

Vault

Proceedings of the twelfth  
meeting of the committee on  
**Forest Tree Breeding  
in Canada**

Comptes rendus de la douzième  
conférence du comité  
**Canadien D'amélioration des  
Arbres Forestiers**



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1970

Part 1

MINUTES AND DISCUSSIONS

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A. ATTENDANCE

Dr. Jean-Paul Campagna	Ministère des Terres et Forêts du Québec, Le Service de la Restauration forestière, Berthierville, Qué.
Dr. A. Carlisle	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
M. Claude Chouinard	Ministère des Terres et Forêts du Québec, Le Service de la Recherche, Québec, Qué.
M. D. Cornu	Ministère des Terres et Forêts du Québec, Le Service de la Recherche, Québec, Qué.
M. Armand Corriveau	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Region Québec, Ste-Foy, Qué.
Dr. A. D'Aoust	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Mr. Wilfred G. Dyer	Ontario Department of Lands and Forests, Timber Branch, Toronto, Ontario.
Mr. Kenneth Eng	Ontario Department of Lands and Forests, Timber Branch, Angus, Ont.
M. Jean M. Fortin	Ministère des Terres et Forêts du Québec, Le Service de la Restauration forestière, Québec, Qué.
Dr. D.P. Fowler (Chairman, 1971-72)	Department of Fisheries and Forestry, Canadian Forestry Service, Maritimes Region, Fredericton, N.B.
Dr. D.A. Fraser	Sir George Williams University, Department of Geography, Montreal, Qué.
Dr. Peter W. Garrett	U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station, Durham, N.H., U.S.A.
Dr. R. Girouard	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.

Dr. A.G. Gordon	Ontario Department of Lands and Forests, Research Branch, Sault Ste. Marie, Ont.
Dr. C. Heimbürger	80 Haddington Avenue, Toronto 12, Ont.
M. Karl Heinstejn	Compagnie Internationale de Papier du Canada, La Tuque, Qué.
Mr. Mark Holst	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Mr. Michael Kaye	Manitoba Department of Mines and Natural Resources, Winnipeg, Man.
M. Roger Keable	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Mr. L. Kennedy	Alberta Department of Lands and Forests, Edmonton, Alta.
Dr. M.A.K. Khalil	Lakehead University, School of Forestry, Thunder Bay, Ont.
Dr. Jerome Klein	Department of Fisheries and Forestry, Canadian Forestry Service, Prairie Region, Edmonton, Alta.
Dr. J.L. Ladell	Ontario Research Foundation, Sheridan Park, Ont.
Mr. C.H. Lane	Ontario Department of Lands and Forests, Timber Branch, Toronto, Ont.
Mr. H.C. Larsson	Ontario Department of Lands and Forests, Research Branch, Maple, Ont.
M. Henri Leblanc	Compagnie Internationale de Papier du Canada, Montreal, Qué.
Mr. Donald Levy	Nova Scotia Department of Lands and Forests, Lawrencetown, N.S.
Mr. K.T. Logan	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.

Dr. Marcel Lortie	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Dr. J. Maini	Department of Fisheries and Forestry, Canadian Forestry Service, Program Coordination Branch, Ottawa, Ont.
Mr. J.A. McPherson	Kimberly-Clark Pulp and Paper Co. Ltd., Longlac, Ont.
Dr. E.K. Morgenstern (Exec. Secretary, 1969-70)	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Dr. J.C. Nautiyal	University of Toronto, Faculty of Forestry, Toronto, Ont.
Dr. Louis Parrot (Chairman, 1969-70)	Université Laval, Faculté de Foresterie et de Géodésie, Québec, Qué.
Mr. Richard F. Piesch	Department of Fisheries and Forestry, Canadian Forestry Service, British Columbia Region, Victoria, B.C.
M.J. Pfalzgraf	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
M. Jean-Claude Racine	Ministère des Terres et Forêts du Québec, Shawinigan District, Shawinigan, Qué.
Miss R. Marie Rauter	Ontario Department of Lands and Forests, Research Branch, Maple, Ont.
Mr. Ralph Redmond	New Brunswick Department of Natural Resources, Fredericton, N.B.
Dr. Larry Roche (Exec. Secretary, 1971-72)	Ministère des Pêches et des Forêts, Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
M. Jean Smith	Ministère des Terres et Forêts du Québec, Le Service de la Restauration Forestière, Québec, Qué.

