Dear colleagues

Already 2013 and the year we have planned to meet again. Last meeting was in Austria 2011 and inside this issue of the newsletter we have a short note on the upcoming meeting, but here I would like to thank Karl Schuster and his Austrian colleagues so much for a great meeting in 2011.

The past two years have caused some changes in Denmark due to sparse funding and several colleagues of our group have pursued other tasks and even a new job. However, that is probably a fact several Christmas tree research groups have to deal with – the ups and downs of successful funding.

A very clear outcome of our passed CTRE meetings is the inspiration one can achieve. Recently, in Denmark, we have got financing for a 4 year project focusing on chemical mowing and use of mini-clover ground coverage in Nordmann fir Christmas tree production. I guess several of us firstly got introduced to the benefits of this concept at the North Carolina meeting in 2003.

The upcoming meeting this year is planned to be held in Nova Scotia, and organized by Raj Lada and his group. Raj and his team are quite new members of our IUFRO work unit, and you are all warmly welcomed. Our group is continuously increasing and includes new persons on the mailing list - e.g. Brian Eshenaur from the State of New York and an Icelandic colleague Brynjar Skulason – more inside this issue, and also a warm welcome.

Hopefully time and funding will allow many of us to meet in Nova Scotia – looking forward to seeing you all.

Ulrik Bräuner Nielsen

**Letter from the Coordinator**

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 80 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.
Mark your calendars and save the date. The Christmas Tree Research Centre of Dalhousie University is pleased to host the 11th International Christmas Tree Research and Extension Conference

When and Where: August 10-14, 2013, Truro, Nova Scotia, Canada.

Program outline: The conference program will comprise contributed and invited talks, posters and field tours to Christmas tree research locations and local production sites, as well as other horticultural sites of interest.

Tentative schedule:
Saturday August 10 Arrive in Truro and Evening Social.
Sunday, August 11 Oral and Poster Presentations
Monday, August 12 Field Tour
Tuesday, August 13 Oral Presentations, Local Tour and Banquet
Wednesday, August 14 Oral Presentations and Departure

Topics: Conference topics may include (but are not limited to): Breeding & Molecular Biology, Propagation & Biotechnology, Plantation Establishment & Cultivation, Tree Physiology, Vegetation Management, Pest and Disease Management, Economics, Market and Policy, post-harvest Technology, Certification, Import/Export Issues.

Anticipated cost (includes lodging, meals and tours during conference): Between $600.00 and $750.00 (Canadian Dollars), depending on room selection by participants and the finalization of tours.

Deadlines for Abstract Submission for Oral and Poster Presentations: Due July 1st, 2013

Abstract submission form is attached to this newsletter, but will be available on the web site later.

Spouse/Family tours
A list of local tours and attractions will be provided for spouses and family members for entertainment during the conference. As well, prices and instructions for rental cars that can be booked ahead and waiting for you at the conference upon your registration, will be provided on the website.

More information:
Conference website: http://www.dal.ca/about/agricultural-campus/about/conferences/international-christmas-tree-research-and-extension-conference.html
Information will be added as finalized.

Local coordinator:
Rachel Kennedy, Dalhousie University, rrkennedy@dal.ca
Our 2011 Meeting in Austria - the 10th CTRE
Ulrik Bräuner Nielsen

Our August 21-27, 2011 Christmas Tree Research and Extension Conference is now a memory; and hopefully a good one for those attending. The proceedings are now on the IUFRO 2.02.09 web site.

The 10th International Christmas Tree Research and Extension Conference was hosted by the Christmas Tree Growers Association of Lower Austria. By all accounts, both participants and spouses were treated to a fantastic week of research findings, great food, history, and scenic beauty.

The conference included the presentation of 32 papers, 10 posters, and presentations and discussions at a number of farm tour sites across Austria. This conference was the most international of all, with 11 countries represented in attendance. A total of 44 persons.

A wide range of topics were covered during the meeting including sessions on breeding and genetics, growth conditions, cultivation techniques, tree health, insect and vertebrate pests, weeds and finally market and economy.

