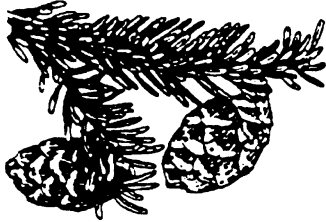

CANADIAN TREE IMPROVEMENT ASSOCIATION/
ASSOCIATION CANADIENNE POUR L'AMÉLIORATION DES ARBRES



Tree Seed Working Group

NEWS BULLETIN

No. 35, August 2002

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CHAIR'S 'ARMCHAIR' REPORT

It has been an exciting and eventful time for myself since the last News Bulletin. Government downsizing is proceeding in BC with a move to the 'privatization' of all nurseries and seed orchards. The softwood lumber tariffs seem to dominate any discussions concerning forestry and hopefully we will see a fair resolution in the near future. I had the opportunity to visit a few seed centres over the Christmas holidays: the Centre de Semences Forestières de Berthier in Quebec; the research station in Uherske Hradiste with its ISTA laboratory and the Seed Processing plant in Týniště nad Orlicí, both in the Czech Republic. I'd like to thank my hosts Michelle Bettez, Zdeňka Prochazkova, and Zdeňka Hlavová for excellent tours and enlightening conversation. Last, but not least, I got married at the end of March. Life is good!

The workshop topic for the CTIA meeting in Edmonton was "Genetic and Physiological Control of Seed Dormancy and Germination" and an agenda is enclosed within the Newsbulletin. Approximately 50 people attended the workshop and many had complimentary comments. I would like to thank all of our speakers for taking the time to prepare excellent presentations spanning the gamut from the biochemical level to the very practical. The 2004 CTIA meeting will probably be held in Vernon, BC.

The theme of this issue concerns the legislation, policies and procedures used to 'manage' the use of tree seed in Canada. A warm thank you to all of the contributors – the News Bulletin would not happen without you. In many provinces seed legislation and policy are evolving quickly and one may find quite a different situation in a years time. This trend probably will continue for some time – here is a snapshot of today's situation across Canada and beyond with a special thanks to Pat Doody for his overview of the situation in Ireland.

The next News Bulletin theme will be more operationally focused as we look at "Quality Assurance Monitoring" with respect to our facilities (orchards, seed centres, nurseries) and how we assure our clients are receiving a quality product. With greater expectations of quality from cones, seed, and seedlings

this topic is important in order to stay current and competitive in today's market. I'll be brief here, but expect me to have lots to say on QA as a review of our program will be a major part of my summer. Enjoy what is left of your summer.

Dave Kolotelo
Chair TSWG



EDITOR'S NOTES

It has been an exceptionally busy field season and as fall quickly approaches, the May issue of the TSWG NewsBulletin has unfortunately become the August issue. I sincerely apologize for the tardiness of this issue - Dave, as usual, received great cooperation with regard to articles, (they were received several months ago). The fault is mine. I want to extend a special thanks to John Letourneau who has done the lions share of work on compiling and editing this issue.

Dave is also being very proactive in trying to resurrect our TREESEED Discussion Group. It has been dormant for some time now. Hopefully by the next issue we should have some good news, including information on the electronic posting of our Tree Seed NewsBulletin.

Ron Smith
Natural Resources Canada
Canadian Forest Service, PO Box 4000
Fredericton, New Brunswick
E3B 5P7
Tel: (506)452-3533
Fax: (506)452-3525
Email: rosmith@nrccan.gc.ca



TREE SEED WORKING GROUP

Chairperson, TSWG, **Dave Kolotelo**
B.C. Ministry of Forests
Tree Seed Centre
18793 - 32nd Avenue
Surrey, B.C. V4P 1M5
Tel.: (604)541-1683
Fax.: (604)541-1685
Email: Dave.Kolotelo@gems7.gov.bc.ca

Editor of the News Bulletin, **Ron Smith**
Natural Resources Canada
Canadian Forest Service
Atlantic Forestry Centre
P.O. Box 4000
Fredericton, N.B. E3B 5P7
Tel.: (506)452-3533
Fax.: (506)452-3525
Email: rosmith@nrccan.gc.ca

Comments, suggestions and contributions for the Newsletter are welcomed by the Chairman or Editor.

TREE SEED WORKING GROUP CTIA WORKSHOP

The Tree Seed Working Group had a workshop in conjunction with the CTIA meeting in Edmonton, Alberta. The workshop was held on Monday, July 22nd at the University of Alberta. The theme for the workshop was Genetic and Physiological Control of Seed Dormancy and Germination and featured some of our foremost seed scientists.

