News and Views
from SNS – Nordic Forest Research Co-operation Committee
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Professor Ewa Mellerowicz with aspen trees at Umeå Plant Science Center. Photo: Mattias Pettersson, Print & Media © UPSC

Xylan modification may allow customisation of wood properties

Hemicelluloses constitute some 25% of the total wood biomass on earth, making them one of the most abundant polymers, along with cellulose and lignin. Xylan is the main hemicellulose in deciduous trees and grasses, and is also an important component of conifer wood. Xylan interacts with both cellulose and lignin, and is thought to have an important role in cell wall architecture.

The SNS-supported project *Xylan modification for added value wood products* used genetic engineering to modify the structure of xylan and examined its effects on important properties of cell walls, wood and lignocellulose. Fungal genes encoding xylan-modifying enzymes were introduced into aspen and *Arabidopsis*. The experiments determined the types of xylan modification that were tolerated by the plants, and which caused detrimental effects on growth and development.

Physical properties of the cell wall and chemical characteristics of transgenic aspen and *Arabidopsis* were studied in laboratories in Umeå, Helsinki and Copenhagen.

The researchers found, for example, that xylan structure determines cellulose microfibril angle, which is the major determinant of the mechanical strength of fibres. They also found that xylan acetylation plays a key role in determining lignocellulose saccharification (a process of breaking down complex carbohydrates such as cellulose into monosaccharide components, which is a necessary step for biofuel production).

According to the researchers, many other wood and lignocellulose properties may be affected by the xylan modification, in particular properties important for mechanical strength, pulping and biofuel production. However, several more years of research are needed before we have a full understanding of the relationship between modified xylan and wood properties.

Project: SNS-107, Xylan modification for added value wood products

Coordinator/contact: Professor Ewa Mellerowicz, SLU, ewa.mellerowicz@slu.se

Participating organisations: Swedish University of Agricultural Sciences (SLU), University of Helsinki, Copenhagen University

SNS grant: €150 000

Read more:
www. nordicforestresearch.org

Nordic wood furnishes Council of Ministers' office

The secretariat of the Nordic Council of Ministers moved to new premises in 2010. The office of the General Secretary now contains high-quality furniture that reflects Nordic tree species and design. The furniture was handed over by SNS at a reception in September 2012. The gift was a result of a generous donation from Vemmetofte Closter in Denmark, a foundation whose main income is from forestry.

The furniture consists of 14 pieces of Hans J Wegner's famous design "The Chair" and an elliptical table specially designed for the space by Marianne Wegner, his daughter.

The chairs and the table are made of soaped red heart stained beechwood. The discoloured heartwood gives individual colours to the wood, and makes each chair unique.

"The Chair" is among the most famous pieces of Danish furniture art. When John F. Kennedy met Richard Nixon in the world's first televised election debate in 1960, they sat in "The Chair". It was chosen for its comfort and stylish appearance.

Photos: Katrine Hahn Kristensen and Youtube

Above: from the reception where the new furniture was presented.
Below: A close-up of the classic Danish "The Chair, the same model that John F Kennedy and Richard Nixon used in the world's first election TV-debate in 1960.

Shortcuts

Denmark

SNS board member leads new institute

University of Copenhagen continues to combine its units. The Forest & Landscape Institute will merge with the Institute for Geography and Geology. The new *Department of Geoscience and Natural Resource Management*, will be led by Professor Niels Elers Koch. He is a long-time board member of SNS, and currently President of IUFRO (the International Union of Forest Research Organisations). The new unit has a staff of about 400.

Read more: sl.life.ku.dk

Norway

European network protects forest genetic variation

The European network EUFORGEN has established a large database, collating information on the genetic resources of forest trees. Altogether 2557 gene conservation units ("forests") from 31 countries and more than 100 tree species are included in the database. Norway has contributed 19 units to the network.

The aim is to identify a network of sites to be protected for genetic conservation, but also to monitor how the trees react to new conditions resulting, for example, from climate change.
The intention now is to select the most valuable genetic entries in order to create a core network that will cover as much of the genetic diversity of each tree species as possible.

The conservation units are presented on the portal EUFGIS (portal.eufgis.org).

Read more: www.skogogforskning.no, search for EUFORGEN

The networks webpage: www.euforgen.org

Finnish–Swedish teamwork helps foresters prepare for climate change

Zoom in on your planting site in Google maps. Choose if you want to optimise for the current or future climate. Press the button "Show orchards", and a list of recommended reforestation material is shown. The program makes a selection of all available Scots pine seed orchards from Finland and northern Sweden.