M. Ante Stipanivic	Ministère des Terres et Forêts du Québec, Le Service de la Recherche, Québec, Qué.
Mr. Jaap Salm	Department of Fisheries and Forestry, Canadian Forestry Service, Forest Management Institute, Ottawa, Ont.
Dr. H. Stewart Swan	Pulp and Paper Research Institute of Canada, Pointe-Claire, Qué.
Dr. A. Teich	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Dr. G. Vallée	Ministère des Terres et Forêts du Québec, Le Service de la Recherche, Québec, Qué.
Dr. P.E. Vezina	Université Laval, Faculté de Foresterie et de Géodésie, Québec, Qué.
Mr. B.S.P. Wang	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Dr. C.W. Yeatman	Department of Fisheries and Forestry, Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Dr. L. Zufa	Ontario Department of Lands and Forests, Research Branch, Maple, Ont.

## B. TECHNICAL MEETING

### 1. Welcome

The Chairman, Professor Louis Parrot, opened the meeting at 9 a.m. August 18th and introduced Monsieur Edgar Porter, Doyen, Faculté de Foresterie et de Géodésie, Université Laval. Dean Porter welcomed Committee members and guests to Laval University and his Faculty and expressed his wishes for a successful conference.

### 2. Symposium Discussions

The meeting continued with a symposium on "Tree Breeding and Silviculture in Canada : Needs and Objectives". Ten papers were presented by speakers from provincial forest services, universities and the Canadian Forestry Service. These papers are published as Part 2 of the Proceedings.

In reply to questions, Mr. L. Kennedy noted that in Alberta the area regenerated annually is increasing. Some seed production areas have been established. A need is felt to initiate a breeding program. In white spruce, selection for early rapid growth in height should be considered. Interest was expressed in the breeding material at the F.L. Skinner Nursery, Dropmore, Manitoba, and the question was asked if the Province had considered buying the nursery. Mr. M. Kaye replied that the Nursery as a whole was not suitable for forestry purposes but that considerable amounts of material had been purchased or exchanged.

In reply to a question Mr. R. Redmond indicated that in New Brunswick the J.D. Irving Company has assumed a leading role in regeneration. Following intensive site preparation, more than 4 million trees are planted annually. Some of the recent planting has been at a spacing of 5 x 5 ft. A volume production of about 2 cords per acre per year is expected over short rotation periods. Dr. J.R. Blais mentioned the possibility of controlling budworm damage if a balsam fir could be bred that flushes about two weeks later than the native fir, but that this would require replacing the native population. Mr. J.H. Cayford said that replacement of balsam fir in Newfoundland has met with serious difficulties.

Mr. D. Levy stated that in Nova Scotia early growth following planting, ranked in the order from good to poor, is: black spruce, Norway spruce, white spruce. Insect and disease resistance also have a bearing on early performance. There has been little planting of black spruce in the past but the species will now be used more widely. Nursery production of black spruce plants amounts to one-eighth of the total. Mr. M. Holst cautioned against overrating black spruce which shows poor diameter development, and Dr. A.G. Gordon noted its capacity for peat accumulation and "ortstein" formation if established in pure stands. Dr. D.P. Fowler considered black spruce very suitable at short rotations on good sites, particularly in northern New Brunswick where there is little hardpan formation.

Dr. C. Heimburger emphasized the need to develop methods and equipment for non-destructive seed harvesting for species such as black spruce, jack pine and lodgepole pine. Dr. H.S. Swan replied that aluminium ladders 60 ft long have been useful when collecting cones from black spruce.

Mr. L. Kennedy advised that the Alberta Department of Lands and Forests is purchasing a mechanical tree shaker to harvest seed from white spruce. Dr. J. Maini pointed out that to propagate valuable breeding material and make it more widely available, the Canadian Forestry Service is exploring the use of tissue culture techniques and is conducting studies to improve grafting and rooting methods.

In a discussion on seed zones, it was concluded that these should not be considered a selection procedure to improve a given species, but rather a basic step to conserve native, adapted populations and thus to avoid losses.

