Greetings! It is hard to believe more than a year has passed since the very successful 12th International Christmas Tree Research and Extension Conference (CTREC) that was hosted by Venche Talgo and Inger Floistad in Norway. There is a lot of work that goes into hosting our conferences and Venche and Inger did an outstanding job!

The 13th Biennial CTREC is going to be held in Iceland during September 2017. A special thanks to Icelandic Forest Research for hosting the conference and all of the work by Pétur Halldórsson, Brynjar Skulason, Else Møller and their colleagues for organizing the conference. They have lined up a great venue and we can look forward to another productive conference in a unique location. Additional information about the 13th CTREC are included in this newsletter and are posted on the IUFRO Website Calendar of Meetings [http://www.iufro.org/events/calendar/](http://www.iufro.org/events/calendar/).

Over the years, these conferences have provided an excellent opportunity for research and extension scientist working on various issues relating to the production and marketing of Christmas trees to develop national and international collaborative projects. I expect that the results from several of these projects will be discussed at the conference in Iceland. Our conferences also provide an excellent opportunity for participants to learn about some of the unique regional aspects associated with the production and marketing of Christmas trees in North America and Europe.

Many thanks to Iben M. Thomsen from Denmark for preparing our newsletter and maintaining our mailing list. I encourage each of you to provide Iben updates on your activities for inclusion in the next newsletter. I would like to also thank Bert Cregg (Michigan State University) and Venche Talgo (NIBIO) who are the current deputy coordinators.

Hope to see you in Iceland!

Gary Chastagner

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**About the Christmas tree IUFRO Workgroup**

The scope of this unit includes all aspects of Christmas tree and greenery production including nutrition, genetics, propagation, diseases, arthropod pests, weeds, production techniques, post-harvest quality, and marketing. While the indoor display of forest trees to celebrate Christmas is a centuries-old tradition, establishment and culture of plantations specifically for Christmas tree use is a relatively new development. During the last 20 to 30 years, as the worldwide consumption of real Christmas trees has risen to exceed 140 million annually, the science and technology behind plantation Christmas tree production has developed rapidly, particularly in Europe and North America. This unit provides a forum for the exchange of scientific research results among researchers, students, extension agents and extension specialist who work professionally with the Christmas tree industry.
The Icelandic Forest Research, Mógilsá, is pleased to host the 13th International Christmas Tree Research and Extension Conference, held in Akureyri in September 2017.

When and where: September 4-8, 2017, Hótel Natur in Eyjafjörður Fjord, North Iceland. www.hotelnatur.com

Program outline: The conference will provide researchers, students, extension agents and specialist, and others who work professionally with the Christmas tree industry, with a forum for exchange of scientific research results and extension knowledge. Participation from Christmas tree growers will especially be appreciated.

Tentative schedule:
- Sunday September 3rd. Arrive at Akureyri
- Monday September 4th. Presentations and afternoon excursion
- Tuesday September 5th. Presentations and poster sessions
- Wednesday September 6th. Field trip
- Tuesday September 7th. Presentations and afternoon excursion
- Friday September 8th. Business meeting and conference wrap up

Topics: All aspects of Christmas tree and greenery production may be presented, including nutrition, genetics, propagation, diseases, arthropod pests, weeds, production techniques, post-harvest quality, and marketing.

Cost (includes lodging & meals during conference): Single room: 1,380 USD / 1,210 EUR. Double room: 1,220 USD / 1,070 EUR

Important dates:
February 1st: Pre-registration opened (email to else.akur@gmail.com)
May 1st: Registration opens
May 15th: Submission of Abstracts
June 15th: End of early registration fee
August 1st: Submission of research papers
August 18th: Last day of registration

More information:
Conference website www.skogur.is/ctre2017

Local coordinators:
Else Møller, Pétur Halldórsson, Bryjnar Skulason
Please use this conference e-mail for all correspondence: else.akur@gmail.com

Media partner for publication: Forests (forests@mdpi.com)
Our 2013 Meeting in Nova Scotia - the 11th CTRE
Bert Cregg and Jill O’Donnell

Christmas tree researchers and extension personnel from North America and Europe convened in Truro, Nova Scotia August 12-16, 2013 for the 11th International Christmas Tree Research and Extension Conference. The conference was hosted by the Christmas Tree Research Centre, which is located at the Dalhousie University Agricultural Campus (formerly Nova Scotia Agricultural College) in Truro. The program for the conference included three days of presentations, tours and discussions with Nova Scotia Christmas Tree growers.

Field Tour highlights
The field tours included stops at a range of Christmas tree operations. Although practices varied somewhat from farm to farm, there are several consistent elements that contrast Christmas tree production in Nova Scotia with production in other parts of the world.

