News and Views
from SNS – Nordic Forest Research Co-operation Committee
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A network of spore traps could help to determine which fungi are present in the Nordic and Baltic forests. Photo: Lasse Modin.

Invasive pathogens demand sophisticated warning systems

Invasive forest pathogens are already here, and more of them can be expected in the future. Researchers fear that a warmer climate and more intensive trade will increase the chance of diseases arriving in the region that may become a true threat to Nordic forests. A warning system is needed to combat the pathogens in a timely manner.

The SNS-supported project "Risk assessment and establishment of a system to address potential pathogens in Nordic and Baltic forestry as a result of climate change" presented a proposal in July 2012 to establish a monitoring and warning system for forest pathogens. The background is that anticipated changes in climate, together with globalisation of trade, are expected to increase new introductions of forest pathogens in the Nordic and Baltic region. The project was initiated by SNS to deliver the actions listed in the Selfoss declaration (see another article in this edition of News & Views).

New pathogens a threat

Pathogens can be spread in many ways, including through air-borne fungal spores or by insect vectors. Such natural invasion can be expected to increase as conditions within the Nordic countries become suitable for a wider range of pathogens due to a warmer climate. Pathogens can also be spread with human help as passengers on nursery stock or wood products traded on the international market.

The project report highlights a number of potential pathogens that have been observed in the region or are expected to be found in the near future. The genus *Phytophthora* includes several examples of aggressive species that have caused severe damage elsewhere in the world. Many species have been observed in the Nordic and Baltic countries, posing a potential threat to both conifers and broadleaved trees.

Sphaeropsis sapinea is an important pathogen on conifers throughout the world. It is established in southern Europe but has recently been observed in Estonia on *Pinus nigra* trees. The pathogen is known to cause damage to a large number of conifer

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species, and may also become a threat to trees in the Nordic forests as it spreads further north.

The rust fungi *Endocronartium harknessii* causes the western gall rust or pine-pine gall rust in North America, but is currently not found in Europe. If introduced to the Nordic and Baltic region, this pathogen could have a devastating impact.

Native pathogens may proliferate

Another risk factor with a warmer climate is that already established pathogens may become more aggressive or more widely spread. Examples of common pathogens which are predicted to change with the climate are *Heterobasidion spp.* (root rots), *Melampsora pinitorqua*, *Gremmeniella abietina* and *Cronartium flaccidum*.

Lophodermium seditiosum (pine needle cast) is another pathogen common in southern Fennoscandia, but recent sampling of pine needles has also been found it northern Sweden. This species has spread northwards, causing more disease in northern areas as the climate warms, but it may become less harmful in the south due to drier summers.

A warmer climate can also affect insect vectors. One example is *Ophiostoma novo-ulmi*, which causes Dutch elm disease. The fungus is carried by elm bark beetles (*Scolytus spp.*), whose distribution is limited today. With a warmer climate, this insect may migrate northwards and spread the disease over the entire range of elm trees.

The need to take action

The pathologists suggest a region-wide scheme to help optimise management and reduce the spread of pathogens. The key elements of such a scheme should include legislation and management plans, a monitoring system, competence building and a strategy for enhancing the dissemination of information about forest pathology. There is also a need for further research. The executive recommendations are presented in the final report. Some examples of recommended actions:

- Improved phytosanitary regulations for imported plants and wood material
- Restrictions on import of high risk genera (such as *Rhododendron*)
- A framework for the detection and monitoring of pathogens, including the use of spore trapping and sentinel plantings that target high risk sites (e.g. ports, nurseries, airports, popular tourist areas), in combination with widespread forest monitoring
- More training of plant health officials
- Training for forest owners and forest professionals carrying out forest health surveys.

Project: SNS-113, Risk assessment and establishment of a system to address potential pathogens in Nordic forestry as a result of climate change.

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Read more: The final report, compiled by Anna Hopkins and Johanna Boberg, can be downloaded from the SNS website: www.nordicforestresearch.org. Browse SNS research/Research projects.

Lophodermium seditiosum, a future threat in northern Scandinavia. Photo: Elna Stenström

Signing the declaration in Selfoss. From left: Jan-Erik Mattson (Parliament Member, Åland), Jouni Lind (State Secretary, Ministry of Agriculture and Forestry, Finland), Eskil Erlandsson (Minister of Rural Affairs, Sweden), Mads Jensen (Office Manager, Danish Nature Agency, Denmark), Ola T Heggem (State Secretary, Ministry of Agriculture and Food, Norway), Þórunn Sveinbjarnardóttir (Minister of Environment, Iceland). Photo: Pernille Karlog.

Selfoss declaration – four years later

In August 2008, forestry ministers from all the Nordic countries adopted a declaration of significant importance for forest researchers and decision-makers. *The Selfoss Declaration on Sustainable Forestry* placed great weight on the role of forests in mitigating climate change and securing fresh water resources.

The ministerial declaration was followed up by a report presenting recommendations on how the Selfoss Declaration could be implemented via policies and research efforts. The recommendations will have a great impact on research priorities in a Nordic cooperation context. They were addressed to the Committee of Senior Officials for forestry of the Nordic Council of Ministers, and it is thus natural that the Nordic Forest Research Co-operation Committee (SNS) will play a significant part in implementing the declaration as regards research.

At the SNS Jubilee Conference in July, 2012, Adalsteinn Sigurgeirson, Director of Icelandic Forest Research, described the outcomes of the recommendations and explained how these have been implemented so far in Nordic research. The declaration consists of nine resolutions, highlighting the Forestry Ministers' priorities. All of these points have, to some extent, been dealt with by SNS and its partners. One specific project under the Selfoss Declaration, is presented on previous pages in this edition of News & Views.

