NordGen

Statistics: Forest Seeds and Plants in the Nordic Region – Version 2025

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Preface

This is the third edition in a biennial statistics report on forest seed and plant material in the Nordic countries. The first edition was published in 2021 and the second in 2023. This edition has been expanded by including more statistics and more species than the previous reports, as well as including more recent data from the years 2022 and 2023. The report compiles statistics and reports contributed by representatives of each country in the NordGen Forest Regeneration Council.

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Members of the NordGen Forest Regeneration Council on a forest excursion in northern Finland in 2024. Member Torben Leisgaard from Denmark is missing in this photo.

Please contact NordGen Forest if you are interested in further statistics, see "About This Publication" for contact information. How to cite this publication: Spongsveen et al. 2025. Statistics: Forest Seeds and Plants in the Nordic Region 2025. NordGen Publication Series: 2025:05.

Seeds and seedlings for forest regeneration in the Nordic forestry

In the Nordic countries, forests have always played an important role. Forests provide wood and bioenergy, protection against wind and erosion, support biodiversity and act as carbon dioxide sinks, as well as important areas for outdoor recreation and human health. When it comes to climate change, the forest is especially important because it binds carbon dioxide throughout its lifetime. In addition, timber can replace other materials that give large emissions when produced.

For all these purposes, it is important to keep a healthy and resilient forest, with sufficient genetic diversity for adaptation to climate change. Sufficient regeneration with the proper seed and plant material is crucial. Forest regeneration after harvest may be executed differently in the Nordic countries, and for the various species, either by natural regeneration using seed-trees, by direct sowing or by planting of seedlings. For the main commercial species, planting of seedlings based on genetically improved seeds are used when such seeds are available. This report aims at giving an overview of the use of seeds and seedlings in the Nordic countries, with key statistics from Denmark, Finland, Iceland, Norway and Sweden.

For all these purposes, it is important to keep a healthy and resilient forest, with sufficient genetic diversity for adaptation to climate change.

NordGen Forest

NordGen Forest is a Nordic body dedicated to forest regeneration, plants, seeds and genetic resources. Our main goal is to contribute to the establishment of the best possible Nordic forests for the future, through knowledge exchange and dialogue. NordGen Forest is supported by two networks, the NordGen Forest Regeneration Council and the NordGen Forest Working Group on Genetic Resources, each with members from all the Nordic countries.

NordGen – the Nordic Genetic Resource Center – is a Nordic organization dedicated to safeguarding and sustainable use of cultivated plants, farm animals and forest trees.

Overview of the most important species in each country

Choice of species for forest production varies across the Nordic region based on which tree species are naturally occurring and which thrive and produce under different climatic conditions. This, and the fact that available statistics vary among the countries, makes comparisons challenging across countries. Therefore, not all statistics are presented for all countries and species.

Seedlings in Sweden, Finland, and Norway

To give an overview of the most important species in production in the different Nordic countries, the amount of seedlings delivered to the forestry in 2023 is shown below. In Finland, Norway and Sweden, the two conifers Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) amount to most of the production. Sweden has the highest total amount of seedlings, at more than 430 million seedlings.

Germination test of Scots pine seeds at Siemen Forelia Oy, 2024.

Finland

174.960.000 seedlings in total

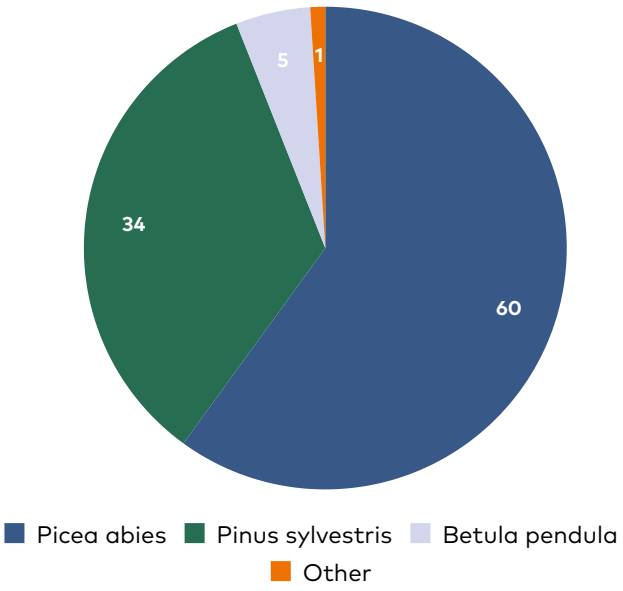


Figure 1.

Figure 1-3 shows rounded percentage of seedlings delivered to Swedish, Finnish and Norwegian forestry in different species categories in 2023.

The total amount is rounded to thousand seedlings.

Norway

49.928.000 seedlings in total

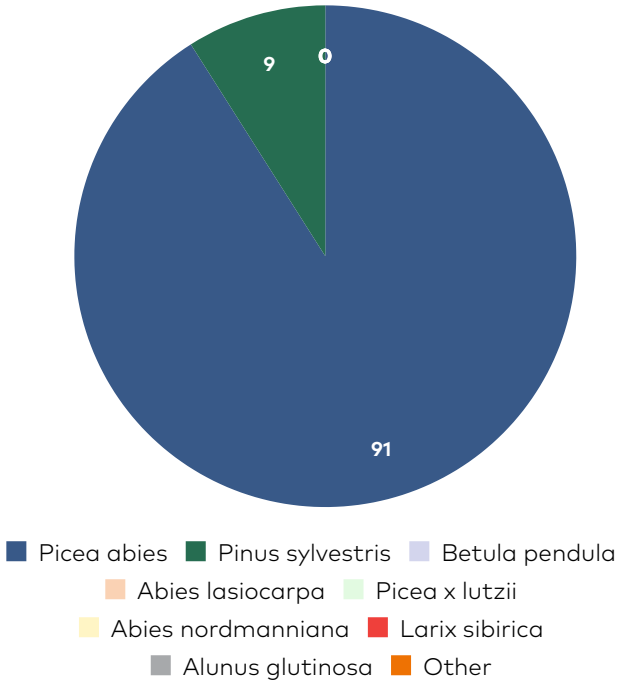


Figure 2.

The figure shows rounded percentage of seedlings. The number of seedlings varies from 29 thousand to 1 thousand for the species *Abies lasiocarpa*, *Betula pendula*, *Alnus glutinosa*, *Picea x lutzii*, *Abies nordmanniana*, *Larix sibirica* and "Other".

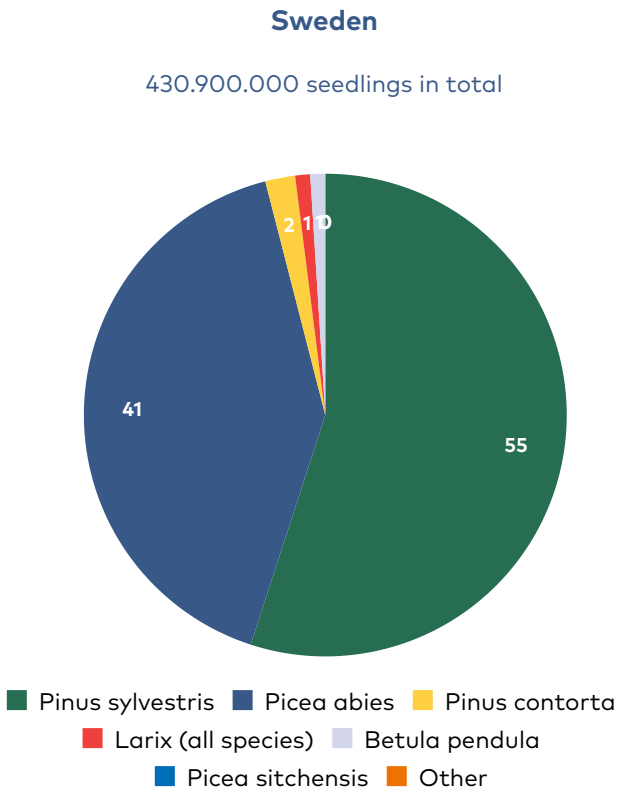


Figure 3.

The figure shows rounded percentage of seedlings. For the species *Picea sitchensis* the number is 500 thousand plants and for the category "Other" the number is 2100 thousand plants.

Seedlings in Iceland

The main species for afforestation in Iceland is downy birch (*Betula pubescens*) which is the only native forest tree species in Iceland.

Silver birch (*Betula pendula*) may be an alternative in lowland areas with increasing temperatures. Seeds are collected in the wild or from planted trees. Other important species in Iceland include *Larix sibirica*, *Larix decidua* and the hybrid *Larix sibirica x Larix decidua*, *Populus trichocarpa*, *Pinus contorta*, *Picea sitchensis*, *Picea glauca* and *Abies lasiocarpa* (Christmas trees).

Detail of Icelandic downy birch, 2022.

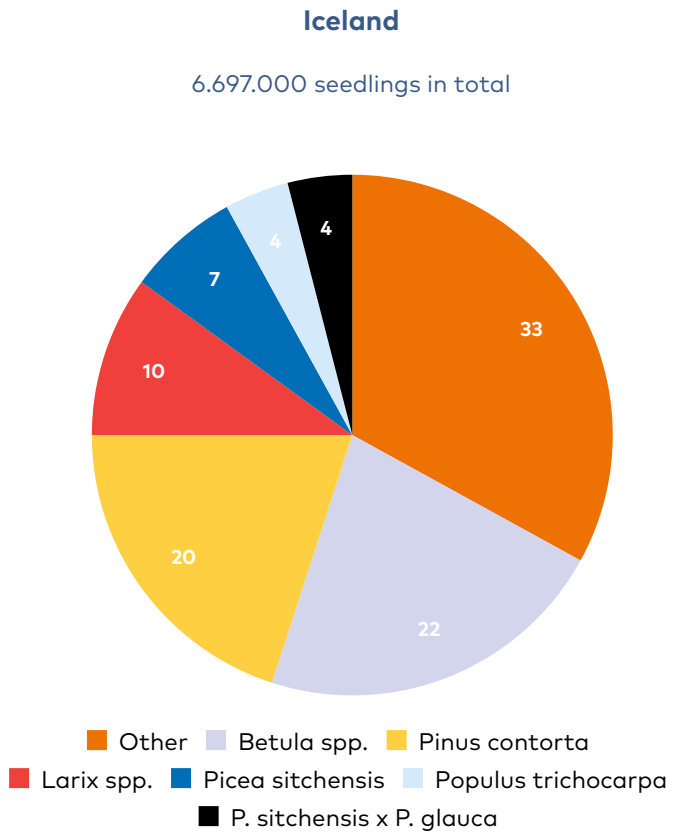


Figure 4.

Percentage of seedlings delivered to Icelandic forestry in different species categories in 2023.

