

# Reproducing Mixed Hardwoods By A Seed-Tree Cutting In The Carolina Coastal Plain

By DEAN S. DEBELL, O. GORDON LANGDON, and JACK STUBBS

South. Lumberman  
217(2704):121-123  
1968

Growth of mixed hardwood reproduction under the selection system of management in the Southeastern Coastal Plain has been less than satisfactory.<sup>1</sup> How does such reproduction fare under an even-aged system? What practices are necessary to achieve satisfactory reproduction, and how can composition be improved? Although complete answers to these questions have not been obtained, some important leads have been gained from a seed-tree regeneration trial on the Santee Experimental Forest.

## The Study Area

An 85-acre, even-aged stand about 65 years old was selected as the study area. It contained about 8,400 board feet (Scribner rule) per acre of saw-timber (fig. 1), and was

considered typical of many mixed hardwood stands in the coastal plain of South Carolina. Cherry-bark oak, Shumard oak, swamp chestnut oak, sweet gum, yellow poplar, and loblolly pine were the most abundant species.

The soils are classified in the Wadmalaw-Meggett-Santee soil association. About half of the 85 acres cut had been in cultivation until 1890. Rice was grown on silt loam soil in the first bottom, and row crops were grown on sandy loam in

more elevated, second bottom situations. A higher terrace of virgin, loamy coarse sand is found in the center of the area.

## What We Did

### Seed-Tree Selection

Seed trees of preferred species were selected in the fall of 1959. The goal was to select six trees per acre for light-seeded species, or 12 trees for heavy-seeded species, all regularly spaced. A total of 636 seed trees were marked, resulting in an average of 7.4 seed trees per acre totaling some 1,950 board feet.

### Logging and Timber Stand Improvement (TSI) Treatment

The logging was done during the

<sup>1</sup>See "Stand Development After a Selection Cutting in a Hardwood Bottom" on page 126 of this issue.



FIGURE 1.—The mixed bottomland hardwoods stand before cutting to seed trees. The white band (arrow) marks a yellow poplar seed tree.

summer of 1960. A total of 547 M board feet of saw-timber was harvested, leaving 168 M board feet reserved as seed trees. No pulpwood was cut. Freshly cut stumps were sprayed with 2, 4, 5-T in oil to prevent stump sprouts. In late summer after logging was completed, residual woody vegetation—trees, shrubs, and vines—was also treated with 2, 4, 5-T. Larger cull trees were frilled and poisoned, the "Little Tree Injector" was used on poles and saplings, and small stems down to 4.5 feet tall were basal sprayed. This TSI treatment was done thoroughly, at a cost of \$25 per acre. The seed trees were harvested in the winter of 1963-1964.

#### Reproduction Survey

Eighty-five randomly located points served as hubs of concentric circular plots varying from one mil-acre to 1/10 acre in size (plot area varied with size class of reproduction being tallied). Surveys were made immediately after logging (fall 1960), after one growing season under seed trees (early spring 1962), and after six growing seasons (fall 1966). Each stem was tallied by species, size class, and competitive status (free-to-grow or overtopped). In 1963 a tag was placed on the best stem in each of 85 milacres to observe its growth and development.

#### Regeneration

##### Advance Reproduction

The survey immediately after logging indicated that 76 per cent of the milacres were stocked with desirable hardwoods, one per cent had pine, and the remainder supported

Table 1.—Composition and size of reproduction at one and six growing seasons after a seed-tree cut in a mixed hardwood stand

Species	After 1 growing season		After 6 growing seasons	
	All reproduction	Large reproduction <sup>1</sup>	All reproduction	Large reproduction <sup>1</sup>
(Number of stems)				
Sweet gum	520	110	640	280
Yellow poplar	770	60	440	220
Red oaks	680	—	850	140
Red maple	160	30	400	120
Ash	390	80	340	110
Swamp chestnut and white oaks	20	—	40	20
Sub-total desirable hardwoods	2540	280	2710	890
Less-desirable hardwoods <sup>2</sup>	270	60	1730	640
Loblolly pine	120	10	220	100
All species	2930	350	4660	1630

<sup>1</sup>Reproduction that was more than 4.5 feet tall and free-to-grow.

