

## From the scientific editor:

**Functions that predict the wood properties even before the stand is cut, and mathematical models of trees from aerial photographs. These and many more topics are covered in this issue of Scandinavian Journal of Forest Research. Here follows the editor's condensed summary of the contents:**



Photo: Areca

**Hardiness and nitrogen.** The build-up of hardiness in seedlings is a matter of great concern for forest nurseries, and nutrient supply is believed to have an important role in the process. Contrary to some earlier results, **Inger Sundheim Fløistad** found that high nitrogen fertilization did not reduce hardiness. Thus, hardiness cannot be improved by starving the seedlings. However, short day treatment does seem to be effective.

**Growth indices.** Growth indices are normally based on annual ring sizes at breast height. However, it is questionable whether breast height radial growth always reflects the volume growth of the tree, since trees can allocate resources differently depending on their status and environmental conditions. **Harri Mäkinen** and colleagues concluded that breast-height radial growth reflects short-term, annual, growth variation sufficiently well for most purposes. However, it is less suitable for describing medium term variations in volume growth.

**Dead wood.** The rate and distribution of trees that die, fall and decay determine the availability of substrate for insects, fungi and lichens that specialise in dead wood. **Seppo Rouvinen** and **Jari Kouki** described these processes in detail for two

stands. They found that the diversity of the dead wood tends to decline with time – if no natural disturbances occur. They also suggest that man has to induce disturbances, such as fire, to allow species other than Norway spruce to contribute dead wood in boreal forests.

**Prediction of wood properties.** There would be great advantages if wood and fibre characteristics could be predicted at the stand stage, before the wood has been assigned to a certain mill or process. **Lars Wilhelmsson** and co-workers present a model that uses basic stand data to predict the average outcome of variables such as basic density, juvenile wood content, heartwood diameter and bark thickness. The models are applicable to most Norway spruce and Scots pine stands in Sweden.

**Compression of wood.** Another paper that predicts wood properties is presented by **Micael Öhman** and **Jan Nyström**. However, the predictions here relate to the individual plank level. By observing the shape of the plank, they found that it is possible to predict the distribution of compression wood. This knowledge can be used to better grade the planks and to select cutting strategies for each plank, thereby improving the value of the end products from the sawmill.

**Improvement of GPS data.** GPS technology has quickly become a 'hit' in forest inventory and planning, and a lot of effort is being put into further improving its accuracy under applied conditions. **Erik Naesset** and **Tobias Jonmeister** investigated whether errors in GPS positioning could be predicted and reduced at different stages of data collection. Their findings include data showing that it is usually better to move the GPS receiver to an opening in the forest, since more exact positions can then be obtained than the much less precise values obtained under a dense canopy.

**Remote sensing.** Remote sensing combined with automatic data analysis has the potential to greatly reduce the costs involved in forest inventory and planning. **Mads Jeppe Tarp-Johansen** demonstrates two applications in this issue. In the first, he uses high resolution air photographs to create a 3D stem map. In the second, he develops a mathematical model of stem surfaces, which can be used to estimate the diameters and basal areas.



*Olav Hepsø is a research official with deep roots in the countryside of central Norway. Timber hauling with horses and cutting trees with crosscut saws were natural elements of everyday life during Olav Hepsø's adolescence at his parents' farm in Sør-Trøndelag.*

## “SNS is an important player in Nordic forest research”

**“The role of SNS has become increasingly important. Its position has become stronger since international cooperation has been increasing”, says Olav Hepsø, the new chairman for SNS (the Nordic Forestry Research Cooperation Committee).**

“I think that SNS has a major role in developing research contacts with adjacent areas. Not only with the countries east of the Baltic sea, but also with the research community in the west. For example, the forestry sector in the Nordic countries has much in common with forestry in Scotland,” says Olav Hepsø.

“SNS also has a duty to look after the Nordic interests in the EU. We are taking an active part in the development of the 6<sup>th</sup> Framework Programme, where we want to highlight the natural networks between the Nordic countries and adjacent areas.”

### Network activities

“The role of SNS as a source of funds has changed in recent years. Instead of financing research projects, more

money is directed to network activities. The purpose is to support and initiate cooperation that can be financed by the EU and national funding sources.”

