

Editor's summary

The following is the editor's condensed summary of the articles of this issue.



Photo: Skogforsk

- Fertile but wet sites constitute a challenge for the forester, since poor drainage hinders establishment of the trees. But, once a stand is established on such a site, it may be highly productive. In order to find suitable nurse species for the establishment of *Picea glauca* on wet sites in Canada, **Simon Landhäusser** and colleagues studied growth characteristics of various species under wet soil conditions. They concluded, *inter alia*, that balsam poplar would be a good nurse crop on wet and warm soils, and paper birch on wet and cold soils.
- Fertilization in plant production could be considerably reduced without risking the quality and growth of the seedlings. In the study presented by **Lars Rytter** and colleagues, fertilizer was more efficiently utilized when applied "on demand" than when a standard fertilization protocol was followed. Seedlings fertilized on demand received half as much nutrients as the conventionally grown seedlings. They were smaller at the end of the nursery period, but had attained the same size as their conventionally grown counterparts after three years in the field: possibly because they had a more appropriate root:shoot ratio for field conditions.
- Admixtures of birches in Scots pine stands may have positive effects on the external quality of the pine logs.

Sauli Valkonen and **Juha Ruuska** present data from southern Finland showing that tree diameter and branch size of the pines decreased at the sites they examined when the number of birches increased. Height growth of the pines was not reduced, even at an admixture of 10,000 birch stems per hectare.

- The potential for woody biomass production on agricultural land is high, even at Scandinavian latitudes. **Almir Karacic** and colleagues evaluated short-rotation plantations of hybrid aspen and poplar in Sweden. The best balsam poplar clone produced 9 tonnes per hectare and year over a 9-year period, while hybrid aspen produced 8 tonnes per year and hectare. On corresponding sites, Norway spruce may produce up to 5 tonnes per hectare and year.
- Pine weevil damage is the main threat to the establishment of planted conifer seedlings in southern Sweden. Leaving a high shelterwood has been found to reduce the negative impact of the weevils. However, the positive effect of the shelterwood has not been clearly explained, and few data have been published on variations in weevil density. However, **Göran Nordlander** and colleagues have now counted weevils, finding about 14,000 per hectare. Pine weevil density was about the same in the shelterwood as on the

clear-cuts they examined, indicating that the reduced damage to seedlings in shelterwoods is due to the presence of alternative food sources in them, rather than to lower densities of weevils.

- Managers of recreational areas can obtain a lot of information simply by asking the opinions of the visitors. **Won Sop Shin** and colleagues evaluated a method for extracting as much information as possible from the experience of visitors to a forest reserve in Korea. This so-called observance-influence analysis revealed, for example, that the visitors reacted negatively to power lines, poor maintenance of buildings and discourteous behaviour.
- A forester who follows standard silvicultural recommendations when planning rotation ages may make considerably less profit than one who follows more economically-based criteria. **Kari Hyytiäinen** and **Olli Tahvonen** demonstrate that setting rotation ages according to the Faustmann formula can give better financial returns than official Finnish silvicultural recommendations or criteria such as "maximum sustained yield" and "forest rent" criteria.

Forest research in the North

Sweden page 387-390

Larch not as durable as believed

The value of larch wood for constructions where strength and durability are important has long been debated. Larch has been suggested as an environmentally friendly alternative to chemically treated wood. Research on the utilization of larch has been pursued for a long time in the Nordic countries, but not in a coordinated fashion, and results are difficult to compare.

An effort to combine various results has now been made in an SNS-sponsored project. Christian Lyck and Andreas Bergstedt compiled a literature survey on the use and availability of larch wood, Erkki Verkasalo and Hannu Viitanen compiled one on

Siberian larch as raw material, and finally, Nasko Terziev and Galia Zamaraskaia compiled a review of Soviet and Russian literature on larch timber.

Some of the main conclusions were:

- Spiral grain, internal stress and drying deformations (twist) are common flaws in larch wood.
- Drying larch wood is slower, and more problematic, than drying spruce wood.
- The heartwood proportion is much higher in larch than in Scots pine and Douglas fir.
- Testimonies of extreme durability of larch wood are not supported by

comparative laboratory tests. Heartwood of larch and Scots pine have almost equal durability. Heartwood of larch can replace chemically treated sapwood to some extent, but should not be used in contact with soil.

