National Tree Seed Centre

Annual Report

2015

J.D. Simpson

National Tree Seed Centre
Natural Resources Canada
Canadian Forest Service
Atlantic Forestry Centre
Fredericton, N.B.
April 2016

NATIONAL TREE SEED CENTRE ANNUAL REPORT 2015

EXECUTIVE SUMMARY

The number of seedlots in storage increased to 14,071. Of this number, almost 6,900 seedlots are stored under Seed Bank and are available for research, and over 5,000 seedlots are stored for gene conservation.

Forty-four collections were made by Seed Centre staff. In addition, 348 seedlots were donated and purchased. Of that number, a significant donation of 317 seedlots of 21 species was received from Agriculture and Agri-Food Canada, Agroforestry Development Centre in Indian Head, Saskatchewan.

A total of 37 requests for seed resulted in 224 seedlots provided for research. The majority of the requests were from Canada (33 requests; 211 seedlots) but seed was also sent to Ireland (1 request; 4 seedlots) and United States (3 requests; 9 seedlots).

Seed testing consisted of 931 germination tests, 518 moisture content tests, and 65 thousand-seed weight tests. A significant proportion of the germination testing was re-testing of seedlots tested 10 years ago which provides an up-to-date assessment of seed quality. The data are also used to evaluate long-term storage potential. About 500 seedlots were conditioned to lower seed moisture content.

Results from an experiment to determine optimal treatment protocols to maximize germination of pin cherry (*Prunus pennsylvanica*) seed demonstrated that 2 weeks of moist incubation followed by 20 weeks of moist chilling were sufficient. This trial was conducted to improve seed germination for nurseries growing seedlings for mine site reclamation in Alberta.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

In the 1960s, tree genetics and breeding research was expanding across Canada. There was increasing demand for small quantities of seed of known origin and quality for provenance testing. In response to this need, the Canadian Forest Service (CFS) established the National Tree Seed Centre (NTSC) in 1967 at the Petawawa Research Forest (formerly Petawawa Forest Experiment Station), Chalk River, Ontario. At that time, reforestation programs across Canada were being initiated or were expanding and there was a need for large quantities of high quality seed as well as knowledge on how to collect, process, test, and store tree seed. Germination testing protocols existed for the major conifer reforestation species, but in some cases, fine tuning was required. As well, the NTSC played an active role in acquiring and disseminating seed of native and non-native species to researchers for establishing provenance trials and other genetic tests. A significant accomplishment of the NTSC was the development of the Petawawa Germination Box. This was in response to the need for a container of appropriate size to permit maximum use of germinator space, allow for full development of germinants, and maintain uniform moisture levels in the germination medium.

Canada was the first industrialized country to ratify the Convention on Biological Diversity (CBD) in 1992. This national commitment is high-lighted in Article 9: "Establish and maintain facilities for ex-situ conservation of and research on plants, animals and micro-organisms, preferably in the country of origin of genetic resources". As a signatory to the CBD, Canada was obligated to develop a national biodiversity strategy. Accordingly, a Federal-Provincial-Territorial Biodiversity Working Group was established to develop the Canadian Biodiversity Strategy that was released by the Biodiversity Convention Office of Environment Canada in 1995. Under the Forested Areas section of this Strategy, Strategic Direction 1.74 is to "Establish and maintain forest seed and clonal gene banks to conserve genetic diversity of tree species". In response to the Canadian Biodiversity Strategy, in 1997 the CFS published a 3-year Action Plan that stated that CFS will "Maintain a national forest seed bank to conserve genetic diversity, while continuing to develop protocols for ex situ conservation of forest genetic resources".

Following a review of the research program within the CFS, the NTSC was transferred to the Atlantic Forestry Centre in Fredericton, N.B. in 1996. The mission of the NTSC is "to safeguard Canada's forest genetic resources in the face of climate change and other threats by acquiring, evaluating, preserving, and providing a national collection of forest genetic resources to assist in securing the forest biological diversity that underpins the sustainable development of Canada's forests".

This report covers the activities of the NTSC for 2015. Similar reports were prepared from 1998−2014. The report also captures the results of tests and experiments that were conducted during the year in order to ensure that this information is synthesized and reported.

INVENTORY STATUS

Seed is stored in four categories: Seed Bank, Gene Conservation, Reserved, and Tree Breeding (Table 1). The total number of seedlots increased by 129 to 14,071 in 2015. The numbers in brackets in Table 1 represent the numbers reported in the 2014 Annual Report.

Table 1. Seed stored at the NTSC as of December 31, 2015.

Seed Bank		Gene Conservation		Reserved		Tree Breeding	
No. species	No. seedlots	No. species	No. seedlots	No. species	No. seedlots	No. species	No. seedlots
156 (148)	6,891 (6,893)	52 (50)	5,081 (4,950)	37 (37)	1,709 (1,709)	10 (10)	390 (390)

The Seed Bank category is the active portion of the collection and represents seedlots that are available for distribution for research. Since 1998, the number of seedlots in the Seed Bank collection has increased from 3,079 to 6,891 (Figure 1). This number includes seedlots from native and non-native species. The increase represents the net gain after discarding seedlots due to low germination and the depletion of seedlots as they are provided to clients. In 2015, 18 seedlots were discarded and 16 seedlots were depleted.