A variety of opinions was expressed following the presentation of papers dealing with the economics of tree breeding. Dr. J.C. Nautiyal cautioned against a tendency to oversimplify by looking at certain aspects of improvement in isolation, for example, genetic gain. More important is the overall benefit to society. Dr. A. Teich pointed out the necessity to apply priority ratings to several breeding alternatives. Dr. H.S. Swan stressed the social benefits of reforestation and questioned the use of compound interest formulas. Dr. L. Zufa said that we have been mainly concerned with provenance research and selection and little with breeding. Breeding on an individual-tree basis could give much higher returns than normally considered, up to 200 percent, for example, in poplars. Dr. L. Roche questioned the implication in the paper by Drs. Carlisle and Teich that seed production areas would lead to some genetic improvement. Furthermore, in his view, realistic cost estimates for tree breeding are not yet available in Canada because no program had been carried far enough. Dr. A. Teich defended their position, stating that results were generally in agreement with studies elsewhere and that they had used the best figures available. Their paper referred essentially to provenance selection, not to individual tree selection.

In his résumé of the symposium, Dr. L. Roche drew attention to the fact that all provinces represented were planning for an expansion of their reforestation program. Large amounts of seed will be required and the need for the application of genetic principles and breeding is recognized. However, he warned that breeding cannot be handled by geneticists alone but demands much greater involvement of the management forester.

### 3. Film and Slide Show

The traditional film and slide show was held in the evening of August 18th with Dr. D.A. Fraser, Dr. M.A.K. Khalil, Mr. C.H. Lane, Miss R.M. Rauter, Dr. L. Roche, Dr. A. Teich and Dr. C.W. Yeatman contributing. The film "Not Trees Alone" showing silvicultural activities of the Alberta Department of Lands and Forests, was introduced by Mr. L. Kennedy and proved to be the highlight of this session.



#### 4. Field Trips

A field trip to the Station Expérimentale de Valcartier in the morning of August 19th afforded opportunities to inspect field experiments of Norway spruce and red spruce, and nursery experiments with yellow birch and black spruce. Brief project outlines were given on vegetative propagation by Dr. R. Girouard and testing of poplars for disease resistance by Dr. M. Hubbes. M. Jacques Pfalzgraf explained the management of the Station.

In the afternoon the group travelled to the Parc des Laurentides. Messrs. Leopold Dion and Claude Tremblay of Société Forestière Domtar Ltée. demonstrated the intermediate cutting procedure used in the Epaule District. In a spruce-fir forest, this has raised the useful yield from the original average of 21 cu ft per acre with clear cutting to 52 cu ft with one or two intermediate cuts. The estimated additional cost per cord of wood ranges from \$1.50 to \$4.00. At the Laval University Forest, Forêt Montmorency, educational facilities were inspected. A banquet was held with Dr. Marcel Lortie, Director of the Quebec Region, Canadian Forestry Service, as speaker.

#### C. BUSINESS MEETING

The business meeting was held in the afternoon of August 20th and attended by 24 members and guests.

##### 132. Minutes of the Last Meeting

Criticism was expressed that it took about 1½ years to publish the minutes of the Eleventh Meeting. On a motion by W.G. Dyer, seconded by B.S.P. Wang, the minutes were adopted as printed.

##### 133. International Arrangements for Seed Procurement

Mr. B.S.P. Wang reported on developments during the past 2 years. A Tree Seed Service Center has been established by the U.S. Forest Service in conjunction with the Eastern Tree Seed Laboratory at Macon, Georgia. The objective of the Center is to supply small lots of seed, pollen and vegetative material for research purposes and breeding at nominal charges to foreign agencies.

In 1970 the Petawawa Tree Seed Unit joined the seed scheme sponsored by the IUFRO Working Group on Procurement of Seed for Provenance Research. This scheme is administered by Mr. H. Barner in Denmark. Petawawa will act as agent for all forestry establishments in Canada that want to take advantage of the IUFRO scheme. Independently from these formal arrangements, the Petawawa Unit has recently procured seed of several species from Finland, Sweden, and Japan.