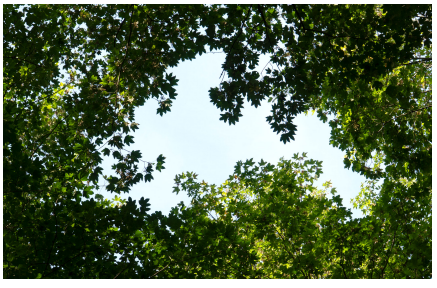
Afforestation in Iceland

The first official National Forest Plan for Iceland was published in August 2022 by the Ministry of Food, Agriculture and Fisheries. The policy applies until 2031 and is accompanied by a detailed action plan from 2022-2026. To meet the government's goal regarding carbon neutrality, Iceland needs to increase actions related to carbon sequestration, including afforestation and the restoration of natural forests. However, afforestation efforts have not reached the ambitious levels initially hoped for. The government's plan outlines a scaling plan, beginning with 3,000 hectares of new forest plantings in 2025 and increasing to 4,350 ha (2026), 5,700 ha (2027), 7,050 ha (2028), before reaching the target capacity of 8,500 hectares per year in 2029-2030. This includes both public and private afforestation efforts.

Proportion of the total forest area in Denmark

Seedling statistics are not available for Denmark. As an overview of the most important species for Denmark, the proportions of the total forest area covered by each of the species is shown in the pie chart below.

It is important to note that the conifers are planted and introduced species, whereas for instance beech (*Fagus sylvatica*) and sycamore (*Acer pseudoplatanus*) often are regenerated naturally. Furthermore, the yearly use of seedlings is higher for short-rotation Christmas trees (e.g. *Abies species*) than for typical long-rotation species such as oak (*Quercus* spp).



Acer pseudoplatanus, Denmark, 2023.

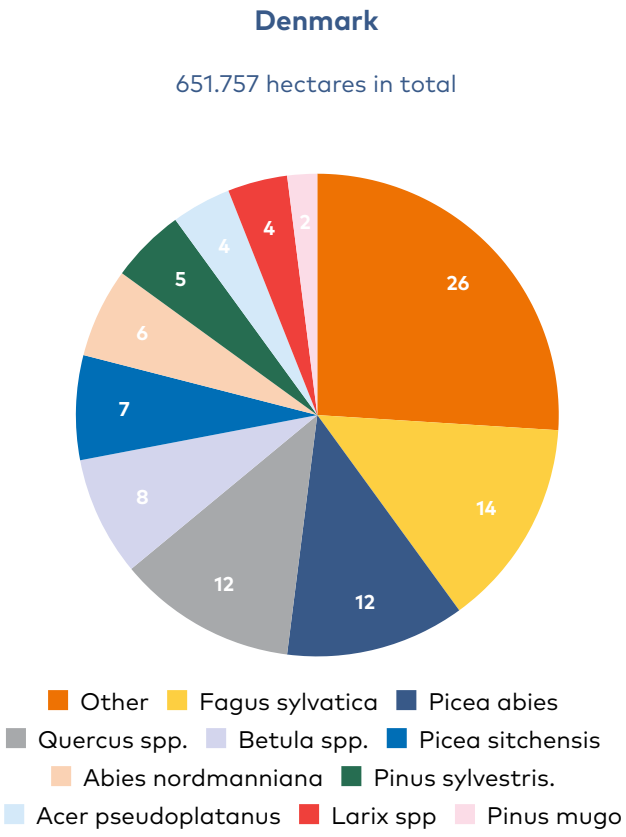


Figure 5.

Proportion in percentage of the total forest area covered by the most common species in Denmark.

Source: Thomas Nord-Larsen, Torben Riis-Nielsen, Iben Margrete Thomsen, Niclas Scott Bentsen, Bruno Bilde Jørgensen, Annemarie Bastrup-Birk og Vivian Kvist Johannsen (2024): Skovstatistik 2023, Institut for Geovidenskab og Naturforvaltning, Københavns Universitet, Frederiksberg. 77 s. ill. (Based on numbers in table 1.4)

The Afforestation Tripartite Agreement is an agreement aimed at converting 250,000 hectares of agricultural land into new forest in Denmark by 2045. The agreement has been made between the government and a number of organizations and is part of the "Agreement for a Green Denmark."

Key points of the agreement:

- Goal: To plant 250,000 hectares of new forest, equivalent to the combined size of Lolland-Falster and Bornholm.
- Funding: Approximately 22 billion DKK has been allocated for afforestation.
- Subsidies: A subsidy of 75,500 DKK per hectare is provided, with an additional 15,000 DKK per hectare if the forest is established as untouched forest.
- Targeted efforts: Special focus on areas needing nitrogen reduction or offering other synergies, such as considerations for nature and biodiversity, as well as protection of drinking water.
- Local tripartite groups: The agreement will be implemented through 23 local tripartite groups involving municipalities, agriculture, and nature organizations.
- Amendment of the Forest Act: The Forest Act will be amended to support the green initiatives.

Time series for plant deliverance

The deliverance of seedlings to forestry is presented below for the years 2006-2023 for Norway, Sweden, Iceland and Finland. In Finland, there has been a big increase in plant deliverance of *Betula spp.* the last years, whereas deliverance of *Larix spp.* has increased in Sweden in the last few years.

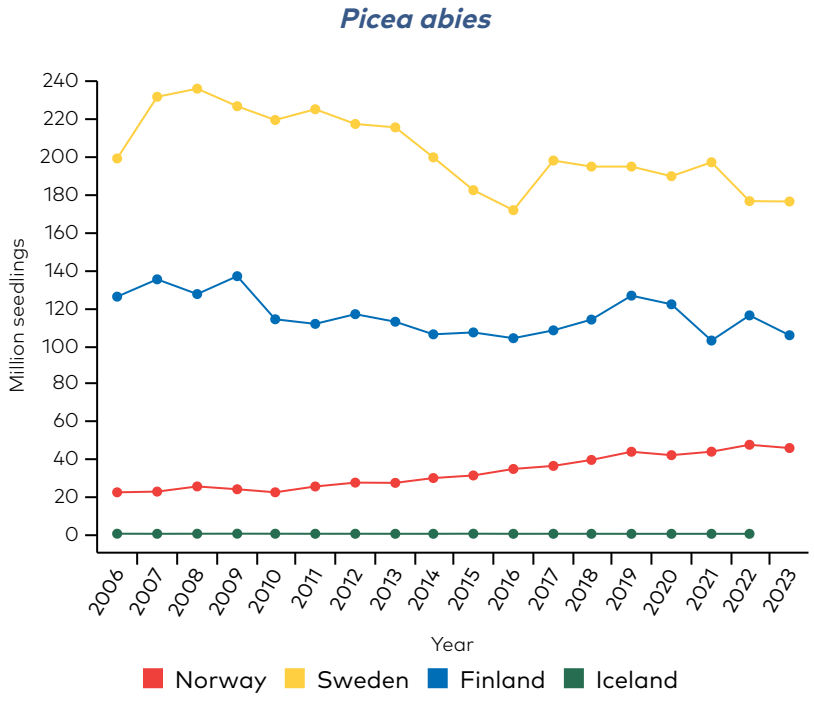


Figure 6.

Figure 6-14 shows the number of million seedlings to the forestry planted in each country and year.

Spruce seedlings at Fin Forelia Oy, 2024.

Pinus sylvestris

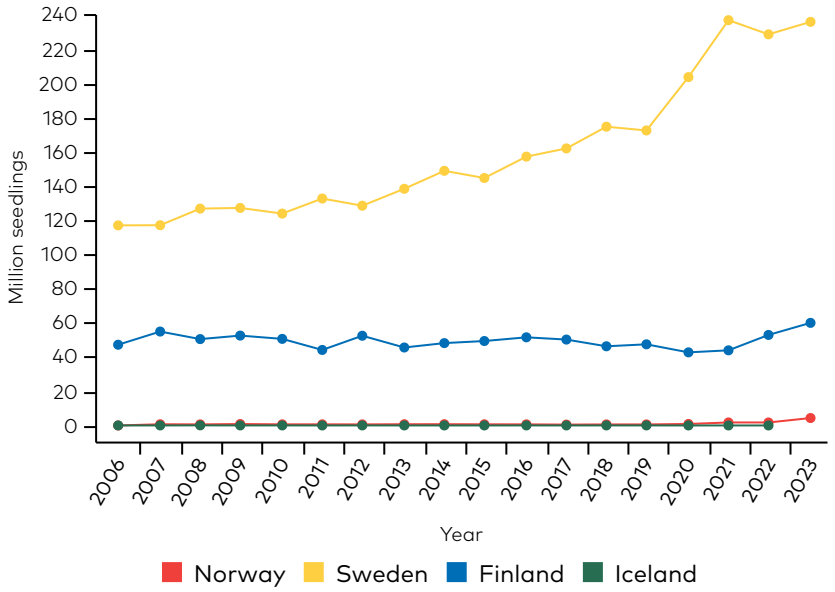


Figure 7.

The low numbers of pine seedlings in Norway is due to the fact that pine traditionally has been regenerated naturally.

Abies spp.

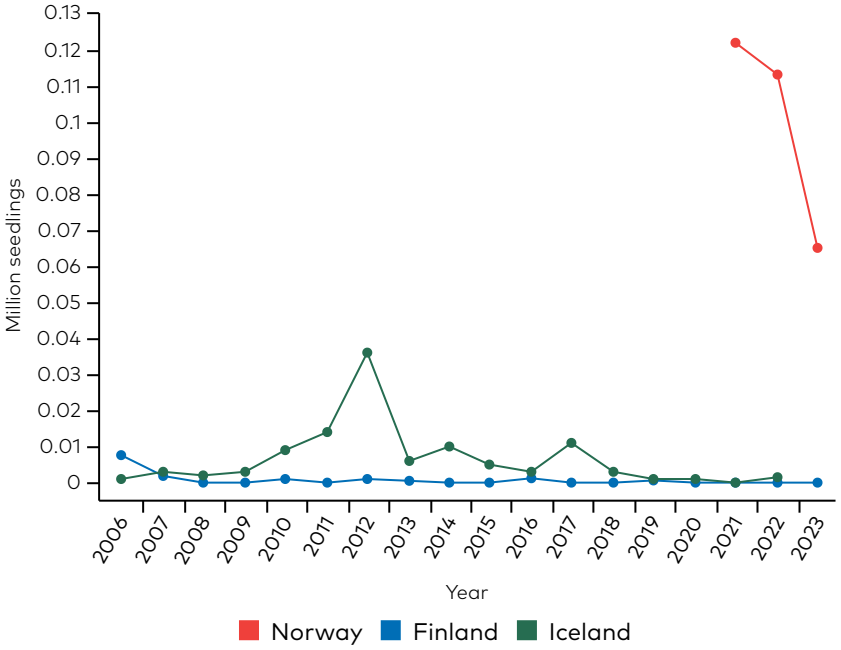


Figure 8.

Data for Norway not available for the years before 2021.

Iceland

For the past decades forest seedlings have been stored outside over the winter time in Iceland. There is a growing interest in using freezers to store seedlings during the winter, as this method eases the transportation of seedlings and can better guarantee their quality.

A PhD project, carried out by Rakel J. Jónsdóttir, compares survival, growth and autumn freezing tolerance for seedlings stored in freezers and in an outdoor storage. The result will help to deal with increasing production and planting of seedlings.