Balsam fir is king. Christmas tree production in Nova Scotia is dominated by balsam fir. Nova Scotia and Quebec lead Canada in Christmas tree production with approximately 2 million trees harvested annually in each province. Nearly all the trees grown in Nova Scotia are balsam fir and approximately 95% are exported, mainly to the United States. As with U.S. producers, Canadian growers are recognizing that traditional markets are shrinking and there is increased interest in exporting to longer-distance markets. Growth in these markets has added to the need for improved keepability of balsam fir.

Production systems. A major difference in Christmas tree production between Nova Scotia and the United States is the heavy reliance on natural regeneration in Nova Scotia. Growers typically maintain 6-10 seed trees per acre in each production block. As seedlings develop from the seed shed from the seed trees, the seedlings are thinned in order to achieve the desired stocking. This seed tree system has been the traditional method for managing balsam fir in the region for decades; however, more growers are starting to plant seedlings and this trend is likely to continue. Planting is increasing for several reasons. Balsam woolly adelgid populations are rising, causing increased mortality in seed trees. As a result of the loss of seed trees, growers are augmenting natural regeneration with planted seedlings to maintain adequate stocking. In addition, increased use of artificial regeneration systems (i.e., planting seedlings) will be necessary for growers to capture gains from intensive tree improvement efforts in balsam fir at the Christmas Tree Research Centre.

As a result of their reliance on natural regeneration systems, Nova Scotia Christmas trees farms are characterized by uneven-aged stands with relatively low harvest densities (typical annual harvests are 150 trees per acre). Growers use some herbicides to control competing vegetation, with Pronone (active ingredient: hexazinone) as the most commonly mentioned product. However, most stands are managed with nearly complete native ground cover. Maintaining ground cover promotes populations of beneficial insects resulting in low levels of pests observed in the farms visited.

Nova Scotia balsam fir trees are sheared fairly tightly forming dense trees but preferred shearing method varies among farms. Some farms rely on gas-powered hedge trimmers while others use hand shears or shearing knives.

Two over-arching and interrelated issues for balsam fir growers in Nova Scotia are dwindling markets and needle retention. Nova Scotia producers are exploring expanding their markets beyond Canada and the U.S., largely via refrigerated cargo shipping to warm locations such as Mexico and Puerto Rico. This places an added emphasis on improving needle retention.

Christmas Tree Research Centre. The need to improve needle retention of balsam fir from the Atlantic provinces of Canada was the driving factor behind the formation of the Christmas Tree Research Centre at the Agricultural Campus at Dalhousie University. The program is headed by Dr. Raj Lada, who developed a research consortium based on federal, provincial and grower association funding. Dr. Lada has assembled a team that includes a dozen researchers and support staff dedicated entirely on production of balsam fir. The CTRC research is broadly focused in two areas, genetics of needle retention and basic physiology of needle abscission.

One of the most important findings of their research to date is the importance of ethylene, a plant hormone, as a trigger for needle abscission. This discovery has several implications for further research. First, it offers the opportunity to serve as a ‘marker’ for selection of genotypes for improved needle retention. Second, identifying ethylene as a trigger for needle abscission suggests that post-harvest needle retention may be improved by applying compounds that block ethylene synthesis or inhibit that action of ethylene. For example, MCP (methyl cyclopropene) is effective in improving the storage life of apples by blocking ethylene signaling and might be effective in Christmas tree as well.

Balsam fir seed tree production
Photos from

Our 2013 Meeting in Nova Scotia - the 11th CTRE

Bert Clegg

Nursery visit during the CTRE Conference

Manual and mechanical shearing
Our 2015 Meeting in Norway - the 12th CTRE
Iben M. Thomsen

Christmas tree researchers and extension personnel from North America, Europe and even Australia convened in Honne, Norway, in September 6-11, 2015 for the 12th International Christmas Tree Research and Extension Conference. The conference was hosted by NIBIO Plant Health and Biotechnology Division, Ås. The program for the conference included four days of presentations, tours and discussions with Norwegian Christmas Tree growers. Here are some Field Tour highlights.

Dr. Knut Huse guided us through the local arboretum at Honne on Monday afternoon. He gave an introduction to the area at the start of the walk (photo left).

Ulrik, Chal and AnneMargaret study fir branch, while Knud listens to the discussion with interest.

A group photo was taken by Erling Fløistadt after the coffee stop with a view over the lake.
On Tuesday, we visited the forest nursery at Biri, Skogplanter Østnorge AS. Left: Elonora Høst at Skogplanter nursery demonstrates the new mikropot-frames, each containing 840 plants, which are later machine transplanted (inserted photo) to traditional frames with 60 or 95 pots. This system was expected to increased productivity markedly. Right: Showing off the different plants produced at the nursery.

Thursday was entirely dedicated to visits to Christmas tree growers, a subalpine provenance trial and a seed orchard, an excursion facilitated by John-Anders Strande, general manager of The Norwegian Christmas tree grower association.

