News and Views

3 2002

Photo: Nils Jerling

From the scientific editor:

Brown rot, frost and drought; soil- and water- chemistry; yield potential; thinning methods; scenic beauty and the economic return of cuttings. All these topics and many more are covered in issue No. 3 of volume 17. Here is the editor's brief summary of the contents.

Downloaded By: [Hannerz, Mats] At: 08:29 28 March 2011

Is it possible to increase resistance to wood decay through genetic selection? **Annu Harju and Martti Venäläinen** came to the conclusion that there is important genetic variation in heartwood resistance to a brown rot fungus in Scots pine. However, it seems difficult to exploit this variation through direct selection, since unfavourable responses in heartwood density are likely to follow.

That root freezing causes damage and should be avoided in forest nurseries is well known, although few studies have been devoted to the correlations between levels of damage and subsequent growth. The nursery operator may want to know if a partially damaged seedling stock will be able to sell or not. **Carole Coursolle and her co-workers** in Quebec found, in experiments with black spruce, white spruce and jack pine, that survival will be significantly reduced when 60–80% of the root system is damaged. However, reductions in seedling growth due to root damage tend to become less important over time.

A response related to root freezing is the effect of drought on seedling behaviour. Summer planting would be advantageous in many ways, but the risk of drought is one of its main constraints. **Pekka Helenius and his colleagues** in Finland describe how actively growing spruce seedlings can usually be planted without risking damage, even if the planting is followed by a short period of drought. A prerequisite is that the seedlings must be well watered before planting.

The potential benefits of ameliorating acidic soil have long been discussed, but there is a lack of experimental data showing the environmental effects of possible treatments. **Bernard Ludwig and his colleagues** demonstrated in a north German pine stand that addition of lime and wood ash may affect soil chemistry and nutritional status to the trees. They recommend the use of wood ash for improving acidic soils, provided that heavy metal content is kept under control.

In Finland, large areas of formerly drained peatlands are in need of maintenance, raising questions about the environmental effects of ditch cleaning. **Samuli Joensuu and his colleagues** studied the effects of cleaning ditches on run-off chemistry in a large number of stands in diverse areas. The most important environmental effect of the cleaning was shown to be an increase in the load of suspended solids in the water.

Oak is a minor tree species in Finland, restricted to the southernmost part of the country. Nevertheless, it has the potential to produce valuable timber, although data describing its growth in Finland have been lacking. Therefore, **Sauli Valkonen, Piia Urpelainen and Anneli Virkki** estimated the site indices for 23 stands, and related them to site fertility and geographical location. They also found that the external quality of the trees was poor, due to the lack of stand management.

Contents

Precommercial thinning is a well-established procedure in Scandinavian forestry. The conventional method is to cut off all stems not considered "main stems". However, the method is costly, and alternatives are being sought. **Anders Karlsson and his co-workers** at SLU in Umeå evaluate whether point cleaning would be an effective alternative. They found that it may be, but a complementary cleaning operation is usually necessary.

Precommercial thinning was only one of many types of cutting that **Harri Silvennoine, Timo Pukkala and Liisa Tahvanainen** analysed with respect to their visual effects. They found that people generally dislike clearcuttings, while thinnings are usually thought to improve the beauty of a stand. They also evaluated two different methods to study people's preferences, both of which gave similar results.

Much economic research in forestry has been devoted to optimising rotation periods. The calculations become much more complex if the effects of thinnings are considered. And, if the number, timing and intensity of thinnings are to be optimised against length of rotation period, and for different economic parameters, tree species and site indices, then the problems start to seem insoluble. But, **Kari Hyytiäinen and Olli Tahvonen** have tackled these complications, and present solutions relevant for Finnish forestry. They also give examples showing how the officially recommended thinning regimes lead to economic imperfections.

Current SNS activities

Ongoing projects financed by SNS

Projects started in 2000:

- Urban forestry in the Nordic countries (described in N&V 15.2).
- Genetic variation and mechanisms of root-rot resistance in Norway spruce (described in N&V 15.2).

Projects started in 2001:

- New and efficient pre-commercial thinning – integrating biology, technology and economy (described in N&V 16.3).
- Removal of nutrients with biomass in Norway spruce stands (described in N&V 16.2).