A compilation of extended abstracts and smaller papers are available on our IUFRO homepage. Chal Landgren faced the challenge of editing the proceedings with courage, thanks, also for a series of friendly hints to authors to finalize their contributions.

The field tours were smiled upon by quite warm and beautiful summer weather including the excursions to Franz Raith Farm, Jauerling, and the Christmas tree fair in Lower Austria.

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/christmastreegenetics/ctg_index.html
- Michigan State University: http://christmastree.for.msu.edu/
- Penn State University: http://ento.psu.edu/extension/christmas-trees
- Ohio State University: http://ohioline.osu.edu/b670/
- Oregon State University: http://horticulture.oregonstate.edu/content/christmas-tree-resources-oregon-state-university
- Washington State University: http://smallfarms.wsu.edu/crops/christmastrees/index.html
- University of California: http://cecentralsierra.ucanr.edu/Agriculture/Christmas_Trees/
- University of Copenhagen: http://sl.life.ku.dk/English/research/forest_and_ecology/christmas_trees_and_greenery.aspx
Joint IUFRO Meeting in Kastamonu, Turkey

Ulrik Bräuner Nielsen, University of Copenhagen

In September 2012 the 14th IUFRO International Fir Symposium were held in Turkey and hosted by Kastamonu University, Forestry faculty. It was a joint meeting of three IUFRO working parties: 1.01.09 Ecology and silviculture of European silver fir, 02.02.13 Breeding and genetic resources of Mediterranean conifers and our group 2.02.09 Christmas trees.

Nearly 200 persons attended the meeting and it was a great opportunity to learn more about the genus Abies and its many-sided use and to discuss future directions of sustainable management of fir forest. There were a number of sessions including genetics, Christmas trees and landscape architecture, ecology and stand dynamics and the impact of climate change to mention some.


A pre-conference tour were organized by Mehmet Tokcan going from Istanbul to Kastamonu passing by several beautiful stands of Abies bornmülleriana in its natural distribution area near Kökez and Aladag. One has also to mention the great Turkish hospitality and splendid food.
New York State Christmas Tree Production and Disease Update
Brian Eschenaur, Cornell University Integrated Pest Management Program

NYS Produced Christmas Trees: According to the most recent USDA Census of Agriculture New York State is seventh in the United States for Christmas tree producers (844 farms) and total trees harvested (348,043 trees) – an estimated farm gate and consumer retail value of $8.8 and $14.2 million US dollars, respectively. New York producers have transitioned, over the years, from mainly producing Scots pine to Douglas fir and now to Fraser fir, which is presently considered the premium tree for both consumers and Christmas tree growers in NY. Other popular trees grown in NY State include balsam, Canaan, concolor and grand fir. Having a mixed planting is common and there are some growers that produce spruce trees in their Christmas tree mix, including Colorado blue and Norway spruce.

Fraser fir root rot: Unfortunately tree death through root rot has also become common on Fraser fir on many NY tree farms. The areas of greatest tree death are often associated with low-lying portions of fields. *Phytophthora* species have been isolated from the roots and root collars of dead and dying plants. In 2011 and 2012 over 100 samples of root rot affected Fraser firs were collected and attempts to isolate *Phytophthora* were conducted at Cornell University, Department of Plant Pathology and Microbe–Biology. Two of the most common *Phytophthora* species isolated from symptomatic and dead trees in 2011 and 2012 were *P. cactorum* and *P. cryptogea*.

We have also taken a molecular approach to combine detection and characterization of *Phytophthora* spp. in soil at sites experiencing Fraser fir mortality. This molecular approach utilizes *Phytophthora*-specific primers and semi-nested PCR-amplification of ribosomal DNA (rDNA), and when combined with a cloning vector system and DNA sequencing of cloned rDNA, and will provide an accurate assessment of the diversity of *Phytophthora* spp. within the rhizosphere of diseased trees. These assays currently are underway; results of the rDNA analysis will be reported in the spring of 2013.