“The Nordic Council of Ministers is carrying out an investigation into research and education in the agricultural and forestry sectors”, Olav Hepsø says. “We are very eager to see the outcome, which will be presented at the Council’s meeting in Greenland in August this year. It is an advantage that the political profile of this field has been raised. Forestry tends to be a relatively weak priority for our governments, its role in the economy as a whole is decreasing and fewer young people want to make a career in the forestry sector. The trends are the same in all the Nordic countries,

### Mini-CV

Olav Hepsø was born in 1943 and holds an agronomist qualification from the Agricultural University of Norway. He has been working in research funding since 1970, when he was assistant director in the former Agricultural Research Council of Norway.

In 1993 the council became part of the Research Council of Norway, where he was made a director of the agricultural department in the Bioproduction and Processing Division. Forestry has been an important part of his remit since 1974.

When Norway took over the chair of SNS in 2002, he was elected chairman for the next four years.

making it even more necessary to cooperate to reverse the trend.”

### News and Views

“SNS supports Scandinavian Journal of Forest Research, and its section ‘News and Views’ is the only published outlet of information for SNS. It has an important role: to present research news in a form that is accessible to people who are not researchers themselves. Therefore, we want to place it on the SNS homepage so that non-subscribers can read it. I would also be glad to see more open debates in the News and Views pages”, he concludes.

## New dissertations

### Seedling responses to temperature and nutrients

In May, Sari Iivonen at the Finnish Forest Research Institute in Suonenjoki defended a thesis in which she described detailed studies of pine seedlings' responses to changes in root zone temperatures and nutrient supplies. Temperatures below +5°C clearly limit net photosynthesis, transpiration and root growth, but these variables are also restricted at temperatures below 12–13°C. Sari Iivonen also shows how root growth accelerates when shoot growth has terminated.

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### Soil scarification has long-term effects

Stefan Mattsson from SLU in Umeå showed in his dissertation how stem growth and wood properties are affected by soil scarification. In two experiments with 18-year-old planted lodgepole pine stands, ploughing increased the yield 3–6 fold compared to no scarification. Ploughing also increased the yield, by 50%, compared to patch scarification in Scots pine stands (23 to 28 years old) in northern Finland. Stefan Mattsson also showed that the variation in wood properties was related to the size of the trees rather than to the method of soil scarification itself.

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### Environmental impact of forest nurseries

Leached fertilizers and pesticides from forest nurseries constitute a significant environmental threat. In a new thesis, Marja-Liisa Juntunen from the Finnish Forest Research Institute in Suonenjoki shows that there is considerable variation in the use of fertilizers and pesticides between different stocks and producers. For example, a bare root seedling consumes eight times more nitrogen and four times more pesticides than a containerised seedling. There was also great variation between different container nurseries. The one with the

greatest use of fertilizers applied six times more nitrogen and phosphorus than the one with the lowest. The risk of leaching is also affected by the method of application and substrate involved. The Finnish nurseries used much smaller amounts of pesticides and fertilizers in the beginning of the 2000s compared with the beginning of the 1980s. However, additional action could be taken to further reduce these amounts, and the potential risk of leaching.

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*There are big differences between nurseries in consumption of fertilizers and pesticides.*



### Composition of ectomycorrhizal fungi changes with carbon dioxide concentration

Ectomycorrhizal fungi may receive 20% of the total C fixed by their host plants. Petra Fransson from SLU in Uppsala showed in her dissertation that the biomass of these highly important organisms will tend to increase with increased carbon dioxide concentrations, and that the relative abundance of different fungi species will change. When the ectomycorrhizal fungi grow larger, the trees can be better supplied with nutrients from the soil. Petra Fransson's results also indicate that large trees can support smaller trees with carbon through their common mycelial network.

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*Ectomycorrhiza of Tricholoma albobrunneum. Photo: Petra Fransson*



## Snippets

### Danish forest research reorganised

The new government in Denmark has reorganised forest research in the country. KVL (The Royal Veterinary and Agricultural University) was moved from the Ministry of Education to the Ministry of Science, Technology and Innovation. "Skovskolen", which trains forest engineers, was moved from the Ministry of the Environment to the Ministry of Education. Finally, the Danish Forest and Landscape Research Institute (FSL) remained in the Ministry of the Environment, but was subject to large cutbacks, amounting to 12 % of its budget.