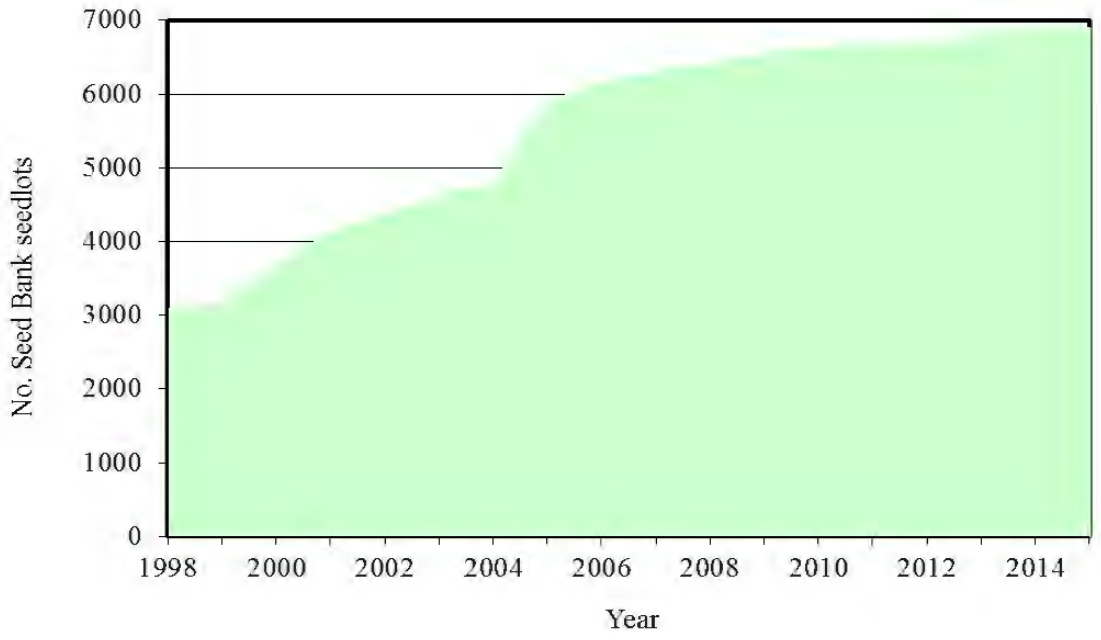

Figure 1. Increase in number of Seed Bank seedlots stored at the NTSC since 1998.

One of the objectives of the NTSC is to obtain seed samples of Canadian tree and shrub species from across their natural ranges. As of December 31, 2015, the NTSC Seed Bank had 6,601 seedlots of 111 species in storage from locations in Canada (Table 2). Seed from 45 non-native species as well as native species from the United States (290 seedlots) are also stored. Seed is also stored from non-native species growing in Canada, but most of the 290 seedlots are from species native to other countries. The proportion of seedlots from non-native species continues to decrease as seedlots are discarded due to low germination or are exhausted due to client requests. No effort is made to replace them.

Table 2. Number of native species, number of seedlots, and percentage by province or territory of seedlots stored in the Seed Bank category.

Province	No. species	No. seedlots	Percent
Alberta	14	53	0.8
British Columbia	33	358	5.4
Manitoba	7	65	1.0
New Brunswick	63	1,499	22.7
Newfoundland and Labrador	17	169	2.6
Nova Scotia	40	550	8.3
Ontario	49	2,417	36.6
Prince Edward Island	34	253	3.8
Quebec	22	1,042	15.8
Saskatchewan	11	145	2.2
Yukon Territory	3	50	0.8
Total	111	6,601	100

Since the NTSC moved to Fredericton, effort has concentrated on acquiring collections from New Brunswick, Nova Scotia, and Prince Edward Island. Travel beyond the Maritime Provinces is challenging due to limited resources (staff and budget). There is an ongoing effort to acquire seed from other provinces and seed centres when opportunities arise. These seedlots are purchased or obtained through donation.

The Gene Conservation category was initiated in 2000 using seed already in storage. Its purpose is to conserve the genetic variation occurring in natural populations as well as to ensure that genetic material from rare, endangered, or threatened species as well as unique populations is preserved. Over the past ten years, seed collecting has focused on expanding the Gene Conservation collection. Any surplus seed from these collections is placed in Seed Bank. The collection increased by 131 to 5,081 primarily due to 89 accessions of butternut (*Juglans cinerea*) that were collected in 2013 and

2014. Butternut is listed as endangered by the Species at Risk Act. Dr. Tannis Beardmore has secured funding for four years from the Interdepartmental Recovery Fund. One objective is to collect and store germplasm from populations in New Brunswick. Butternut fruit are classified as recalcitrant however, the embryonic axis is excised and stored in liquid nitrogen (-196°C) in the Seed Centre's cryogenic facility. Parks Canada Agency in Radium, BC donated seven seedlots of *Pinus albicaulis*. The Seed Centre is providing back-up storage of germplasm from this nationally listed endangered species. Twenty *Pinus strobus* and ten *Ulmus rubra* seedlots were added from collections made in Ontario. Figure 2 shows the increase in the number of seedlots in this category since 2000. There are seed and embryos from 52 species in Gene Conservation with the number of accessions per species ranging from 1 to 1,641 (Table 3).