In subsequent discussion, much interest was expressed in the work of the Petawawa Seed Unit. There was agreement that regarding international seed collections, its contacts and facilities would be very helpful. Concerning

Canadian seed collections, some members felt that its objectives should be stated more specifically, especially as they relate to cooperation with provincial forest services. The assistance of provincial forest services should be emphasized and acknowledged formally because this encourages the development of their staff and facilities. Other members felt that detailed rules concerning its operation in Canada would not be helpful. A diversity of opinions was also expressed as to what extent the Seed Unit should be involved in seed collections for larger, detailed provenance and botanical studies. Mr. B.S.P. Wang pointed out that the Unit is not only concerned with seed collection and distribution but also with seed research and development of extraction and testing methods. As a result, there is a limit to its services. A motion supporting the Seed Unit was originally proposed by Dr. H.S. Swan, discussed at length, and changed. It then took the following form.

Motion: moved by D.P. Fowler, seconded by H.S. Swan, that the Committee recognizes the important contribution by the Petawawa Tree Seed Unit to tree improvement in Canada. Due to many demands placed on the Seed Unit, the Committee recommends that the Unit be strengthened.

Carried.

#### 134. Implementation of the OECD Scheme in Canada

Mr. M. Holst presented this subcommittee report. The Organisation for Economic Cooperation and Development (OECD) Scheme for the Control of Forest Reproductive Material Moving in International Trade was adopted by the OECD Council in May 1967. The objective of the scheme is "to encourage the production and use of seeds, parts of plants, and plants that have been collected, transported, processed, raised and distributed in a manner that ensures their trueness to name". Three broad categories are recognized:

- a) source-identified reproductive material, which represents a minimum standard;
- b) selected reproductive material, which conforms to the desired standard at the present time; and
- c) certified reproductive material which represents the standard of genetically improved material to be aimed at in the future.

The Government of Canada accepted the scheme in principle in 1968 and discussed it with the Provinces in 1968 and 1969. In the summer of 1970 the Government decided to implement the scheme and nominated the Department of Fisheries and Forestry, Canadian Forestry Service, as Designated Authority. Initially implementation is restricted to British Columbia where responsibilities are delegated to the Regional Director, Forest Research Laboratory, Victoria. In view of the limited time and finances available, and with no previous experience, certification will be confined to source-identified seed. J.S. Rowe's "Forest Regions of Canada" is the basic geographic reference used. Latitude, longitude and elevation will also be recorded.

It is hoped that the OECD Scheme will pave the way for general seed certification in Canada. The Committee on Forest Tree Breeding should take a leading role in the further work required toward this goal.

In the discussion some members argued that implementation should be extended to eastern Canada, but others disagreed because the demand for eastern seed is small. Still, many members felt that seed certification will inevitably be applied throughout the country in response to the rising demand for quality seed.

Motion: moved by H.S. Swan, seconded by C.W. Yeatman, that a sub-committee be formed to study an extension of tree seed certification in Canada.

Defeated.

135. The Applied Forest Genetics Program in Canada

This subcommittee report was submitted by Dr. L. Roche under the title "Forest genetics and tree improvement research in Canada : a critique" (Internal Report Q-18, Quebec Region, Department of Fisheries and Forestry. 24 p.). The report contains sections dealing with seed production, conservation of gene resources, future research in order of priority, and the roles of governments, industries, and universities. It points out that the theoretical forest geneticist cannot be expected to be a practical tree breeder at the same time. The operational aspects of tree improvement should rightly form part of silvicultural practice. The mass production of seedlings is not a research activity. Failure to involve the practicing forester in tree improvement activities is delaying progress. Future research in order of priority is:

- (1) exploration of gene resources, including studies of geographic variation, distribution mapping, and studies of heritability and introgression;
- (2) utilization of gene resources, including the demarcation of seed zones, and research related to all aspects of seed production areas and seed orchards; and
- (3) conservation of gene resources.

In the discussion of the role of different agencies, the report states that the biology and botany departments of universities could have an important function in some research activities, for example, the biology of flowering. Finally it points out the need for a national system of seed registration.

Motion: moved by L. Roche, seconded by D.P. Fowler, that the report "Forest genetics and tree improvement research in Canada : a critique" be accepted.

Carried.

136. Tree Improvement Task Force, CPPA

Dr. H.S. Swan reported that this Task Force has been formed within the Forest Management Group of the Woodlands Section, Canadian Pulp and Paper Association. Its objective is to study ways and means in which industry could help to make progress in tree improvement. Chairman is M. Henri Leblanc. Dr. J. Maini serves as advisor. Specific recommendations will be soon made to the Executive Committee of the Woodlands Section.

