SOUTHERN FOREST EXPERIMENT STATION

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EPICORMIC BRANCHING IN NORTH LOUISIANA DELTA

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SOUTHERN FOREST EXPERIMENT STATION

In a nine-county area, epicormic branches were found on the second log of 72 percent of the saw-log size hardwoods. Branching was most frequent in stands with basal areas below 75 square feet per acre; for the most common species it was inversely related to the product of tree d.b.h. and stand basal area.

In a 1963 survey of a nine-county area in northeast Louisiana, epicormic branches were found on more than 70 percent of the saw-timber-size hardwoods sampled.

Epicormic branching often follows disturbances, such as thinning or top breakage, which stimulate the sprouting of dormant buds on the boles. The branches may add to the growth capacity of a tree, but they also create knots that reduce lumber value.

The effects of epicormic branching have been studied in localized stands, but the extent to which the hardwood resource over extensive areas is affected by this source of degrade is unknown. Therefore, in conjunction with a forest survey of the north Louisiana Delta, plots were taken at intersections of a 3-mile grid covering approximately 1.7 million acres of bottom-land forest—mostly second-growth stands of sweetgum, overcup oak, water hickory, water oaks, and elms.

The sample consisted of hardwood trees 11 inches d.b.h. and larger with a minimum scaling diameter of 8 inches at 32 feet. On each plot, such trees were selected with an angle gauge having a basal area factor of 37.5. Epicormic branches were counted on the second 16-foot log, and the log was then graded twice, with epicormic branching a defect and not a defect. Grading was by rules of the U. S. Forest Products Laboratory *(1)*,[1] except that logs were not degraded if they were undersize. Logs culled for reasons other than epicormic branching were excluded from the analysis.

The second log was used because of the greater frequency and persistence of epicormic branches in upper logs. Moreover, depending upon its severity, epicormic branching often limits merchantable length.

Of the 760 study logs of all species, 72 percent had epicormic branches (fig. 1). These 544 logs averaged 8.7 branches, a number often sufficient to cause degrade. Of the branch-free logs, approximately two-thirds occurred in stands where the basal area of trees 5 inches d.b.h. and larger exceeded 75 square feet.

[1] Italic numbers in parentheses refer to Literature Cited, p. 3.

