

FOREST TREE BREEDING WORK IN CANADA

C. Heimbürger

Forest Geneticist, Southern Research Station
Ontario Dept. Lands and Forests, Maple, Ontario, Canada

The tree breeding work in Canada has been summarized three times and the summaries have been published as follows:

- Heimbürger, C., 1953. The present status of forest tree breeding in Canada. Proceedings Lake States Forest Genetics Conference. Lake States Forest Expt. Sta. Misc. Rpt. No. 22: 33-41.
- Heimbürger, C., 1954. Forest Tree Breeding in Canada. Jour. of Forestry 52(9): 682-684.
- Hoist, M. J., 1955. Forest Tree Breeding in Canada. Proceedings Lake States Forest Tree Improvement Conference, August 30-31, 1955. Lake States Forest Expt. Sta. Misc. Rpt. No. 40: 41-42.

Tree breeding work is at present proceeding along the lines indicated in the publications above. We have one Committee on Forest Tree Breeding dealing with all such activities in Canada. The present Committee is sponsored by the Forestry Branch, Canada Department of Northern Affairs and National Resources. The terms of reference of this Committee are as follows:

1. To advise, assist, and when necessary make recommendations to the Forestry Branch and to participating organizations, with regard to matters referred to it by organizations concerned with forestry, and with regard to matters that may appear expedient for the progress of research in forest genetics and forest tree breeding.
2. To serve in a liaison capacity between the various organizations concerned, for the investigation and review of facilities for progress in and requirements of research in forest genetics and forest tree breeding in Canada.

The agencies represented are:

Canada Dept. of Northern Affairs and National Resources, Forestry Branch
Canada Department of Agriculture, Division of Forest Biology
Canada Department of Agriculture, Division of Horticulture
Canada Department of Agriculture, Division of Botany and Plant Pathology
Canada Department of Agriculture, Experimental Farms Service
Ontario Department of Lands and Forests, Division of Research
Ontario Department of Lands and Forests, Division of Reforestation
British Columbia Forest Service, Division of Research
Acadia University, Department of Biology
Laval University, School of Forestry
University of Toronto, Faculty of Forestry
University of British Columbia, Department of Biology and Botany
Pulp and Paper Research Institute of Canada

Meetings are held once a year. Present Chairman is A. P. Leslie, Southern Research Station, Maple, Ont., Secretary C. W. Yeatmen, Petawawa Forest Experiment Station, Chalk River, Ont. Length of tenure is 2 years for both. We have no subcommittees. Proceedings of annual meetings are distributed to members, but not for publication.

DISCUSSION

SCHREINER. I would like to ask Mr. Fowler of the Southern Research Station, Maple, Ontario, whether he would give us a brief summary of the current tree breeding work at his Station.

FOWLER. At the Southern Research Station breeding work with white pines, aspen poplars and 2-needle pines are the major projects. In the last year the program was expanded to include work with Thuja species.

The main object of the white pine work is to develop trees resistant to the white pine blister rust. Growth form and possible weevil resistance are also considered. Perhaps the most notable recent development in this work is the apparent resistance to blister rust shown by certain Pinus strobus X P. peuce hybrids. Some P. peuce are resistant to blister rust and at least some individuals appear to transom this resistance into the F₁. In some instances P. peuce has also shown apparent resistance to the white pine weevil; P. peuce is attacked by the weevil, but quite often the terminal shoot survives. Possibly this is because of the heavy resin flow of this species. Several F₁'s are now of flowering age and have been used in the current breeding work. The hybrid is intermediate between P. strobus and P. peuce, under Southern Ontario conditions, and has no outstanding as a forest tree. The approach to developing desirable forest types will be backcrossing to superior P. strobus and selecting for resistance.

Abundant flowering of many of the pine grafts at the Station has made it possible to carry out sizable pollination projects with both white and hard pines. The primary objective of the hard pine breeding program is to develop suitable types resistant to the European pine shoot moth. This program has recently been expanded by funds made available by the Ontario Governments' "Project Regeneration."

Dr. Heimburger's work with poplars is aimed at breeding desirable aspen types that root well from cuttings. Certain crosses between Populus alba and aspens have shown quite high rooting. Further selection among these offspring should yield "good rooting" clones. P. canescens and P. grandidentata were successfully crossed with P. trichocarpa for the first time.

The heavy 1956 seed crop of northern white cedar was utilized in an attempt to find cedars suitable for the highly calcareous soils of southern Ontario. Seed collected from some 37 sources is now available for provenance work. Plans have also been made to obtain cuttings and seed of Thuja plicata from the northern part of its range.

KRIEBEL. To make the regional summaries complete some report should be included for the Central States Region. Incidental to this it may be of interest to those in the Northeast to know that some of the finest, rapid-growing, unweeviled stands of white pine to be found anywhere are in Ohio, which also is an important maple syrup producing state.

I would like to mention some work by the Central States Station which hasn't been covered here, in particular a yellow poplar seed source test which is in the process of establishment. Perhaps someone here can elaborate on that more than I can, but I think their collections are pretty well complete and are

now growing in at least two nurseries in the Central States region. These provenances do not cover the entire range of yellow poplar; they cover particularly the Central States region and extend down into Kentucky. In some of the Ohio spoil bank areas where the very acid spoils have been turned up, yellow poplar grows very well in mixture with black locust, at least during the relatively few years it has been observed; in many places it grows much better than in old field stands.

In southern Illinois there are a number of seed source plantations of shortleaf, loblolly, and various hybrids which have been reported on from time to time. In various other places throughout the region there are tests of exotics and to a limited extent, seed source tests.

We are interested in sugar maple in Wooster from various standpoints, as we have reported in the past, and we feel we are making some progress in maple genetics research. We have range-wide provenance tests set out in permanent plots. We're working closely with Bill Gabriel and exchanging material. We've been doing quite a bit of grafting and budding and expect to set out at least one seed orchard next spring containing probably about 20 clones from selected sugar trees.

WAKELEY. Is the yellow poplar seed source study in the Central States part of the same study under way at the Southeastern Station?

DOOLITTLE The Central States Forest Experiment Station started their yellow-poplar seed source study about 5 years ago; Dick Lane can check me on that. Some of the seed was collected near Asheville, North Carolina; that's how the Southeastern Station became interested in this study. The Central States very kindly furnished seedlings from eight sources for an outplanting at Asheville. In addition to these eight sources, the study at Southeastern was expanded to include another eight sources from the southern portion of the range--down into Georgia and Mississippi. The plantings at Asheville are now in their fourth growing season.

GRAVES. Our young friend who gave us such an excellent account of the work in Maple, Ontario, spoke of a hybrid between *Pinus peuce* and *F. strobilus* which was resistant to the weevil and blister rust. I think he also mentioned other hybrids with *P. strobilus*; would you kindly tell us what hybrids you have?

FOWLER. The following *P. strobilus* crosses made at the Southern Research Station under the direction of Dr. C. Heimburger have yielded hybrids: *P. strobilus* X *F. excelsa*, *P. strobilus* X *F. pentaphylla* and *F. strobilus* X *peuce*.

Hybrids between *F. strobilus* and *F. peuce* have been identified among the offspring from open pollinated *F. peuce* planted near native *P. strobilus*.

GABRIEL. Dr. Wright of the Northeastern Forest Experiment Station has a manuscript ready for publication that will cover quite completely all the crosses that will and will not take in most of the 5-needled pines.