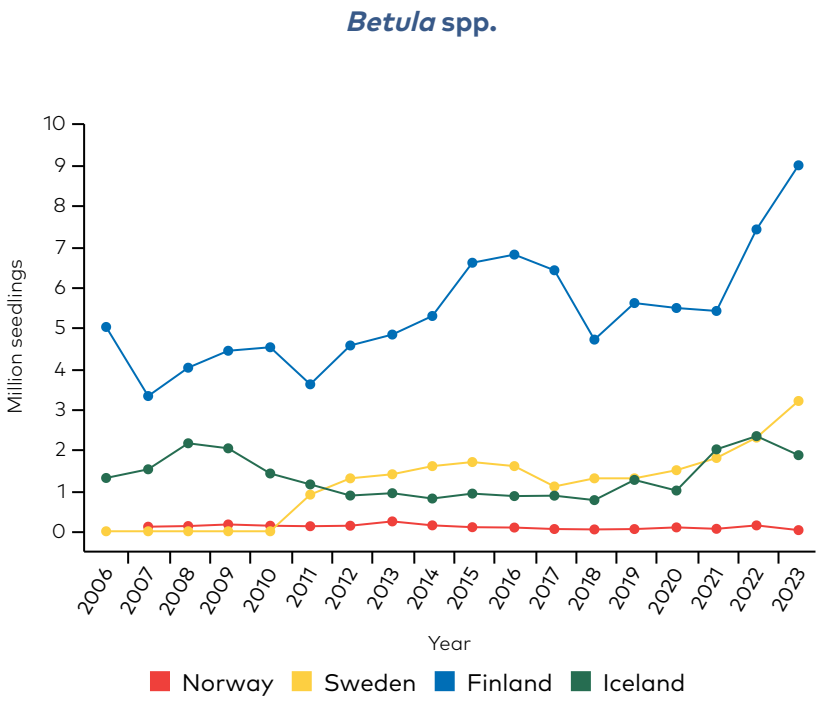


Figure 9.

The category *Betula* spp. (birch) contains aggregated numbers for all species of birch where data were available.

A birch stand in Iceland, 2022.

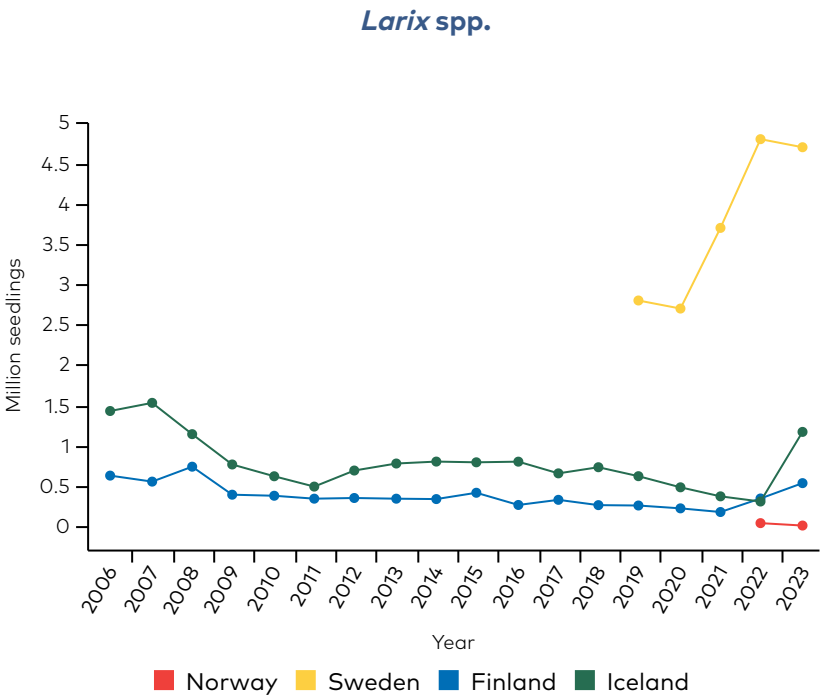


Figure 10.

Data for Sweden not available for the years before 2019. Data for Norway not available before 2022.

Larix decidua, European larch, Finland 2024.

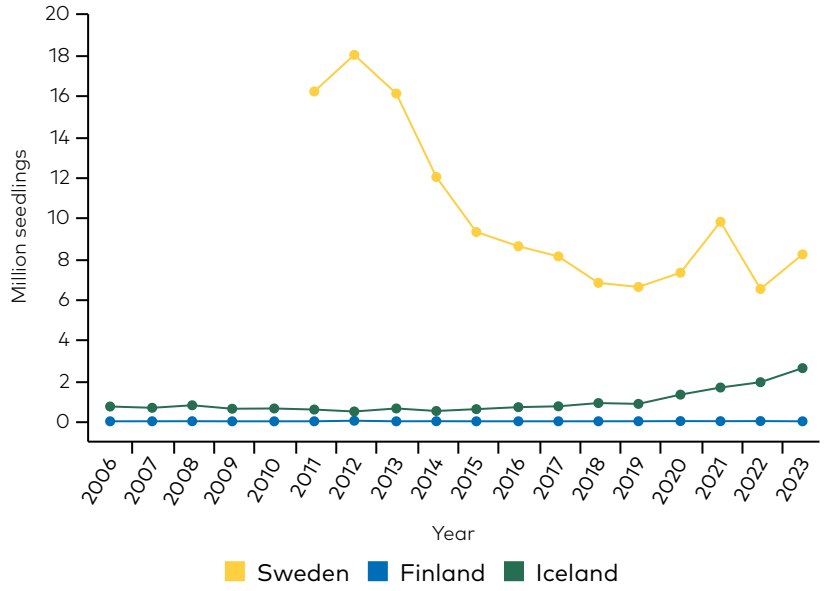


Figure 11.

Data for Sweden not available for the years before 2011.

Sweden

Annual rates of forest harvesting have been steadily increasing with a peak in 2022, followed by reduced levels in the following two years. This coincides with an all time high plant production in 2021-2023. The most obvious trend in Swedish plant deliveries is the shift in dominance from Norway spruce to Scots pine, although Norway spruce still represents around 40 percent of the total amount of plants. To some extent, the increased interest in Scots pine is a result of intense bark beetle damages on Norway spruce and also part of the general climate change drive towards more drought resistant and site adapted forests. Another interesting shift is a more than doubled production of birch over the last three years up to 2023, an increase that is predicted to continue with more seed orchards recently established. This can be interpreted as an orientation towards spreading the risks among more tree species and towards more emphasize on landscape shaping and biodiversity. It is also a result of the successful

breeding, making improved birch an economically more interesting option.

Large scale inventories of plant establishment and survival across Sweden have recently showed that far too many plants fail in survival and growth. Swedish forestry is now struggling to find ways to increase the survival to bring more of the investment in breeding and plant production into growing forests to improve wood production as well as carbon sequestration.

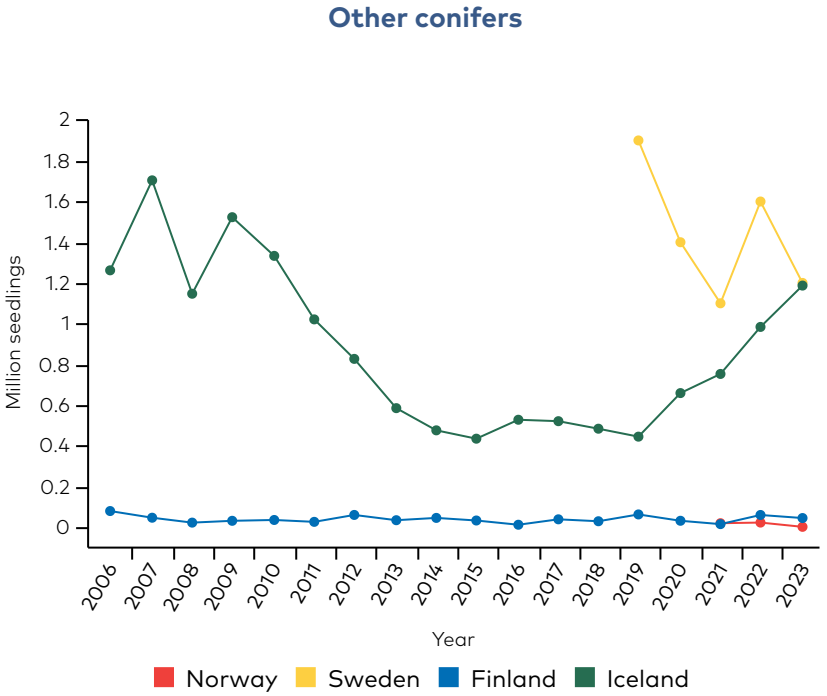


Figure 12.

Data for Sweden not available for the years before 2019. Data for Norway not available before 2021

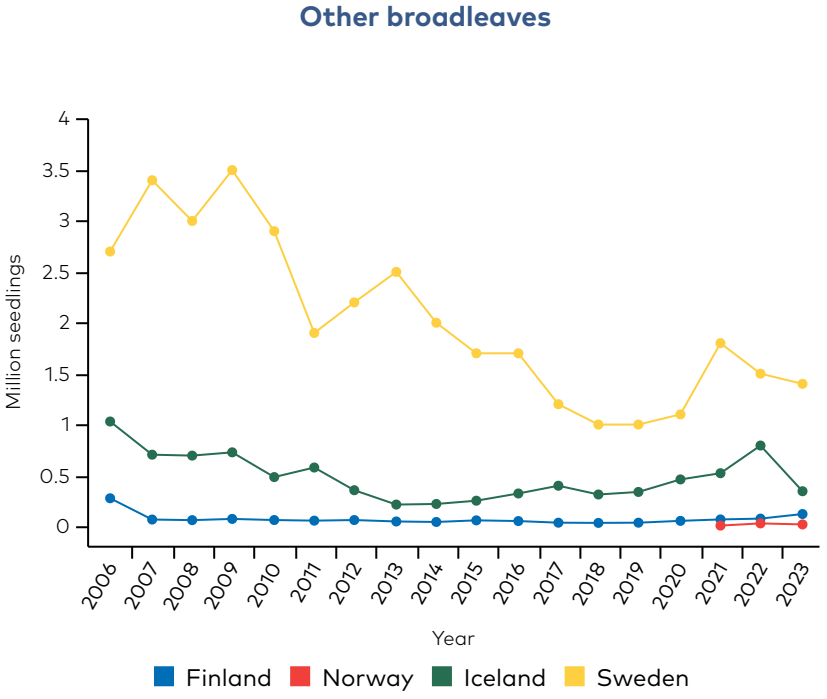


Figure 13.

Data for Norway not available for the years before 2021.

Note: For the category "Other broadleaves", we have included the data on *Quercus* and *Populus* from Finland and Iceland, as these are automatically included in the numbers from Norway and Sweden. This is to make comparison between the countries possible.

Quercus spp.