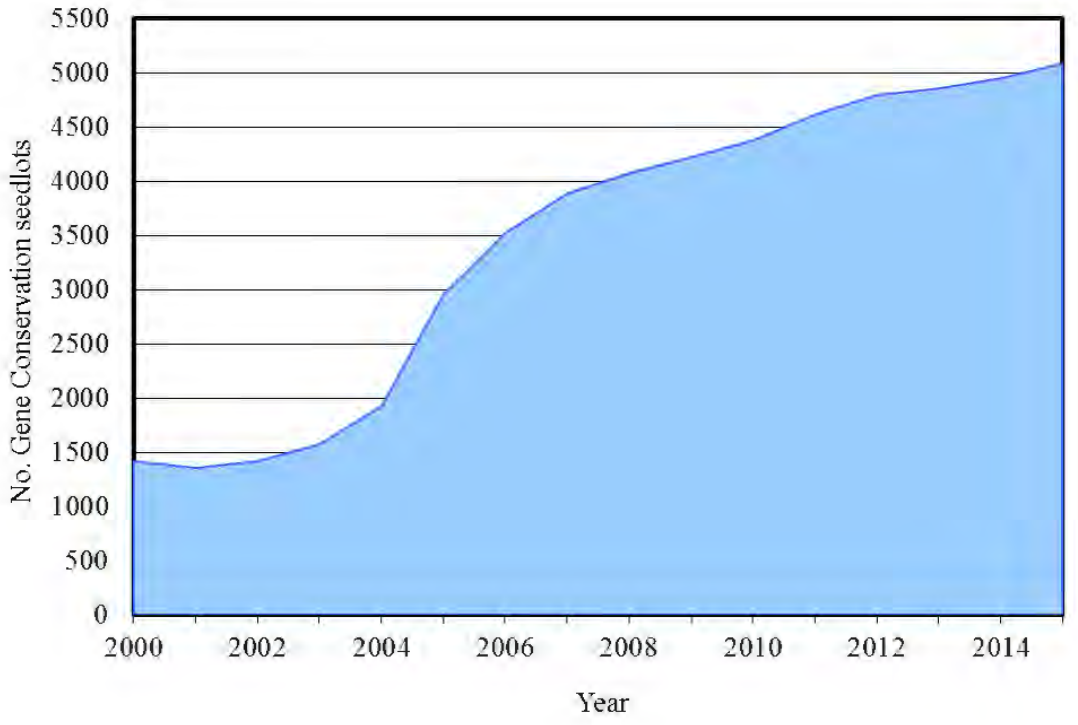

Figure 2. Increase in the number of Gene Conservation seedlots stored at the NTSC since 2000.

The Reserved category contains seedlots that have been reserved by researchers. Many of these seedlots were collected for special projects. There was no change in this category.

The Tree Breeding category consists of seedlots that originated from the genetics program at the Petawawa Research Forest and were transferred to the NTSC for storage. There was no change in this category.

Table 3. Species and number of seedlots stored in Gene Conservation.

Species	No. seedlots	Species	No. seedlots
Abies balsamea	8	*Picea glauca*	1,641
Acer negundo	15	*Picea glauca* var. *albertiana*	9
Acer pensylvanicum	17	*Picea glauca* ssp. *porsildii*	15
Acer rubrum	111	*Picea mariana*	434
Acer saccharum	23	*Picea rubens*	222
Acer spicatum	49	*Pinus albicaulis*	48
Alnus incana spp. *rugosa*	3	*Pinus banksiana*	95
Alnus incana spp. *tenuifolia*	1	*Pinus contorta* var. *latifolia*	4
Alnus serrulata	2	*Pinus flexilis*	101
Alnus viridis spp. *crispa*	9	*Pinus pinceana*	181
Betula alleghaniensis	57	*Pinus ponderosa*	2
Betula cordifolia	5	*Pinus resinosa*	15
Betula minor	1	*Pinus rigida*	4
Betula papyrifera	10	*Pinus strobus*	72
Betula populifolia	20	*Pinus sylvestris*	12
Betula spp.	1	*Populus balsamifera*	20
Cephalanthus occidentalis	1	*Populus grandidentata*	13
Cornus florida	4	*Populus tremuloides*	16
Fraxinus americana	263	*Prunus pensylvanica*	61
Fraxinus nigra	216	*Prunus virginiana* var. *virginiana*	337
Fraxinus pennsylvanica	300	*Salix lantana* spp. *richardsonii*	1
Fraxinus profunda	1	*Thuja occidentalis*	89
Fraxinus quadrangulata	19	*Thuja plicata*	2
Juglans cinerea	89	*Tsuga canadensis*	183
Larix laricina	267	*Tsuga mertensiana*	1
Larix occidentalis	1	*Ulmus rubra*	10

SEED COLLECTIONS

Seed production was average and variable for most species in the Maritimes. In order to ensure good quality seed, seed is only collected during good seed years. Seed collected in good seed years is of better genetic quality because of ample pollen production and higher physiological quality due to trees allocating significantly more resources to the developing seed crop. Also, less time is required to collect sufficient seed when there is a good seed crop. Forty-four collections were made (Table 4). The *Fraxinus* collections were made to increase the inventory of ash germplasm due to the devastating impact that emerald ash borer (*Agrilus planipennis*) is having on the resource. High bush cranberry (*Viburnum opulus* var. *americanum*) fruit was collected for comparison with Alberta sources for a germination experiment to evaluate various durations of moist incubation and moist chilling treatments on germination. Other collections that were made were opportunistic.

Table 4. Seed collections made by Seed Centre staff in 2015.