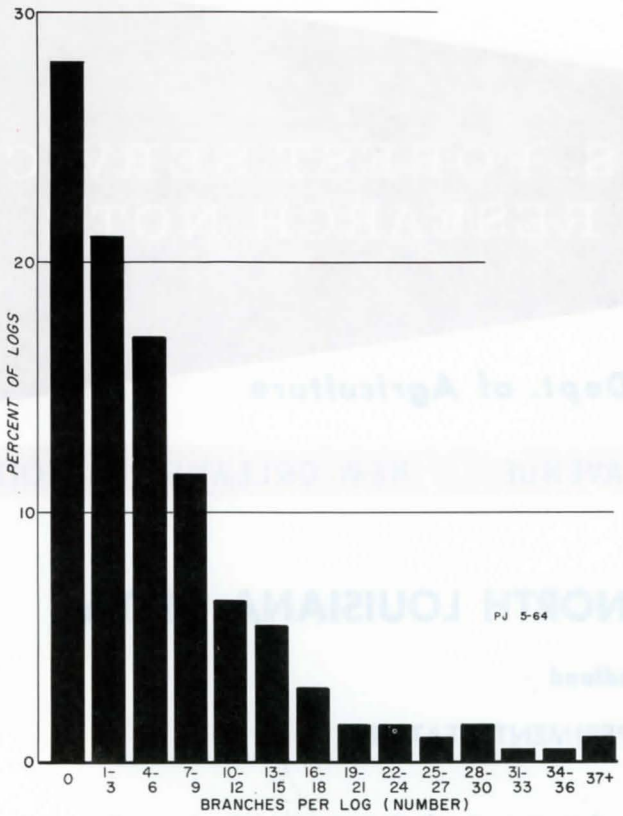

FIGURE 1.—*Distribution of 4,729 epicormic branches on 760 study logs.*

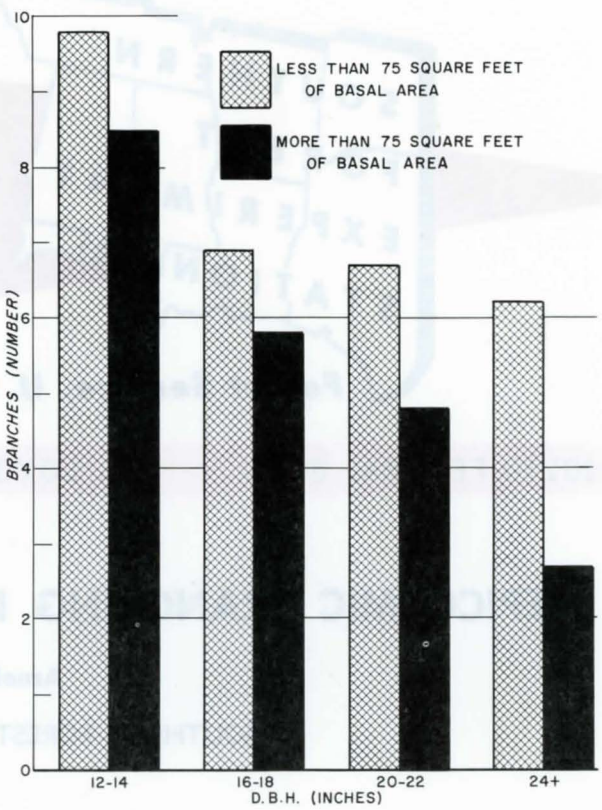

FIGURE 2.—*Average number of epicormic branches on the second log of 760 study trees, by d.b.h. and basal area per acre.*

The number of branches per log was significantly (0.05 level) greater in stands with less than 75 square feet of basal area than in well-stocked stands. An earlier study *(2)* reported that branching on sycamore was serious only at basal areas below 80 square feet.

Correlation between number of epicormic branches and d.b.h. was not significant. In stands of 75 square feet of basal area per acre and upwards, however, a definite trend was discernible—branching decreased as tree diameter increased (fig. 2). For example, in well-stocked stands, 12-inch trees averaged 5.5 more epicormic branches than 24-inch trees. Below 75 square feet of basal area, the difference between d.b.h. groupings was not so apparent.

The five most common species or species groups were selected for special analysis. These were water hickory *(Carya aquatica* (Michx. f.) Nutt.), sweetgum *(Liquidambar styraciflua* L.), overcup oak *(Quercus lyrata* Walt.), water oaks *(Quercus nuttallii* Palmer, *Q. nigra* L., *Q. phellos* L.), and elms *(Ulmus americana* L., *U. crassifolia* Nutt., *U. rubra* Muhl.). Regression analysis showed that the product of d.b.h. and basal area was inversely related to the number of epicormic branches for these species.

Covariance analysis with orthogonal polynomials indicated that the d.b.h.-basal area relationships were similar for all groups except water hickory. The latter was less heavily branched.

Log grades were greatly lowered by epicormic branching. Such branching caused degrade in almost 40 percent of the sample, with 23 percent of the logs lowered by two or more grades.

The effect on grade is shown in figure 3. With branching not a defect, the factory grade logs (grades 1, 2, 3) increased from 60 to 86 percent of the total number; cull logs and tie-and-timber grade logs (grade 4) decreased from 40 to 14 percent. In approximately one-third of the branched logs, grade was unaffected.

Because the history of the stands is unknown, the relationships developed in this

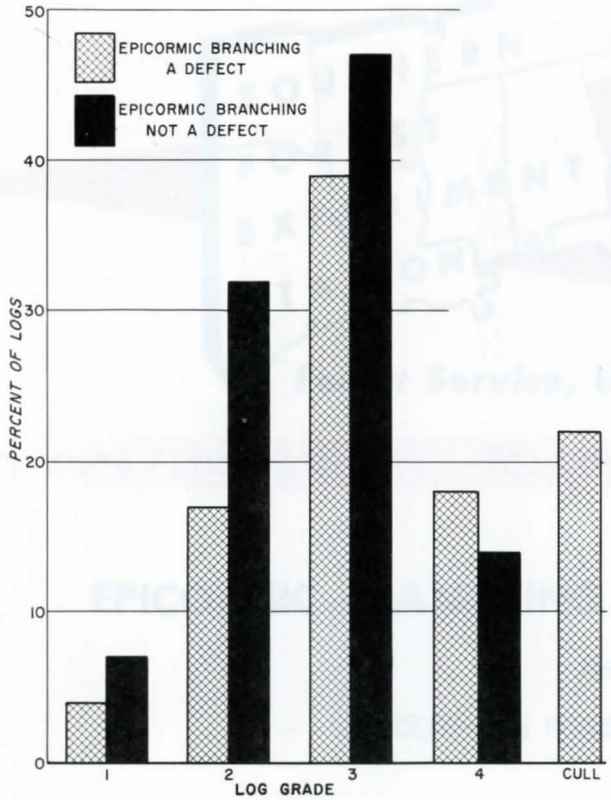

FIGURE 3.—*Effects of branching on grade distribution.*

study cannot reliably be used to predict how much branching will occur when hardwood stands are partially cut. But it seems evident from the results, and from earlier work in the Appalachians *(3)*, that plots established under controlled conditions would yield prediction equations of value to forest managers.

LITERATURE CITED

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1961. Hardwood log grades for standard lumber and how to apply them. U. S. Forest Serv. Forest Prod. Lab. Rpt. D1737-A, 16 pp., illus.

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