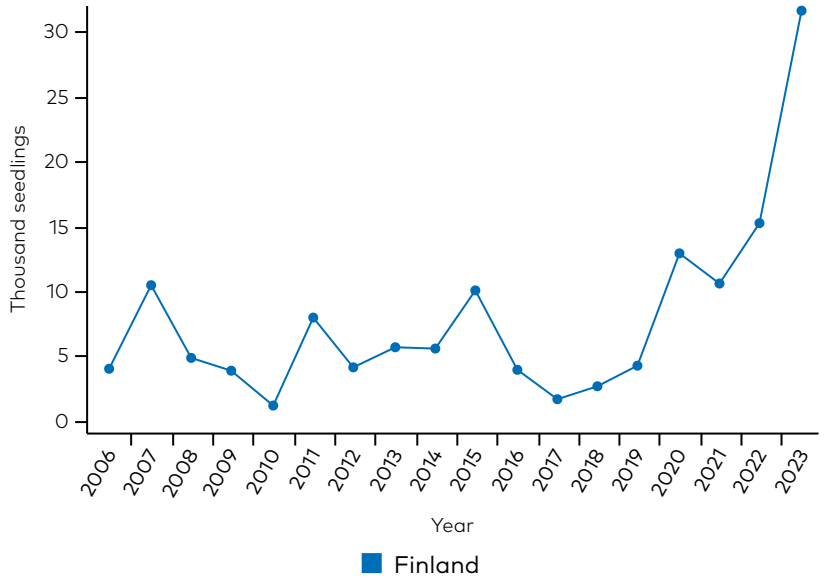


Figure 14.

Please note that this graph shows the numbers in thousand of seedlings.

Populus spp.

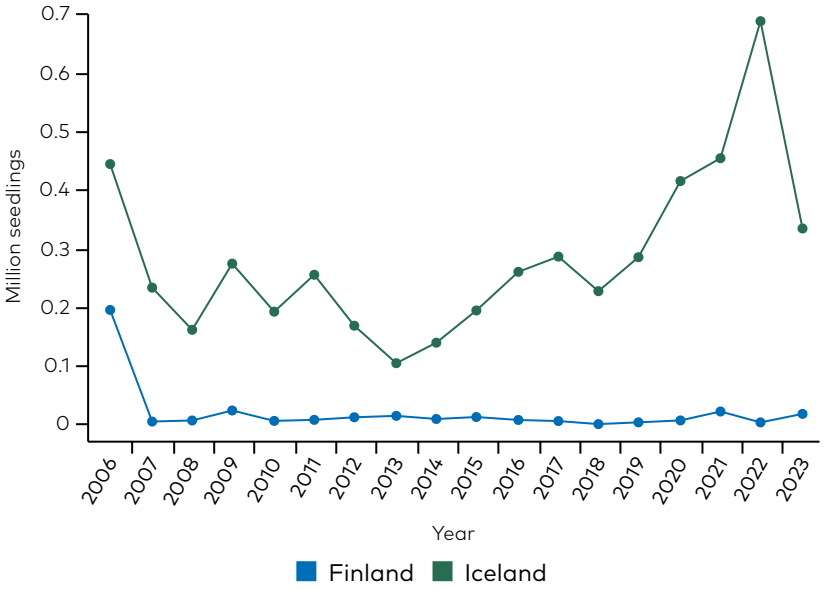


Figure 15.

Only data from Finland and Iceland is included in this graph, as these species are not common for plant deliverance in the other countries.

Strategy for forest tree breeding and seed supply in Norway

The Norwegian Seed Senter has revised the Strategy for forest tree breeding and seed supply in 2024. The aim for the revision has been to meet the increasing challenges our forest meets due to climate changes and the need to introduce new tree species into the seed supply. Our goal is to ensure a national supply of high-quality seeds for the tree species and provenances that are relevant for the Norwegian forestry.

Plant deliverance in 2022/2023 categorized as improved/unimproved

In the following graphs we present deliverance of plants to the forestry categorized as improved and unimproved material. The purpose of this partition is to compare the use of material that has been genetically improved, typically as part of a forest tree breeding program, with the use of material not subject to genetic improvement. We have defined improved material as plants from seeds classified as "qualified" or "tested" according to the OECD classification (table 1 in the chapter "Seed Production per OECD Category"). Unimproved is here defined as any other material than improved. Not all countries have data for all species. For *Fagus sylvativca* there is no data reported during this period.

Picea abies

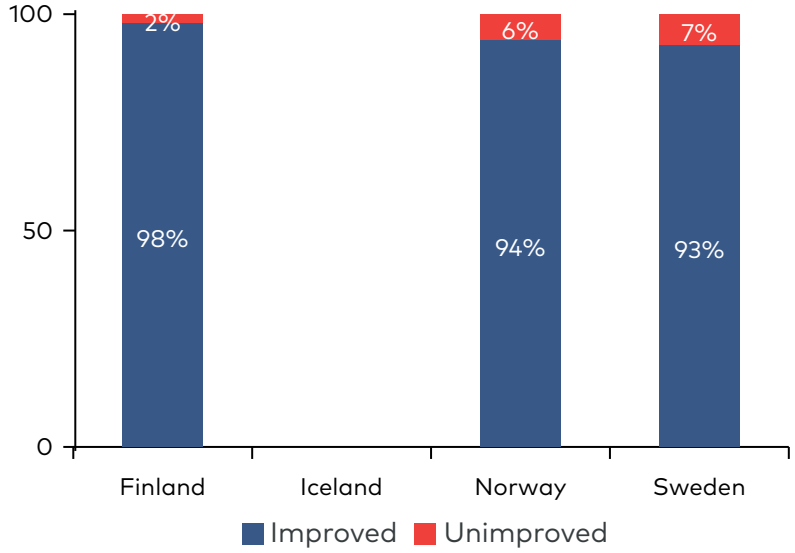


Figure 16.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 105.162

Norway: 45.475

Sweden: 176.200

Pinus sylvestris

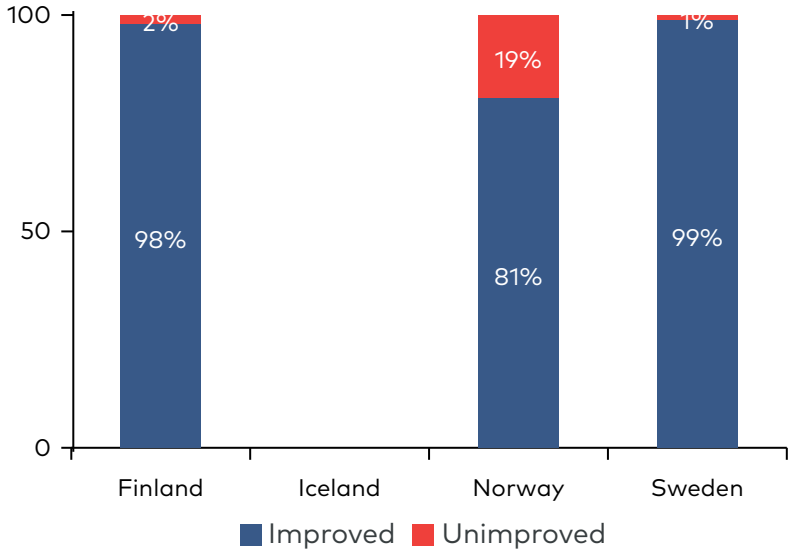


Figure 17.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 59.938

Norway: 4.338

Sweden: 236.000

Betula spp.

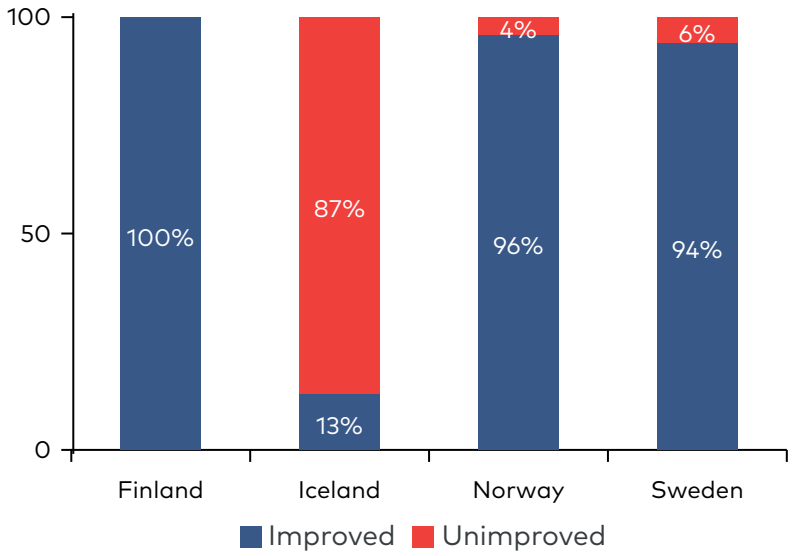


Figure 18.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 8988

Iceland: 1869

Norway: 28

Sweden: 3200

Larix spp.

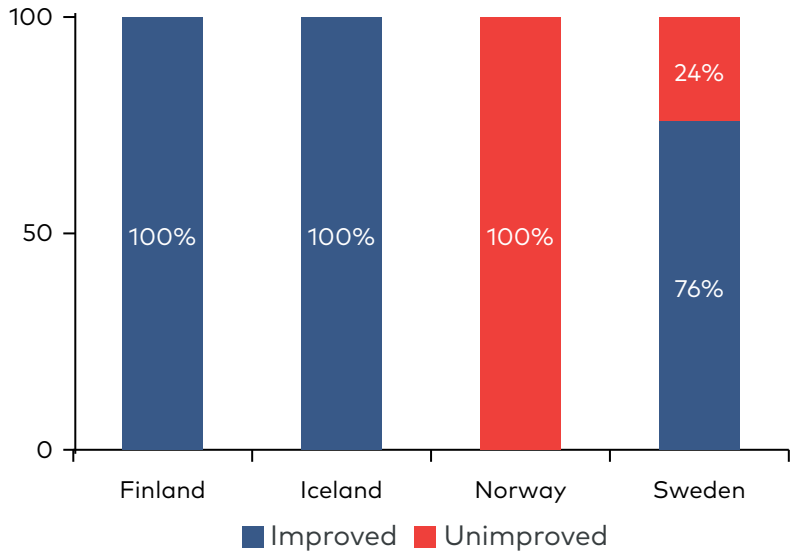


Figure 19.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 536 ("Unimproved"= 2,33)

Iceland: 1171

Norway: 1

Sweden: 4700

Genetically improved Norwegian oak seeds

The Research Council of Norway has provided funding to the IPN project "Genetically improved oak seed" for the period 2025 - 2028. The Norwegian Forest Seed Center is the project owner. Partners and collaborators are Norgesplanter AS, UCPH, SLU, Skogforsk, Skogselskapet i Østfold, Skogselskapet i Buskerud og Telemark, Glommen Mjøsen Skog and AT-Skog. NIBIO is the primary R&D provider.

The objective is to establish seed sources in forest, seed orchards and a breeding population for summer and winter oak.

Abies spp.