As in other tree producing states, there is an increasing interest in Turkish fir in NY due to its resistance to root rot. A trial on resistance to *Phytophthora* was recently conducted in upstate NY. Three alternative species as well as a check row of Fraser fir were planted in a field previously affected by *Phytophthora*. To do this, Concolor fir, Turkish fir, Canaan fir (and Fraser fir as a control) were planted where dead trees had been removed. Each species of the replacement trees was planted among existing trees in 3 replicated rows for a total of 812 trees. All trees in the plot were inspected individually for above ground symptoms throughout the 2011 and 2012 growing seasons. Results indicated Concolor and Turkish firs had significantly higher survival than Fraser fir when used as replants. The percentage of survival for Canaan fir, however, was not significantly different from Fraser

Suitability of soils: Currently, soil characteristics are being assessed to determine if a set of soil criteria could be used to evaluate sites for suitability for growing Fraser fir. Data were collected at four growers’ Fraser fir fields in Western NY in November and December 2012. Measurements were made on water drainage ability in minutes per inch of soil with percolation tests. In addition, soil samples were pulled from all sites for analysis of water retention, physical properties, nutrient, pH and soil health characteristics. These measurements and samples were collected from fields where Fraser fir is showing healthy growth and at locations where Fraser firs have died due to root rot on the same farms. The geographic position (lat./long.) and elevation were recorded for all the sampling sites. The information generated from the soil characteristics is still being analyzed. Consistent markers of problem areas will be used to create a protocol for growers to determine which sites on their property are suitable for growing Fraser fir. The results of this soil/site study will be presented to growers at their upcoming summer grower meetings in 2013.
Fir Broom Rust: Some fir growers in Upstate NY have experienced outbreaks of Fir Broom Rust. This rust disease has an alternate host of chickweed. Growers have had success managing this disease by controlling the chickweed in turf cover between the rows of trees. A fact sheet was produced on this disease: http://nysipm.cornell.edu/factsheets/n_gh/fir_broom_rust.pdf

Douglas Fir Needle Cast Observation: New plantings of Douglas fir have declined steadily over the past ten years in NY. One of the reasons is due to needlecast diseases and the necessity to make three to four fungicide applications each spring to protect the developing needles. Interestingly over the past five years we have noticed that the once prevalent Rhabdocline needlecast is almost non-existent in NY and that Swiss needle cast has become very common now on Douglas fir trees that were not thoroughly sprayed with fungicides.

NY Christmas tree grower’s organization: The Christmas Tree Farmers’ Association of New York is supportive of the alternative tree species research; and recently has become a participant in the multi-state Turkish fir germplasm evaluation project.

The upcoming summer meeting for the Christmas Tree Farmers’ Association of New York will take place on July 18-20, 2013 on two farms in New York’s Hudson Valley and Southern Catskill regions. Information will be posted on the organization’s website. http://www.christmastreesny.org/

New York State Christmas Tree Contacts:

New York State Integrated Pest Management Program for Ornamentals
Education and research for pest management in Christmas trees and other ornamental crops
Brian Eshenaur  bce1@cornell.edu and Elizabeth Lamb  eml38@cornell.edu

Cornell University’s Plant Pathology and Plant Microbe-Biology
Currently studying the association of Phytopthora and Fraser fir root rot
George Hudler  gwh2@cornell.edu and Shawn C. Kenaley  sck26@cornell.edu

Christmas Tree Farmers’ Association of New York
Supporting the New York State Christmas tree industry
Peter Goderie, Association President, 2013  pgoderie@yahoo.com
Mary Jeanne Packer, Executive Director  mjpacker@gwriters.com

Dead Fraser firs due to root rot in low area of field, upstate NY. Proliferation of shoots due to Fraser fir infections with Fir Broom Rust.
A *Neonectria* canker has become a serious problem on true fir in Norway and Denmark

Venchte Talgø, Iben M. Thomsen and Arne Stensvand

A *Neonectria* species is presently causing a severe canker epidemic on true fir (*Abies* sp.) in Norway and Denmark. We expect that it is only a matter of time before the situation will be the same outside Scandinavia. Infected transplant and even Christmas trees may spread the pathogen. Since it seems very aggressive, both under field conditions and in inoculation tests, we see it as a threat to the European fir production, not least the Christmas tree industry. We have also found the *Neonectria* sp. to be seed borne on Nordmann fir (*Abies nordmanniana*), and seed trade between countries and continents may thus spread the disease.

