



Injuries caused by *Phytophthora* on beech. Photo Jesper Witzell.

Nordic cooperation to map the status of *Phytophthora*

The microscopic pathogens of the genus *Phytophthora* are already harming trees in Europe, and there is a risk that some of the species are becoming a more severe threat. Global trade in nursery stock combined with more favourable climatic conditions increase potential problems for forests. Two SNS-supported projects have focused on *Phytophthora*.

The invasive spread of the pathogens has been shown to be closely related to plant trade via nurseries. One of the projects (SNS-117, reported in 2016), therefore investigated the occurrence of *Phytophthora* in nurseries in Estonia, Latvia, Finland and Sweden. Different species can be found in most nurseries and on many tree species, both broadleaves and conifers. The fact that the pathogens predominately originate from forest nurseries and

are transferred to forests with infected plants provides an opportunity for disease prevention and restoration of infested sites.

Climate change may increase risks

An ongoing project (SNS-121) focuses on the spread of invasive *Phytophthora* species in the light of climate change. Over the last 200 years, the number of invasive forest pathogens introduced to Europe has increased exponentially. Outbreaks of these are predicted to become even more frequent and intense with the stress associated with climate change. Increased winter temperatures, summer droughts and more winter precipitation are factors that are believed to favour infection by several species of *Phytophthora*.

The project involves experts from Denmark, Norway, Finland, Sweden, Lithuania and Estonia, who together are mapping the distribution and

Phytophthora is a genus of microscopic oomycetes (water moulds, not related to fungi). The name is a combination of the Greek words for Plant and Destroyer. *Phytophthora* caused severe damage to potatoes in the mid-19th century, particularly in Ireland, where two million people starved or many were forced to emigrate to America. *Phytophthora* species are usually harmless in their natural environments but can become aggressive when moved to new conditions or host trees. Damage has mostly been recorded on broadleaved trees such as chestnut, beech, alder and oak, but also on larch. *Phytophthora* is easily transferred from nurseries, where the plants may appear completely healthy, but the soil contains the pathogen. Most species are spread via soil, but some are also airborne.

diversity of different *Phytophthora* species on a variety of host species.

One joint activity is to analyse soil samples across a soil-climate



Phytophthora, cont.

gradient in the Nordic-Baltic area. With increased knowledge of the distribution, it will become more viable to predict the potential impacts. Some research already predicts that increasing temperatures will lead to a potential range expansion of *Phytophthora* species up to a few hundred kilometres. Results of the project will be reported on the SNS website as well as in News and Views.

Both projects are presented on www.nordicforestresearch.org

The projects:

SNS-117 (2013-2015): Preventive and restorative measures to reduce damage on forests – *Phytophthora* diseases in focus.

Coordinator: Jan Stenlid, SLU, Sweden (jan.stenlid@slu.se).

SNS-121 (2016-2019): Assessing the role of climate factors in association with spread of invasive *Phytophthora* species in forest and from urban landscapes.

Coordinator: Michelle Cleary, SLU, Sweden (michelle.cleary@slu.se)



Defoliation as a result of root damage caused by *Phytophthora*. Photo Johanna Witzell.

Nordic cooperation to cope with extreme weather

By Katarina Ekegren

Nordic cooperation in situations of extreme weather is about to improve. Nordic Agri Research (NKJ) and Nordic Forest Research (SNS) are launching a project under the Nordic Council of Ministers.

The extremely dry and hot weather last summer clearly demonstrated the need for Nordic cooperation and the benefits of learning from each other when it comes to extreme situations for agriculture and forestry.

“Not only in Sweden, the weather has set the areas of agriculture and forestry difficult challenges. In these times, the need for cooperation across national borders becomes clearer than ever, and I see that we in the Nordic Council of Ministers have a natural forum to meet to discuss these issues” wrote the Swedish Minister of Rural Affairs in an invitation to an extra ministerial council meeting between the Nordic ministers responsible for agriculture and forestry in September last year.

