

# Reproducing Southern Hardwoods Is Easier Than You Think

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Throughout the South poor upland hardwood stands are being converted to pine, while bottom-land hardwood stands are largely ignored. Why are Southern foresters pre-occupied with pines? Uncertainties about hardwood markets and gaps in available information about hardwood management are contributing causes, but fear is probably a key factor. Foresters much prefer the well-established and familiar procedures of pine management to the unfamiliar steps in mixed hardwood management. They fear the task of learning silvical characteristics of a large number of species with which they have never dealt. They fear the need to re-train technicians and crews. They fear all the new problems that hardwood management would entail.

For anyone that can turn a profit from upland type conversion, these fears are unjustified. If there is a large number of bottom-land hardwood species in the South, there is also a considerable margin for error in their management. Reproduction, the most difficult step in a timber rotation, is often easier in hardwood than in pine stands. Techniques for reproducing good hardwood stands have been developed at the Southern Hardwoods Laboratory and elsewhere. While they can and will be improved, these techniques are workable now, and their application could do much to halt the decline in

quality and quantity of hardwood growing stock in the South.

## Grim History—Brighter Future?

For years, hardwood stands have been high-graded and then left alone until another harvest was feasible. Results were predictable, and one does not have to travel far to see them. The typical hardwood stand is dominated by cull trees and by the generally undesirable species that were able to develop in the shade of culls. These stands are occupying valuable, often highly fertile lands and are producing little of value. They should be replaced by vigorous young stands, but most foresters doubt their ability to establish the new stands.

These doubts may have been justified when only a few hardwood species were marketable, but they should be re-examined in the light of changing market conditions. Some pulp companies still demand one or two species of hardwoods, but most will accept the majority of hardwoods available. Timber companies prefer some species, but saw-logs of

most species are marketable. Furthermore, most companies concede that current preferences could change over the next 10 to 20 years. Bitter pecan saw-timber, for example, was once deadened for lack of markets, but today bitter pecan saw-logs are highly salable.

If a forest manager can sell a variety of species, he can usually rely upon natural regeneration in his stands. Sprouts from cut trees and seedlings established in the under-story before the harvest cut will usually produce enough trees of commercial species to make a new stand after a clear-cut. In addition, in Southern stream bottoms and loess areas, it is often possible to obtain fine stands in openings via natural seeding.

The primary requirement for obtaining a satisfactory new stand is a true clear-cut. Unmerchantable stems must be cut or deadened. If large numbers of culls or trees that will never reach saw-timber size are left, they will dominate the new stand and prevent desirable trees from developing. Failure also results



FIGURE 1.—Sweet gum reproduction originating as root sprouts from harvested sawtimber-sized trees. Dominants are about 35 feet tall and four inches d.b.h. after 15 years.

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from making openings that are too small for sufficient light to reach the ground. In general, clear-cuttings should cover at least one-half acre.

### Surveys

The first step in planning for regeneration of hardwood stands is to survey under-story plants, seed-bed conditions, and density and composition of the over-story. Ideally, there should be two surveys, one about one or two years before and one just before the stand is treated. The first will provide information needed to decide whether treatment is necessary and justified, and the second will reveal any need for last-minute changes in plans that have been made.

Under-story trees (advanced reproduction) should be inventoried, because they often will form the bulk of the new stand. The presence of sufficient quantities of desirable under-story trees is particularly important in stands that are currently dominated by sub-commercial species. Seedlings of many species, particularly oaks, sugarberry, elm, and ash, are stored for a few to many years in the under-story. When the mature trees are removed and light reaches the ground, these seedlings grow rapidly and become dominant. Southern oak seedlings, however, do not grow as rapidly as the sprouts of cut trees after a clear-cutting. Additional release is sometimes necessary to develop a new oak stand.

The forester who hopes to manage his hardwoods must learn to identify their seedlings with and without leaves. A Southern Forest Experiment Station Research Paper, "Identifying Juvenile Seedlings in Southern Hardwood Forests," by L. C. Maisenhelder, should help. It is available on request at 701 Loyola Avenue, New Orleans, Louisiana 70113.

Vines are particularly damaging to small trees, and their presence in the

under-story should be noted. In open stands, vines can be seen readily, but where the over-story is dense they are small and more difficult to find and identify.

If natural seeding is hoped for after the clear-cut, a bare, mineral soil is best. Where the over-story is not dense, many herbaceous plants, including grasses and vines, may cover the soil surface. These plants will practically negate the chance of establishing a new hardwood stand from natural seeding. In such cases, one must rely wholly on advanced reproduction and sprouting from the stumps and roots of cut trees.

Presence in the over-story of species that reproduce primarily from seed, such as yellow poplar and American sycamore, should be noted, since the proportion of these species can often be increased in the new stand. Where such species are absent from the over-story, it is unlikely that they will appear in the new stand.

Gum, ash, maple, hickory, and basswood sprout prolifically. American beech, the oaks, and many other species will sprout occasionally (Figure 1). Important sprouters among sub-commercial species are American hornbeam, eastern hop-hornbeam, box-elder, and flowering dogwood. If any of these species are in the over-story, they can be counted upon to be part of the next stand.

### Timing Of Treatment

The over-story should be cut in November through February to favor yellow poplar, sweet gum, and American sycamore reproduction. During that period the current year's seed crop is mature and is either on the ground or will be scattered over the ground when the trees are dropped. Reproduction from seed must be established during the first year after cutting. Competing vegetation will appear during the first

year and greatly reduce the chances of establishing seedlings thereafter. Timing of harvest does not appear to be critical for advanced reproduction or for sprouting from roots and stumps of cut trees. For most species, stumps should be cut as low as possible to assure that originating sprouts are not affected by heart rot from the decaying stumps.

Periodically, thousands of seedlings per acre of elm, sugarberry, ash, hickory, and occasionally oak may appear in the under-story. Usually the vast majority will die in a year or two. By timing over-story removal to take advantage of unusually good seed crops, good new stands, particularly of oaks, can be obtained.

### The New Stand

Thousand of young trees per acre will normally appear after a Southern hardwood stand is clear-cut. In fact, over-story removal should not be contemplated unless from several thousand to ten thousand new stems are anticipated. This heavy stocking reduces early growth, but is necessary, particularly if many vines are present. Where vines are plentiful, the new stand will not develop quickly into saplings and poles unless at least 10,000 trees were present initially.

A typical well-stocked stand of seedlings and seedling sprouts of mixed species is likely to be 20 to 30 feet tall and have trees two inches d.b.h. at age 10. Root and stump sprouts will probably grow about 10 feet taller and about one more inch in diameter over the same period. A seedling stand of yellow poplar or sycamore on loess should be 30 to 40 feet tall and about three to four inches d.b.h. in 10 years.

Those foresters willing to try will find that it usually is not difficult to establish good new hardwood stands on Southern stream bottoms and loess. And if some of the over-story trees are merchantable, the cost may be very low.

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