The program *Planters' Guide 2* is a result of the joint project *Optimal Deployment*, which has involved Skogforsk and Metla. The project is also part of the EU-cooperation *NovelTree* (see N&V No. 2, 2009).

Optimal Deployment is unique since it merges information on reforestation material from two countries into a tool available for forest owners in both Sweden and Finland. It is also unique since it brings climate scenarios into a practical decision support system for those establishing the forests of the future.

– There are clear benefits in using seed orchard material from Finland in Sweden, and vice versa, says Professor Bengt Andersson at Skogforsk, who is leading the project. With cooperation, we can give forest owners a wider selection of material that is optimal for a specific planting site.

Planters' Guide 2, which will be publicly available in 2013, is the practical outcome of the cooperation, but the results are much wider than that. Forest geneticists in Finland and Sweden have started to combine their data from field trials within their countries north of latitude 60.

A giant data base

Altogether 15 000 entries from several hundred thousand Scots pine trees are now part of the database. The growth records from the field trials are linked to climate variables used by climate researchers worldwide. New climatic models from SMHI (the Swedish Meteorological and Hydrological Institute) generate climate indices for a specific site – today and in the future.

With the aid of the field data and climate models, a new prognosis model was developed. This can estimate production with respect to climate for the site, and genetic/climatic origin and level of improvement of the reforestation material.

– We still have some polishing to do on the functions, but we are now able to forecast area production and survival for all the available seed orchards at a selected site. We assign them an index, which shows their yield compared to trees of unselected local origin, says Bengt Andersson.

The user will also be able to choose between the current climate or a future climate scenario.

Today's climate for survival, tomorrow's for yield

Bengt Andersson argues that it is appropriate to use the current climate when estimating survival but an expected climate 40 years ahead for estimates of yield, i.e. the average climate conditions for the coming rotation period.

– With a warmer climate, optimal deployment of seed orchard material is expected to be further north and/or at a higher elevation than today, he says. This program allows the forest owners to be prepared for climate change as early as the time of planting.

Contact: Professor Bengt Andersson, bengt.andersson@skogforsk.se

Bengt Andersson: "The program allows forest owners to be prepared for climate change.". Photo: Mats Hannerz.

About Planter's guide

The original program Planters´ Guide (Plantval in Swedish) was first developed around the year 2000. It is used as a web-based decision support system for forest owners and nurseries when they select reforestation material, and it includes choices for Scots pine, Norway spruce, Lodgepole pine and birch.

The new *Planters' Guide 2* will, in the first instance, be focused on Scots pine in northern Fennoscandia, and will also take into account climate change.

Plantval can be found on www.kunskapdirekt.se/plantval.

A "semi-English" version is also available.

Shortcuts

Sweden

New film about Swedish forestry

The Swedish University of Agricultural Sciences has produced a new film about the Swedish sustainable forestry model. The film was originally created for an international audience at the UN conference in Rio de Janeiro (Rio+20).

The 12-minute long film explains the rise, success and future of the Swedish sustainable forestry model, as well as the criticism it has received.

"We have already received requests from administrative authorities and other organisations who wish to use the film", says Tomas Lundmark, Dean of the Faculty of Forest Sciences.

The film (in English) can be seen on Youtube (search for Sustainable Forestry – the Swedish model)

Finland

New EU-project for more efficient biomass supply

The Finnish Forest Research Institute (Metla) is coordinating the new EU-project INFRES (Innovative and effective technology and logistics for forest residual biomass supply in the EU).

The project is funded through the EU's 7th framework programme. IFRES aims at high production efficiency and precise deliveries with respect to woody feedstock intended for the industrial generation of heat and power and for the biorefining sector.

The consortium has 23 partners, including nine leading forest energy research organisations, plus 14 SMEs operating throughout the supply chain.

The duration of the project is three years, with a total budget of around €4.2 million.

Read more: www.metla.fi (pressrelease) and www.forestenergy2020.org

Finland

New website for forestry C&I in Europe

Criteria and indicators (C&I) have emerged as a powerful tool in promoting sustainable forest management. A pan-European set of criteria and indicators have served as the basis for State of Europé´s Forest assessments in 2003, 2007 and 2011, and provided the basis for regional and national policy formulation, analysis and monitoring.

A new website gathers together information from a recent project whcih analyses the implementation of the C&I in 46 countries. The project is coordinated by the European Forest Institute (EFI) in close cooperation with FOREST EUROPE Liaison Unit, UNECE/FAO, Metla and relevant experts.

The website: www.ci-sfm.org

Source: www.efi.int

Swedish model – the Movie.

Biomass supply Photo: Mats Hannerz

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More info about SNS:

www.nordicforestresearch.org

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