### What is a natural forest?

Most people seem to have at least a vague idea of what a natural forest is, but a wide range of definitions are used. Skogforsk and NINA in Norway have now given a definitive statement applicable for Norwegian conditions: "Natural forest is forest established through natural regeneration of local genetic material, in which human activity has had so little impact, or occurred so long ago, or is conducted in such a way that the natural structure of the forest, its composition and its ecological processes are not essentially affected.

Source: *Aktuelt fra skogforskningen 1-2002.*

### Urban forests in focus

In the 1990s 70% of Norwegians lived in cities, compared to 30% a century ago. Urban or near-urban forests cover only 10% of the productive forest area in Norway, but they play an increasingly important recreational role. The Research Council of Norway is now financing a 3-year project which will identify the needs of different interest groups, and how the forests should be maintained to minimize conflicts.

Source: [www.skogforsk.no](http://www.skogforsk.no)

### Deterioration of the warship *Vasa* explained

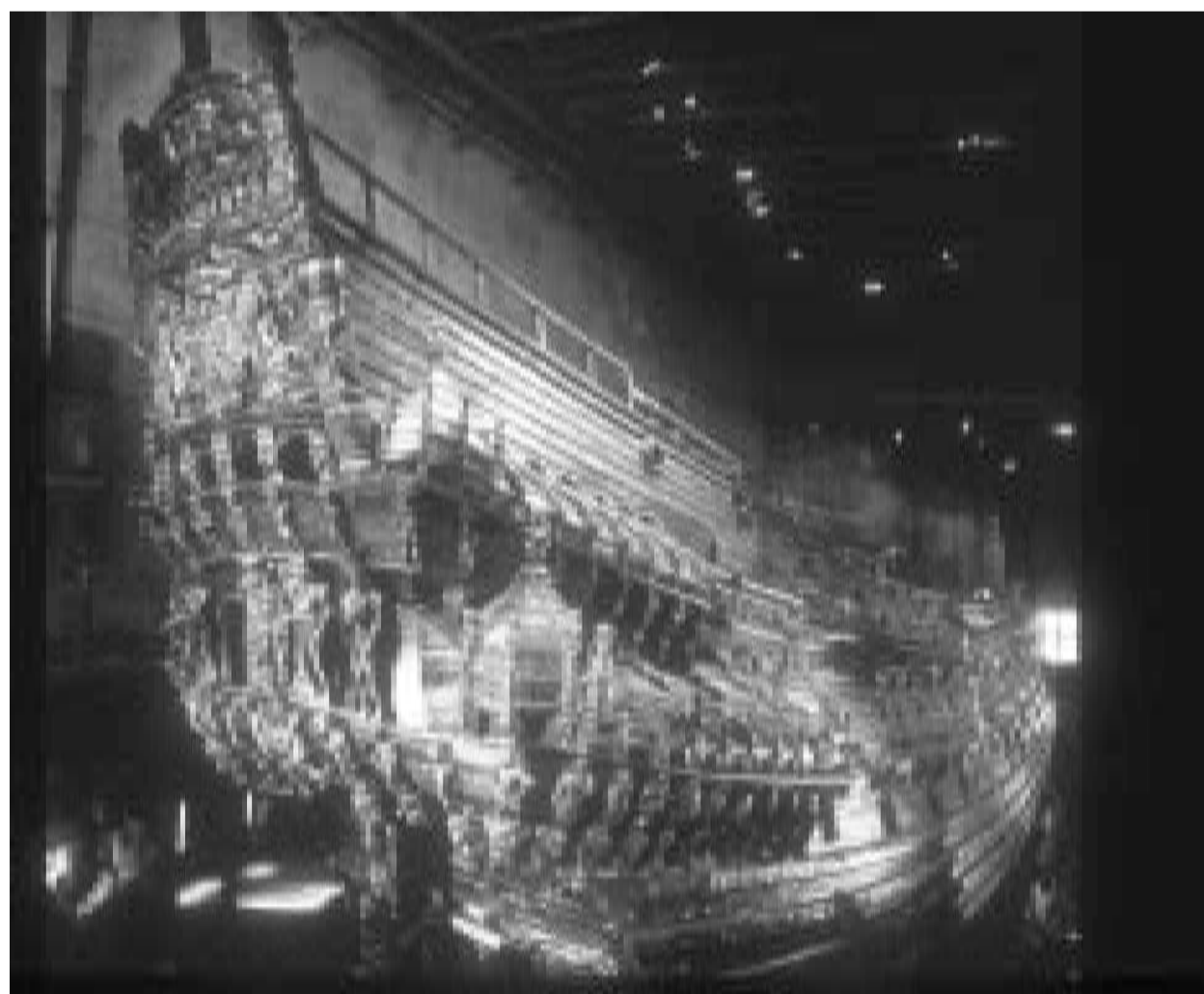
The seventeenth-century Swedish warship *Vasa* has been slowly deteriorating since it was put on display in Stockholm in 1990. High acidity and a rapid spread of sulphate salts have been observed in its oak beams. A research group from Uppsala and Stockholm have now pinpointed the causes of the deterioration.

