwoods. Its research is closely integrated with an action program to provide improved trees for the Tennessee Valley. The program includes selection, breeding, and testing of improved forest trees, and the establishment of seed orchards.

The Southern and Southeastern Forest Experiment Stations are responsible for tree improvement research by the Forest Service in the South. The Southeastern Station's oldest continuing project, that at Olustee, Florida, is now developing fast-growing slash pine with high-quality wood as well as high gum yield. Breeding is now in the third generation. At Macon, Georgia, research by the Southeastern Station was begun in 1954 with the support of the Georgia Forest Research Council in cooperation with Georgia Forestry Commission and the Ida Cason Calloway Foundation. Efforts have been concentrated on loblolly and slash pine. At Athens, Georgia, resistance to littleleaf disease is being studied, and sweetgum and sycamore are being improved. Other important Southeastern Station studies are being conducted at Charleston, South Carolina; Blacksburg, Virginia; Asheville, North Carolina; and Cordele, Georgia.

In the Southern Station, the biggest effort is at the Institute of Forest Genetics in Gulfport, Mississippi. A broad range of problems, with both hardwoods and pines is being investigated. The program includes studies of disease resistance, insect resistance, provenance, and the variation and inheritance of many other traits of economic importance in southern timber species. To keep close contacts with theoreticians, one member of the staff of the Institute is in the genetics department of North Carolina State University at Raleigh.

At Stoneville, Mississippi, genetics and breeding studies are underway for cottonwood, sweetgum, and cherrybark oak. Alexandria, Louisiana, is the site of a recently expanded effort to develop long-leaf pines that will grow out of the grass stage

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rapidly; emphasis is on inherent vigor and resistance to brown-spot needle blight. In cooperation with the Georgia-Pacific Corporation, a project at Crossett, Arkansas, is concentrating on loblolly pine tree improvement. Studies of shortleaf pine may begin there soon.

In general, the federal programs are providing basic knowledge about the genetics of forest trees. Improved strains of the important species are being developed for all forest owners. Detailed lists of organizations and research efforts in the South were recently published by Dorman.²

ACTION PROGRAMS

All Southern States have recognized the importance of supplying high-quality seedlings to forest owners. About 73 percent of the seedlings planted in the area come from State nurseries. Figure 1 shows 1966 nursery production by State; the total is 380 million trees.

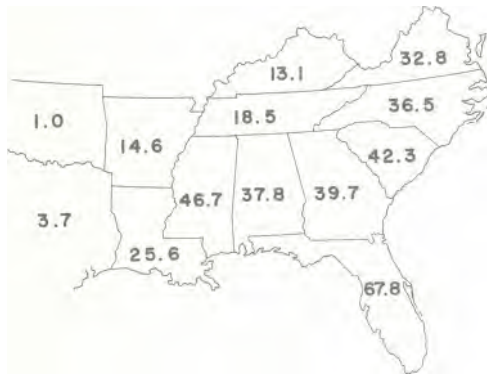


FIGURE 1. Millions of tree seedlings shipped to landowners by State nurseries, 1966. Includes 75% of all seedlings shipped.

To improve the genetic quality of the seedlings raised in nurseries, 12 of the 13 Southern states have established seed orchards. In 10 to 15 years, it is expected that all seeds sown in state nurseries will come from seed orchards. All orchard programs will include some form of progeny testing.

Seed production areas are needed to control genetic quality before the orchards begin producing in quantity, but only a few states have set them up. Kentucky, Louisiana, Texas, and Virginia have a total of 350 acres for loblolly, shortleaf, slash, and white pine seed production. North Carolina is planning to set up an area for Frazer fir. The states with seed production areas and planned and established seed orchards are shown, by species, in Figures 2-5.

²Dorman, K. W., 1966. Forest tree improvement research in the South and Southeast. U. S. Forest Service, Res. Pap. SE-22. 90 pp.

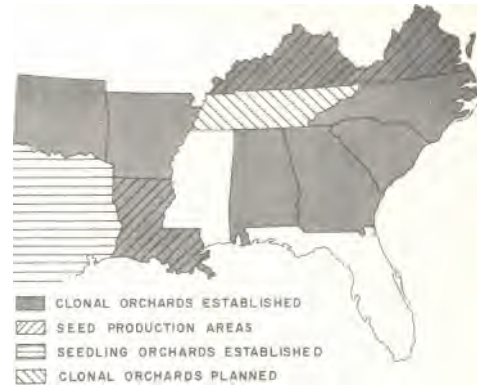


FIGURE 2. State tree improvement programs for loblolly pine.

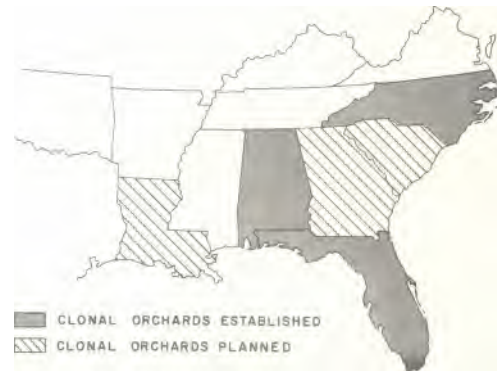


FIGURE 3. State tree improvement programs for longleaf pine.

