Forest Research Notes

NE

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

No. 92
1959

# HARDWOODS ON POORLY DRAINED SITES DO NOT RESPOND TO LOW THINNING

Little is known about the effects of thinning upon hardwoods in southern New Jersey. To supply some of this needed information, State foresters have established several thinning studies. This research note reports the results of two of these studies, both located in stands of the pin oak-sweetgum type. One study was in Salem County, the other in Cumberland County.

## The Study

In 1946, when these studies were started, the two stands had some common characteristics. They were composed primarily of several oak species, sweetgum, and red maple; but most of the dominant trees were oaks. The Cumberland County stand was 45 years old, the Salem County stand 47 years old.

Two $\frac{1}{4}$-acre plots were established in each stand. Both of the Salem plots were located on Elkton loams and had a site index of 65. The thinned Cumberland plot had chiefly a Showell loam soil and a site index of 55; the control plot had chiefly a Fallsington loam soil and a site index of 50.[1]

Prior to thinning, plots in the Salem stand were similar. However, those in the Cumberland stand differed appreciably, as shown by the following per-acre values:

| Plot | Stems | Average diameter | Basal area | Merchantable volume |
|---|---|---|---|---|
| | (No.) | (Inches) | (Sq.ft.) | (Cu.ft.) |
| Salem: | | | | |
| Thinned | 672 | 5.3 | 103 | 2,288 |
| Unthinned | 548 | 5.4 | 87 | 1,850 |
| Cumberland: | | | | |
| Thinned | 820 | 4.9 | 107 | 1,781 |
| Unthinned | 1,204 | 3.8 | 97 | 1,137 |

[1]Schnur, G.L. Yield, stand, and volume tables for even-aged upland oak forests. U.S. Dept. Agr. Tech. Bul. 560. 88 pp. 1937.

In 1946 one of the paired plots in each stand received a low thinning. This removed 62 percent of the stems and 30 percent of the basal area in the Salem stand, and 42 percent of the stems and 28 percent of the basal area in the Cumberland stand. In both areas, red oaks, white oaks, and sweetgum were favored, thus increasing the proportions of these species in the thinned plots.

## Results

During the 10 years that followed, the thinnings had relatively little consistent effect upon stand growth, either in diameter, basal area, or cubic-foot volume (table 1). Although the thinned Cumberland plot showed greater volume growth than the control, its increment formed a smaller percentage of the 1946 post-thinning volume than that of the unthinned plot. The growth percent on the thinned Salem plot was also less than that of the control.

Since hardwood buyers in New Jersey are, at present, interested chiefly in sawtimber, the effect of thinning on future sawtimber trees was considered. The 25 largest de-

Table 1.--Ten-year growth of all trees and of crop trees following thinning

| Plot | Increment in: | | | | | |
|---|---|---|---|---|---|---|
| | Average diameter | | Basal area per acre | | Merchantable volume per acre[1] | |
| | All trees | Crop trees | All trees | Crop trees | All trees | Crop trees |
| | Inches | Inches | Sq.ft. | Sq.ft. | Cu.ft. | Cu.ft. |
| Salem | | | | | | |
| Thinned | 0.9 | 1.3 | 14 | 14 | 570 | 499 |
| Unthinned | 0.8 | 1.6 | 22 | 19 | 875 | 693 |
| Cumberland | | | | | | |
| Thinned | 0.6 | 1.6 | 26 | 16 | 691 | 479 |
| Unthinned | 0.9 | 1.4 | 13 | 13 | 628 | 371 |

[1]To a top diameter of 4 inches d.o.b.

sirable trees per plot were selected as crop trees and their growth was computed (table 1). These computations indicated that low thinning did not consistently stimulate the 10-year diameter, basal area, or volume growth of the crop trees. In fact, in both stands, the growth percent of crop trees in the thinned plot was less than that in the unthinned plot.

While some thinnings generally have little influence on total stand growth, they do have a highly important effect in redistributing growth, in reducing the volume in low-value species, and in increasing the volume of desir-

able species. In these studies no such changes occurred, probably because desirable species dominated the stands before treatment. Then too, differences between plots of each pair in site, stocking, and diameter distribution could have masked, in part, real differences in response to thinning. Since a low thinning was employed, it is also doubtful whether the quality of crop trees on the thinned plots was greatly improved.

## Conclusions

Low thinnings made in 45- and 47-year-old hardwoods on moderately productive, poorly drained sites in southern New Jersey did not increase the 10-year growth of either the entire stand or of selected crop trees. Where desirable stems were already dominant, low thinnings did not improve stand composition.

--H. B. TEPPER

Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

and G. T. BAMFORD

Forest Management Section, N. J.
Dept. of Conservation and Economic Development

AGRICULTURE-FOREST SERVICE-UPPER DARBY