Species	NB	QC	ON	Total
Acer pensylvanicum	2			2
Betula alleghaniensis	3			3
Betula papyrifera	3			3
Fraxinus americana		7		7
Fraxinus pennsylvanica		19	8	27
Picea mariana	1			1
Viburnum opulus var. *americanum*	1			1

The NTSC also acquired seed via donation. A significant donation was made by Agriculture and Agri-Food Canada from the Agroforestry Development Centre in Indian Head, Saskatchewan. The following species were received: *Acer negundo*, *Caragana arborescens*, *Cornus serecia* spp. *serecia*, *Crataegus mollis*, *Crataegus rotundifolia*, *Eleagnus commutata*, *Fraxinus pennsylvanica*, *Hippophae rhamnoides* var. *mongolica*, *Larix sibirica*, *Malus baccata*, *Picea pungens* var. *glauca*, *Pinus sylvestris*, *Prunus pennsylvanica*, *Prunus virginiana* var. *virginiana*, *Pyrus ussuriensis*, *Rosa acicularis*, *Rosa woodsii*, *Sambucus racemosa* var. *racemosa*, *Shepherdia argentea*, *Symphoricarpus occidentalis*, and *Syringa villosa*. A total of 317 seedlots were accessioned with 152 going to Gene Conservation and the remainder to Seed Bank. Seedlots from non-native and some native species are from varieties selected specifically for windbreak purposes. Parks Canada Agency at Bruce Peninsula National Park, Ontario donated one *Fraxinus americana* and seven *Fraxinus pennsylvanica* seedlots. As previously mentioned Parks Canada Agency donated seven *Pinus albicaulis* seedlots.

Two seedlots of *Viburnum opulus* var. *americanum* were purchased from Wild Rose Consulting, Inc., Alberta and Boreal Horticultural Services Ltd., Alberta for use in an experiment to evaluate various durations of moist incubation and moist chilling treatments on germination. A seed collector

in southern Ontario was contracted to make 14 individual-tree seed collections of rock elm (*Ulmus rubra*).

In 2012 a pan-Canadian survey was conducted under the auspices of CON**FOR**GEN (a pan-Canadian program for the Conservation of Forest Genetic Resources) to assess the conservation needs for tree species to identify those that require conservation activities to potentially avoid these species becoming listed under the Species at Risk Act. The survey identified 30 hardwood and 5 softwood species, some of which are listed. When possible these species are targeted for seed collection.

Table 5 shows the number of seedlots acquired by the NTSC since 1996. About 50% of the seedlots were obtained through collection and a substantial number, 45%, were donated. The remaining 5% were purchased.

Table 5. Number of seedlots acquired by the NTSC through collection, donation, and purchase between 1996 and 2015.

Year	Number of seedlots			
	Collection	Donation	Purchase	Total
1996	239	22	0	261
1997	75	245	0	320
1998	284	47	9	340
1999	139	80	0	219
2000	195	673	0	868
2001	137	122	45	304
2002	367	36	0	403
2003	69	142	0	211
2004	549	381	137	1,067
2005	142	29	3	184
2006	329	42	30	401
2007	190	181	0	371
2008	160	3	0	163
2009	137	75	30	242
2010	37	0	2	39
2011	104	13	57	170
2012	1	258	0	259
2013	3	218	0	221
2014	5	2	24	31
2015	[illegible]	[illegible]	16	382
Total	3,206	2,901	353	6,460

SEED REQUESTS

The Seed Centre's policy is to provide seed, at no cost, for scientific research. Seed is also provided to universities and other educational institutions for educational purposes and to arboreta and botanic gardens. A Seed Request Form must be completed by the client before a seed order is processed. The purpose of this form is to gather information on the type of research being carried out and to serve as a means for screening requests. Seed requests received from international clients are referred to the Canadian Food Inspection Agency to determine if an import permit is required and for the issue of Phytosanitary Certificates.

During 2015, 37 requests representing 224 seedlots were processed. The majority of the requests were from Canada but seed was also sent to Ireland and United States (Table 6). One fewer request was received than in 2014 and 67 fewer seedlots were requested. The number of seedlots provided by the NTSC since 1967 has ranged from a low of 99 in 1996 to a high of 1,603 in 1985 (Figure 3). On average, Canadian clients have received about 70% of the seed while international clients accounted for the remaining 30%.

Table 6. Number of requests and number of seedlots shipped by country in 2015

Country	No. requests	No. seedlots
Canada	33	211
Ireland	1	4
United States	3	9
Total	37	224

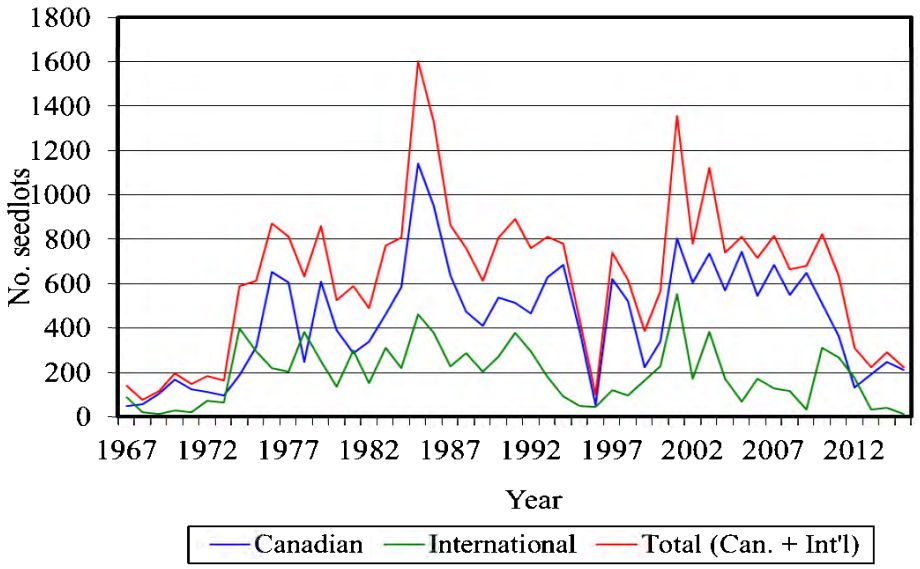

Figure 3. Number of seedlots sent to clients between 1967 and 2015.