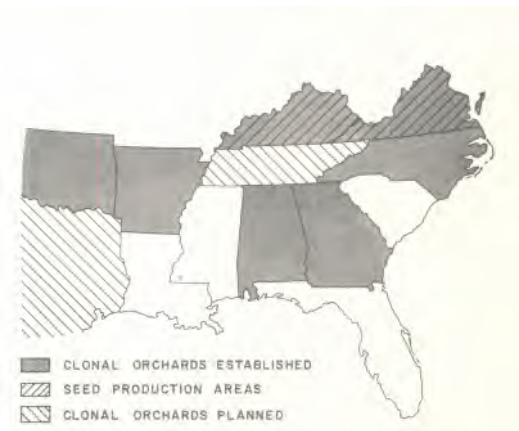


FIGURE 4. State tree improvement programs for shortleaf pine.



FIGURE 5. State tree improvement programs for slash pine.

When present plans are completed, the States will be operating more than 2,550 acres of pine seed orchards (table 1). They report 1,467 acres now established; about 2/3 is slash pine and 1/4 loblolly. Five other species make up the remainder. As expected, longleaf orchards are furthest from completion among major species. Over half of the 1,084 additional acres planned will be devoted to slash and loblolly, though longleaf, shortleaf, and white pines are strongly represented.

Table 1. Clonal pine seed orchards in State programs, April 1, 1967

Species	Established	Additional Planned	Total
	Acres	Acres	Acres
Loblolly	346	395	741
Longleaf	31	136	167
Pitch		5	5
Pond		5	5
Sand	25	45	70
Shortleaf	53	148	201
Slash	948	253	1,201
Virginia	12	18	30
White	52	79	131
Total	1,467	1,084	2,551

State	Established	Additional Planned	Total
Alabama	22	120	142
Arkansas	37	0	37
Florida	576	160	736
Georgia	406	14	420
Kentucky	28	210	238
Louisiana	36	204	240
North Carolina	95	30	125
Oklahoma	13	19	32
South Carolina	95	55	150
Tennessee	0	30	30
Texas	36	7	43
Virginia	123	235	358
Total	1,467	1,084	2,551

Large seedling seed orchards are not planned. Texas has 27 acres of loblolly and Georgia 2 acres of slash pine seedling orchards. North Carolina plans a seedling orchard of Frazer fir, and Texas will expand its loblolly pine orchard.

The development of hardwood seed supplies has lagged far behind that of the pines, primarily because the demand for hardwood seed is small but also because information is needed on the genetics of most hardwoods. The Tennessee Division of Forestry has established 14 acres of yellow-poplar and 6 acres of black walnut clonal orchard for various hardwoods. Several other States are making preliminary plans for hardwood seed production.

TVA has set aside seed production areas for black walnut (20 acres) and white oak (5 acres). Its seed orchards include 82 acres for four species of pine and 39 acres for six species of hardwoods (table 2). Thus, among public agencies TVA and the Tennessee Division of Forestry have all the established hardwood orchards.

TABLE 2-- Tennessee Valley Authority clonal seed orchards

Species	Established	Additional Planned	Total
	Acres	Acres	Acres
Loblolly Pine	28		28
Shortleaf Pine	29		29
Virginia Pine	14		14
White Pine	11		11
Total Pine	82		82
Black cherry	2.8	1.2	4.0
Yellow-poplar	3.3	2.7	6.0
N. red oak	3.0	2.0	5.0
Chestnut oak	1.1	3.9	5.0
White Oak	3.0	2.0	5.0
Black walnut		14.0	14.0
Total Hardwood	13.2	25.8	39.0

Region 8 of the U. S. Forest Service is carrying out the largest single program in the country. The program is designed to supply all the seeds required by the southern National Forests, where most pine sites will eventually be planted or seeded for regeneration. A total of 2,557 acres of seed production areas have been established (table 3). In 1966, a poor seed year, about 2,500 pounds of seed were collected from the few areas that had good cone crops. Problems of insect control and cone harvesting are now being studied. These seed production areas will soon be supplying the needs of the National Forests.

The Region is also establishing five clonal pine seed orchards that will cover a total of 1,228

acres (table 4). They will contain 38 species/source combinations. The plus trees have already been selected in all States but Kentucky, which was added to the Region last year, and completion of establishment now depends on grafting success. At the end of 1966, establishment was considered to be 40 percent complete. Seed orchards are planned for several hardwood species.

Another Federal action program worthy of mention is that of the Southeastern Area, State and

Private Forestry. This Forest Service organization operates the Eastern Tree Seed Laboratory at Macon, Georgia, and advises on matters of tree improvement from its Atlanta office.

As I hope I have shown in this brief presentation, public programs for tree improvement in the South are well under way. Their early completion, with the limited funds available, depends largely upon cooperation such as that stimulated at this meeting.

TABLE 3-- Region 8 pine seed production areas by species and State

State	Loblolly	Longleaf	Shortleaf	Slash	Other	Total
Acres						
Alabama	36	394	--	10		440
Arkansas	10		712			722
Florida		266	--	76		342
Georgia	10		--		15	25
Kentucky	--		--	--		
Louisiana	35	130		85		250
Mississippi	--	234	---	80		314
North Carolina	34	90	20		10	154
South Carolina	60	98	--		--	158
Tennessee	5		5			10
Texas	50	15	--			65
Virginia	--		10		67	77
Total	240	1,227	747	251	92	2,557

TABLE 4-- Acreage in Region 8 seed orchards allocated by species and state

State	Loblolly	Longleaf	Shortleaf	Slash	Other	Total
Acres						
Alabama	73	30		5		108
Arkansas	--		300			300
Florida	--	43	--	71	39	153
Georgia	20		26		28	74
Kentucky	--	--	40			40
Louisiana	52	14	6	5		77
Mississippi	51	34	10	21		116
North Carolina	12	12	18		29	71
South Carolina	39	35				74
Tennessee	--		34		43	77
Texas	64	15	39			118
Virginia	--		20			20
Total	311	183	493	102	139	1,228