Agenda

- 8:30 **David Kolotelo**
Opening Remarks
- 8:35 **Dr. Allison Kermod**
Physiological Control of Dormancy in North Temperate Conifers
- 9:05 **Dr. Tannis Beardmore**
Physiological control of Dormancy in North Temperate Angiosperm Trees
- 9:35 **Dr. David Gifford**
The breakdown and use of seed reserves in North Temperate Conifers and Angiosperms
- 10:05 **COFFEE**
- 10:35 **Dr. Frank Sorensen**
Adaptive Variation in Dormancy and Timing of Germination of Seeds of North Temperate Conifers
- 11:05 **Dr. Yousry El-Kassaby**
Genetic Control of Germination Parameters in North Temperate Conifers
- 11:35 **Dale Simpson**
National Gene Conservation Initiative
- 11:45 **Business Meeting**

Some of the speakers will be including an abstract in the proceedings. If you require additional information on the topics presented it would be best to contact the respective speakers directly.

David Kolotelo



NATIONAL TREE SEED REGULATIONS

There is no National Act which specifically deals with tree seed or reproductive material. Testing, inspection, quality, and sale of tree reproductive material is under the broad auspices of the Seeds Act. This act and its regulations are administered by the Minister of Agriculture and Agri-Food and therefore focuses on agricultural crops. Tree reproductive material exported from Canada may require certification. When this is required, the rules prescribed by the Organization of Economic Cooperation and Development Scheme for

the Control of Forest Reproductive Material Moving in International Trade are followed. The Canadian Forest Service (CFS) is the designated authority which provides inspection and registration and issues certificates. Seed certification was reviewed by Wang and Sziklai (1969).

In the absence of national standards of genetic and physical quality, each province has developed standards to fit its own needs. In the early 1980's, Doug Pollard, George Edwards, and Ben Wang (all ex CFS, retired employees) developed a draft set of regulations. The purpose of these federal regulations was to provide uniform minimum standards for seed transactions among the provinces and territories. They were not intended to supplant or override existing provincial regulations. One of the main objectives was to impose some kind of control over inter-provincial movement. If regulations regarding forest reproductive material were approved and adopted then there would be a national set of "rules". The regulations would provide: protection for the producers as well as assurance to seed users such as assurance to seed purchasers that descriptions declared on labels and certificates were accurate and provide protection for seed purchasers based on schemes such as OECD and standards of the International Seed Testing Association. It would also provide a means for the Federal Minister to monitor and if necessary regulate the long-distance movement of seeds, and establish federal leadership in the standards for genetic and physical quality of forest tree seeds. These regulations had the potential to guarantee that the genetic composition of seed lots for reforestation purposes contain sufficient genetic diversity to ensure healthy future forests.

Following numerous drafts which were reviewed by provincial governments and companies, a meeting was held in Ottawa in the mid 1980's. It became apparent at the meeting that the regulations would not be accepted. As a result the authors decided to publish the regulations as guidelines for voluntary application (Edwards *et al.*, 1988). After this time, the regulations were resurrected. Following two more revisions, a meeting was held in August, 1991 in Ottawa in conjunction with the Canadian Tree Improvement Association meeting to discuss "Regulations Respecting the Labeling and Registration of Tree Reproductive Materials." This was the final opportunity to accept the regulations. At the meeting there were a number of issues discussed and several which could not be resolved. The result was that the regulations were not accepted. Hence, regulations concerning forest reproductive material remain under the auspices of the Seeds Act.

Considerable time and effort was expended by a number of people drafting, reviewing, and revising these regulations. They were formulated at a time when all seed used for reforestation was collected from natural stands. As reforestation programs developed and expanded over the years, there probably were a number of inappropriate inter-provincial, USA/Canada, and inter-continental seed movements when seed from

"local" sources may have been in short supply. Now that tree improvement programs are maturing and significant quantities of genetically improved seed are being produced there is probably less concern about inappropriate movements of seed, although they occasionally do occur. With CFS having lost Departmental status and due to further fiscal constraints it would be a challenge to administer these regulations.

Importation of tree seed falls under the Seed Regulations of the Seeds Act. However, these Regulations are very specific to agricultural crops. Therefore, it is best to contact a Canadian Food Inspection Agency (CFIA) representative to determine what the necessary requirements are for tree seed. For example, an import permit may be required for some species as well as a phytosanitary certificate. Exemptions may apply depending on the weight of seed being imported. The CFIA has just released a directive containing general import requirements for plants and plant parts. It can be found at the following URL: <http://www.inspection.gc.ca/english/plaveg/protect/di r/d-02-02e.shtml>