SEED TESTING

Germination tests are performed on seedlots prior to storage as well as seedlots in storage. In most cases, four replicates of 50 seeds each are placed on moistened Versa-Pak™ in Petawawa Germination Boxes. When larger seed are tested, the number of seed is usually reduced. **Nine hundred and thirty-one germination tests** were carried out primarily on stored seed. Seedlots in storage are tested every 10 years.

Figure 4 shows the number of tests carried out by the NTSC since 1983. Some testing was carried out prior to 1983 (1970–82), however, the number of tests conducted was low. The reduction in the number of tests between 1994 and 1996 coincided with the transfer of the NTSC from Petawawa to Fredericton.

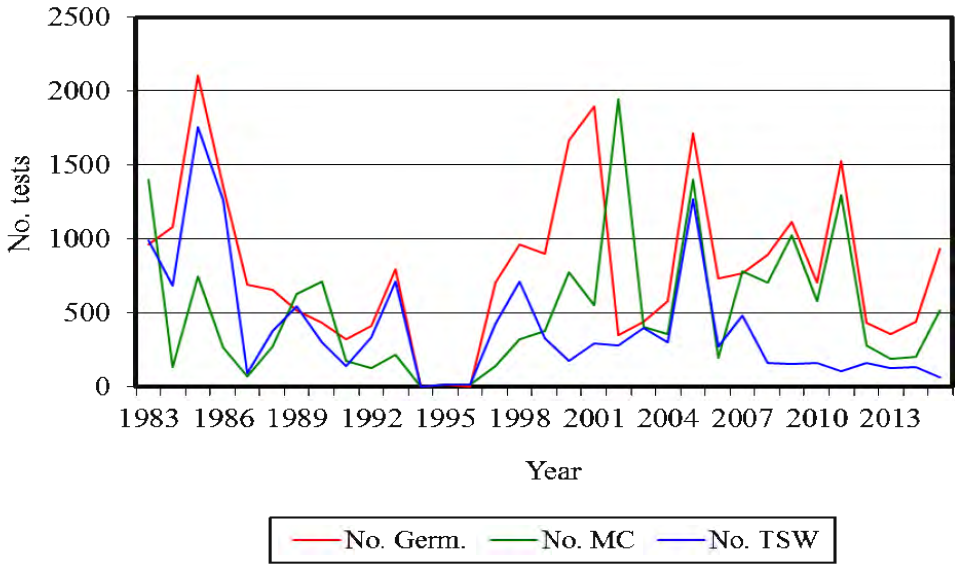

Figure 4. Number of germination tests (No. Germ.), moisture content tests (No. MC), and thousand-seed weight tests (No. TSW) carried out by the NTSC since 1983.

The target moisture content (MC) for orthodox seed is between 5 and 7%. Seed that are above this range are dried before being stored. **Five hundred and eighteen moisture content** determinations were carried out. MC is often checked when seed are re-tested particularly those seedlots exceeding 7%. When MC exceeds 7% the seed are conditioned to lower their MC. About 500 seedlots were conditioned.

Once MC is within acceptable limits, the 1000-seed weight is determined. This is carried out by counting and weighing eight replicates of 100 seeds. When dealing with small seed (alders, birches, poplars, willows) fewer replicates are performed. When the collected sample is small (less than 800 seeds), the total number of seed is counted, the total weight of the sample is determined, and the 1000-seed weight calculated. A total of **sixty-five 1000-seed weights** was done.

RESEARCH AND DEVELOPMENT

Treating Pin Cherry (*Prunus pennsylvanica*) Seed to Maximize Germination[1]

The environmental reputation of Canada's oil sands is a high priority for the Government of Canada and concomitantly for the Canadian Forest Service. Oil sands companies operating in Alberta are required to reclaim mining sites after bitumen extraction has ceased. Tree and shrub species used for reclamation are purchased from forest nurseries. These nurseries produce excellent tree planting stock but some are having difficulty growing quality shrub planting stock. An informal survey conducted in 2013 of several Alberta forest nurseries producing native shrubs for reclamation identified pin cherry (*Prunus pennsylvanica*) as problematic due to low and protracted germination.

Previous work on Maritime seedlots of pin cherry had been done by the National Tree Seed Centre (Simpson 2014) which provided a good starting point. For this trial, treatments were further refined and their effect assessed on four Alberta and one New Brunswick pin cherry seedlots. The results reported here are for the treatment that was most effective.

Methods

After processing, seed were imbibed in water for 72 h, mixed with moist peat in Ziploc® bags, and placed in various treatments. A combination of nine treatments that included incubation in the dark (21°C) (2, 4, 6 weeks) and chilling in the dark (4°C) (16, 20, 24 weeks). Following treatment, seed were transferred to germination boxes and placed in a germination cabinet (25°C for 12 h with light, 20°C for 12 h in dark, 85% relative humidity). Germination was recorded every 7 days for 21 days. A seed was considered to be germinated when the radicle was at least as long as the seed. A tetrazolium test was conducted on ungerminated seed on day 21.

