

HIGHLIGHTS OF CURRENT FOREST TREE IMPROVEMENT ACTIVITIES
IN THE LAKE STATES

Paul O. Rudolf¹

Lake States Forest Experiment Station²

Currently 10 agencies are conducting forest tree improvement research in the three Lake States (Minnesota, Wisconsin, and Michigan). Several other agencies are cooperating with the research groups in carrying out their work and are applying the results. Federal, state, and private agencies are included in both groups.

Reasonably complete summaries of past tree improvement work in the Lake States can be obtained from the following three publications:

1. Proceedings of the Lake States Forest Genetics Conference, Lake States Forest Expt. Sta. Misc. Rpt. No. 22, 1953;
2. Proceedings of the Lake States Forest Tree Improvement Conference, Lake States Forest Expt. Sta. Misc. Rpt. No. 40, 1955, and
3. Directory of Forest Genetics Research and Education in the United States and Canada, by Jonathan W. Wright, Publ. of Comm. on Forest Tree Imp., S.A.F., 1955.

This brief account will, therefore, be confined to current activities only. It is based largely on informal reports from the agencies involved, and they should be consulted for further details.

Activities of Research Agencies

The Lake States Forest Experiment Station has active studies under way as follows: (1) seed source studies of red pine (Pinus resinosa), jack pine (P. banksiana), Scotch pine (P. sylvestris), eastern white pine (P. strobus), white spruce (Picea glauca), Norway spruce (P. abies), European larch (Larix decidua), and Siberia larch (L. sibirica); (2) field tests of hybrid poplars and hybrid pine (eastern white pine western white pine (Pinus monticola), and lodgepole pine (P. contorta)-jack pine crosses); (3) cone pollinations of white spruce and black spruce (Picea mariana); (4) fall-grafting of spruces; (5) phenological studies of white spruce; (6) physiological studies of flowering and rooting of cuttings in spruce, and summerwood formation in red pine; (7) selection of phenotypically superior trees; and (8) field tests of some 65 exotic tree species.

At the University of Wisconsin, tree improvement research is conducted both by the Genetics and Plant Pathology Departments. Included are (1) Progeny tests of red pine, white pine, jack pine, Scotch pine, lodgepole pine, Virginia pine (Pinus virginiana), white spruce, Norway spruce, and balsam fir (Abies balsamea); (2) controlled breeding of red pine; (3) greenhouse and field grafting and layering of red pine; (4) development of seed orchards; (5) development of a seed "verification" program (segregation and use of seed from se-

¹ Executive Secretary of the Lake States Forest Tree Improvement Committee.

² Maintained by the Forest Service, U. S. Department of Agriculture, at St. Paul 1, Minnesota, in cooperation with the University of Minnesota.

lected stands) for the State Conservation Department; (6) development by selection and breeding of eastern white pines resistant to white pine blister rust; (7) flower induction trials through grafting techniques; (8) selection and testing of jack pine apparently resistant to eastern gall rust; (9) selection, field testing, and checking for disease resistance of several poplar species and hybrids.

The University of Minnesota's School of Forestry tree improvement projects include the followings Seed source tests of jack pine, blue spruce (Picea pungens), and paper birch (Betula papyrifera); (2) studies of genetic diversity in ulus species and hybrid, birch elms, jack pine, white spruce, black spruce, and a natural spruce hybrid; (3) studies of abnormalities in aspen flowers; (4) grafting, rooting of cuttings, and air layering tests of several species; and (5) tests of a large number of exotic species.

The Institute of Paper Chemistry, supported by forest industry, has an extensive project on aspen, particularly concerning the occurrence, propagation, and development of polyploids. Under way are numerous progeny tests, propagation method trials, tests of artificial induction of polyploids, and some controlled breeding. Research in physiology and cytology is included in the program.

At the University of Michigan's School of Natural Resources, active research includes seed source studies of jack pine and Scotch pine, (2) selection of Norway spruce for resistance to the spruce gall aphid, (3) a study of variation in aspen clones within a limited locality, and (4) testing a number of exotic species.

Michigan State University's Department of Forestry is (1) field testing hybrid poplars and hybrid pines (lodgepole pine-jack pine, ponderosa pine (Pinus ponderosa)-Apache pine (P. engelmannii), and ponderosa pine-Arizona pine (P. ponderosa var. arizonica) crosses), studying variation in sap production and sugar content of sugar maple, and (3) testing a large number of exotic species.

The Forest Products Laboratory is doing no tree improvement work on Lake States species. Major emphasis is on variation in wood quality among the Southern pines. Techniques developed may, however, be applicable to species in the Lake States and other regions.

The Quetico-Superior Wilderness Research Center has (1) field tests of white pines selected for blister rust resistance, studies of greenhouse and field grafting methods on several conifers, and (3) trials of phloem inversion on pines.

The Nekoosa-Edwards Paper Company has under way (1) seed source tests of red pine, jack pine, and white spruce; and (2) field tests of the jack pine-lodgepole pine hybrids which they have developed, and also of the reciprocal cross developed at Placerville, Calif.

The Consolidated Water Power and Paper Company has selected "super" white spruce in the nursery seedbeds and is field testing then in comparison to "general run" stock.

Activities of Cooperating Agencies

The State Conservation Departments of Minnesota, Wisconsin, and Michigan are all participating in a regional jack pine seed source study. All have instructed their field forces also to aid in the location of apparently superior trees. The Wisconsin Conservation Department in addition is putting into force its "seed verification" program that involves the use of seed from selected superior stands.

The national forest organization in the Lake States also is participating in the regional jack pine seed source study. Its fieldmen are reporting apparently superior trees and stands to the Lake States Forest Experiment Station., and it has made genetics outplanting sites available to the Station.

Several of the pulp and paper companies in the region are participating in the regional jack pine seed source study, are collecting their own seed from apparently superior trees and stands, and are making such material available to research agencies.

The Lake States Forest Tree Improvement Committee

In 1953 the Lake States Forest Tree Improvement Committee was appointed to encourage and coordinate forest tree improvement activities in the region. Its 14 members represent the research and action agencies and the subject matter interests in this field. The Committee carries on its work through three means: special subcommittees, periodic newsletters, and regional tree improvement conferences.

Subcommittees have developed and issued reports to guide workers in the region in (1) selecting superior trees and stands, (2) pertinent literature published in the field, and (3) seed collection zones. Currently active subcommittees are concerned with developing summaries of research projects in the region, seed certification, and the registration and marking of selections.

Once or twice a year, between Committee meetings, a newsletter (Lake States Trebredinews) provides interested people in the region and elsewhere brief reports on Committee activities and tree improvement activities in the region and in other regions and nations.

Biennial regional tree improvement conferences have been held in 1953 and 1955. The third is scheduled for Sept. 17 and 18, 1957. These conferences provide opportunities for those interested to hear brief reports on what is being done in tree improvement in the Lake States and other regions, to discuss this work with those engaged in it, and to propose new activities in this field. The conferences usually involve both indoor discussions and field trips. The proceedings of these conferences are published so that others, both in and outside the region, may be kept informed of tree improvement research in the Lake States.

Summary

To recapitulate briefly, 10 agencies are conducting forest tree improvement research in the Lake States. These include Federal, state, and private agencies. Several other agencies in all these categories are cooperating in the research and are beginning to apply the findings. All these agencies are represented on the Lake States Forest Tree Improvement Committee of 14, members. The Committee encourages and coordinates forest tree improvement activities in the region by means of subcommittee reports in specific fields, periodic newsletters, and biennial regional conferences.