Exportation is governed by regulations of the country the seed is being exported to and there may be additional requirements by Canada. Again, it is best to contact a CFIA representative to determine what the necessary requirements are. For example, some countries require an import permit for certain species and other countries may not require an import permit. A phytosanitary certificate is generally required by all countries. If an import permit is required, the person or agency who is importing the seed must obtain this and send it to the person or agency who is exporting the seed. This document must accompany the shipment. As mentioned at the beginning, the OECD Scheme is applied to seed that is sold to Europe. Under this Scheme, reproductive material falls into 4 categories: source-identified, selected, untested seed orchards, and tested reproductive material. *Source-identified* refers to material originating from a specific geographic location (stand). Practically all seed that has been OECD certified and sold has been in this category. *Selected* refers to a specific stand or population that has been phenotypically selected for exhibiting a superior trait or traits. *Untested seed orchards* is self-explanatory. Such orchards must be registered. Guidelines have been published outlining what information is necessary to register an orchard (Edwards and Portlock, 1986). *Tested reproductive material* must be identified on the basis of data collected from field trials such as progeny tests.

Seed certification has been publically discussed in Canada for over 30 years but there are still no national regulations. An attempt was made in the 1980's to develop such regulations but they were not unanimously accepted by the provinces. A new type of certification arose in the 1990's; forest practices/operations certification. Companies and provinces have come to accept this as a necessary means to remain competitive on the global market.

Does domestic seed or reproductive material certification have a role too?

For further information on the Seeds Act, go to the following web site:

<http://laws.justice.gc.ca/en/S-8/index.html> .

Edwards, D.G.W. and Portlock, F.T. 1986. Expansion of Canadian tree seed certification. *For. Chron.* 62: 461-466.

Edwards, D.G.W., Pollard, D.F.W. and Wang, B.S.P. 1988. Guidelines for grading and labeling forest tree seeds in Canada. *For. Chron.* 64: 334-344.

Wang, B.S.P. and Sziklai, O. 1969. A review of forest tree seed certification. *For. Chron.* 45: 378-385.

Dale Simpson

Natural Resources Canada
Canadian Forest Service
P.O. Box 4000
Fredericton, NB E3B 5P7

Ben Wang

Natural Resources Canada
Canadian Forest Service
Petawawa Research Forest
P.O. Box 2000
Chalk River, ON K0J 1J0



**FOREST TREE GENE RESOURCE
MANAGEMENT IN BRITISH COLUMBIA**

This article is a portion of the full BC Ministry of Forests, Tree Improvement Branch Update extension note, "Forest Tree Gene Resource Management in British Columbia, May, 2002 (Volume 6, Number 1)" that can be found at <http://www.for.gov.bc.ca/tip/publications/updates/vol6no1.pdf>. This extension note has been published as a companion piece to the discussion paper, "A Results-Based Forest and Range Practices Regime for British Columbia", released for public review and comment on May 1, 2002. Implementation of the new Results Based Code legislation and policy is planned for Spring, 2003. For more information, please refer to the following web sites: <http://www.resultsbasedcode.ca> and <http://www.fgcouncil.bc.ca>.

Establishment of a comprehensive provincial forest tree gene resource management (GRM) model, for implementation at both a *stand* and *landscape* level, is critical to achieving sustainable forest tree gene resources within British Columbia. A viable and effective GRM model should be broad enough in scope to meet the:

- Stewardship responsibilities of BC's forest tree gene resource managers,
- Goals and objectives identified by the Forest Genetics Council of British Columbia,
- New results-based policy requirements for land-based decision makers,
- Monitoring requirements for policy/program implementation, and the requirements of
- Higher-level forestry initiatives (e.g. Criteria and Indicators, Forest Certification Schemes).

Gene Resource Management – New Directions:

Over the past decade, the development of technical standards for genetic diversity at the *stand level* has ensured that stock used in reforestation has high genetic quality, and is well adapted to its planting site. Further development of a GRM model for implementation across a spatial-temporal scale is needed to encompass broader land-based gene resource objectives. The development of *landscape level* goals and objectives is proposed to enable the sustainable management of British Columbia's complex forest tree gene resources over the long term.

Impact of High Level Initiatives/ Policy Changes:

Recently, there has been an industry-wide response to trade agreements, international market pressures, environmental pressures, and, in BC, economic downsizing. Three broad, high level initiatives and/or impending policy changes are part of this response: 1) **Results Based Code**, 2) **Zonation** (Land Use Zones) and 3) **Certification**. Implementation of these initiatives and/or changes will have a major impact on how land-based resources are managed in British Columbia over the coming years.

Results Based Code: The Results Based Code (RBC) will impact policy implementation for sustainable forest management and stewardship objectives. With RBC, the focus is on a results-based framework allowing for flexibility, reduction in regulatory burden while encouraging innovative forest practices.

Land Use Zones: Land Use zones and objectives provide spatially explicit and measurable targets for a number of forest resource values where management is effected at the landscape level. Resource development plans, for which legislated requirements will be met through results-based RBC regimes, must also be consistent with the landscape level objectives set out for that land use zone.