"The forest is linked to two of the most important environmental challenges of our time; global climate change and the global administration of freshwater resources. The Nordic forestry ministers want to highlight the importance of the forest in facing up these two challenges."

From the Selfoss Declaration on Sustainable Forestry.

More about implementation of Selfoss declaration

Implementation of the Selfoss declaration – actions so far

Point 1:
Increased forest biomass

The declaration

We want, taking into account the forest's biological diversity and recreation potential, to work towards increased sustainable biomass production in the Nordic Region's forests, which is an important measure in counteracting climate change and reducing the competition between cultivation of biomass for bio-energy and for other purposes.*

Actions

✔ *NordGen* (the Nordic Genetic Resource Center) held a conference on Sustainable biomass production in 2011.

✔ *ENERWOODS*, financed by Nordic Energy Research, was established under the programme for Sustainable Energy Systems 2050

Point 2:
Ecosystem services from forests

The declaration

We place great weight on the protection and care of forests with the aim of safeguarding ecosystems, biodiversity and groundwater, as well as counteracting erosion and protecting watercourses.

Actions

✔ *Centre of Advanced Research on Environmental Services from Nordic forest ecosystems* (CAR-ES) is funded for by SNS the period 2011–2015.

✔ SNS supports the two projects *Leaching of carbon, nitrogen and phosphorous from forest land in the Nordic and Baltic countries* and *Risk assessment and establishment of a system to address potential pathogens in Nordic forestry as a result of climate change*

Point 3:
Increase afforestation and wood usage for mitigation

The declaration

We note that afforestation ought to be increased and that forest management and the use of wood be developed as the basis of the starting point in the joint European guidelines in order to create viable forests and thereby counteract the negative consequences of climate change.

Actions

✔ Two SNS-projects have been initiated: "*Risk assessment of new forest tree species*" and "*Improving market communication of wood products' environmental values*".

✔ A pilot project was initiated under the EU Baltic Sea Strategy: *Evolutionary genetic pockets for broadleaved tree species*

* Forestry ministers from the Nordic countries

Point 4:
Forestry's role in a climate context

The declaration

We place weight on the forestry sector participating actively and constructively in the discussion of the forest's role in a climate context in order to facilitate the optimum use of the forest's potential and ensure that any measures taken are based on sustainable forest management.

Actions

✔ The web portal *NBforest – research-based information on Nordic and Baltic forests and forestry* was launched with the aim of disseminating and sharing information within the regional forestry community

Point 5:
Strengthened Nordic cooperation on forestry issues

The declaration

We wish to strengthen cooperation and the sharing of experiences within the Nordic Region, so that Nordic forest users have access to and knowledge about how they can, in a way that is efficient in terms of resources, take care of the forest's water and how they can adapt forest management as a consequence of climate change.

Actions

✔ Two important networks are active: the SNS-supported *Nordic Forest Water Mercury Network* and the *Forestry and water network* led by the Swedish Forest Agency

Point 6:
Tree breeding and adaptation to climate change

The declaration

We *stress the importance of tree breeding, including genetic adaptation to climate change and the adoption of new measures whenever necessary.*

Actions

✔ The SNS-supported *AdapCAR* undertakes research on how trees adapt to climate change

✔ The EU Baltic Sea Strategy project *Cooperation in breeding of Norway spruce"*promotes active use and conservation of genetic resources

✔ A report was published in the TemaNord-series: *Searching for appropriate legislation regulating the access and exclusive rights to forest genetic resources in the Nordic region*

✔ The storage of forest tree seed at the Svalbard Global Seed Vault can also be addresses to this point

Point 7:

The forest's local and regional socio-economic importance

The declaration

We place great weight on the forest's local and regional importance for healthy economic development, e.g. income from tourism and hunting, which is a prerequisite for active forest management and thereby a further development of the forest's importance in a climate and water-management context.

Actions

✔ *The forest's local values* (Danish: Skovens lokale vaerdier) is a working group under the Nordic Council of Ministers

✔ The SNS-supported *Nordic-Baltic Centre of Advanced Research on Forestry Serving Urbanised Societies* (CARe-FOR-US II) is funded for the period 2011–2015

Point 8:

Forests for combating erosion

The declaration

We support the idea that forests which aim, for example, to protect against erosion or preserve biological diversity or are planted to rehabilitate eroded fields, should also be capable of being used for timber production, as long as this contributes to looking after the forest's ecological, social and economic values.

Actions

✔ This point specifically addresses Icelandic conditions. Icelandic Forest Research is preparing a conference *Afforestation to protect land, restore degraded land and sequester carbon* to be held in 2013

Point 9:

The continued need for high-quality Nordic forestry research

The declaration

We note that high-quality research and innovation is required in all of these areas, and that closer Nordic co-operation is required for Nordic forestry research to remain at the forefront of forest research in an international context in the future as well.

Action

✔ Cooperation has continued and been strengthened among the Nordic research networks and organisations: SNS, NKJ (Nordic Joint Committee for Agricultural and Food Research), NordGen, NEF, EFINORD, EU Strategy for the Baltic region

Read more: The publication "Implementing the Selfoss declaration" can be downloaded from www.norden.org.

Besides describing the implementation of the declaration, the report has a comprehensive description of Nordic forests and forestry, various forms of Nordic cooperation in forest research, and current research within the specific fields of the Selfoss declaration.

Left: Freshwater resources, one of the most important environmental challenges, according to the Selfoss declaration.
Photo: Mats Hannerz

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- relevant to the Journal
- interesting for the readers.

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