Source: Larch wood, a literature review for the Nordic Forest Research Co-operation Committee (SNS), project no. SNS 80, March 2003. The report can be ordered from SNS: og@forskningssradet.no

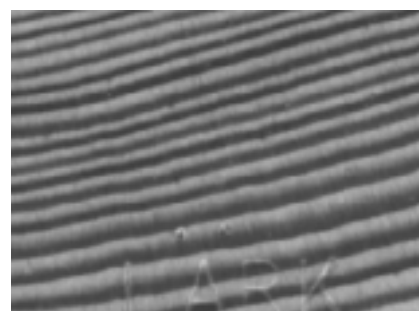


Photo: Skogforsk

SNS Nordic Forest Regeneration Seminar

More integration needed

To counter increasing costs, and various other factors affecting the whole of northern Europe, more intensive research into regeneration is required. Cost-effective methods of establishment, mechanisation and more efficient management of the regenerations were some of the topics discussed at a workshop in Suonenjoki in June 2003. This meeting—the first formal activity of the SNS Nordic Network on Forest Regeneration—

brought together 50 participants from the Nordic and Baltic countries. Over 20 papers were presented.

“The discussions highlighted a need for more integrated research in forest regeneration”, says Professor Taneli Kolström, chairman of the network.

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Decreased planting in Nordic countries

Trends in artificial regeneration in the Nordic countries was the title of a presentation by Professor Göran Örlander to the SNS Nordic Network on Forest Regeneration workshop. Some conclusions were:

- The area of final felling has been relatively constant since 1980 in Finland and Sweden, but has decreased in Norway during the last decade.
- Planting is by far the most commonly used method for artificial regeneration, although seeding is relatively common in Finland.
- Planting has decreased in all countries, but especially in Sweden, since the late 1980s, and in Norway during the last few years.
- Over time, natural regeneration has increased, especially in Sweden and Norway. However, it has decreased during the last few years in Sweden.
- Scarification is practiced on a majority of regeneration areas in Finland and Sweden, but is not common in Norway. Disc trenching is the most common method, followed by patch scarification and mounding.

Mechanization of point-cleaning, as demonstrated in the field-seminar by UPM-Kymmene Forest is one of a number of new ideas for the management of young stands. Photo: Taneli Kolström.





Photo: Skogforsk



Swedish forest research in brief

In the last three issues, we have portrayed the forestry sectors of Iceland, Norway and Finland. Sweden is the focus of this issue's *Forest research in the north*.

Forests and forestry play a more important role in Sweden than in any other European country except Finland. The forest industry and forestry account for more than 4% of Sweden's GDP and 15% of Sweden's total exports. The country is the fourth biggest paper and pulp exporter in the world and the second biggest exporter of sawn softwood timber.

Forestry research is dominated by the Swedish University of Agricultural Sciences (SLU), with Skogforsk (the Forestry Research Institute of Sweden) as the second largest contributor. However, several other regional universities and institutes conduct research relevant to the forests, e.g. in the environmental field. Research related to industrial aspects is dominated by the Swedish Pulp and Paper Research Institute (STFI) and the Swedish Institute for Wood Technology Research (Träteknik), but other participants are also involved.

Swedish forests in figures

- Total land area: 41 million hectares
- Productive forest land: 22.6 million hectares
- Annual increment: 100 million m³
- Annual harvest: 75 million m³
- Growing stock: 3 billion m³

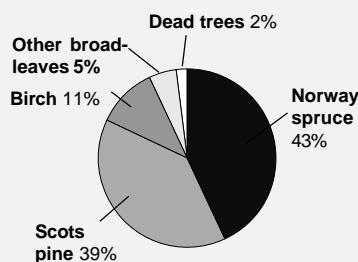
Ownership

- Private individuals: 52%
- Private forest companies: 24%
- The state (including the state-owned company Sveaskog): 17%
- Other public bodies: 7%

Forest industry

- Sawnwood production: 17 million m³
- Number of sawmills (>10,000 m³/yr): 165
- Pulp production: 11 million tonnes
- Number of pulp mills: 45
- Paper production: 11 million tonnes

Sources: www.svo.se
www.skogsindustrierna.org



Long-term field experiments form one of the cornerstones of Swedish forest research. The picture shows the first systematically laid-out plot: Lycksele no. 1.

Photo: Henrik Hesselman 1902. Copyright: SLU, Forestry Library.



Faculty of Forestry at SLU

The main actor on the forestry research stage is the Swedish University of Agricultural Sciences (SLU). The Faculty of Forestry is one of the major institutions of its kind in Europe. The main units are located in Umeå, Uppsala and Alnarp. Eight research parks provide sites for field experiments.

Each year, about 80 students start the Master's degree program in forestry, and 45 forest engineers are trained in Skinnskatteberg. About

The faculty of today*

- 800 employees (280 with PhD-degree)
- 22 departments
- Total expenditure: SEK500
 - Research: 60%
 - Postgraduate education: 15%
 - Undergraduate education: 10%
 - Monitoring & assesment: 15%
- Governmental grants: 50%
- External funding: 50%

* before re-organisation

25–30 receive a PhD degree each year.

Research ranges from cell biology to wood utilization. Basic and environmental projects account for half of the total research budget, and applied studies, such as forest management analyses, for the other half.