<sup>2</sup>Includes hickories, elms, beech, black gum, water and willow oaks, mulberry, and sugar-berry.

less desirable hardwoods. Among desirable hardwoods, cherry-bark and Shumard oaks were the predominant species on more than 28 per cent of the plots, red maple on 14 per cent, yellow poplar on 14 per cent, ash on 12 per cent, and sweet gum on eight per cent. The larger (4.5 feet and taller) advance reproduction was basal sprayed in the TSI operation.

##### Reproduction After One and Six Growing Seasons

An abundance (2930 trees per acre) of reproduction was established after the first growing season (table 1). Nearly 90 per cent was composed of desirable hardwoods. Five years later stocking had increased to 4660 trees per acre, but most of the increase was less-desirable hardwoods. However, in

both total and large reproduction categories, desirable hardwoods still accounted for the greater proportion of stems.

Of the total stems (4660 per acre) present at six years, red oaks (cherry-bark and Shumard) were the most abundant, followed by sweet gum, yellow poplar, red maple, and ash. Perhaps more important than numbers in stand development is composition of the large reproduction, which totaled 1630 stems per acre. Desirable hardwoods accounted for 890, less desirable hardwoods for 640, and loblolly pine for 100 stems per acre. Most abundant of the desirables were sweet gum and yellow poplar, which made up 30 per cent of this large regeneration. Red oaks, which were most abundant, had the lowest proportion of their stems in large reproduction. Less-desirable hardwoods retained their relative abundance in the larger sizes, accounting for about 39 per cent of the stand.

##### Best Stems per Milacre

Of all stems tagged in 1963 as the best stem per milacre, 79 per cent remained free-to-grow in 1966. Evidently, the best trees to favor in early cleanings can be identified as early as two years after a regeneration cut. Height growth measurements of these stems in 1966 revealed that yellow poplar grew almost 2.5 feet, loblolly pine 2 feet, and gums and oaks only 1.2 feet annually since 1963.

##### Discussion

The regeneration cutting was extremely successful in improving quality and quantity of resulting reproduction (fig. 2). Not only are sufficient numbers of desirable

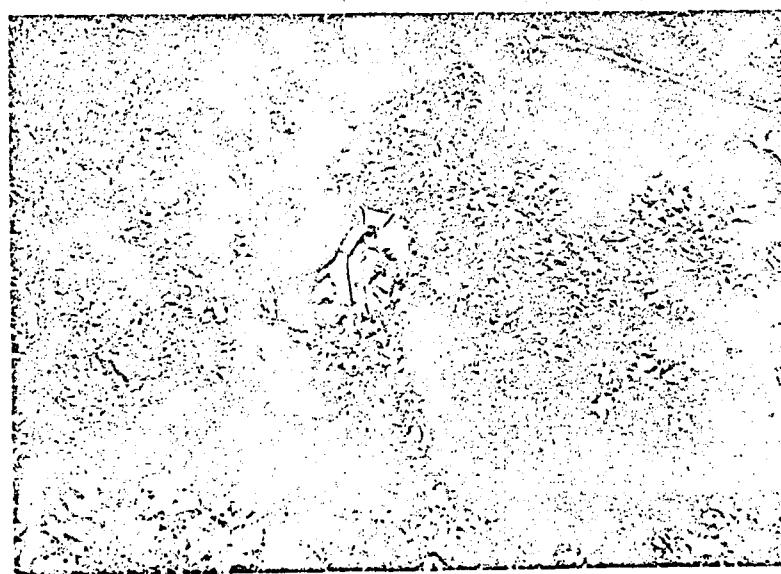


FIGURE 2.—Cherry-bark oak, sweetgum, and yellow poplar reproduction in July of the third growing season.

species present, they are growing rapidly into larger size classes.

How great was the role of seed trees in this regeneration success? We had no control by which to evaluate the contribution of seed trees, but there is considerable evidence that seed on the ground at harvest, advance reproduction, and root sprouts probably accounted for most of the reproduction. This may not be an uncommon occurrence in the bottom-land mixed forest. In another study, a nearby similar stand of mixed hardwoods was clear-cut and planted with several hardwood species and loblolly pine. A survey of this site 11 years later revealed that volunteer woody vegetation amounted to some 5400 stems per acre.<sup>3</sup>

No losses were incurred by leaving seed trees, which with pre-harvest stand manipulation offer possibilities for controlling stand composition. A seed-tree or shelter-wood cut may be particularly useful where we want to favor heavy-seeded species, such as oaks.