Projects started in 2002:

- Development of fibre-based composite materials *(see next page)*
- Role of fine roots in carbon dynamics *(see next page)*
- Control of apical growth cessation and cambial activity. Coordinator Rishikesh P. Bhalerao.
- Plant protection by beneficial soil organisms. Coordinator Gudmundur Halldorsson

Networking activities supported by SNS in 2002

- A Nordic group for the conservation of genetic resources in trees
- A meeting related to the project "Effect of growth, age and genotype on the fibre characteristics of aspen and hybrid aspen"
- A Scandinavian Society of Forest Economics conference
- A workshop for evaluation of data from intensively monitored permanent plots
- A network for the conservation of biodiversity in managed forests
- A meeting on silviculture of birch stands for various goals
- Development of a Nordic database on forest damage
- A Nordic meeting on forest yield research
- A workshop for staff at forest research institutes involved in communication
- A seminar on "Models in forest analyses and planning systems"
- A Nordic-Baltic forest pathology meeting.

Board members in spring 2002

Chairman: Olav Hepsø

Denmark: Niels Elers Koch and Agnete Thomsen, deputy member Gustav Berner

Finland: Kari Mielikäinen and Liisa Saarenmaa, deputy members Kim von Weissenberg and Eeva Hellström

Iceland: Jón Loftsson and Aðalsteinn Sigurgeirsson

Norway: Olav Hepsø and Liv Marit Strupstad, deputy members Berit Hauger Lindstad and Berit Sanness

Sweden: Lisa Sennerby-Forsse and Håkan Wirtén, deputy members Barbro Wåger and Stefan Wirtén.

Åland: Mikael Sandvik (observer)

Faroe Islands: Tróndur Leivsson (observer)

The Nordic Forest Research Co-operation Committee ("SNS") is financed by the Nordic Council of Ministers. SNS promotes research into diverse aspects of sustainable forestry, through research, communication of relevant findings etc.

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New SNS Project 1:

Composites based on wood fibre

The goal of a new SNS-supported project is to develop novel materials based on wood fibres. Composites based on cellulose fibres may potentially have better mechanical properties than glass fibre composites. Besides, natural fibres are more environmentally sound, since they are based on renewable resources. The project will use new technology to describe the characteristics of fibres, to develop chemical treatments for modifying fibre surfaces, to design suitable polymer matrices, and to improve mechanical properties of composites by enhancing fibre architecture and manufacturing processes. Later, micro-mechanical modelling will be used to optimise the choice of materials to maximise their mechanical properties.

The project is a cooperation between researchers in Denmark, Sweden and Finland. Coordinator: Kristofer Gamstedt. kristofer.gamstedt@risoe.dk

Wood fibres. A source for new products. *Photo: Joanna Hornatowska, STFI.*

New SNS Project 2:

Carbon allocation in fine roots

There is a wide consensus that fine roots play an important role in the carbon dynamics of forest soils, but little is known about their quantitative contribution to the carbon budgets. Our knowledge of the role of fine roots in carbon inputs to the soil during decomposition is especially poor. Today, uncertainties about the role of fine roots constitute a weak link in process-based models of carbon dynamics in whole plants and ecosystems.

This was the background to a new 3-year project with partners in Finland, Estonia and Sweden. The partners will perform research in their home countries to determine carbon allocation patterns in fine root production. Further goals will be to produce reliable estimates of carbon inputs into forest soils via the decomposition of fine roots, and carbon outputs from forest soil through root and soil respiration.

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Shortcuts

Scandinavian wolves have eastern origin

The wolves living in Sweden and Norway today are genetically related to wolves in Finland, a few immigrant wolves seem to have been the ancestors of all the wolves in Scandinavia. These are the main conclusions of genetic analyses conducted over several years at the Department of Evolutionary Biology, Uppsala University, under the guidance of Professor Hans Ellegren.

The wolf was almost extinct in Norway and Sweden for many decades when, surprisingly, some wolves were observed in the deep forests of central Sweden (Värmland) in the early 1980s. Since then, the wolf population has increased to a hundred individuals. The genetic analyses show that most of the wolves may be traced back to a single pair in the early 1980s. Since then, at least one more wolf has immigrated and added new genetic material to the population.

DNA-analyses of wolf specimens in museums also show that the wolves of today are genetically different from the wolves living in Scandinavia during the 19th century. But, the old wolves were also occasionally visited, and mated, by their relatives from Finland and Russia.

Source: www.ebc.uu.se/evbiol/

EU-report on research:

Finland, Sweden and Denmark ranked top

Finland, Sweden and Denmark rank highest among EU-countries for most statistics describing research resources and effectiveness. They have a higher proportion of researchers in the total workforce, higher proportions of new PhDs, more research expenditure per unit GDP, more patents per person and more publications per inhabitant than EU averages. However, Sweden and Denmark lag behind in governmental research funding.