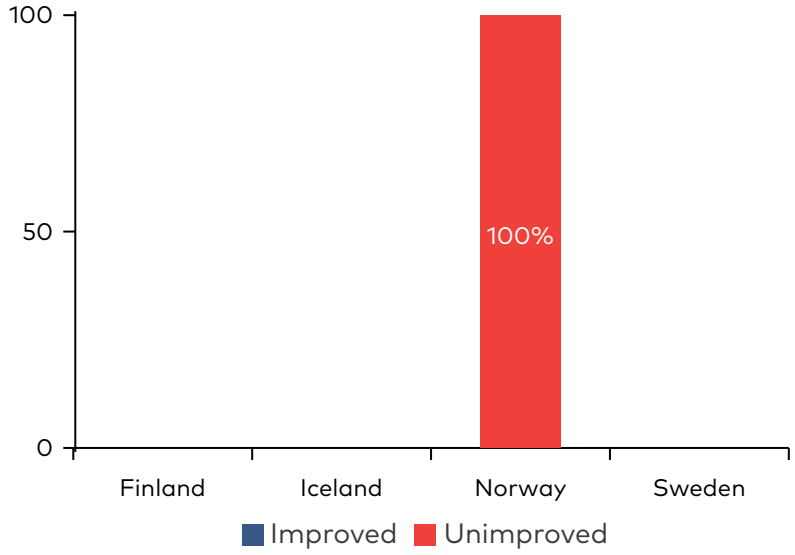


Figure 20.

The stack represents rounded percentage of the total amount in thousand seedlings.

Norway: 65

Pinus contorta

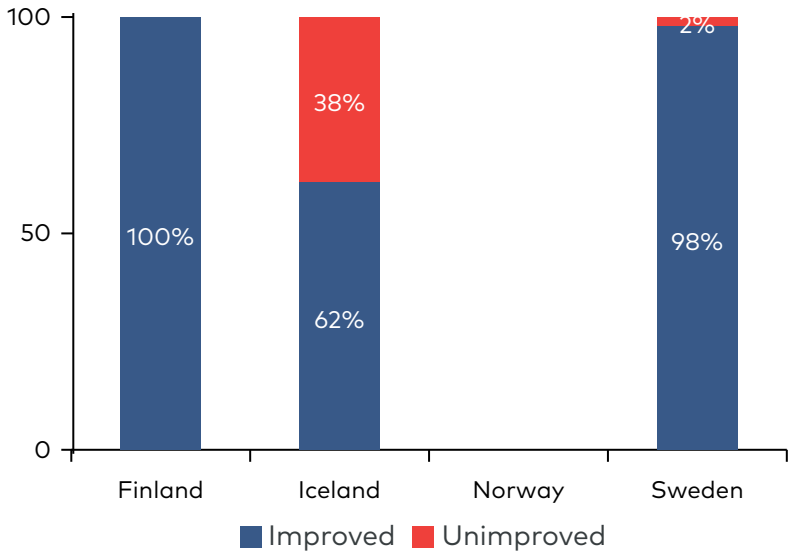


Figure 21.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 0,32

Iceland: 2612

Sweden: 8200

Populus spp.

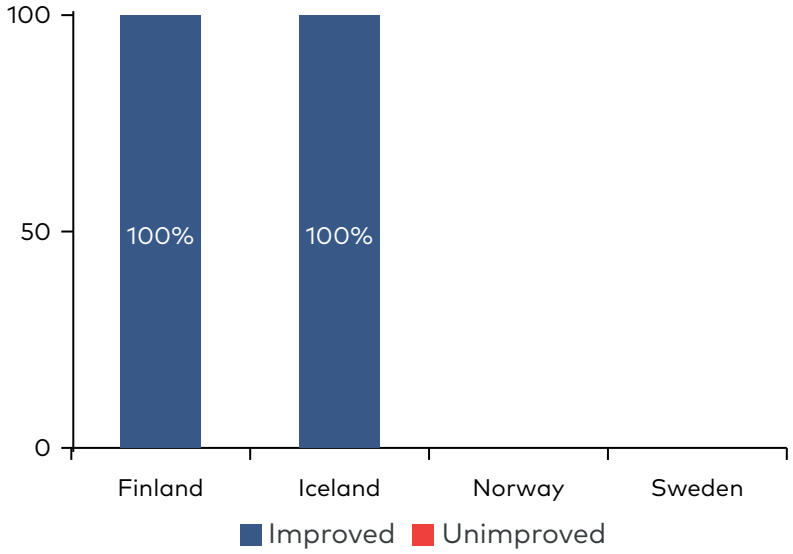


Figure 22.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 17

Iceland: 334

Quercus spp.

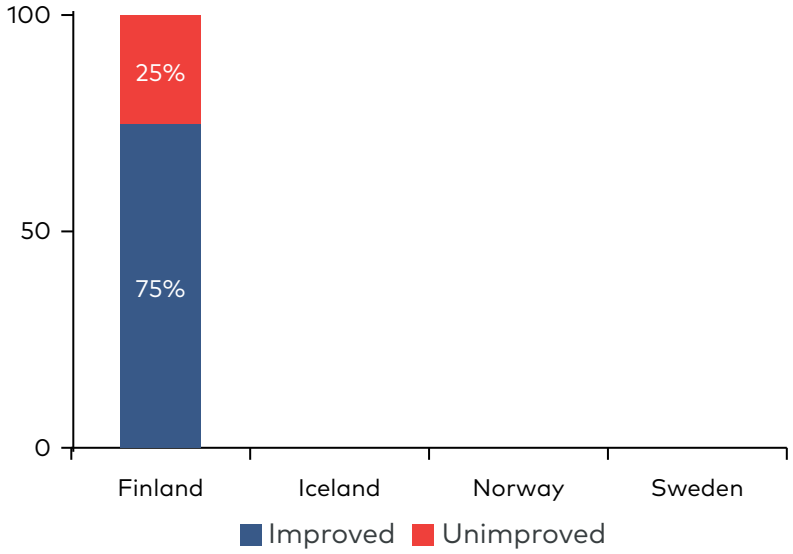


Figure 23.

The stack represents rounded percentage of the total amount in thousand seedlings.

Finland: 26

Other conifers

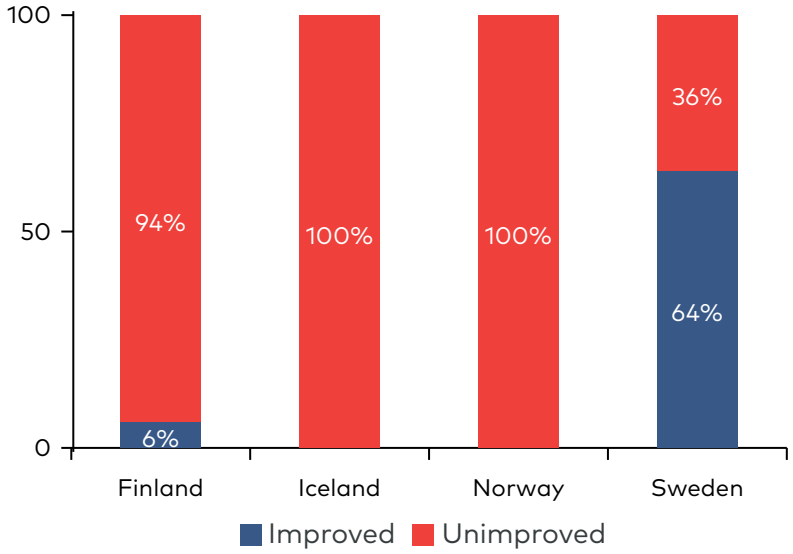


Figure 24.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 45

Iceland: 1187

Norway: 2

Sweden: 1200

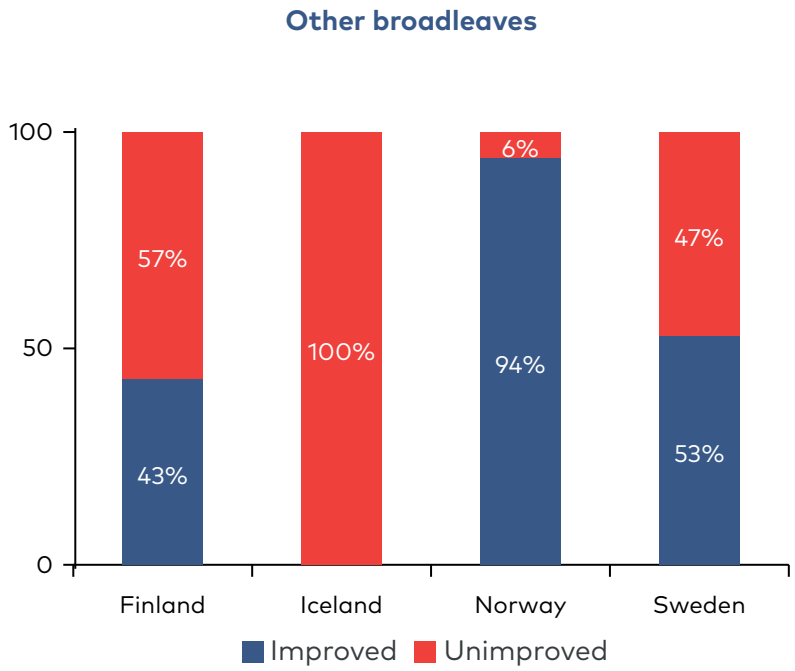


Figure 25.

The stacks represents rounded percentage of the total amount in thousand seedlings.

Finland: 72

Iceland: 11

Norway: 19

Sweden: 1400

Acer pseudoplatanus, Denmark, 2023.

Scots pine seed, photo by Dan Aamlid, NIBIO.

Seed production in the Nordic countries

Seed Production is presented below for the years 2009-2023, with data from all countries. The following categories are included in the figures: Norway spruce (*Picea abies*), Scots pine (*Pinus sylvestris*), birch (*Betula* spp.), firs (*Abies* spp.), larch (*Larix* spp.), contorta pine (*Pinus contorta*), European beech (*Fagus sylvatica*), oak (*Quercus* spp.), other conifers and other broadleaves. In 2023, there was notably high production of *Quercus spp.* seeds in Denmark

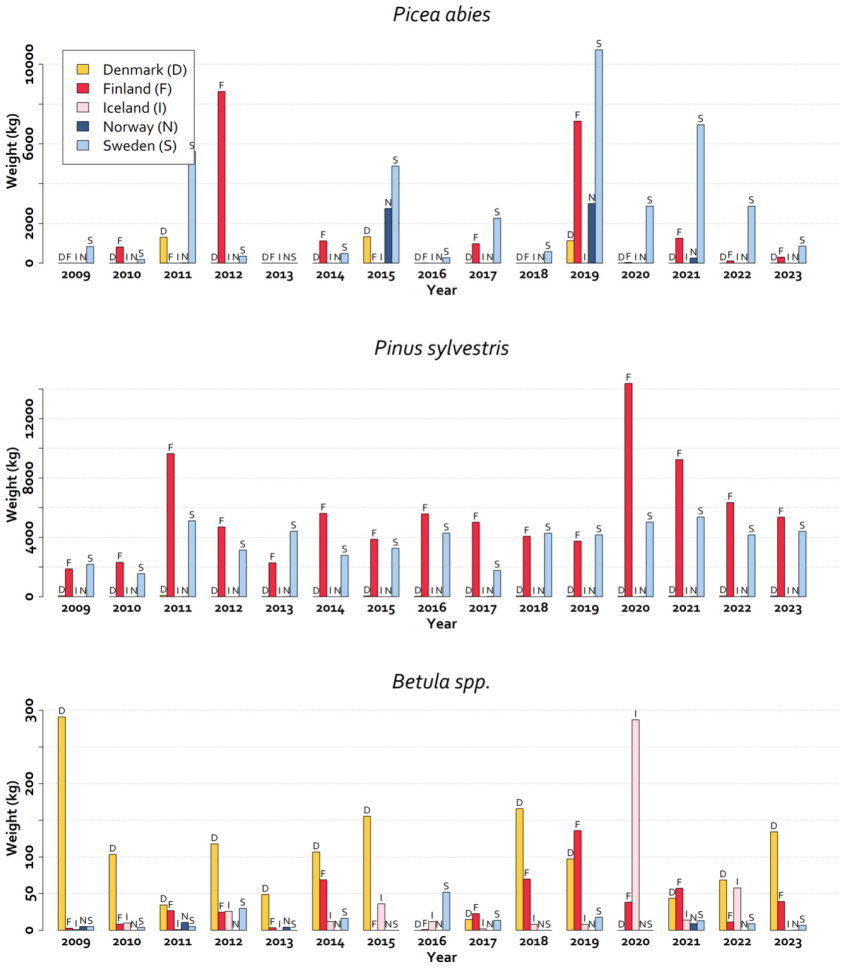


Figure 26.

