5. STUDY OF SEED SOURCE IN REVERSE

Sulo Sihvonen, Manager
Crossett Forestry Division, Crossett Industries
Crossett, Arkansas

The Crossett Company started its program of tree improvement in 1922 when it was decided to cut the virgin forests to a seed tree basis. The logging boss in those days was a farseeing man in that he felt that only the best trees should be left for seed. This was perhaps best exemplified by a visit paid to his operations by one of the Board of Directors and the late Austin Carey. Both of the latter felt, and expressed themselves, that the monetary loss by leaving the best trees was too great when most any old tree would do the job of seeding just as well. The logging boss was somewhat startled but never batted an eye in replying that he couldn't see why the best trees shouldn't be left for seed when even the sorriest farmer wouldn't permit a runt bull to run with his herd. Needless to say, he won his point and Crossett has benefited by the regeneration of a new forest from good parent trees.

Through the intervening years, starting in 1934, Crossett's raw material production from its own lands has come from selection cutting and thinnings. Since most of this cutting has been of an improvement nature, the quality of the stands with respect to tree form and vigor has improved considerably through the years.

Because we feel that our forest has a head start with respect to potential production of high quality seed, we were pleased to consider a test to determine how good our seed is within a reasonable distance of Crossett.

The progress of the broad southwide study on geographic sources of seed has just been reviewed for us. As has been pointed out, this project has for its objective the determination of provenance boundaries for the four major southern pines beyond which it is not desirable to import seed for planting. Because of the broad scope of the study, however, the results may only apply in a very general way in specific localities. Therefore, local seed source tests in which local seed is checked against that from outlying areas are necessary to fill in the gaps left by the broader, parent study.

Both the over-all study and the local supplements to it have considerable practical significance. We now find it profitable to use all of a pine tree with the exception of its branches. Why not

extend this into the branches and use the good cone crops when they occur? If one can prove that his local pine has genetic characteristics making it superior or at least equal to a given local source in its own area, the possibility of harvesting and marketing seed as well as lumber, pulpwood, or poles has interesting possibilities.

One's first reaction is that collection and handling of seed is such a tedious procedure that it would be difficult to make any real showing or profit. It has largely been a slow procedure in the past because most of us have not made any provisions in our normal operations to expedite seed production. The research which has been done in seed stimulation and in the management of seed orchards or seed producing areas, about which we will hear during this session, points the way to how we can do this and successfully integrate it with our other operations.

The periodicity of seed crops is a factor with which we all must contend. In our Crossett area, the nine-year post-war period has given us one excellent seed year, one very good, three fair, and four failures. The good or better years have been four years apart and there seems to be a tendency for failures to occur two years at a time. Of course, heavy collection in good years and adequate storage is one way to get around the variable supply. Storage presents some problems, however, and one cannot always anticipate just what his needs are going to be. A reliable source from somewhere besides one's own territory would be extremely useful at frequent intervals. It is not too clear just how local in nature seed failure is in given years. If it proves to generally cover rather large areas of several states at a time, the investigation of seed source differences within this area becomes of less practical importance. There is considerable reason to think, however, that failure is often much more local in nature, making the filling in of gaps in the broad southwide study much more useful.

The foregoing comments are primarily further justification of the value of not only the local seed source tests, but the parent study of geographic sources of seed as well. Current forestry practice no longer allows us to wait indefinitely for nature to do the seeding. The future points toward a situation of even greater intolerance toward leaving forest land partly idle for even a few years.

Local seed source studies can take varying forms. In the Crossett seed source study we are interested in exploring the possibility that seed collected in the Crossett area can be used to advantage in adjacent states and localities in place of their local seed. This type of study has been referred to as "a seed source study in reverse". This is in contrast to the normal type of study in which seed from a number of outlying areas is tested along with a local source. Such checks are being made, however, with many of them integrated with the Crossett study. The objectives of the Crossett study are two-fold: (1) to certify Crossett seed and seedling stock as equal to or perhaps superior to local seed within carefully defined

areas, and (2) to locate seed source provenances which are as satisfactory in our Crossett area, or nearly so, as our local source.