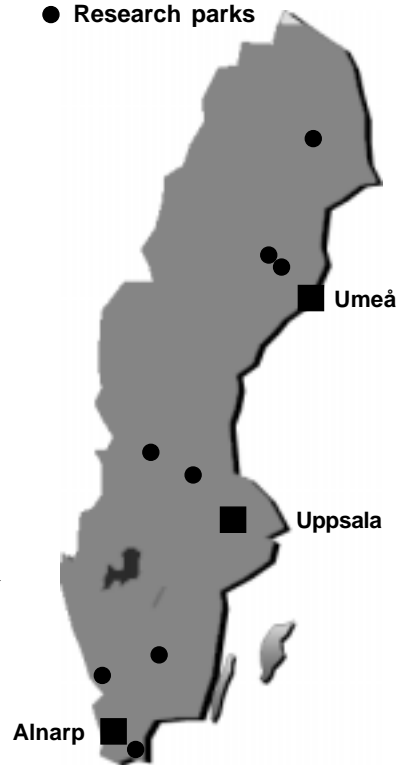
Coming re-organisation

SLU's faculties are to be re-organised, with changes taking effect from 1 January 2004. The departments will be divided amongst four new faculties. The main difference for the forestry-related departments is that several departments in Uppsala, that now belong to the Faculty of Forestry, will become part of a new faculty for natural resources and agriculture, with its head office in Uppsala. The forestry faculty will be concentrated in Umeå. More information will appear in News and Views when the structure has been fully decided.

Read more: www.slu.se

■ Main research units

● Research parks



Examples of ongoing activities at SLU

RIS checks the forests

Since the first National Forest Inventory was established in 1923, the status of Swedish forests has been intensively monitored and we have learned, for example, that the growing stock has increased by 72%, from 1.76 to over 3 billion cubic metres, from the 1920s to the present day.

Both permanent and temporary plots are examined in the National Forest Inventory. On the permanent plots, the inventory is combined with data from the Swedish Forest Soil Inventory.

Every summer, more than 60 persons help to inventory the forests on about 12,000 circular plots in 1,450 tracts distributed in a regular network across the country. The inventory is coordinated and compiled by the RIS (the Swedish National Inventory of Forests), which is hosted by SLU's Faculty of Forestry.

Source: www-nfi.slu.se

Genetic research school

A new research school in genetics is currently being launched in a co-operative initiative by SLU, Skogforsk and the Swedish Forest Tree Breeding Association. Additional support comes from the Knowledge Foundation (KK-Stiftelsen). The objective is to combine expertise in quantitative forest genetics and molecular genetics in order to create an internationally leading research program. The research school, managed by SLU, will host eleven PhD students for a period of five years starting in 2004.

"If the promising findings in biotechnology are ever to be applied, it will be necessary to combine the molecular research with traditional breeding. The students will learn both aspects in order to bridge the gap", says Professor Bengt Andersson, director of the research school.

Contact: bengt.andersson@skogforsk.se

Broad-leaved research

A new six-year research program on broad-leaved forests is being launched this autumn. The 200 million SEK-program will be led by SLU. This is to be a cooperative exercise, involving several participants, including WWF, the forest industry, the wood industry, and other universities and institutes.

"Research and development on broad-leaved forestry has been very sparse in Sweden. It is time to change that. Foresters and society are seeking alternatives to spruce", says Hasse Berglöf, forestry chief at WWF.

"The broad-leaved forests provide shelter for many threatened species and are in need of protection and restoration. At the same time, there is increased interest among forest owners to establish new broad-leaved stands", says program leader Magnus Löf at SLU in Alnarp.

Sources: www.slu.se, www.wwf.se

Skogforsk (The Forestry Research Institute of Sweden)

SkogForsk is the research institute of the Swedish forestry sector. Skogforsk carries out applied research in a variety of different fields:

- technological developments
- environmental and conservation issues
- breeding of forestry trees
- organisational issues

Skogforsk was founded jointly by the forestry cooperatives and the major industrial forest enterprises in 1992, when the Forest Operations Institute and Institute of Tree Improvement were merged.

The staff amounts to 120, 70 of whom are researchers. Half of the researchers have a PhD or licentiate degree. Most people work at the head office in Uppsala, but research stations are also found in Sävar (outside Umeå) and Svalöv. The village of Brunnsberg hosts a breeding station.

The total turnover comes to approximately SEK100 million, half of which supports the framework program. The other half consists of various

external grants and research commissions from the forest sector.

At one end of the spectrum of research fields covered by Skogforsk are topics such as long-term tree breeding. The tree breeding programs date back to the 1930s, continuously providing new, and better, regeneration material for forestry. At present, the forestry sector is establishing new seed orchards with improved material that will grow 20–25% better than unselected trees. At the other end of the spectrum, one can find research on such aspects as the automation of forest operations and IT-supported logistical systems.