Benchmarking

A new EC-report presents indicators for benchmarking national research policies. Benchmarking in this context doesn't mean merely comparison of statistics, it is inteded to provide means to improve policies and practices. The first step is to compare a set of indicators, the second is to exploit knowledge gained from the comparisons to optimise national policies. The ultimate goal is, of course, to increase the competitiveness of the EU in the world market by improving its research. Comparisons are therefore also made with Japan and the US.

Highest ratios of researchers

First, the report compares human resources in research and development (R&D). Finland and Sweden, together with Japan and the US, are found at the top of the list. Below them come a group with above EU-average levels, led by Denmark. The rate of increase in the total number of researchers is highest in Finland and Ireland.

Sweden and Finland, followed by Germany and France, have the highest proportion of new PhDs (as a share of the total 25–34 years age-group). Denmark is also above the EU average in this respect.

High research expenditures, but government pays less

The total research expenditures (public and private) were higher in the US and Japan than in the EU as a whole, but even more money, in relation to GDP, was put into research by Finland and Sweden. Finland is also increasing its research funding most of all the EU-countries. Industry-financed research seems to be important in the Nordic countries. The share of industrial output ploughed back into research is highest in Sweden and Finland, followed by Germany and Denmark. On the other hand, the government budget allocated to research is lower in the Nordic countries. Finland is the only Nordic country above the EU-average in these terms. In contrast, the amount of money put into research by the Swedish government actually fell over the last five years. In fact the Swedish reduction was by far the largest in the EU, while governmental funding increased in the EU on average. The report considers reasons for this decline.

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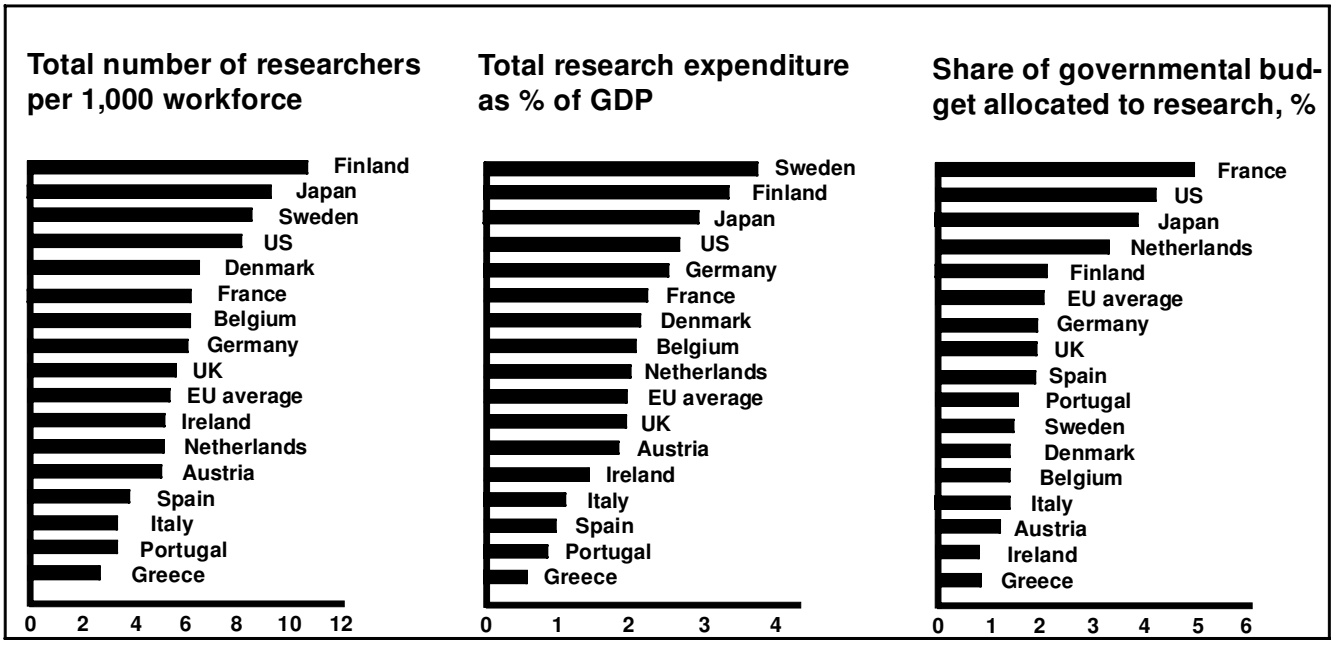

Most patents and publications

The report also compares scientific and technological productivity, in terms of number of patents per capita. Sweden and Finland are at the top of the European patent lists. Among EU countries, Sweden also generates most US patents, followed by Germany, Luxembourg and Finland. Sweden, Denmark and Finland are also top in terms of scientific publications per capita, far ahead of the US, Japan and the EU average. Furthermore, the Nordic countries receive high values for publication quality, since Denmark and Sweden, with Finland not far behind, produce the highest number of "highly cited" publications per million population.