The poisoning of stumps and residual vegetation after logging was undoubtedly a big factor in resulting composition and growth of the new stand. The establishment of desirable species and their subsequent rapid growth and development were aided by this clean-up which knocked back undesirable competition. In addition to affecting immediate reproduction, such measures at time of regeneration influence the need for and timing of young-stand management practices, such as cleanings or release cuttings. Although our work was done after logging, the forest owner may find pre-harvest TSI operations more profitable. Stumps must be sprayed after logging, but forest workers should be able to kill undesirable vegetation more efficiently before slash and tops litter the ground. Doing such work a year or two in advance of cutting offers a good chance to control composition, and reducing the under-story may result in higher stumpage rates because logging operations will be easier.

In conclusion, we believe that even-aged silviculture is a sound method for regenerating and managing the bottom-land mixed hardwood forest. Regeneration success,

coupled with savings by being able to concentrate harvesting or cultural operations on given cutting compartments, should make such a system attractive to owners of hardwood forests. Furthermore, timber

stand improvement is extremely important in preparing the site for establishment and early growth of new seedlings. Doing such work before harvest offers great possibilities for controlling the future stand.

## SLMA — Six Years Of Service

By JOHN C. MILLINER, JR.

Organized in 1962, the Southeastern Lumber Manufacturers Association is an Atlanta-based association of 88 lumber manufacturers located in the states of Alabama, Florida, Georgia, North Carolina and South Carolina. The association is governed by its officers and a ten-member executive committee, elected by the general membership. Seven standing committees, whose members are appointed each year by the incoming president, are given the responsibility of determining and formulating ways and means of alleviating industry problems through the strength of the entire membership. Problems and questions of a controversial nature are voted on by the entire membership so that a consensus of opinion may be obtained, from which the Association may truly represent the majority of its members.

### Activities And Accomplishments

Listed below are a number of SLMA's activities and accomplishments since its formation in 1962:

Active in defeat of Jones Act Amendment. Passage would have allowed West Coast mills to substantially reduce their transportation costs through the use of foreign flag ships.

Responsible for persuading Southern railroads to effect substantially reduced incentive rates on lumber within the South.

Opposed Canadian lumber imports. SLMA members attended Congressional meetings and hearings in Washington, Columbia and Atlanta combatting Canadian competition.

At the request of SLMA, U. S. Senate Commerce Committee scheduled hearings at Columbia, S. C.; Atlanta, Ga.; and Shreveport, La., to hear problems of lumber industry to

determine what, if any, Congressional action could be taken. SLMA presented statements at Columbia and Atlanta. Lumber manufacturers, many of whom were SLMA members appeared before that committee.

Revise and publish annually a buyer's manual listing the name and address of member mills, their production, species cut, mill equipment and items manufactured. Mailed to 4,000 buyers of lumber throughout the East, Midwest and South. Also, the staff personally distributes the manuals to many wholesale and retail lumber firms.

Printed and distributed a 16-page promotional booklet with regard to the quality, characteristics and uses of Southern yellow pine lumber.

Full-page advertisements placed periodically in technical journals telling of quality, characteristics and uses of Southern pine lumber.

At SLMA's request and through joint efforts of this association and the Southern Freight Association, an incentive scale of reduced rail rates was placed into effect throughout the Official Territory in July 1964.

Responsible for Southern railroads granting 1,000 lbs. dunnage rule applicable on incentive scale of reduced rail rates on lumber.

Sponsor tours of outstanding sawmills in the Southeast.

SLMA periodically sponsors seminars of particular interest to member manufacturers.

SLMA has, on several occasions, explored possibilities of establishing sawmilling courses in state-supported vocational training schools. A continuing interest in such a program is maintained by the association.

Published and distributed to members for their use cartoon-statements relating the economic importance of Southern lumber as

<sup>3</sup>DeBell, D. S., and O. G. Langdon. Look at an 11-Year-Old Hardwood Plantation. *Southern Lumberman* 215 (2680):156-158. 1967.