Certification: Over the past few years, participation by both government and industry stakeholders in nationally and internationally recognized "Certification schemes" has increased substantially within British Columbia. This rise in participation is expected to continue, with increased scrutiny of land use management and results. Under certification, we can expect to face new challenges on how best to manage our forest tree gene resources as sustainable forest management objectives.

A New Delivery Model: As the focus on GRM shifts to include both the *stand* and the *landscape* levels, implementation of a new GRM delivery model is critical to our success in meeting long term stewardship goals and objectives.

Two key points describe the expected outcomes from delivery of a new GRM model:

1. The ability to track genetic diversity, allowing
 - Integration of GRM with sustainable forest management plans,
 - Response to the requirements of Certification schemes, and
 - Greater ability to monitor and assess risks to forest tree gene resources due to forest management practices, forest health threats, urban encroachment, or climate change.
2. Provision of a framework in which to move science-based information and principles forward, aiding:
 - Integration of GRM with other land-based resource objectives (e.g. Biodiversity, Wildlife Tree Retention, Land Use/ Landscape Planning) and,
 - Incorporation of existing, and identification of new 'set aside' areas or reserves for gene conservation within a meaningful planning framework.

GRM – Goals and Objectives: A GRM land use plan (or component) would likely include goals and objectives that define permitted uses and/or levels of intensity in the following areas: 1) Diversity, 2) Gain, and 3) Preservation Areas (where needed). GRM land use objectives would be tied to other resource values and permitted uses/intensities (including timber resource values). Temporal issues would also require consideration for monitoring GRM objectives over time.

Benefits of a Landscape-based GRM Model: Implementation of a provincial GRM model at the landscape level will allow us to:

- Provide the strategic plan and framework to integrate GRM with Forest Genetics Council goals and objectives;
- Fully identify the roles and responsibilities necessary for stewardship of the province's forest tree gene resources;
- Integrate the use of GRM within the existing management unit / landscape unit (MU/LU) framework;
- Develop GRM objectives in keeping with other resource management objectives (Biodiversity, Visual Quality, Recreation, Cultural Heritage)
- Integrate GRM with Certification requirements based on C&I standards (genetic diversity);
- Deliver GRM tools at the operational level to aid in the development of sustainable forest management plans (SFMP's);
- Provide adequate records to assess population response to environmental change and/or disturbance brought about through forest management practices; and
- Provide adequate records for *in-situ* and *ex-situ*

- Gene bank/reserve management strategies due to disturbance factors, pest infestations and other gene conservation needs.

Leslie McAuley

Seed Policy & Planning Officer
Tree Improvement Branch
BC Ministry of Forests

Alvin Yanchuk

Manager, Forest Genetics, Research Branch
BC Ministry of Forests



THE FOREST PRACTICES CODE AND TREE SEED IN BRITISH COLUMBIA

The collection, processing, registration, storage and use of tree seed in British Columbia is currently governed by the *Forest Practices Code of British Columbia Act* (Code) and its attending regulations and guidebooks (specifically the *Silviculture Practices Regulation*, the *Tree Cone, Tree Seed and Vegetative Material Regulation*, and the *Seed and Vegetative Material Guidebook*), and several policies and standards established by the BC Ministry of Forests. A brief description of these requirements follows.

The Code applies to Crown and private land subject to tenures issued in accordance with the *Forest Act*. Persons who incur reforestation obligations under the Code, are responsible for establishing a new forest at their own expense, including the costs associated with procuring seed and seedlings. If planting is prescribed, the person, with some provision for exemptions, must use tree seed

- collected under a cone collection permit issued by the ministry, if wild seed is to be used,
- collected from a seed orchard licenced with the ministry, if seed orchard seed is to be used,
- registered with the ministry, and thus meeting the ministry's technical physical and genetic quality standards,
- stored at the ministry's Tree Seed Centre,
- derived from the best genetic quality source available (e.g. seed orchards),
- derived from naturally or genetically improved resistant sources, if available, where forest health concerns exist, and
- in accordance with its applicable transfer guidelines.

Persons must also keep a record of the planting locations where tree seed is used and submit new information biannually to the ministry. Persons who buy, sell, trade or process tree cones or seed must also possess a licence issued by the ministry, which obligates the person to keep a record of transactions. With the exception of storage with the ministry, all of the above rules apply to cuttings and other vegetative propagules. Collectively these rules ensure that plantations remain productive and stable over time, and

permit the tracking of seed from its source to its planting site. Monetary penalties and administrative remedies encourage compliance.