Figure 27-29 shows seed production for species in countries and years (year of ripening/harvest).

When comparing seed production in kg among species it is worth noting that seeds of different species can have very different weights.

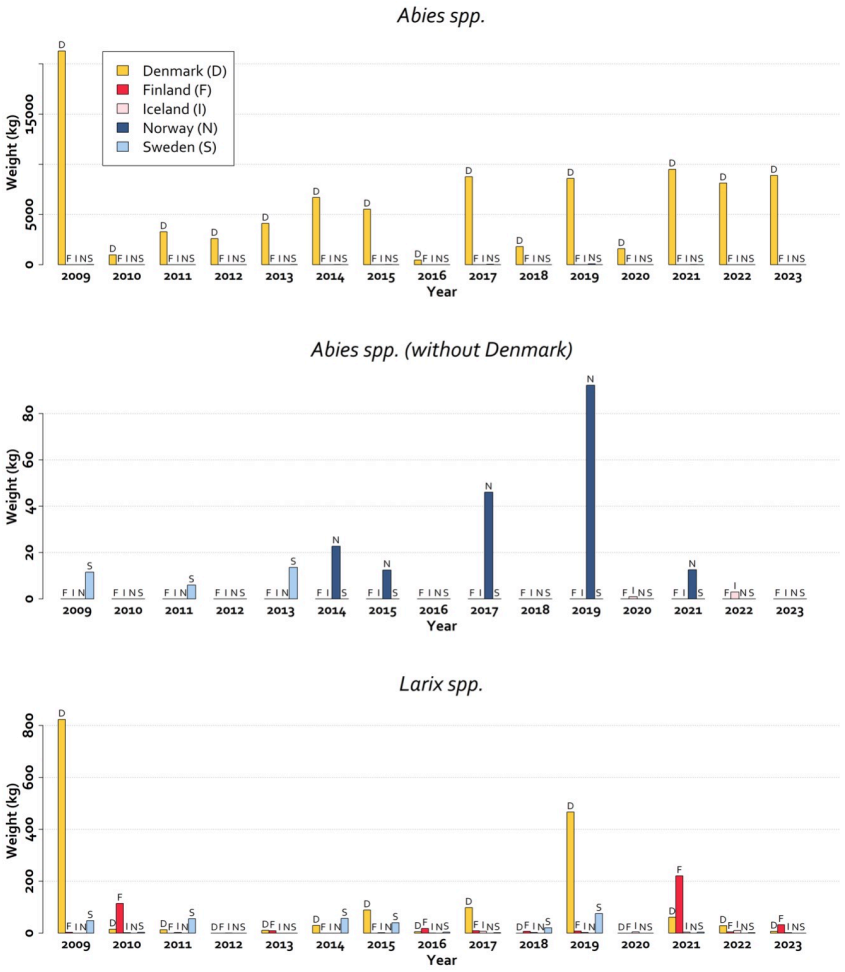


Figure 27.

A stand of *Larix sibirica* in Finland, 2024.

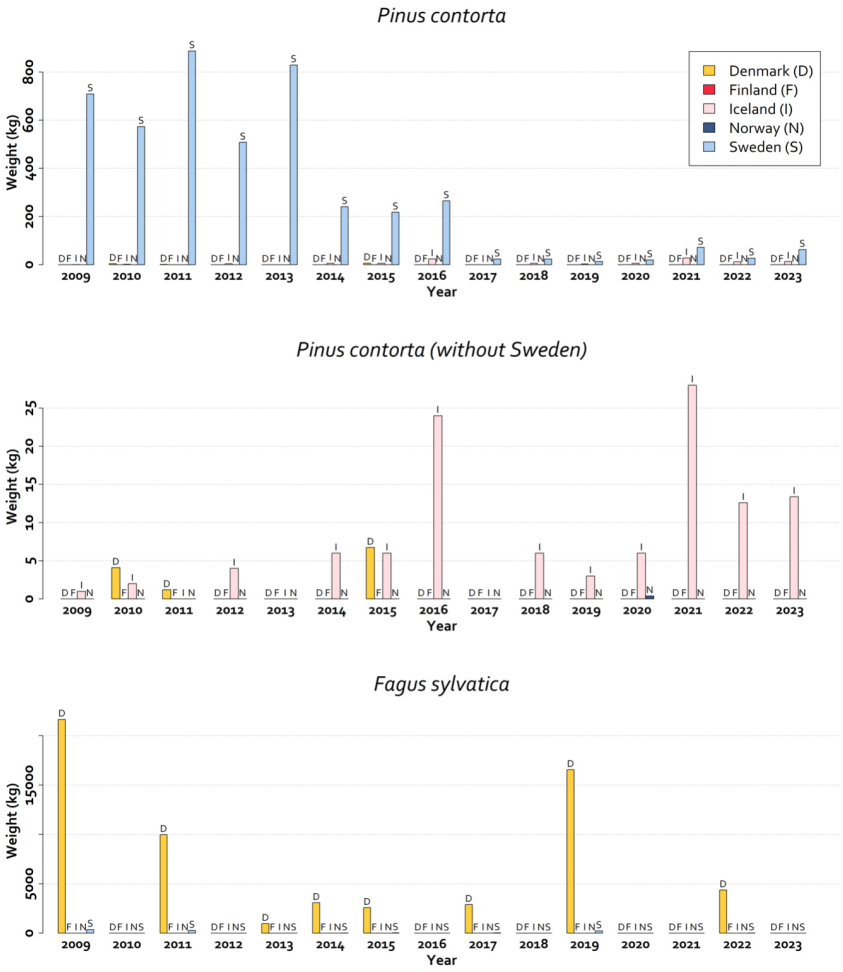


Figure 28.

Seed Quality

All seeds produced in the EU must come from officially approved and registered basic material, such as seed orchards or seed stands. A Master Certificate is issued to each seed lot after collection and is required for marketing forest reproductive material. It assures that seeds are collected from an approved basic material and include information on the type of basic material, phenotypic and genetic quality and origin of the material.

Forest reproductive material coming from countries outside the EU may be imported to and marketed in the EU if it affords the same assurances as the material produced in the EU, based on the OECD Certificate of Identity or Certificate of Provenance.

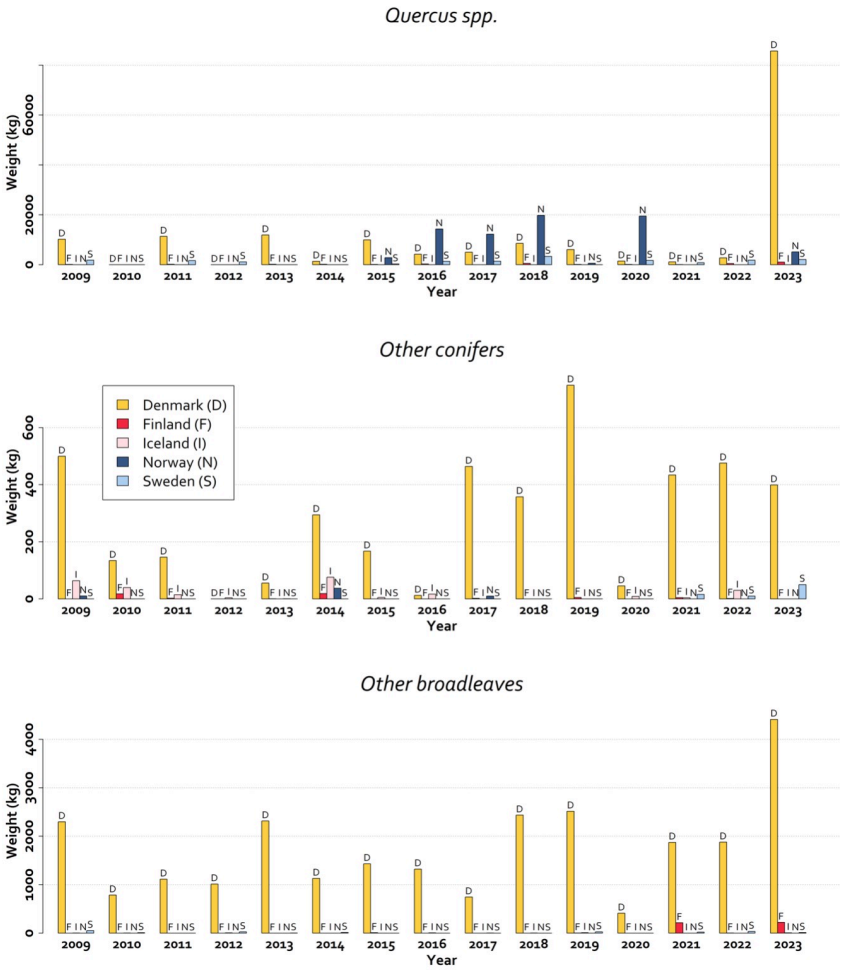


Figure 29.

Data *for Quercus* spp. for Norway were not available before 2014.

Leafs of *Quercus robur*.

Seed production per OECD category

The stacks in this chapter represent rounded percentage of the total amount of kilos of seeds produced in 2023. For *Fagus sylvativca* there is no data reported during this period.

The object of the OECD Forest Seed and Plant Scheme is to "*encourage the production and use of seeds, parts of plants and plants that have been collected, processed and marketed in a manner that ensures their trueness to name*" (www.oecd.org/agriculture/forest). Reproductive material can be certified under four categories as in table 1:

Category	Definition
Source-identified	This is the minimum standard permitted in which the location and altitude of the place(s) from which reproductive material is collected must be recorded; little or no phenotypic selection has taken place.
Selected	The basic material must be phenotypically selected at the population level.
Qualified	The components of the basic material have been selected at the individual level; however, evaluation may not have been undertaken or completed.
Tested	The superiority of the reproductive material must have been demonstrated by comparative testing or an estimate of its superiority calculated from the genetic evaluation of the components of the basic material.