Results and Discussion

The 2-week incubation + 20-week chilling treatment was most effective in maximizing germination. After 21 days in a germination cabinet, total germination ranged from 27–63% (Fig. 5). Variation in germination was a reflection of seedlot quality. A possible explanation may be the timing of fruit collection. The collection at Devon, AB was made July 28, 2014, followed by Jocelyn, AB on August 1, Fort Mackay1, AB on August 11 and Fredericton, NB on August 12. The Fort Mackay2, AB collection was made August 1, 2011. The fruit for the Devon and Fort Mackay1 Alberta collections appeared to be fully ripe whereas the Jocelyn collection was predominantly hard and lighter red with some small fruit and many that did not readily detach from the stalk. Possibly the embryos from these three collections were not completely mature.

[1] A manuscript for publication in a journal is being prepared for this trial. Therefore only selected results are presented.

After being placed in the germination cabinet, 95% of seed that germinated did so within 14 days. This was a marked improvement over the long duration reported by several Alberta nurseries. About 83% of the seed that failed to germinate were not viable. The proportion of seed that germinated during chilling was quite small and this is important for nursery managers so they do not have to deal with germinated seed.

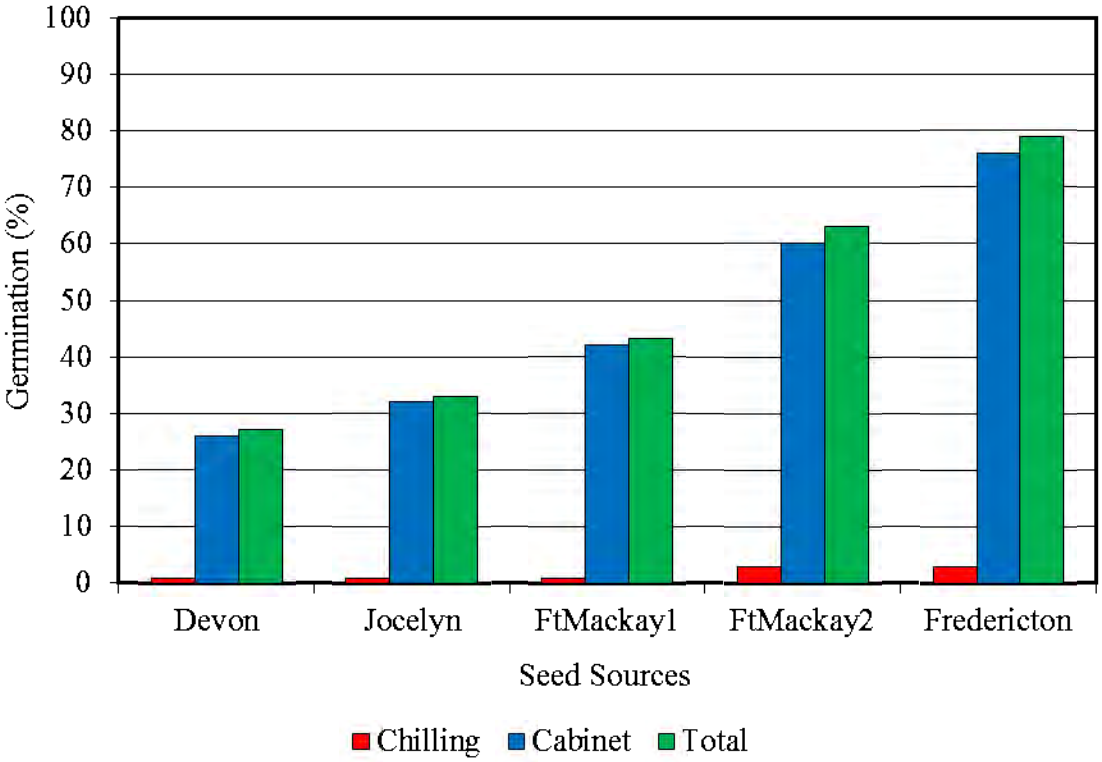

Figure 5. Percentage of pin cherry seed, from four Alberta seedlots and one New Brunswick seedlot, that germinated normally after incubation at 21°C for 2 weeks, then chilling at 4°C for 20 weeks. There was a small proportion that germinated during the chilling treatment.

Literature Cited

Simpson, J.D. 2014. National Tree Seed Centre Annual Report 2013. Nat. Res. Can., Can. For. Serv.-Atl. 20 p.

SEED CERTIFICATION

Canada has been applying the OECD (Organization for Economic Cooperation and Development) tree seed certification scheme since 1970 to seed collected for export to Europe. The CFS was nominated by the Government of Canada as the Designated Authority to implement the Scheme. All seed certification has been conducted by the Pacific Forestry Centre in response to demand, primarily by European seed dealers, for seed from west coast tree species. Practically all seed has been certified in the Source-identified category.

Demand for certified seed, which was high in the 1970s and 1980s, has declined the past 25 years (Figure 6) due to less demand from European importers. A total of 179 kg of certified seed was exported in 2015. Grand fir (*Abies grandis)* and subalpine fir (*A. lasiocarpa*) accounted for 89 kg and 42 kg respectively, while 48 kg of Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) were exported.