Further description, and links to the legislation, regulations, guidebook, standards etc. referenced above, can be found on the ministry's Tree Improvement Branch website located at: <http://www.for.gov.bc.ca/TIP/>

Brian Barber, RPF
Technical Advisor
Tree Improvement Branch
Ministry of Forests
Victoria, BC
Brian.Barber@gems4.gov.bc.ca



MANITOBA CONSERVATION, FORESTRY BRANCH - TREE SEED GUIDELINES

There is currently no legislation in Manitoba concerning the use of tree seed within the province. Policies and guidelines concerning seed control zones were initially proposed by Ron F. Calvert in 1973. He divided the province into 12 seed zones based on climatic, physiographic, vegetative and latitudinal factors. John Dojack revised these seed zones in 1990 based on additional information on ecoregions delineated by G. D. Adams in 1985 and some realignment of boundaries to improve administrative efficiency. There are currently 13 seed zones common to all species with definable physical or geographic boundaries. Dojack also outlined guidelines for the movement of seed between and within these seed zones.

The Forestry Branch seed collection program is administered by the Head Office, while the collections are conducted by staff in each of the six regions. The three forest companies are responsible for their own seed collections. The Forestry Branch recently produced forms adopted by the regions and forest companies to better track information and identity of seed sources. The Forestry Branch encourages the collection of better seed through selection of good source stands, establishment of seed production areas and cooperation in tree improvement programs to produce genetically improved seed.



THE REGULATION OF SEED IN NEW BRUNSWICK

In New Brunswick, approximately 49% of the productive forest is owned by the Province, 30% is owned by private woodlot owners, and 21% is large Industrial freeholds. The Province manages the Crown Land according to the Crown Land and Forests Act, and the regulations associated with this Act. At the present

time there are no regulations specifically related to seed sources and seed movement in the Act. However, the Department of Natural Resources & Energy (DNRE), the government body that is responsible for the management of Crown Land, grows all of the seedlings for Crown Land and recommends appropriate seed sources.

Unlike some of the larger provinces, New Brunswick, for the most part, is treated as one seed zone with respect to the planting of reforestation material. There are a couple of exceptions to this, which include red spruce, where there is a southern and northern seed source, and some seed sources of Norway spruce. All of the other reforestation species are planted on suitable sites throughout the Province with no boundaries. The fact that the Province selects the seed sources and grows the seedlings for Crown Land ensures that well adapted trees are planted, and reduces the need for legislated regulations.

The DNRE also has a very strong tree improvement program that has been very active since the program started in the early 1970's. Providing well adapted seed sources and improving the quality of the seedlings planted has been a major objective of DNRE and the New Brunswick Tree Improvement Council (NBTIC). The six industrial members on the NBTIC are also very active in the tree improvement program and the member agencies with large industrial freeholds have their own seed orchards and are very aware of the importance of seed source.

The private woodlot owners purchase seedlings from private local nurseries. Many of these local private nurseries purchase the seed from DNRE via the Atlantic Forest Seed Centre. The Seed Centre sells excess local seed to private nurseries and Christmas tree growers. So, for the most part, the private woodlot owners are also receiving seedlings of appropriate origin. The proportion of planting on private land is considerably less than on Crown Land.

In summary, although there are no legislated seed regulations, the players involved in reforestation and collection of seed are well aware of the importance of planting appropriate seed sources. The commitment of the Provincial Government and the Industrial Partners to tree improvement has resulted in a well educated and informed group with regards to the importance and knowledge of seed sources. We are fortunate to have such a dedicated group of professionals contributing to the forests of New Brunswick.

Kathy Tosh, RPF
DNRE- Tree Improvement Manager



SEED REGULATIONS IN NOVA SCOTIA

Nova Scotia does not have seed usage regulations governing how and where seed is deployed within the province. I am happy to report that all nurseries within Nova Scotia do use first generation orchard seed from the Department of Natural Resources orchards' or similar company orchards. Nova Scotia orchards produce white spruce, black spruce, red spruce, Norway spruce and white pine seed.

Nova Scotia's breeding program uses two seed zones for the entire province. Since the province is quite narrow we are able to use one seed zone for genetically improved seed for lowland planting. The Cape Breton Highlands are considered to be a second seed zone within Nova Scotia. With minimal harvesting occurring on the Highlands at this time, staff were unable to justify a separate breeding program for this unique environment. The proliferation of natural balsam fir on the Highlands makes the planting of any other species a difficult proposition at best.

Brian F. White



ONTARIO MOVING TOWARD COLLECTOR CERTIFICATION

In June of 2000 the Ontario Tree Seed Plant hosted our first Tree Seed Collector Certification Workshop in Partnership with the Forest Gene Conservation Association. This was the beginning of our first step toward developing a network of trained collectors and ultimately certifying seedlots.