Table 1. Classification by the OECD.

Picea abies

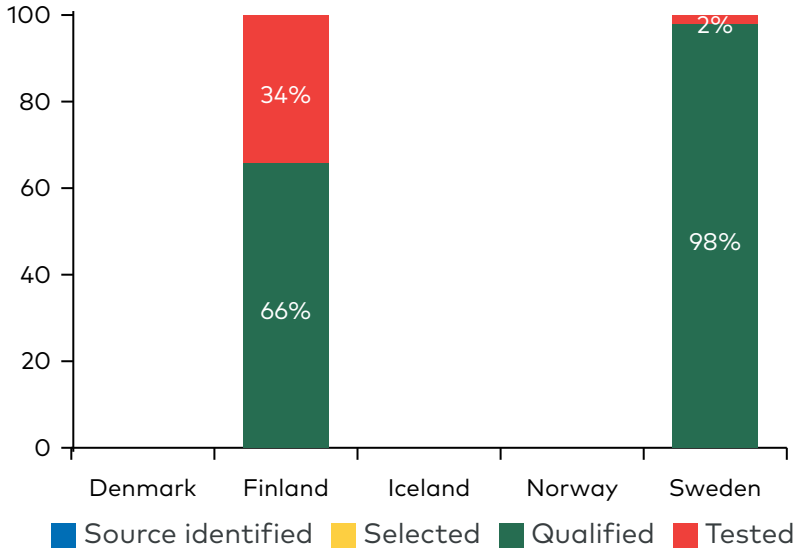


Figure 30.

Finland: 303.8 kg.

Sweden: 851,7 kg.

Pinus sylvestris

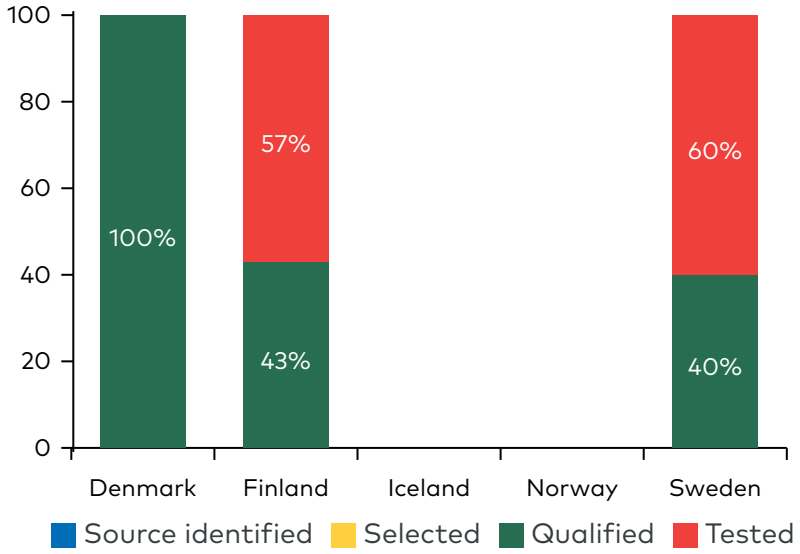


Figure 31.

Denmark: 37,8 kg.

Finland: 5362,4 kg. The category "Source identified" is less than 1 % and therefore not visible.

Sweden: 4400,8 kg.

Betula spp.

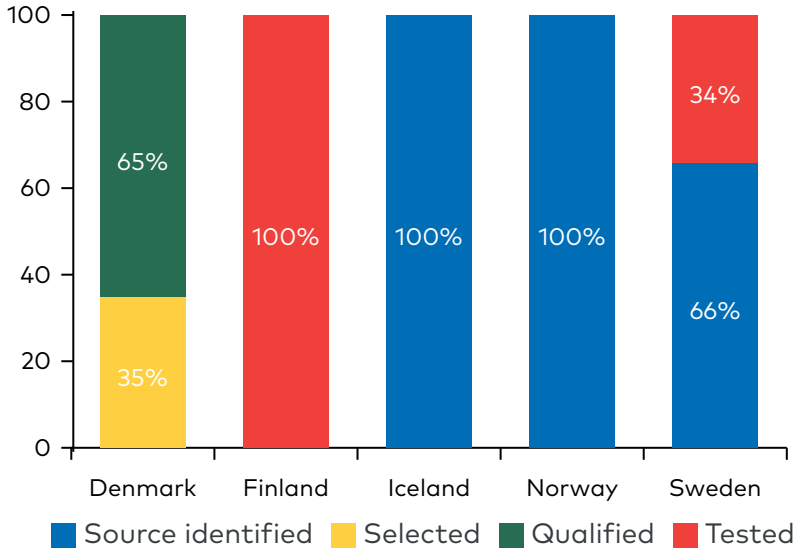


Figure 32.

Denmark: 134.25 kg.

Finland: 39.3 kg.

Iceland: 0.1 kg.

Norway: 0.2 kg.

Sweden: 6,8 kg.

Larix spp.

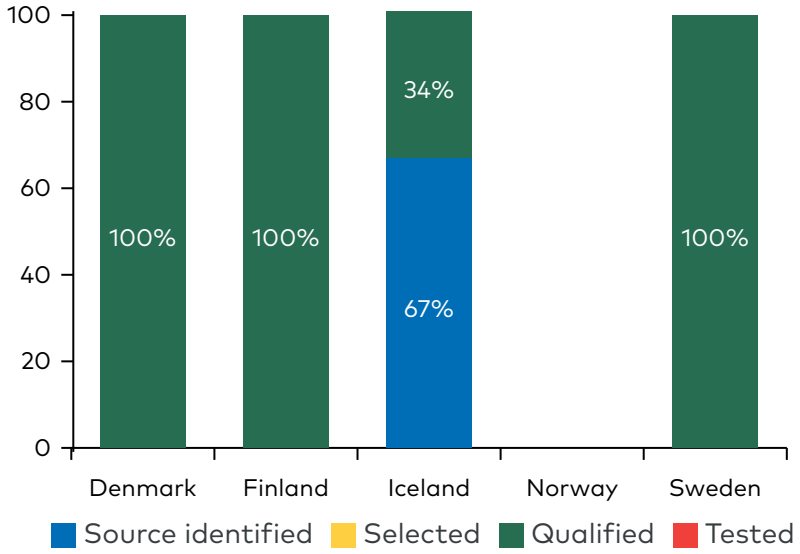


Figure 33.

Denmark: 7.14 kg.

Finland: 32.6 kg.

Iceland: 1.5 kg.

Sweden: 0.4 kg.

Quercus spp.

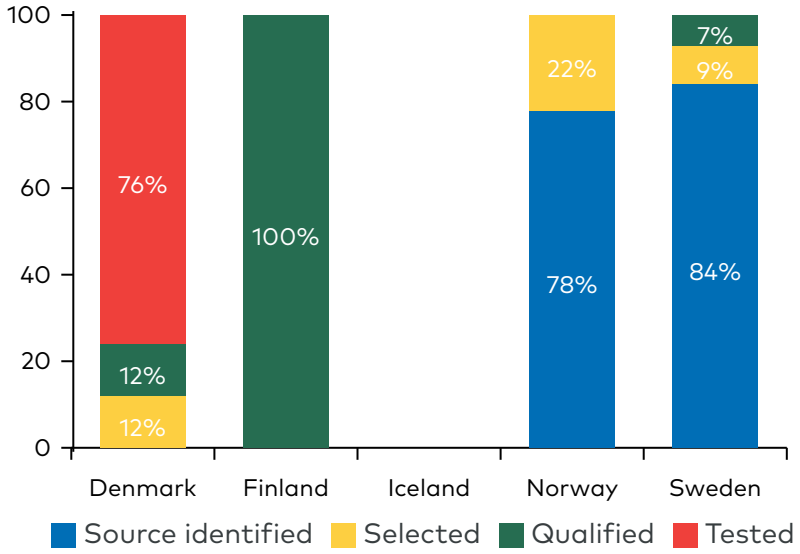


Figure 34.

Denmark: 85699 kg.

Finland: 1018.5 kg.

Norway: 5132 kg.

Sweden: 2066,8 kg.

Abies spp.

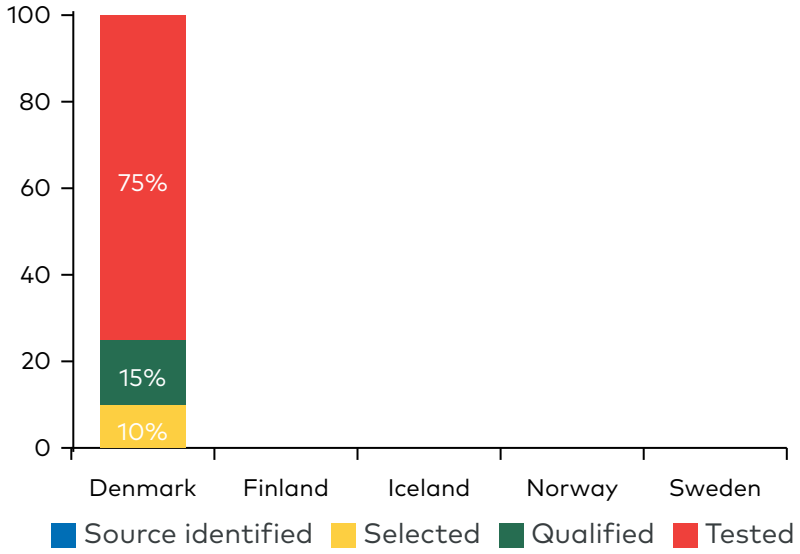


Figure 35.

Denmark: 8881.6 kg.

Pinus contorta

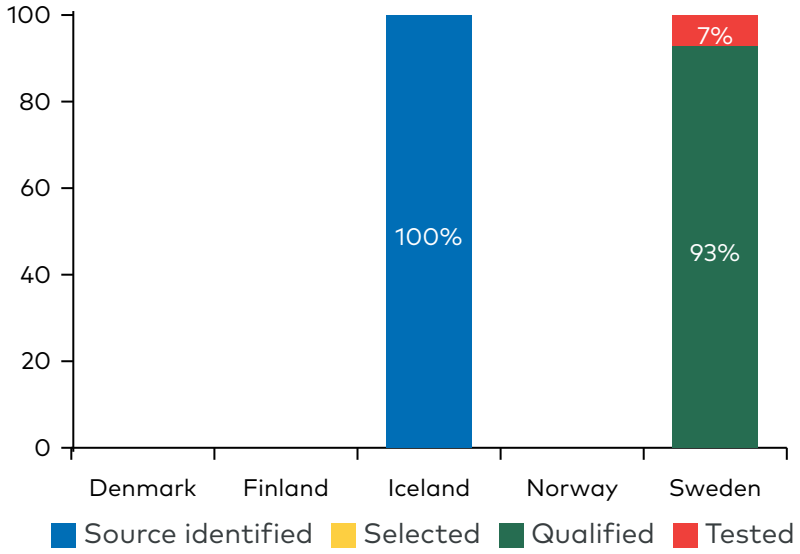


Figure 36.