SNS and NKJ in new project

At the meeting, the ministers asked for a summary of the effects of last

summer’s exceptional drought and of immediate and future actions. A full picture of the drought impact on harvesting, animal husbandry and forestry is yet to be completed. The project’s goal is to find ways to improve future management of these situations.

Working groups have now been established, one for agriculture and one for forestry, with representatives from the Nordic countries including Åland, the Faroe Islands, Greenland and a representative of NordGen. Nordic Forest Research (SNS) and Nordic Agri Research (NKJ) secretariats will manage the projects.

Nordic overview

– We are starting by gathering the latest statistics relating to the effects of the drought. Strategies and measures to cope with the effects of the drought will also be compiled. The working groups will then discuss potential collaborative initiatives, says



Photo Yvonne Aldentun.

Maria Tunberg, process manager for the working groups.

– There are both similarities and differences in how the countries have been affected and how they have managed the situation, she adds.

– We can learn a lot from each other and there are starting points for cooperation across national borders.

Report in June

The working groups will produce a report in which the countries’ experiences of the drought will be documented. It will also include concrete proposals on how to build a well-functioning cooperative system and ways to make the agricultural and forest sectors increasingly sustainable under future extreme weather conditions and to reduce negative effects.

The report will be completed in June 2019 before ministers meet again.

New climate strategy gives Icelandic forests a boost

By Valgerður Jónsdóttir, SNS board

In recent years, public contributions to the forest sector in Iceland have been sharply reduced.

The total area of forest and woodland in Iceland has at least doubled, possibly quadrupled, since 1950. Whether this should be considered a large or small increase depends on the comparison. It is large in comparison to the woodland area in 1950, but very small indeed compared to Iceland's land area and to the woodland area at the time of settlement.

Native birch woodlands have expanded through natural regeneration within fenced areas but much less in areas not specifically protected from grazing, until recently. A recent (2015) remapping of natural woodland extent by the IFS Research Division indicates that, for the first time, birch woods are generally expanding and now cover 130 km² more than in 1990 or a total of roughly 1.5% of Iceland. Cultivated forests cover another 0.4%, bringing the total forest and woodland cover to very nearly 2% of Iceland's land area.

Funding cut drastically

After the financial crisis of 2008-2009, funding for forestry was cut drastically. In real terms, public funding for forestry in 2013 was only half what it was in 2005. This resulted in a severe reduction in planting, down to about 3 million seedlings in 2017. Among the consequences were tree nurseries going out of business and trained foresters moving abroad to find work.

Despite rapid economic recovery in Iceland during 2014-2018, funding for forestry has only increased slightly. However, the country now has a developing commercial forest resource that is already starting to generate significant income.

Increase in forestry ahead

The Icelandic Government recently announced a new climate strategy, intended to boost efforts in cutting net emissions. The new measures are intended to help Iceland meet its Paris Agreement targets for 2030 and reach the government's ambitious aim to make Iceland carbon neutral before 2040.

The Strategy consists of 34 Government measures, ranging from an increase in reforestation to a ban on new registration of fossil fuel cars by 2030.

The main emphasis of the new plan is based on two measures: 1) to phase out fossil fuels in transport, and 2) to increase carbon sequestration in land use, by afforestation, revegetation and restoration of wetlands. Climate mitigation measures will get a substantial increase in funding – almost 7 billion Icelandic krónur in the period 2019-2023.

A general carbon tax, already in place, will be gradually increased.

Afforestation emphasised

Afforestation and revegetation have long been a major emphasis in Iceland's climate policies, as these actions help to mitigate climate change by uptake of carbon from the atmosphere. Funding for these activities will be increased. The Government will also support efforts to reclaim drained wetlands, which in recent years have been shown to be a significant source of carbon emissions. Further details of the policy may be obtained from the Ministry for the Environment and Natural Resources' web site: www.umhverfissraduneyti.is.