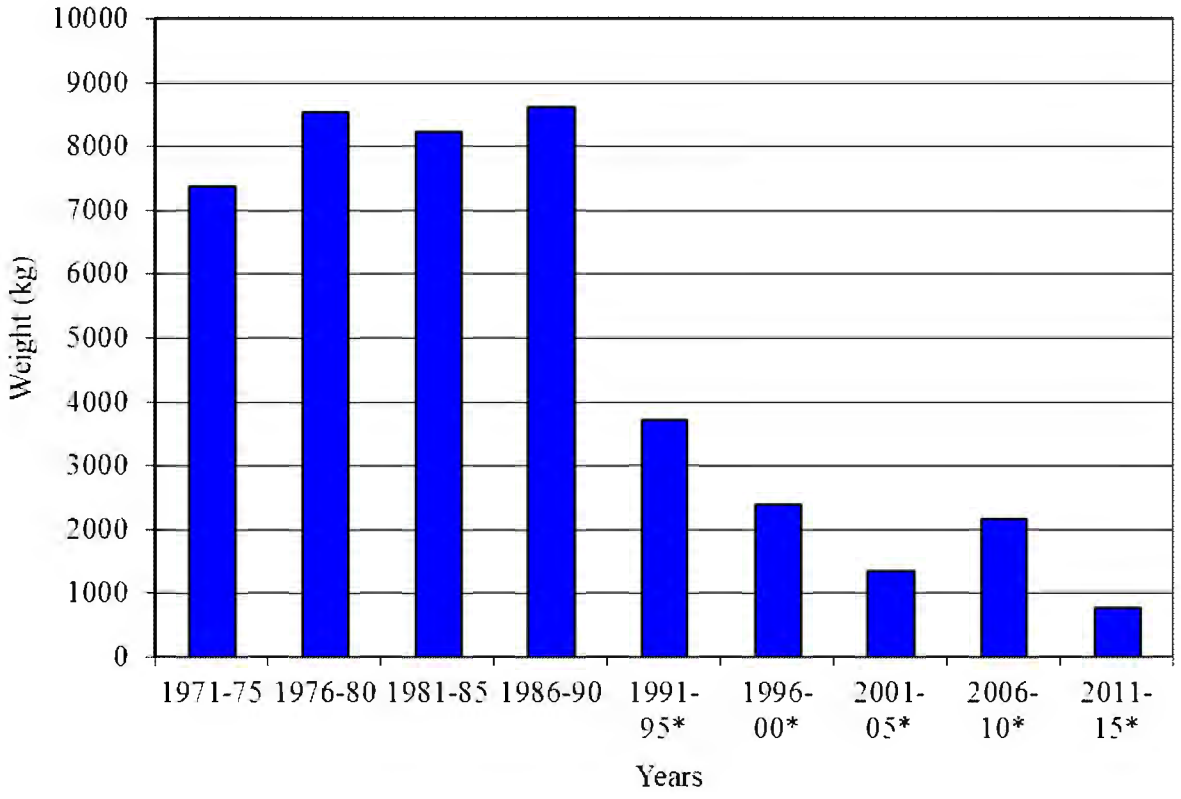

Figure 6. Weight of seed OECD certified or exported* by 5-year periods.

Officially established in 1967, the OECD Scheme for the Control of Forest Reproductive Material Moving in International Trade contained rules and procedures that were adopted in 1974. The Scheme allowed for the certification of seed under four categories: Source-identified (seed collected from a defined geographic area), Selected (seed collected from a stand that was selected for one or more attributes), Untested (seed from untested seed orchards or untested clonal material), and Tested

(seed from tested seed orchards or tested clonal material). From its early implementation by a limited number of countries to enable the export of Douglas-fir (*Pseudotsuga menziesii*) seed from North America to Europe, the scope of the Scheme was progressively enlarged over time to attract new participants and to deal with many forest tree species. The Scheme's membership is comprised of 27 countries (primarily European with five from Africa plus Canada and United States) working with more than 250 tree species.

During the late 1980s, it became apparent that the 1974 Scheme required revision because of changes in forest management (environmental and social aspects, biodiversity conservation, etc.) in addition to wood production and the growing importance of marketing new types of reproductive material derived from forest tree breeding programs. A revised Scheme, adopted in 2007, called the OECD Scheme for the Certification of Forest Reproductive Material Moving in International Trade only included the Source-identified and Selected categories. These categories benefit all stakeholders, including new applicant countries that are strengthening their domestic control systems for forest reproductive material. Inclusion of the Qualified category was approved in 2010. Having the Qualified category provided an opportunity for the marketing of seed orchard seed, the quantity of which is increasing annually. This affords producers the ability to obtain appropriate monetary value for seed orchard seed.

The Tested category, which was approved in 2012, completed the Scheme. This category includes reproductive material (seeds) from seed orchards as well as parents of families, clones, and clonal mixtures that have been tested thus demonstrating its genetic superiority. Now that the Scheme is once again complete it is hoped that it will be an incentive for more countries to join. It is called OECD Forest Seed and Plant Scheme.

The Scheme is always looking for opportunities to expand the membership. Since the annual meeting in 2014 Ivory Coast, Poland, and Slovenia showed interest in joining the Scheme.

Issues and topics that are being discussed and developed include: impact of climate change on adaptation of seed and its implications to Regions of Provenance in the Scheme, revising OECD certificates and labels to improve security and traceability, developing a joint database on forest reproductive material with the European Union, and developing an OECD/ISTA (International Seed Testing Association) handbook of seed testing and nursery practices.