Iceland: 13.4 kg.

Sweden: 62.7 kg.

Other conifers

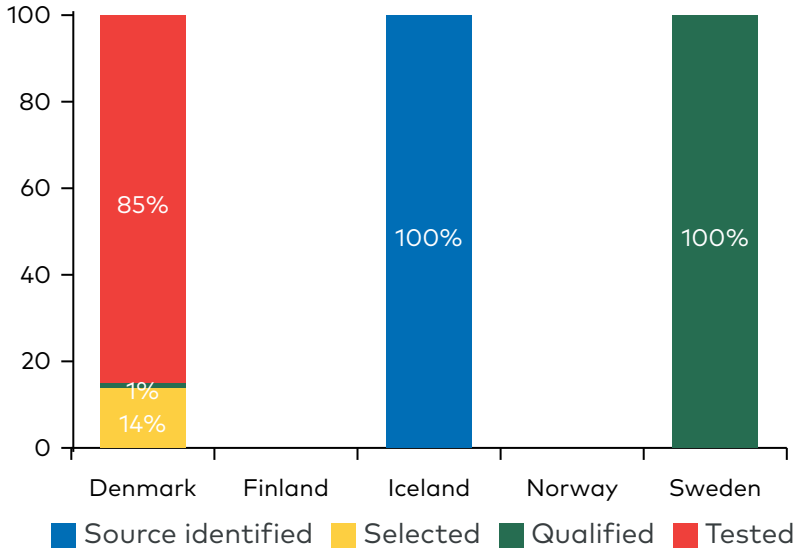


Figure 37.

Denmark: 399 kg.

Iceland: 0.3 kg.

Sweden: 50.3 kg.

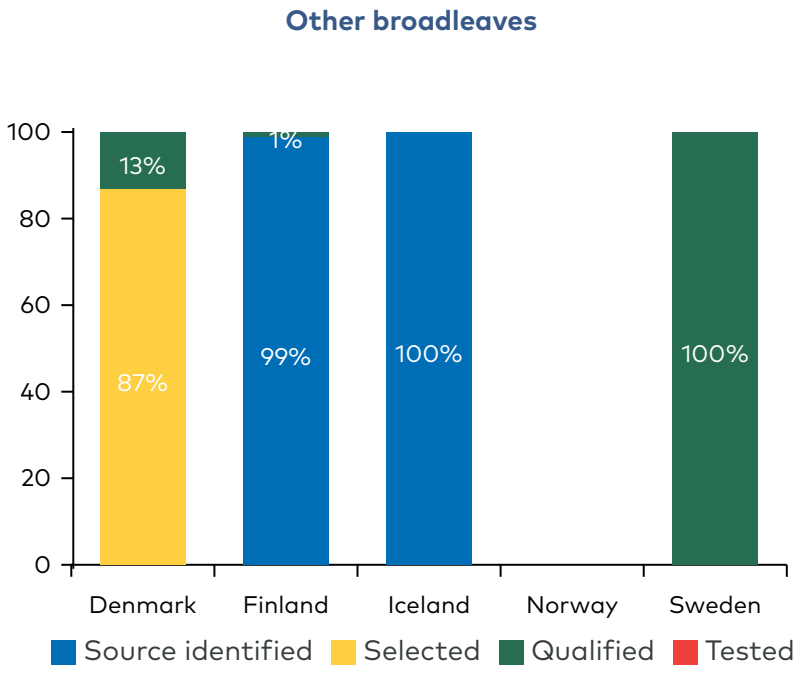


Figure 38.

Denmark: 4410,15 kg.

Finland: 222.7 kg.

Iceland: 7.4 kg.

Sweden: 13,2 kg.

Excursion to a stand of *Acer pseudoplatanus* (sycamore), Denmark, 2023.

Seeds and plants crossing borders

A complete account of plants and seeds were not available, but the available numbers are presented in the tables below. Additional details, such as country of origin, are described in the text were such information was available.

Plant import

Norway mostly imported plants from Sweden (*Pinus sylvestris* and *Picea abies)* in 2023. However, some plants were also imported from Denmark (*Abies spp*. And other broadleaves), Canada (*Abies spp.*), Poland (other broadleaves) and Georgia (*Abies spp.*).

Sweden imports plants from other Nordic countries, mainly Finland, Denmark and Norway, but also from other European countries, such as Germany, Estonia, Latvia, Lithuania and Poland. Finland mainly imported plants from Sweden (*Picea abies, Pinus sylvestris* and *Quercus spp.*), as well as some from Latvia (*Picea abies).* Iceland did not import any plants in 2023.

Plant production at Fin Forelia Oy, 2024.

Species/Country	Denmark	Finland	Iceland	Norway	Sweden
Abies spp.			0	43	
Larix spp.			0		4021
Picea abies		119.62	0	118	30860
Pinus contorta			0		0
Pinus sylvestris		50	0	1904	10780
Other conifers			0		1137
Betula spp.			0		2415
Fagus sylvatica			0		
Populus spp.			0		0
Quercus spp.		5.4	0		
Other broadleaves			0	1	268

Table 2. Plant import in 2023. Empty cells means that data were not available. Numbers in 1000 plants.

Seed import

Norway imported seeds mainly from Sweden (*Pinus sylvestris, Picea abies),* but also from Denmark (*Abies spp.)* and Lithuania (*Picea abies*). Iceland imported seeds from Finland (*Larix spp.*), Denmark (*Abies spp.)* and Sweden (*Pinus sylvestris*). Finland also imported seeds mainly from Sweden (*Larix spp., Picea abies, Pinus sylvestris, Betula spp.* and other conifers), but also some from Norway (*Picea abies*) and Germany (other broadleaves).

Sweden imports seed of many tree species, but in 2023 it was mostly from Denmark (*Abies spp., Larix spp., Picea abies, Betula spp., Fagus sylvatica, Quercus spp.* and other broadleaves and conifers) and Finland (*Larix spp., Picea abies, Pinus sylvestris* and *Betula spp*). Outside of the Nordic, Sweden also imported seeds from Poland (Quercus spp.), Germany (*Larix spp., Pinus sylvestris* and other conifers) and France (*Larix spp.).*

Species/Country	Denmark	Finland	Iceland	Norway	Sweden
Abies spp.			1.7	7.95	12.18
Larix spp.		1	15		32.50
Picea abies		25.60	0	26	13
Pinus contorta			4		0
Pinus sylvestris		12.35	0	102.66	171.1
Other conifers		0,5	0		17.75
Betula spp.		0.99	0		18.88
Fagus sylvatica			0		90
Populus spp.			0		0
Quercus spp.			0		1200
Other broadleaves		1	0		33

Table 3. Seed import in 2023. Empty cells means that data were not available. Numbers in kg seeds.

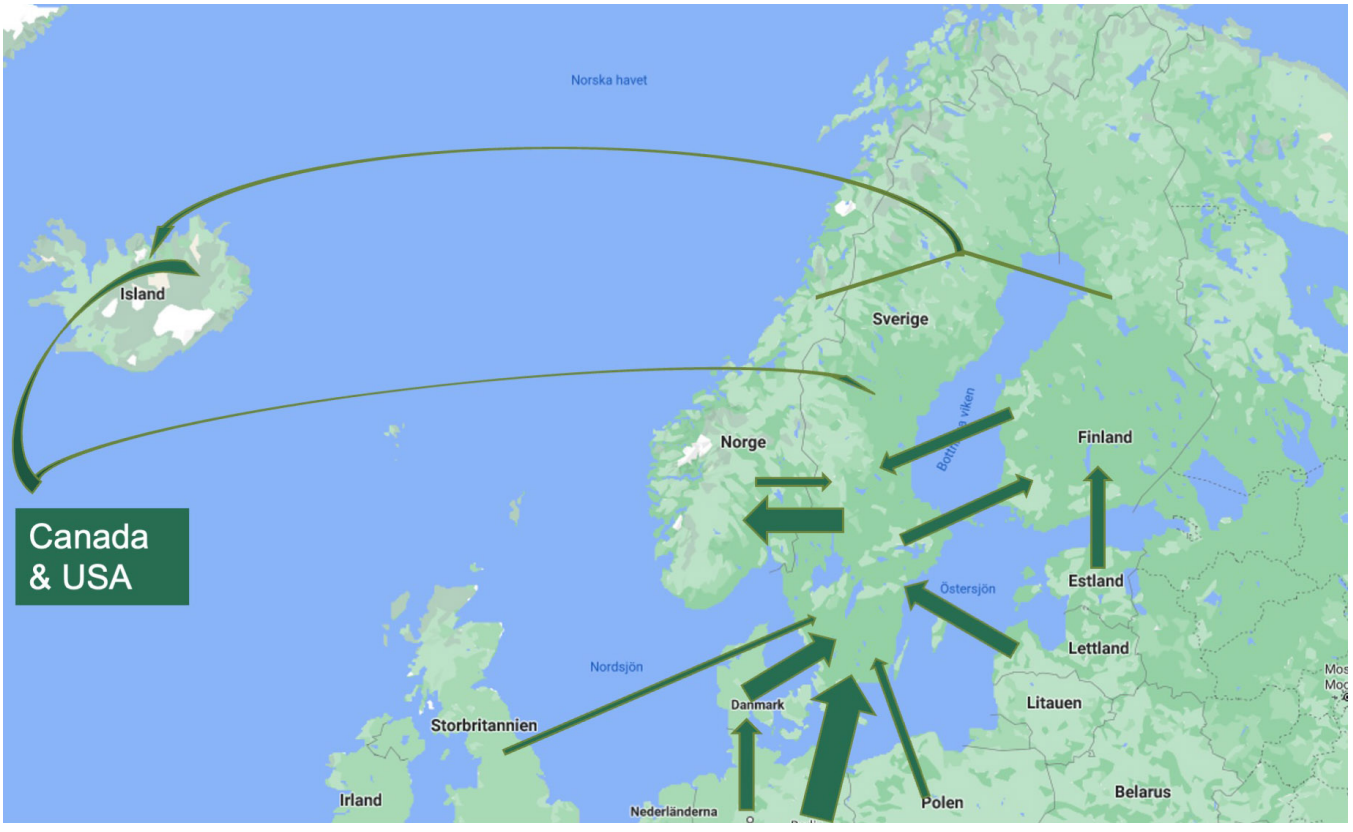


Figure 39. FRM trade illustration by Claes Uggla at the Swedish Forest Agency. The illustration gives an idea of the trade to and within the Nordic countries during the last decade.

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Thomas Nord-Larsen, Torben Riis-Nielsen, Iben Margrete Thomsen, Niclas Scott Bentsen, Bruno Bilde Jørgensen, Annemarie Bastrup-Birk og Vivian Kvist Johannsen (2024): Skovstatistik 2023, Institut for Geovidenskab og Naturforvaltning, Københavns Universitet, Frederiksberg. 77 s. ill.

NordGen

The Nordic Genetic Resource Centre (NordGen) is the Nordic countries' genebank and knowledge center for genetic resources. NordGen is an organisation under the Nordic Council of Minister and works with the mission of conserving and facilitating the sustainable use of genetic resources linked to food, agriculture and forestry.

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