Demand for seedlot certification is coming from a wide variety of Seed Plant clients with the same ultimate objective; to ensure a supply of quality seed from identified and trackable/certifiable sources.

The initial interest came through the Forest Gene Conservation Association and was primarily driven by Southern Ontario markets in conjunction with a program to educate the treeplanting consumer to the importance of seed source. It is anticipated that the educated consumer will drive the growers to demand seed of known source or possibly certified seedlots. The curriculum was developed through the Forest Gene Conservation Association.

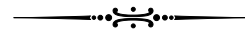
At the same time our major industrial clients, mainly from Northern Ontario, were moving towards "green" certification of their forest products. It is anticipated that part of the certification of their silvicultural practices will include a requirement for known source or possibly certified seedlots.

At the same time as our clients' needs were changing, so was the core business mandate of MNR field offices. This meant that MNR technicians were no longer

directly involved with seed collection and a direct relationship between the collectors and the Seed Plant was established. The new relationship has placed a much greater responsibility on the collector to ensure seed is collected and handled correctly.

We are heading into our third season (summer 2002) of collector training. The demand for the training is high with many of our industry clients and other partners getting involved to ensure their staff are certified to oversee their seed collection programs. We will soon have enough certified collectors spread across the province to ensure that all collections coming in to the Ontario Tree Seed Plant will be from certified collectors.

Al Foley
Plant Manager, Ontario Tree Seed Plant
Ontario Ministry of Natural Resources



LEGISLATION AND POLICIES CONCERNING THE USE OF TREE SEED IN QUEBEC

In the first place, it must be mentioned that there is no specific provincial legislation in Quebec governing forest tree seed production and use.

However, under the *Act respecting the ministère des Ressources naturelles* and the *Forest Act*, the Minister of Natural Resources is responsible for forest resources management in Quebec.

In particular, the Minister of Natural Resources must ensure that forest industries observe the principle of sustained yield whereby volumes harvested may not exceed what the forest can produce annually. To ensure observance of this principle, annual yields are estimated according to methods prescribed in the Forest Management Manual and must be followed by Timber Supply and Forest Management Agreement (TSFMA) holders.

In exchange, each year the MRNQ, in accordance with Section 64 of the *Forest Act*, supplies TSFMA holders with the seedlings required to carry out their obligations in regard to the level of reforestation necessary to attain sustained yield. This is done free of charge

This supply of seedlings is extended to private woodlot owners. In all, approximately 150 million forest seedlings are produced and delivered each year through our seedling production program. This represents about 500 million viable seeds per year.

Tree seed produced by the MRNQ are strictly destined to our seedling production programs. Government regulation does not allow us to intervene in the private seed market. However, surplus seed can sometimes be sold for special projects such as ornamentation or

seedling production outside MNRQ programs. Prices are then equivalent replacement cost, adjusted according to germination capacity. Surplus seed can also be supplied free of charge to certain R&D, education and promotion projects.

For requests originating from abroad, seed can be sold at production cost (on average, this price is equivalent to about 1.6 times the replacement cost).

Since the MRNQ is both the sole producer and principal user of forest tree seed, it is in our own interest to ensure observance of the “Provenance Displacement Rules”. We are easily able to certify the provenance, the genetic quality and the germination capacity of the seed. Contrary to France, for example, we do not have a separate agency responsible for seed certification. Since there is basically no private market for forest tree seed, legislation is not required to regulate its use.

**Luc Masse
Tree Seed Production**



**TREE SEED COLLECTION IN
SASKATCHEWAN**

Although Saskatchewan has no legislation or policies regarding tree seed collection, we have recently completed an exercise with each of our four Forest Management Agreement (FMA) area holders, who have developed FMA standards and guidelines for Conifer Seed Collection (amongst other subject areas).

As a provincial agency, Saskatchewan Environment no longer collects tree seed or operates nurseries, although we operated four provincial nurseries until the 1990's. FMA holders are now responsible for collecting tree seed and providing them to private nurseries who prepare their seedlot.

We are currently developing provincial standards and guidelines, which will supercede those prepared by our FMA holders. We anticipate commencing provincial conifer seed collection/seed orchard standards and guidelines in the next two years. Please contact Pat Mackasey of Saskatchewan Environment's *Forest Ecosystem Branch* at (306)953-2792 if you would like further information.



**FOREST REPRODUCTIVE MATERIAL (FRM)
LEGISLATION IN IRELAND**

Forest reproductive material (FRM) is a collective term used to describe seeds, plants and other propagating material which are important for forestry purposes.

There are currently two EU Directives concerning FRM, Council Directive 66/404/EEC on the marketing of FRM and Council Directive 71/161/EEC on external quality standards for FRM marketed within the EU. These Directives set out the requirements relating to genetic characteristics and external quality which FRM must fulfill before it may be marketed in the EU. Marketing of tree seed in Ireland is controlled by these Directives.