The results, published in *Nature*, indicate that sulphur accumulated in the beams during the more than 300 years the ship lay at the bottom of the sea. Now the beams

are exposed to the air, the sulphur is oxidising and producing sulphuric acid. This process is catalysed by iron from the original, corroded iron bolts.

Treatments to stop the deterioration should focus on removal of the sulphur and iron compounds. The results are probably applicable to many similar objects found at the sea bottom.

Source: [www.slu.se](http://www.slu.se)



*Sulphuric acid is slowly decomposing the ancient warship Vasa.*

### New publication on gene resources

"Nordiske GENresurser" is the name of a new publication from the Nordic council of ministers. The publication is to be issued once a year in Scandinavian, English and Finnish versions. Its goal is to make a popular presentation of efforts from the Nordic Gene Bank, the Nordic Gene Bank for Domestic Animals and the Nordic Council for Forest Reproductive Material. The first issue, published this year, contains articles on gene conservation strategies, DNA-analyses to describe the migration history of trees and forest tree breeding, as well as articles on rare kinds of sheep, pigs, apples and strawberries.

The editor can be contacted at [liv@nordgen.org](mailto:liv@nordgen.org)

### Danish giant felled by storm

Scandinavia has lost one of its giants when a 110-year-old *Abies grandis* at Rye Nørskov in Denmark blew down during one of this winter's storms. The tree, at 52.5 m, was the tallest in Denmark.

Source: *Skoven 5, 2002.*

# Nordic foresters share common values

**Nordic forestry professionals share strong common values. They emphasise the diverse and long-term use of forest resources and they are ready to meet their fellow citizens' increasing expectations from forests. They also value co-operation and the achievement of mutual understanding in conflict situations. On the other hand they take a more defensive stance when it comes to the media.**



*"The forest & its many values" was the theme of the conference.*

Before the 20<sup>th</sup> Nordic Forest Congress, held in Helsinki in June, an extensive survey of values was undertaken. Nearly 1,400 persons from the five Nordic countries took part: mostly forestry professionals and, to some extent, forest owners and representatives of environmental organisations. Some of the results presented at the conference are given here:

- The respondents emphasised the diverse and long-term use of forest resources.
- They stressed the importance of mutual understanding in conflict situations. They wanted to avoid an authoritarian approach.
- They took a more defensive stance when it comes to the media. They do not go out of their way to influence journalists, but they try to explain to them the needs of forestry and the

legal and administrative framework in which they work.

- They wanted to open up to the rest of society. A customer-oriented approach is considered increasingly important.
- They strongly believe that expertise is the key to success in the future.

*The conference attracted more than 500 participants from the Nordic countries. A majority of the participants also attended one of the 20 pre-conference excursions in Finland and Russia. Here is a picture from excursion No. 16: Coastal forestry in the archipelago west of Åbo (Turku).*