Read more: www.skogforsk.se



A simulator is used at Skogforsk to test and develop new techniques for automating harvesting operations.

Photo: Skogforsk



Utilization of beech wood is one of many aspects covered by the new broad-leaved research programme at SLU.

Photo: Martin Werner.

Memorable years for forest research in Sweden

Forestry research and education has a long history in Sweden. Some of the landmark events were:

- **1828** The Royal Institute of Forestry (Kungliga Skogsinstitutet), a school for higher forestry education, is started with, Israel Adolf af Ström as director.
- **1902** The Swedish Institute of Experimental Forestry (Forstliga försöksanstalten – renamed Statens skogsförsöksanstalt in 1905) is established.
- **1916** The Royal Institute of Forestry is reorganized, becoming the Royal College of Forestry (Skogshögskolan) and moves to new buildings in Stockholm.
- **1945** The Swedish Institute of Experimental Forestry is renamed the Forest Research Institute of Sweden (Statens skogsforskningsinstitut).
- **1962** The Forest Research Institute of Sweden is merged with the Royal College of Forestry.
- **1964** The Forest Operations Institute of Sweden is established as a successor to several regional organisations.
- **1967** The Institute for Forest Improvement is established to conduct operational tree breeding and fertilization research.
- **1977** SLU, the Swedish University of Agricultural Research, is established with three faculties, all derived from previously independent institutions specialising in Forestry, Veterinary medicine and Agriculture.
- **1978** The Faculty of Forestry is relocated from Stockholm to Umeå, Uppsala and Garpenberg.
- **1992** The Forest Research Institute of Sweden (Skogforsk) is established as an amalgamation of the Forest Operations Institute and the Institute for Forest Improvement.
- **2004** SLU is reorganised, with the head of the faculty of forestry in Umeå.

Other important Swedish forest and forest industry research bodies

Växjö University

The regional university in Växjö in southern Sweden has recently built up competence in the field of wood utilization. Its Wood Design and Technology (WDAT) R&D programme aims at stimulating, supporting and developing the use of wood and wood-based materials in building constructions, furniture and other consumer products. The group currently has about 10 researchers and 17 PhD students.

Source: www.ips.vxu.se/wooddesign

SUFOR

SUstainable FORestry in southern Sweden is a wide research program. The objective is to provide a scientific basis for economically viable forestry, sustaining long-term forest health while maintaining biodiversity and the multi-use potential of the forest. The SUFOR staff consists of more than 40 persons, mainly from Lund University, Lund Institute of Technology and the Swedish University of Agricultural Sciences.

SUFOR began in 1997 and will continue until the end of 2004. The total grant from MISTRA (The Foundation for Strategic Environmental Research) for the full term 1997–2004 is 108 million SEK.

Source: www.sufor.nu

Luleå Technical University

Luleå Technical University has built up strong research interests in the area of wood technology.

The staff consists of over 30 people, 14 of whom have a PhD-degree and 11 are PhD students.

Source: www.tt.luth.se

Mid Sweden University

A Fibre Science and Communication Centre has been established at the Sundsvall campus of the Mid Sweden University. Some 30 professors and researchers, together with 40 PhD students, are linked to the centre. The research is conducted in close cooperation with the paper industry.

Source: www2.mh.se/fscn

STFI

The Swedish Pulp and Paper Research Institute (STFI) is the main player in Swedish pulp- and paper- related research. In 2003, STFI was merged with Packforsk (the Institute for Packaging and Logistics AB). STFI-Packforsk has a turnover of SEK250 million. The head office of STFI-Packforsk is situated in Stockholm.

The company has 250 employees, of whom approximately 30 are PhD students and 20 are professors/ associated professors. The research interests include fibre & pulp, paper-making, packaging & packaging materials, new materials and composites.

Source: www.stfi.se

Trätek

Trätek, the Swedish Institute for Wood Technology Research, constitutes a collective research and development resource for the Swedish timber and wood manufacturing industries.

Trätek's activities span the full range of timber handling and processing from felling and handling in the forest, via production in the sawmill through to the manufacture and use of finished products. Research and development is conducted in the form of projects commissioned either by the industry as a whole, or by groups of companies.

Trätek is a limited company which is 60% owned by the industry through an association. Trätek has 70 employees and its activities are mainly based in Skellefteå, Stockholm and Växjö.

Source: www.tratek.se

Dalarna University

The forest and wood group at Dalarna University has a staff of about 15 people who research and teach various aspects of plant production, forest technology and wood material science. The group was previously part of the research centre in Garpenberg, which was administered by SLU until it withdrew support in 1996, whereupon some of its activities were transferred to Dalarna University.

Source: www.du.se

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

Examples: comments on papers published in the Journal, views on ongoing research, trends in research policy, opinions about forestry practice etc.

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