The following is the current list of regulated species:

<u>Botanical Name</u>	<u>Common Name</u>
Pinus sylvestris	Scots pine
Pinus nigra	Austrian or Corsican pine
Pinus strobus	Weymouth pine
Picea abies	Norway spruce
Picea sitchensis	Sitka spruce
Larix decidua	European larch
Larix kaempferi	Japanese larch
Pseudotsuga menziesii	Douglas fir
Abies alba	Silver fir
Fagus sylvatica	Beech
Quercus rubra	Red oak
Quercus robur	Pedunculate oak
Quercus petraea	Sessile oak
Populus	Poplar

Categories of reproductive material

Two categories of material are covered by the current EU Directives, “Selected” and “Tested”. Selected and tested reproductive materials come from basic material officially approved in accordance with the Directives.

- Selected - material collected in, or raised from, seed collected in approved stands.
- Tested - material collected in, or raised from, seed collected in a tested seed orchard or poplar clone bank.

Within the meaning of the Directives seed stands and seed orchards for generative propagating material and clones for vegetative reproduction are classified as sources of basic material. The responsibility for the approval of this material lies with the respective national authority, which in Ireland is the Forest Service, Department of the Marine and Natural Resources. Each member state of the EU is required to compile and maintain a national catalogue of this basic material within its territory.

Collection and Marketing

Collections of seeds of the regulated species must be made in registered seed stands included in the official national catalogue. All seed collectors and suppliers of plants must be registered with the Forest Service and all seed collections must be notified in advance, stating proposed starting and finishing dates of collection.

Once the collection has been completed, the collection organizer is required to notify the Forest Service of the total amount of cones, fruit or seed collected and if applicable, the amount of seed extracted. A certificate of provenance is then issued to the seed collector. All seed must be tested in the same seed testing year as that in which it is marketed. No seed may be marketed unless a valid test certificate has been issued giving the following information:

- Percentage of germination.
- Percentage of purity.
- Number, per kilogram, of live seeds capable of germinating.
- Weight of 1,000 pure seeds in grammes.

In Ireland, this certificate is issued from the official seed testing station which is attached to the Department of Agriculture. Without this seed certification, material cannot be legally marketed for forestry use.

The marketing of FRM of the above regulated species which does not conform with either of these categories is not allowed except where special derogations are applied for and approved by the EU. A derogation may be sought to import seed of the species covered by the Directive from non-EU countries or to collect seed outside registered seed stands due to shortages of seed or crop failure. Such derogations must be applied for annually and each has a time limit. In Ireland a derogation is regularly applied for to import *Larix kaempferi* seed from Japan or *Picea sitchensis* seed from Canada or US. Currently, seed received from Canada, US and Japan is imported under OECD certificates.

The current Directive controls seed quality both in the physical and genetic sense as well as the marketing of seeds, cones, cuttings and plants that are destined for wood production. The current Directives do not apply to seeds or cones for export to non-EU countries, or to parts of plants or seedlings not intended for wood production. There are no restrictions on seeds collected for owners use, provided that these seeds are not offered for sale.

From 1st January 2003 the current Directives 66/404/EEC and 71/16/EEC will be replaced by a new Directive, Council Directive 1999/105/EC on the marketing of forest reproductive material. This Directive updates the legislation to take account of the accession of new Member States since 1975, the internal market, and scientific advances including the availability of new material. It is also compatible as far as possible with the revision of the current OECD scheme for the control of FRM moving in international trade, which dates from 1974. The Directive will apply to the production, with a view to marketing, of species which are important for a range of forestry purposes including, but not exclusively, the production of wood. The new Directive will cover a much wider range of species than the previous Directive. Species which are important for forestry in Ireland are now included such

as *Fraxinus excelsior*, *Acer pseudoplatanus*, *Prunus avium*, *Betula pendula*, *Betula pubescens*, *Alnus glutinosa*, *Pinus contorta* (coastal), *Larix eurolepis*, and *Thuja plicata*. These species are used in the Irish Forest Service grant schemes. A new category of material "Source Identified" will be included. This is forest reproductive material derived from basic material, which may be either a seed source or stand located within a single region of provenance (under the OECD scheme Ireland is classified as one region of provenance). This will allow collection and marketing of seed from outside of "Selected" registered sources subject to official control and labelling. Under the new Directive there is a legal requirement for suppliers of FRM throughout the EU to be officially registered (at present this is not a legal requirement).