### Host plants

Since the *Neonectria*-presentation at the 10th International Christmas Tree Research & Extension Conference in Austria in 2011 (Talgø *et al.* 2012), severe damage by *Neonectria* sp. has been observed on a number of *Abies* spp. So far we have found the fungus on grand fir (*Abies grandis*), Noble fir (*A. procera*), Nordmann fir, Pacific silver fir (*A. amabilis*), Spanish fir (*Abies pinsapo*), Siberian fir (*A. sibirica*), subalpine fir (*A. lasiocarpa*), and white fir (*A. concolor*). Especially worrying are heavy attacks on Nordmann fir in Denmark (Fig. 1) and subalpine fir in Norway (Fig. 2). We have also observed symptoms on white fir in southern Sweden.

### Symptoms

Dead shoots, flagging (dead branches), canker wounds, heavy resin flow, and often completely dead trees have been found on *Abies* spp. in landscape plantings, Christmas tree and bough production fields, forest stands in both countries, and on trees and seeds in a Danish Nordmann fir seed orchard.

### Symptoms and identification

The fungus produces white mycelia on incubated material and on artificial media (agar) (Fig. 2). Characteristic red perithecia (Figs. 1 and 2) with ascospores (the perfect stage) are occasionally found on plant material that has been dead for a period (often more than one year), under humid conditions. In addition, the fungus has two imperfect spore stages, macro- (*Cylindrocarpon* sp.) and microconidia (*Cephalosporium* sp.) that are commonly found both on incubated material and in culture. Sequencing of the internal transcribed regions (ITS) of the ribosomal DNA showed that this *Neonectria* sp. was most similar to *N. ditissima*, a common pathogen worldwide on broadleaf trees, but very different from *N. fuckeliana*, a well-known fungus on Norway spruce. The pathogen has proven to be very aggressive in inoculation tests on several *Abies* spp.

### References


A *Neonectria* canker has become a serious problem on true fir in Norway and Denmark

*continued*

Fig. 1 *Neonectria* canker on Nordmann fir (*Abies nordmanniana*) in a Danish Christmas tree field. On lower dead branches, abundant production of red fruiting bodies (perithecia) had taken place, and as seen here there was a sharp border between diseased and healthy tissue. In this field, approximately 60% of the trees showed symptoms, but only 10-15% had as severe damages as shown above. Most of the damage was death of shoots at the lower part of the tree as shown on photo right.

Photos above: Jutland, October 2012. Venche Talgo
Photo right: Jutland, June 2012. Iben M. Thomsen
A *Neonectria* canker has become a serious problem on true fir in Norway and Denmark

continued

Fig. 2 *Neonectria* canker on dead subalpine fir (*Abies lasiocarpa*) in a 45 year old Norwegian forest stand. The fungus had produced red fruiting bodies (perithecia), and typical white mycelium appeared on diseased material incubated in saturated air and after isolation from leading edges on artificial medium (PDA-agar). Rogaland, June 2012. Photos: Venche Talgø

We are very interested in collaborating with other research groups if similar disease symptoms are found on true fir species in their respective countries. Please contact Venche Talgø by mail venche.talgo@bioforsk.no
Announcements

Prag 2014. It is still in the planning phase, but please notices the dates. The IUFRO group 2.04.02 WP (Breeding theory and progeny testing are organizing (under the IUFRO umbrella) a scientific conference on forest tree breeding in Prague in August 25-31, 2014. They have invited selected working parties from the division 2, focusing on European species, to join this event, including our Christmas tree group. The main focus is forest tree breeding, including theory, methods, biotechnology and applications in various European species. Everything from traditional breeding to modern approaches, such as genomic selection. Our goal is to link researchers across Europe working in forest tree breeding.