## The largest undertaking since *Systema Naturae*

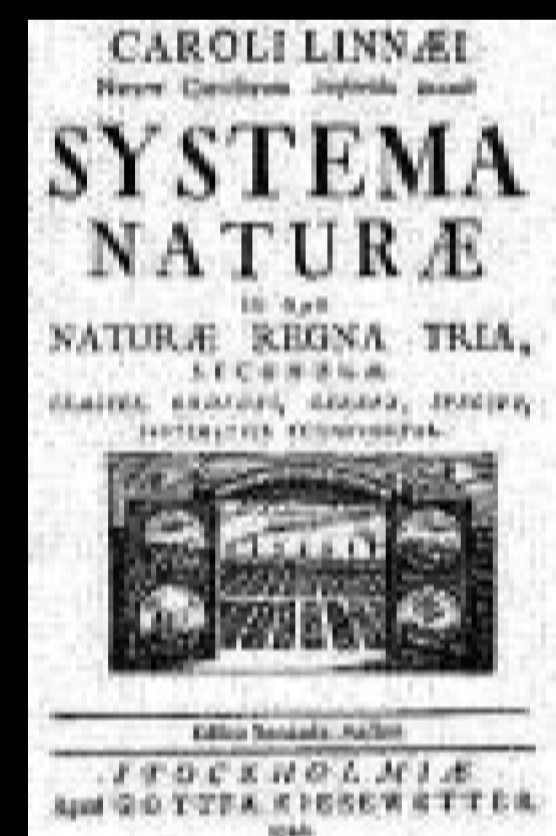
Produce a standard work covering all Swedish animals, plants and fungi, a total of approximately 50,000 species! This was the commission given by the Swedish government to the Swedish Species Information Centre (ArtDatabanken) at SLU in Uppsala. A task that will take 20 years to complete.

The work will consist of two main parts; a national flora and fauna in the form of well-illustrated handbooks in Swedish presenting the Swedish species, and a series of scientific monographs in English providing detailed descriptions of the approximately 30,000 species currently

lacking adequate documentation for the Nordic countries. As a start, 40 million SEK will be invested in the first three years.

"This is the largest single undertaking concerning Swedish species since the publication of Linnaeus' *Systema Naturae*", says Director Torleif Ingelög and Associate Professor Ulf Gärdenfors at ArtDatabanken. All major Swedish universities and natural history museums, as well as many foreign experts, will be involved in the project.

Source: [www.artdata.slu.se](http://www.artdata.slu.se)



# Nordic wood research mapped

**Wood research is conducted at 31 Nordic institutions. Wood research is the main activity of at least 532 researchers in the Nordic countries. These are some of the findings of a survey of wood research, initiated by SNS. The objective was to identify target areas for cooperation and coordination at a joint Nordic level.**

## Two specialized institutes

Per Brenøe, Norway, delivered a report which gives an overview of this research and recommends actions to be taken. He found that wood research (excluding research into wood for energy or the paper industry) is conducted at 31 institutions of university or institute status, but there are only two that specialise in wood research: Träteknik (the Swedish institute for wood technology research) and NTI (the Norwegian institute of wood technology).

Wood research is the main activity of at least 532 researchers in the Nordic countries.

Many of these investigators perform

research on wood properties, but few deal with marketing wood products. Nordic institutes are in the international vanguard when it comes to house building, fire protection and glue-laminated wood.

## Little cooperation across borders

Several national networks have been established for wood research and development, such as Traecenter in Denmark, the Center for Expertise for Wood Products in Finland, Treforsk in Norway and Wood Technology in Sweden. Traecenter cooperates with relevant groups abroad to some extent, but the networks are mainly geared

towards vertical integration through the value-added chain within each country.

A programme for cooperation on wood research, "Nordic Wood", was completed last year. The programme was initiated and partly funded by the Nordic Industrial Fund. In total, 85 projects were funded over the years 1993–2000. The wood industry had strong control over the programme. Some of the most important projects involved building or promoting:

- Wooden bridges (800 new wooden bridges were built during the project period)
- Fireproof wooden houses
- Multi-storey wooden buildings (50 buildings with 1,400 apartments were built)
- Environmental certification (the Nordic Wood certification model is now widely used).

## New initiatives suggested

Many positive results were obtained from the Nordic Wood programme, but Brenøe concludes that it did not succeed in building new networks between the Nordic research organisations. He suggests that SNS should be a major actor in coordinating wood research at a basic research level. Industry research should, instead, mainly be financed by the Nordic Industrial Fund. SNS should also initiate a Nordic programme for basic wood research, he says.

*Promoting multi-storey wooden buildings is given high priority. Photo: Svenskt Trä*



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- short
- relevant to the Journal
- interesting for the readers.

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