At present, the study is limited to loblolly pine. Seed collected in the Crossett area has been sent to cooperators in neighboring states to be raised with seed collected in those areas. The cooperation of over 20 persons representing 12 organizations in five states has been obtained. The standardized working plan for local tests of seed source prepared by the subcommittee on Geographic Source of Seed under the direction of Phil Wakeley has been used as the guide. The Crossett Research Center of the Southern Forest Experiment Station not only conceived the study, but is also coordinating the program.

Approximately ten pounds of seed collected in the Crossett area in the fall of 1951 was distributed to cooperators and sown in eleven different nurseries in the spring of 1953. Nursery survival and growth rate were generally satisfactory, and the seedlings were lifted and outplanted in the winter of 1953-54. The number of seed sources planted by each cooperator varied from two to eight. However, although the comparison of Crossett seed with the local source was necessary for the Crossett seed source test, the others helped to supplement the over-all geographic sources of seed study. Acceptable designs for planting following the outline given in the working plan were drawn up for each plantation. All cooperators followed the designs faithfully, thus making the job of analysis relatively easy. Each cooperator was supplied with instructions and materials to help in establishing and recording information on the plantations. These included a record of establishment, a map of the plantation site, a design for location of each seed source in each block, planting instructions, and height measurement forms for the planted seedlings.

A total of 14 plantations, involving 268 seed source plots in 64 randomized blocks were set out by cooperators in the winter of 1953-54. Five of the cooperators set out two plantations, either in different parts of the state or on a different site within the same general area. Most of the plots are located in south Arkansas or in Louisiana, but some are located as far north and east as Tennessee and northwest Alabama, and one is in east Texas. One plantation has been deferred and will be set out this winter in southwest Arkansas.

The plantations have now been in for one year. This was a severe season, characterized by blistering heat waves and severe drought. Thus, it is not surprising that many of the plantations were lost. It is still too early in the life of this test to take much stock of the results obtained. Plantation survival and measurement forms were sent to cooperators in November, however, and although returns are not complete at this time, the results as we have them can be pointed out.

Survival of five of the fourteen plantations is definitely known to be complete or almost complete failures. These include the one in east Texas, one in west Louisiana, two in north Louisiana, and the local

plantation at Crossett. All of these should be replanted. Three plantations in south Louisiana and one in north Louisiana show fair to good survival and can be used in further analysis. The south Mississippi plantation shows fair survival, but the one in north Mississippi is reported to be largely gone. The fate of the others is not yet reported.

Detailed results are not far enough along to draw any conclusions. Survival on two plantations in central Louisiana shows one case of Crossett stock having 56 percent survival as compared to local stock at 40 percent, and in the other 69 percent to 53 percent in favor of Crossett as compared to local stock. In a southeast Louisiana plantation the comparison was 83 percent for the Crossett seed stock to 77 percent for the local. In north Louisiana a failed plantation showed 17 percent for the Crossett source, 13 percent for the local. The plantation at Crossett had a survival of 41 percent with Crossett seed stock and 22 percent, in comparison, with stock from a Mississippi source. Thus, so far, the Crossett stock seems to do quite well in survival comparisons with other sources.

Though data on the height of the seedlings when planted was not requested, many cooperators volunteered this information. In general, the Crossett stock was somewhat smaller than local stock at the time of outplanting, particularly for the south Louisiana plantations. This could have been a significant factor in the survival trend just quoted. First year remeasurement figures are available only for the Franklinton plantation in central Louisiana. There the local stock is growing slightly better than Crossett stock.

It is intended to have as many of the failed plantations replanted as possible, although all may not be accomplished this year. It would also be desirable to extend the study to include eastern Oklahoma and possibly one or more eastern states if cooperators can be found. The undesirable weather cycle for plantation survival, that we seem to be in, is unfortunately delaying the progress of this test, but we hope to see trends and conclusions drawn as soon as possible.