

32. THE TREE IMPROVEMENT PROGRAM OF THE MISSISSIPPI  
FORESTRY COMMISSION

Hoy C. Grigsby  
Mississippi Forestry Commission, Jackson, Mississippi

In 1952 the attention of the Mississippi Forestry Commission was focused on the widespread deterioration of the forest stands of the state through dysgenic cutting practices. Encouraged by an occasional report on work underway in forest genetics, the Commission made a decision to check into the possibility of selecting and propagating superior trees. In June of that year, one forester was placed on full-time tree improvement work. After further study, the Commission decided to set up a program of tree improvement with the greatest emphasis for the present on selection. The Commission feels that, in the beginning, greater results can be achieved in a shorter time through selection. We will have come a long way when we seek out and propagate the best trees that are now growing in our forests. And, too, tree improvement by selection is not limited to the geneticist. It can be practiced now by foresters, timbermen, and even farmers, for it is basically a refinement of the selection system of management.

While we are not unaware of the possibility of greater gains eventually coming from hybridization, there's no getting around it, hybridization takes time. I know of a geneticist working with cotton here in the South who grows a hybrid crop during the regular season, harvests the cross-pollinated seeds, and sends them to a cooperating experiment station in Mexico where another crop is grown through the winter. Forest trees, unfortunately, require more time than cotton to hybridize. Under certain conditions some trees will bear seed in four to six years, but a tree must grow to maturity--or at least to merchantable size--before we can be absolutely sure of its characteristics. Hybridization is pretty exacting work and only a small number of our foresters have sufficient training to carry out a hybridization program.

Although most of our (the Mississippi Forestry Commission's) work is directed towards selection for the present, we are not forsaking hybridization. We are hybridizing some of our most outstanding selections.

One of the first steps undertaken in our program was to educate and sell our field personnel on the value and need of forest tree improvement. This was done through the use of charts, exhibits, slides, pamphlets and field work with them at forest management schools.

Then we enlisted the cooperation of the federal, industry, and private foresters, and also the naval stores operations of the state. This group of 326 foresters and naval stores operators have been very

cooperative in reporting outstanding trees. The rate at which these reports are being received is more than gratifying. To date, 72 reports have come in and from this number we have chosen five trees for propagation and testing. A total of 24 pine and hardwood trees have been selected. As better trees are found, some of these will be discarded. All of these trees are catalogued and duplicate records can be sent to the Committee on Southern Forest Tree Improvement when and if the Committee sees fit to set up a central catalogue.

Three of the high gum yielding pines reported by naval stores operators are under test and last year two of them produced more than twice as much gum as the check trees. No attempt will be made to go into naval stores tree improvement with the thoroughness that is being done by the Lake City Research Center of the Southeastern Forest Experiment Station, of course. But since Southeast Mississippi is an active naval stores area, we feel that we are justified in checking and propagating the most outstanding trees reported to us.

Three methods of propagation are being used. First open-pollinated seeds are collected from a tree. Then the tree is reproduced vegetatively by grafts. Later, progeny from controlled breeding are obtained. We do not yet have any outplantings from our controlled pollination work.

The Forestry Commission has been fortunate in getting the assistance and facilities of the Department of Horticulture at Mississippi State College in its vegetative propagation work. A horticulturist specializing in the vegetative propagation of ornamental plants is working closely with us. We have had reasonably good success with grafting, but none at all with rooting.

A new type of grafting, a variation of the bare-root method used with ornamentals, showed considerable promise last year and will be tried again this spring. Seedlings used for grafting stock are placed in sand (heeled in) in a greenhouse and the humidity is kept high. A side graft is made after root action begins. When union takes place, the stock plant is pruned back in the conventional manner. It is then potted and moved, to a lathhouse. The advantage in using this method of grafting is that it saves the costly greenhouse space that is consumed by pots. About 30 grafts per square foot can be made when this method is used.

Three test areas, two in Southwest and one in Southeast Mississippi, have been set up for testing selected tree progeny.

Our first controlled pollination work was done in loblolly pine in the spring of 1953. Heavy cloth bags were used. Conelet mortality was high and the few that survived pollination were lost to cone insects or to squirrels. Our efforts last year were more fruitful. Sausage casing bags were used on slash, loblolly, and longleaf pines with only two percent flower mortality. No insect damage has been noted.

Outstanding pine seedlings have been selected from the nursery beds for the past three years and, together with check seedlings, have been planted in test areas in an effort to isolate individuals with superior vigor. For the past two years, the seed has been graded into four size classes to make these selections more accurate.

In addition to selecting superior seedlings from the nurseries, all discernable natural hybrids and odd or freak seedlings are being removed and planted separately. These seedlings will be kept under observation and some of them will no doubt be utilized when we work further into a program of hybridization. I doubt if we who are in tree improvement work utilize this means of selecting natural hybrids as fully as we should. Differences between individuals readily show up in nursery beds and nowhere else can we view so many trees so easily.

Last year, in cooperation with the Crossett Research Center of the Southern Forest Experiment Station, a seed source study was put in involving Crossett, Arkansas, seed and seed from Northeast and Southwest Mississippi. The purpose of this study is to determine if Mississippi and Southeast Arkansas can safely exchange seed or seedlings in case of crop failures in either place. Two plantations were put in, one in Northeast and one in Southwest Mississippi, with each of the three sources being replicated five times.

Inasmuch as loblolly pine has a range of more than 300 miles north to south within the state, and as it is the most sought-after species for planting, a local seed source study will be put in next year to determine how far in latitude seedlings can be moved from points of origin without harmful effects. Seed were collected for this project last fall.