PUBLICATIONS AND PRESENTATIONS

MacDonald, J.E.; Mills, E.; Simpson, J.D.; Norrie, J. 2015. Rooting of choke cherry cuttings in response to a commercial liquid extract of the marine Macroalga *Ascophyllum nodosum*. Poster presented at 2015 American Society for Horticultural Science (ASHS) Annual Conference, New Orleans, LA, 7 Aug 2015.

MacDonald, J.E.; Mills, E.; Simpson, J.D.; Norrie, J. 2015. Rooting of choke cherry cuttings in response to a commercial liquid extract of the marine Macroalga *Ascophyllum nodosum*. HortScience 49(9). Supplement for 2015 American Society of Horticultural Sciences Annual Conference, 7 Aug 2015, New Orleans, LA. S253, No. 088.

MacDonald, J.; Simpson, D.; Mills, E. 2015. Improving the quality of choke cherry seedlings for reclamation. Presented at 8th Annual Atlantic Reclamation Conference, 20−22 Oct 2015, Fredericton, NB.

SEED CENTRE PROMOTION

Throughout the year opportunities arose to promote the Seed Centre. This was accomplished primarily via tours and visits. Some of the more notable events of 2015 are included below.

On May 27, Joanne Frappier, Director General, Planning, Operations and Information, CFS and Pierre Ferland, Chief Information Officer, CFS were provided an overview of the Seed Centre and how data are managed.

On October 1, Renée Lapointe, Director, Ecosystem Health Science Program, CFS visited the Seed Centre and discussed results from the choke cherry and pin cherry seed treatment trials. Dr. Lapointe is the Coordinator of the Land Reclamation Project.

On November 17, Om Rajora, University of New Brunswick, brought students from his Conservation Genetics class for an overview of the Seed Centre's program as it relates to collecting and storing seed for ex situ conservation.

SEED CENTRE STAFF

Due to the loss of the full-time seed technologist in 2012, Dale Simpson, Manager, continued to maintain essential functions such as scheduling/supervising various activities, filling seed orders, entering data into the database, and setting up/assessing germination tests for trials and experiments.

Peter Moreland continued to provide technical support for seed processing, conditioning, and germination testing. Mr. Moreland worked the equivalent of 45 weeks over the course of the year. Donnie McPhee spent four weeks focused on accessioning 300 seedlots donated by Agriculture and Agri-Food Canada. Figure 7 summarizes the number of "extra" work weeks provided to the Seed Centre. The chart assumes that there was a full-time seed technologist.

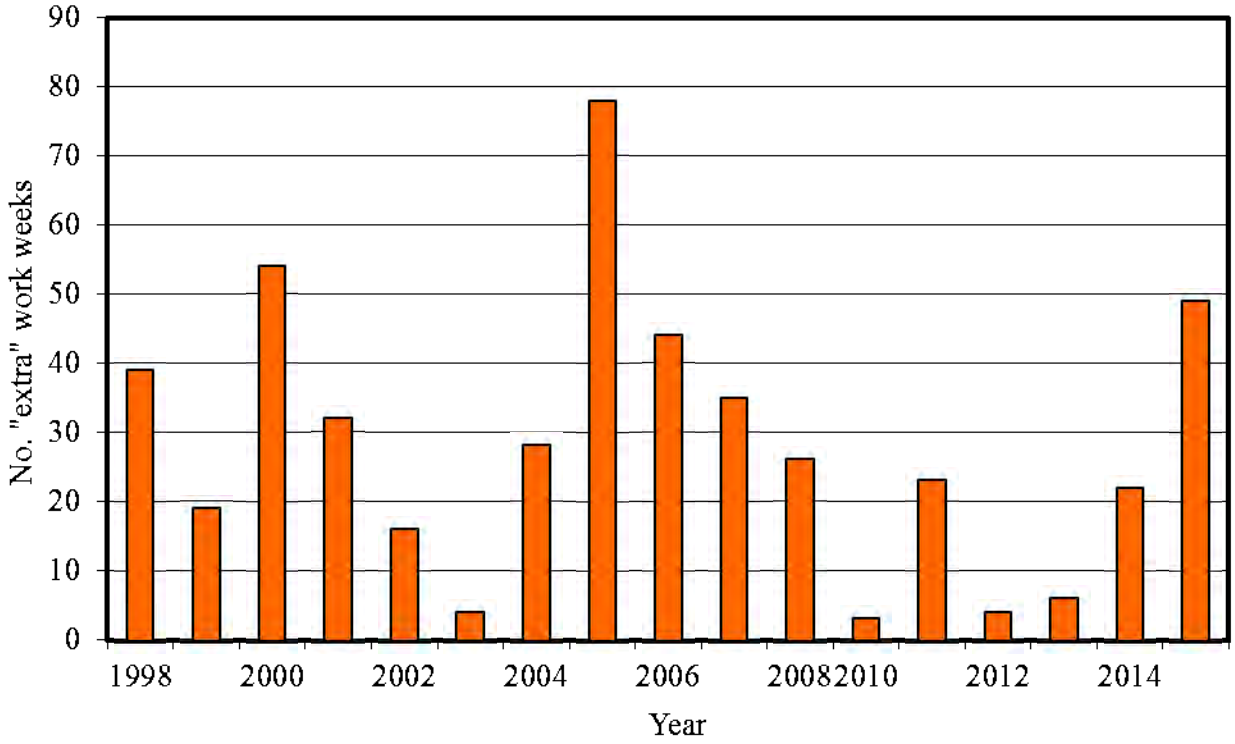

Figure 7. Number of "extra" work weeks provided to the NTSC between 1998 and 2015.