Pat Doody
Seed Manager, Coillte Seed Centre
The Irish Forestry Board



NATIONAL TREE SEED CENTRE

The winter months were busy completing processing of seed collected in 2001 as well as doing germination tests, determining moisture contents, and conditioning seed. Last year was generally not a good seed year but over 130 seedlots were collected from 21 species ranging from *Acer rubrum* to *Ulmus americana*. It was a very busy year for conducting germination tests, in particular to complete testing of all white spruce (*Picea glauca*) seedlots on inventory. Over 2300 tests were conducted. In addition, moisture contents were also determined for these same seedlots making for an interesting dataset to evaluate impact of moisture content on seed storage. About 1350 seed samples were provided to researchers in Australia, Canada, China, Greece, Italy, North Korea and United States. Sixty percent of this seed was shipped within Canada and another 30% sent to China.

Numerous trials and experiments were conducted and evaluated. Germination of white elm (*Ulmus americana*) seed was improved by de-winging (see November 2001 News Bulletin). The same technique had a dramatic improvement on white birch (*Betula papyrifera*) seed germination increasing it from 37% to 60%. Two undergraduate forestry students, attending the University of New Brunswick, completed senior theses investigating germination testing protocols for striped maple (*Acer pensylvanicum*) and sugar maple (*A. saccharum*).

Five seedlots of *Acer pensylvanicum* were used to evaluate the impact of: soaking, length of stratification, and germination temperature on germination. Seeds were soaked for 0, 48, 72, and 96 hours prior to stratification for 16, 24, and 32 weeks at 4 C. Germination temperatures of 30 C days/20 C nights

and 15 C days/5 C nights were used. Soaking seed for 0 and 48 hours prior to stratification increased germination. Stratification for 16 weeks promoted maximum germination. Germination at 30 C/20 C was lower but 95% of un-germinated seeds were still alive. The cooler germination temperature of 15 C/5 C produced much higher germination but more time (7 to 8 weeks) was required for complete germination to occur. Soaking seeds for 48 hours, stratifying for 16 weeks, and germination at 5 C/15 C produced an average germination of 92% (Bourgoin, 2002)

Five seedlots of *Acer saccharum* were soaked for 0, 7, and 14 days at 4 C. After placing the seed in germination boxes for stratification, seed in one-half of the boxes was wrapped with aluminum foil to simulate anaerobic conditions. Stratification was for 2, 4, and 8 weeks at 4 C. Seed was germinated for 6 weeks at a constant 20 C temperature with a daily light period of 8 hours. The aluminum foil treatment did not improve germination. Soaking seed for 14 days and stratifying for 8 weeks produced an average germination of 6%. Practically all the ungerminated seed was still alive indicating that dormancy had not been broken (Richard, 2002).

I announced in the November News Bulletin that a web site for the Seed Centre would be online shortly. Unfortunately, there have been a number of unexpected delays. For those of you who are interested, please keep trying the following URL www.atl.cfs.nrcan.gc.ca.

Bourgoin, A. 2002. Germination testing protocols for *Acer pensylvanicum*. BScF thesis, Univ. New Brunswick, 45 p.

Richard, S. 2002. Dormancy and germination of *Acer saccharum* Marsh. seed. BScF thesis, Univ. New Brunswick, 23 p.

Dale Simpson and Bernard Daigle

Natural Resources Canada
Canadian Forest Service
Atlantic Forestry Centre
P.O. Box 4000
Fredericton, NB
E3B 5P7
Tel: 506 452-3530
Fax: 506 452-3525
E-mail: dsimpson@nrcan.gc.ca
bdaigle@nrcan.gc.ca



KEW'S SEED INFORMATION DATABASE

Release 2 of Kew's Seed Information Database - SID- is now live on our internet site at:

<http://www.rbgekew.org.uk/data/sid/>

A number of changes and improvements have been made in this release, most notably:

- A new module containing seed weight data for ca 9000 species has been added.

- The seed storage behaviour dataset has been expanded to include data for an additional 1386 species, and a number of existing storage behaviour entries have been updated to take into account new research observations.
- The wildcard character '*' can now be used to search for partial name matches within the order, family, genus and species fields.

So, please have a look, and let us know what you think, by emailing sid@rbgekew.org.uk. All constructive criticism gratefully received, as will be offers of data and tip-offs to where it might be found.

The prototype (release 1) was essentially the well known (or ought to be!) 'Compendium of Seed Storage Behaviour', by Hong, Linington and Ellis. Another release is due in July 2002, when we intend to put out germination data for several thousand species, as well as updating the content of the current modules.

John Dickie

Royal Botanic Gardens, Kew Wakehurst Place, Ardingly, Haywards Heath West Sussex
RH17 6TN, UK
Tel direct + 44 -(0)1444 -894115
Fax direct + 44 - (0)1444 -894110
Email: j.dickie@rbgekew.org.uk