What this all means is that state funding for forestry will almost double from current levels by 2023, with emphasis on carbon



More Perspectives on www.nordicforestresearch.org

sequestration coming to the top of the list of forestry goals, mostly by increasing the rate of afforestation. Grants for farm afforestation will increase and more planting will be undertaken in the state-owned forests, but the biggest change will entail increased cooperation with the Soil Conservation Service to afforest land that has, until now, been in their care. These are mostly large desertified areas, often still with problems associated with erosion and blowing sand. Afforestation of such sites involves new challenges for Icelandic forestry, including questions of species and provenance selection, site preparation and fertilisation. At the same time, the issue of adaptation to a changing climate is becoming ever more important, including what to do about new pests and diseases.



Valgerður Jónsdóttir works for the Icelandic Forest Service, and is a member of the SNS board.

Photo Mats Hannerz.

Shortcuts from Nordic-Baltic forest research

Norway: The forest history can help to predict future climate

IMPRINT is the name of a brand new, NOK 10 million, three-year research project initiated by the Norwegian Research Council in order to study the interactions between forests, forest management and climate in Norway.

The project is a collaboration between Norwegian Institute of Bioeconomy Research (NIBIO) and the Norwegian Water Resources and Energy Directorate (NVE), and involves international experts from Sweden, the UK and the US.

NIBIO scientist and project manager Stephanie Eisner explains how the IMPRINT project aims to link past data on forest growth and management with predictions about how the future forests will affect climate, and also how a future climate will affect our forests.

- Anthropogenic greenhouse gas emissions are one of the main drivers of changes in moisture and energy budgets at the land surface. At the same time, land use and land management activities modify biophysical properties of vegetation that govern energy and water fluxes between the land surface and the atmosphere, she explains.

Source: www.nibio.no

Finland: Increased cooperation across the border

Coordinated by the Natural Resources Institute Finland (Luke), the Bofori project was launched at a kick-off seminar in November 2018. During the next

three years, the project aims to improve opportunities for small and medium-sized enterprises (SMEs) in the forest sector to engage in cross-border cooperation in Finnish and Russian parts of the Karelia region.

Source: www.luke.fi

Sweden: First large-scale indoor seed orchard

The demand in Sweden for genetically improved seed of Norway spruce is exceeding the supply. To meet the need, Skogforsk and the company Södra are starting a project to increase the production of spruce seeds in an indoor seed orchard facility. The seed orchard will be located at Södra's nursery in Falkenberg in southern Sweden, and the first seed will be produced in 2019.

Source: www.skogforsk.se

Finland: Mountain-birds decline in Europe

Population data for European mountain birds have been for the first time combined in a recent study, with worrying results: the abundances of mountain-specialist birds has declined by as much as 10% in the 2000s. The study, led by the Finnish researcher Aleksi Lehikoinen, examined population trends of 44 bird species in the mountain and fell regions of Fennoscandia, Great Britain, the Alps and the Iberian Peninsula.

Source: www.helsinki.fi

Sweden: Long-term study indicates growth limitation due to nitrogen deficiency

Can a warmer climate lead to a long-term increase in growth in Swedish coniferous forest, and thus increased storage of carbon? Model-based studies have hinted at this, but now the first long-term study shows that it does not have to be so at all. The reason is probably that nitrogen deficiency limits the growth of the forest.

Source: www.nature.com

NordGen and SNS: Apply for a scholarship

NordGen Forest and Nordic Forest Research (SNS) have announced a scholarship available in 2019. The scholarship is aimed at people working with or studying forest seed or plant production, regeneration methods or tree breeding. The call is open until February 14, 2019.

Read the testimonies from previous scholarship holders on SNS webpage, for example the interview with Johanna Carlsson who used the last year's scholarship to visit a German biotechnology lab.

Read more: www.nordicforestresearch.org

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