Low labour productivity

Figures related to many other factors in the report are also considered in the report, such as the share of Small and Medium Sized Enterprises in the R&D, the role of innovative firms, venture capital, etc. However, these descriptive statistics do not describe the impact of the research on economic competitiveness. One criterion used in the report is labour productivity, measured as GDP per work hour. Surprisingly, both Finland and Sweden have lower productivity than the EU average, while Denmark is slightly above average.

New questions posed

Description of EU research by the criteria listed above is only a first step in the benchmarking process. What follows is an analysis of contributory factors affecting the various results. From a Nordic viewpoint, many interesting questions are raised by the report. How did Finland and Sweden achieve such high proportions of researchers, and what national policies enabled Finland to increase its research force? What factors lie behind some countries rapid increase in number of researchers? What good practices explain the strong performance of Sweden in producing doctoral graduates? What are the reasons for, and what policies explain, the decline of the governmental R&D budget in Sweden, which was already relatively low? Why is it that the strong R&D investment in Finland and Sweden has a relatively low impact on labour productivity?

Source: European Commission: Towards a European Research Area – Key Figures 2001 – Special edition: Indicators for benchmarking of national research policies. Luxembourg. ISBN 92-894-1183-X.

No. of scientific publications per million population

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Shortcuts

IUFRO's new image

The International Union of Forest Research Organizations (IUFRO) is continuously being modernized. A step reflecting recent changes was taken last year, when the word "forestry" in the name was changed to "forest". From this year, the organisation also has a new logo, which is aimed to better reflect the values and mission of the IUFRO. The former logo, known as the "sky rocket", has been in use since 1969.

Poplars clear soil of cyanide

In Denmark, poplars have been planted to clear soil contaminated with cyanide. Cyanides were a by-product from gas-production, and cyanide residues have been found in the drinking water near the old gasworks. The soil had even turned blue because of the cyanide. The poplars are efficient in taking up cyanides, especially a crossbreed called OP42.

New European forestry journal

Scandinavian Journal of Forest Research welcomes a new competitor. Silva Balcanica is the name of a new journal published by the Scientific Council of the Forest Research Institute at the Bulgarian Academy of Sciences. The journal welcomes papers on all aspects of forestry science, especially those focusing on forestry problems on the Balkan peninsula as a whole and Central and Eastern Europe. Editor-in-Chief is Prof. Ivan Raev, who can be contacted at forestin@bulnet.bg

Diseases in nurseries

Intensive trading of forest seedlings increases the risk of spreading diseases to previously uninfected areas. But, the risk shouldn't be exaggerated. These were two of the conclusions from a joint-Nordic seminar on plant-transported diseases in Uppsala, Sweden. The meeting was arranged by the Nordic Council for Forest Reproductive Material.

Maria Gråberg, Sweden

Mette Damm, Denmark

Some key points:

- Trading between countries and nurseries has been intensified recently.
- In many cases there is a potential risk of disease being brought to previously uninfected areas. For example, *Lophodermium pinastri*, which occurs in southern Sweden, could be spread northwards via infected seedlings. Similarly, there have been serious outbreaks of *Gremeniella abietina* in some regions of Sweden recently, which could spread to regions with less infections, while the fungus *Phomopsis* and aphid *Adelges pectinata* could cause severe damage if they spread to regions in western Norway where Christmas tree production is important.
- Ecological methods in nursery production are becoming more popular. Experience so far suggests that insects and weeds can be kept under control without pesticides, but fungicides are still needed to combat fungal infections.
- Waste products from nurseries cause problems when composting due to their high carbon content. Admixture with horse manure or similar material is necessary to initiate the composting process. However, we still don't know if pathogens survive in the compost.
- New tests for detecting latent infections have been developed, based on DNA-analyses and immunological methods. These tests could be used during seedling production, or for random inspections of imported seedlings.
- Root pathogens can be spread via water, soil or dirty, recycled containers, but problems have been reduced in recent years due to the increased use of raised beds, cleaner substrates and cleaned containers.

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- relevant to the Journal
- interesting for the readers.

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