Christmas Tree News from Oregon, Chal Landgren (Nov. 2012)

For the most recent information on Christmas Tree Sustainability Certification in Oregon and Washington-
http://www.serfcertified.org/about.html

Oregon State University Christmas Tree web site:
http://horticulture.oregonstate.edu/group/osu-nursery-greenhouse-and-christmas-trees

To look at the recently published “Identifying and Managing Christmas Tree diseases, Pests and Other Disorders”
http://www.serfcertified.org/resources.html

To order your own copy:
http://oregonstate.edu/dept/NWREC/christmas.php/

Next CTRE Newsletter. We plan to send out another Newsletter around the end of May or early June. Please send your contributions to the editor (imt@life.ku.dk) as soon as possible, including publication lists. You are welcome to include photos or other illustrations with your contribution. Please make sure references meant for the list of publications conform to the format used here.
New to the Group

Icelandic ph.d-project on Subalpine Christmas trees

In August 2012 Brynjar Skulason embarked on a PhD study at University of Copenhagen titled: How to produce Christmas trees of *Abies lasiocarpa* in the Nordic countries. The main goal in this PhD study is to find the best provenance and single trees within provenances based on field trials and plan an effective breeding program for *Abies lasiocarpa* as a Christmas tree for various Icelandic conditions.

A lot of Christmas trees are imported to Iceland every year, mostly *Abies nordmanniana*. The growing conditions in Iceland are too harsh for the production of *A. nordmanniana*, but *Abies lasiocarpa* is easier to produce and can be a high-value Christmas tree. In the years 1999-2003 there was an on-going Inter-Nordic research on how to produce Christmas trees of *A. lasiocarpa*. The largest part of this research project was field trials with different provenances from the large distribution area in USA and Canada. The first results from this provenance research were published in Scandinavian Journal of Forest Research in 2004, three-year results only (Hansen et.al. 2004).

Since then these field trials have been measured a few times in Iceland, Denmark and Norway. These provenance trials will give new and much more information today. To get the whole picture for these provenance trials in these countries the intention is to carry out a combined analysis of the newest measurements. The next step is to go on with the best genetic material into a breeding program and produce seed of *Abies lasiocarpa* for Icelandic and/or Danish conditions. Norway has already started breeding program on *A. lasiocarpa* and has been measuring a lot of field trials in the last 10 years.

The more specific objectives of the study are:

- Describe the variation of Christmas tree characters between various provenances of *Abies lasiocarpa* – based on field trials in Denmark, Iceland and Norway

Estimate:

- Frost hardiness of various provenances – based on results from freeze testing of 25 provenances in spring and autumn (both Danish and Icelandic material)
- Resistance in various provenances against *Adelges pectinatae* (field trials in Denmark)
- Resistance in various provenances against parasites and diseases including *Neonectria* sp. (field trials in Denmark)

Finally, develop recommendations for optimal choice of provenances and breeding material for specific environments (country, various climate)

Brynjar Skulason has a master in Forestry from Norway, a BSc in Equine science from Iceland. For the last nearly 20 years he has worked as a forestry consultant in northern Iceland.

Brynjar was also involved in the former Nordic *Abies lasiocarpa* project and now at the University of Copenhagen, Department of Geosciences and Natural Resource Management. Supervisors are Ulrik Bräuner Nielsen and Ole Kim Hansen.

E-mail: brsku@life.ku.dk

Brynjar Skulason in one of the Danish Subalpine fir trials summer 2012
Recent Christmas tree publications


Talgø, V., Thomsen, I.M., Brodal, G., Brurberg, M.B., Stensvand, A. 2012. Aggressive Neonectria sp. on true fir found to be seed borne. Joint IUFRO 7.03.01 “Cone and seed insects” and 7.03.04 “Diseases and insects in forest nurseries” Working Party Meeting. Vilnius, Lithuania, 16–19 September 2012. Programme and Abstracts s. 19.

