Forest Research Notes

NE

FOREST SERVICE, U.S. DEPT. OF AGRICULTURE, 102 MOTORS AVENUE, UPPER DARBY, PA.

No. 95
1960

THINNING SWEETGUM STANDS IN SOUTHERN NEW JERSEY

In the past 40 years, many poorly drained fields and pastures in southern New Jersey have been abandoned; and on some of them even-aged stands of sweetgum have developed. These stands seem to lend themselves well to management because (1) they are accessible, (2) sweetgum is an economically desirable species, and (3) the individual stems are well formed, with good lengths clear of branches.

But just how fast do these sweetgum stands grow? Are there any indications that thinnings would stimulate their growth or improve their quality?

Partial answers to these questions are now available from three plots of about 0.1 acre each that the New Jersey Department of Conservation and Economic Development established in one stand in 1928. The stand then was about 11 years old. At that time one of the plots was given a low thinning; the other two plots, which have had no treatment, provide growth data on the unthinned stand. The three plots were remeasured in 1958 when the stand was 41 years old.

The Site

The soil is very poorly drained, even though the site had been ditched earlier and the drainage somewhat improved when the land was under cultivation. From measured tree heights, Trenk's tables (3) indicate a site index at 50 years of about 85 feet.

Results

The unthinned stand had made good growth: despite losses from natural mortality, growth had averaged more than a cord per acre annually, and the stand at 41 years of age

Table 1.--Development of a pure even-aged sweetgum stand without thinning

Stand age (years)	Stems per acre		Average diameter*		Basal area per acre		Merchantable volume per acre**	
	Total stand	Crop trees	Total stand	Crop trees	Total stand	Crop trees	Total stand	Crop trees
	No.	No.	In.	In.	Square feet	Square feet	Cubic feet	Cubic feet
11	1764	100	3.0	4.7	85	12	124	62
21	1121	100	5.1	8.0	160	35	1915	643
26	994	100	6.0	9.3	195	47	3189	1088
31	734	100	6.9	9.9	187	54	3836	1474
36	610	100	7.5	10.3	188	58	4632	1793
41	502	100	8.2	10.9	181	65	4896	2137

*Of stems larger than 1.6 inches.

**To a top diameter (o.b.) of 4.0 inches.

contained 4,896 cubic feet of merchantable volume per acre (table 1).

However, the growth rate had declined markedly with increasing age, particularly during the last 15 years. Growth between 21 and 26 years was 1,274 cubic feet, but in the last 5 years it was only 264 cubic feet (table 1).

Growth of crop trees--i.e., the 100 largest trees per acre--had declined less spectacularly. However, their fastest growth also was made prior to 26 years, when they grew 1.3 to 1.6 inches in diameter, or about 12 square feet in basal area per 5-year period. In each subsequent 5-year period, their growth was only about 0.5 inch in diameter and 6 square feet in basal area.

Growth on the plot thinned when the stand was 11 years old has not differed appreciably from that on the untreated plots. Since the thinning removed 49 percent of the stems, mortality was reduced and stand growth was increased for a few years (1). However, over the 30-year period the low thinning has had a negligible effect on crop-tree growth.

Discussion

In the 41-year old sweetgum stand studied, growth without benefit of any management has been relatively fast, producing a total merchantable volume of 4,896 cubic feet per acre. In contrast, 40-year oak stands on 80-foot sites contain only 2,610 cubic feet (2).

With their high growth potential, sweetgum stands such as these theoretically should respond well to thinning. However, the thinning made at 11 years on one plot of this stand evidently was done too early to exert much lasting effect. When, then, should the first thinning be made?

White (4) recommends that thinning should be started in Louisiana sweetgum stands at 15 to 20 years of age. In the present case, data from the unthinned plots (table 1) show that the diameter growth rate of the crop trees began to fall off most markedly after about age 25. This would imply that thinning in this stand could have been delayed, without appreciable sacrifice of growth, until age 20 to 25, or about 5 years later than White recommended for Louisiana.

Conclusions regarding New Jersey stands in general cannot be drawn from observations on one stand, of course. However, since local growth rates probably are somewhat lower than those in Louisiana, New Jersey stands could be expected to go a few years longer to the first thinning; and the inference from our growth data that the first thinning be done at 20 to 25 years is reasonable in the light of White's recommendation.

The above remarks are oriented to silvicultural considerations; whether or not thinnings at 25 years would pay their way will not be dealt with here, except to point out that the answer would vary with local market conditions for such products as pulpwood and treated fence posts. Where the thinnings cannot be sold or used, non-commercial thinning by use of herbicides might merit consideration.

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