137. Working Party on Tree Improvement of the North American Forestry Commission, FAO

Dr. J. Maini informed the Committee about the work of this group, composed of delegates from Mexico, the United States and Canada. One meeting is held every year for the purpose of exchanging information and planning of co-operative programs. Some such programs include the development of computerized data banks incorporating records of field trials and the study of gene resources. Other activities concern the establishment of centers for seed exchange at the international level.

138. Membership

a) New Members. The following were elected members of the Committee:

Mr. A.J. Herridge	Sponsoring	Chief, Timber Branch, Ontario Department of Lands and Forests, Toronto, Ont.
Dr. W.R. Henson	Sponsoring	Chief, Research Branch, Ontario Department of Lands and Forests, Maple, Ont.
Dr. André D'Aoust	Active	Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
M. Armand Corriveau	Active	Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Dr. R. Girouard	Active	Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Dr. M. Hubbes	Active	Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Mr. K.T. Logan	Active	Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Dr. D.F.W. Pollard	Active	Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Mr. J.B. Santon	Active	Canadian Forestry Service, Petawawa Forest Experiment Station, Chalk River, Ont.
Mr. R. Day	Corresponding	Ontario Department of Lands and Forests, Metcalfe, Ont.
Mr. M. Gutz	Corresponding	Shade Tree Research Laboratory, University of Toronto, Toronto, Ont.

Mr. W.D. Harkness	Corresponding	American Can of Canada Ltd., Marathon, Ont.
Dr. Marcel Lortie	Corresponding	Le Service Canadien des Forêts, Région Québec, Ste-Foy, Qué.
Mr. L.A. Smithers	Corresponding	Canadian Forestry Service, Ontario Region, Sault Ste. Marie, Ont.

b) Change in Membership Status. Upon request, the status of the following members has been changed from "Active" to "Corresponding":

M. Jean M. Fortin, Dr. A.K. Hellum, Dr. R.W. Kennedy.

c) Deceased Member.

The death of Dr. George Allen in September 1968 was recorded with regret. The Chairman has written to Dr. Allen's widow expressing our sympathy.

d) Resignations.

Dr. J.S.L. Daviault, Mr. E.S. Huestis, Mr. J. Nicholson.

#### 139. Location of Next Meeting

An invitation from the British Columbia Forest Service had been received to hold the Thirteenth Meeting at Prince George where Mr. G. Kiss is located.

Motion: moved by C.W. Yeatman, seconded by H.S. Swan, that the offer to hold the next meeting of the Committee at Prince George be accepted.

Carried.

#### 140. Date of Next Meeting and Committee Reorganisation

Discussion of the date of the next meeting evoked a number of critical comments. Some members felt that a two-year "resting period" was detrimental to the aims of the Committee. The Committee had not been a forceful voice in Canadian tree breeding and not active enough in identifying problems; perhaps an "executive committee" should be formed. Furthermore, choosing the last day of the biennial meeting for the business session was not considered conducive to good attendance and representative discussions. In response to these criticisms, Dr. C.W. Yeatman pointed out that in the past despite requests from the Executive Secretary, very few items for the business meeting and other suggestions had been received. In any reorganisation no hasty decisions should be made and a subcommittee could investigate these problems.

Motion: moved by J. Klein, seconded by L. Kennedy that the next meeting be held one year earlier, i.e. in 1971.

Carried.

Motion: moved by J. Klein, seconded by A. Carlisle, that a sub-committee be set up to study the structure and organization of the Committee, and that a report be submitted at the next meeting.

Carried.

A. Carlisle, L. Kennedy, and H.S. Swan were nominated for this Committee.

141. Election of Officers

Dr. D.P. Fowler and Mr. G. Kiss were elected Chairman and Co-chairman, respectively, of the Committee. Dr. L. Roche was elected Executive Secretary.

142. Special Recognition of Members

Dr. L. Roche suggested that two Canadian tree breeders and senior members of the Committee, Mr. M. Holst and Dr. A.L. Orr-Ewing, be commended for their work. There was unanimous consent.

143. Appreciation

On behalf of all Committee members, Dr. C.W. Yeatman thanked the Chairman and Executive Secretary, Drs. Louis Parrot and E.K. Morgenstern, for their work in preparation of this meeting. He also expressed appreciation to Dean Porter and his Faculty and staff for their hospitality and assistance.