Ragnar Johnskås from the Norwegian Forest Seed Center (Skogfrøverket) and excursion host Knut Helset tells CTRE participants about the new provenance trial with Abies lasiocarpa, which will test the relevance of different seed sources. Afterwards everybody took a look at an area with older trees. The growers wasn’t quite satisfied with the quality and there was a spirited discussion about the importance of provenance and various management methods to shape the trees.
The next stop was a new seed orchard of *Abies lasiocarpa*, where Grassie Mt. provenance has been grafted on Spring Mt. stock. The difference between the green root stock and the blue grafts was obvious and a few cones could be seen. Ragnar Johnkås from the Norwegian Forest Seed Center (Skogfrøverket) explained one of the reasons for the seed orchards is the wish to ensure a stable production of desired provenances, which are not always available from the natural range.

After lunch at Jønsberg Lantbruksskole we visited an older *Abies lasiocarpa* provenance trial with 76 different seed sources. This was planted in 1999 after seed collecting in Colorado, Utah, New Mexico and Arizona in 1994 and Idaho, Oregon, Washington, Wyoming, Montana, Alberta and British Columbia in 1995.

Venche Talgå described the problems with the needle fungus *Delphinella abietis*, and the huge differences in susceptibility amongst provenances. The green types (*A. lasiocarpa* var. *lasiocarpa*) are a lot more susceptible than the blue types (*A. lasiocarpa* var. *arizonica*).

Danish experiences show that the blue types are also less prone to attack by stem aphids (*Dreysusia piceae*). Unfortunately the opposite is the case when it comes to *Neonectria noemacarpa*, which affect the blue provenances severely.
Christmas tree grower Karl Henrik Hals, Eiker Juletreskog, Hokksund, described his experiences with growing A. nordmanniana, A. lasiocarpa and Picea abies. His main problems were winter and spring frosts. His lasiocarpa trees had to be planted on slopes, but nordmann firs could manage on the flat areas, since they flush later. Photo right taken by Erling Floistadt.

Finally, on Friday, we went on a guided tour of the production facility at the Norwegian Forest Seed Center in Hamar, after an introduction given by Heidi Røsok Bye og Jan Uhlisch (photos by AnneMargaret Braham. We were also shown a couple of newspaper articles about the CTRF conference.
Dear CTRE members

The next Newsletter is planned for late 2017. An update on the 13th CTRE meeting on Iceland may be sent out separately in June.

I would also like to ask for contributions from everyone on the following subjects:

• Projects and results of interest to the CTRE group, including publications
  Please send descriptions and pictures

• Useful links (see next page)

• Additions to the mailing list - or changes in mail address
  New researchers, extension workers and Ph.D. students are welcome to introduce themselves.

If you would like to contribute, please send a mail to the Newsletter Editor, Iben M Thomsen on imt@ign.ku.dk

Three members of the CTRE community, currently doing their Ph.D. at University of Copenhagen

Knud B. Nielsen (left) and Xu Jing are both working on Neonectria neomacrospora fir canker on Nordmann Fir, and Mathias Just Justesen (right) is studying the fir bark beetle Cryphalus picea and the correlation with Heterobasidion root rot. Knud and Mathias are interested in samples of Neonectria spp. and Cryphalus spp.
Useful links

Please contribute

Direct link to IUFRO webpage

IUFRO Website Calendar of Meetings http://www.iufro.org/events/calendar/

IUFRO 2.02.09 publications page

IUFRO online Proceedings Archive
http://www.iufro.org/publications/proceedings/proceedings-meetings-2013/#c22415

If you would like to add to the collection of useful links, please send a mail to the Newsletter Editor, Iben M Thomsen on imt@ign.ku.dk

Links to Christmas Tree Research and Extension Sites

North Carolina State University http://www.ces.ncsu.edu/fletcher/programs/xmas/

NCSU Genetics http://cnr.ncsu.edu/fer/research/christmas-tree-genetics-research-and-extension/

Michigan State University http://christmastree.for.msu.edu/

New Mexico State University http://morasc.nmsu.edu/christmas-tree-research-.html

Penn State University http://ento.psu.edu/extension/christmas-trees

Ohio State University http://ohioline.osu.edu

Oregon State University http://oregonstate.edu/dept/NWREC/programs/christmas-trees

Washington State University http://smallfarms.wsu.edu/crops/christmastrees/index.html

University of California http://cecentralsierra.ucanr.edu/Agriculture/Christmas_Trees/

Dalhousie University, Canada http://www.dal.ca/faculty/agriculture/research/centres-and-labs/christmas-tree-research-centre.html

University of Copenhagen, Denmark http://ign.ku.dk/english/research/forest-nature-biomass/forest-genetics-diversity/

NIBIO Norway (Norwegian Institute of Bioeconomy Research) http://www.nibio.no/