



Photo: Skogforsk



Swedish forest research in brief

Sweden is the focus of this issue's *Forest research in the north*. Sweden is the largest of the Nordic countries, and has the largest amount of forest in absolute terms. In the last three issues, we have portrayed the forestry sectors of Iceland, Norway and Finland. 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 almost 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. Productive forests cover 23 million hectares, almost 60% of the land area, and most Swedes have some kind of personal relationship to the forest, either professional or recreational.

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.

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

Forest composition

Species	Percentage
Norway spruce	43%
Scots pine	39%
Birch	11%
Other broad-leaves	5%
Dead trees	2%

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



Faculty of Forestry at SLU

The main actor on the forestry research stage is the Swedish University of Agricultural Sciences. 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 25–30 receive a PhD degree each year.

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%

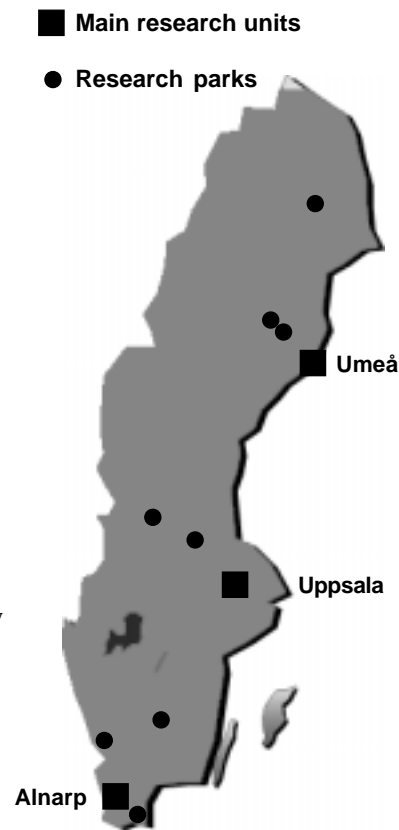
* before re-organisation

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



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](http://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.

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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

Trätec

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

Trätec'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.

Trätec is a limited company which is 60% owned by the industry through an association. Trätec 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 under the head of SLU, 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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- interesting for the readers.

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