Backups of the Nordic Potato collection, what it means to us

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NordGen

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The next 40 minutes

- Nordic Genetic Resources Center – NordGen and SPK
- The Nordic Potato Collection conserved at NordGen and back-up at SPK
- Ideas for cooperation

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NordGen - Our Mission

"To safeguard the Nordic genetic resources and facilitate their sustainable use. To provide knowledge and genetic material for biobased solutions in the Nordic region's changing climate"

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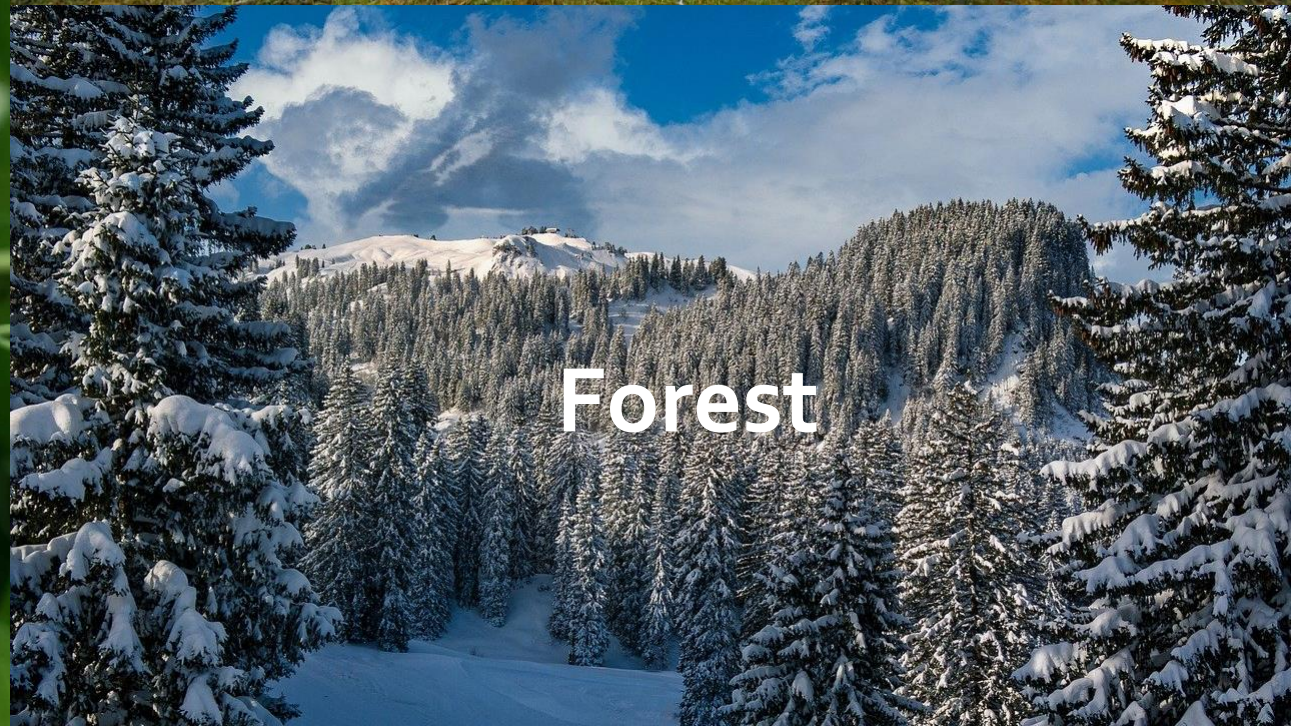
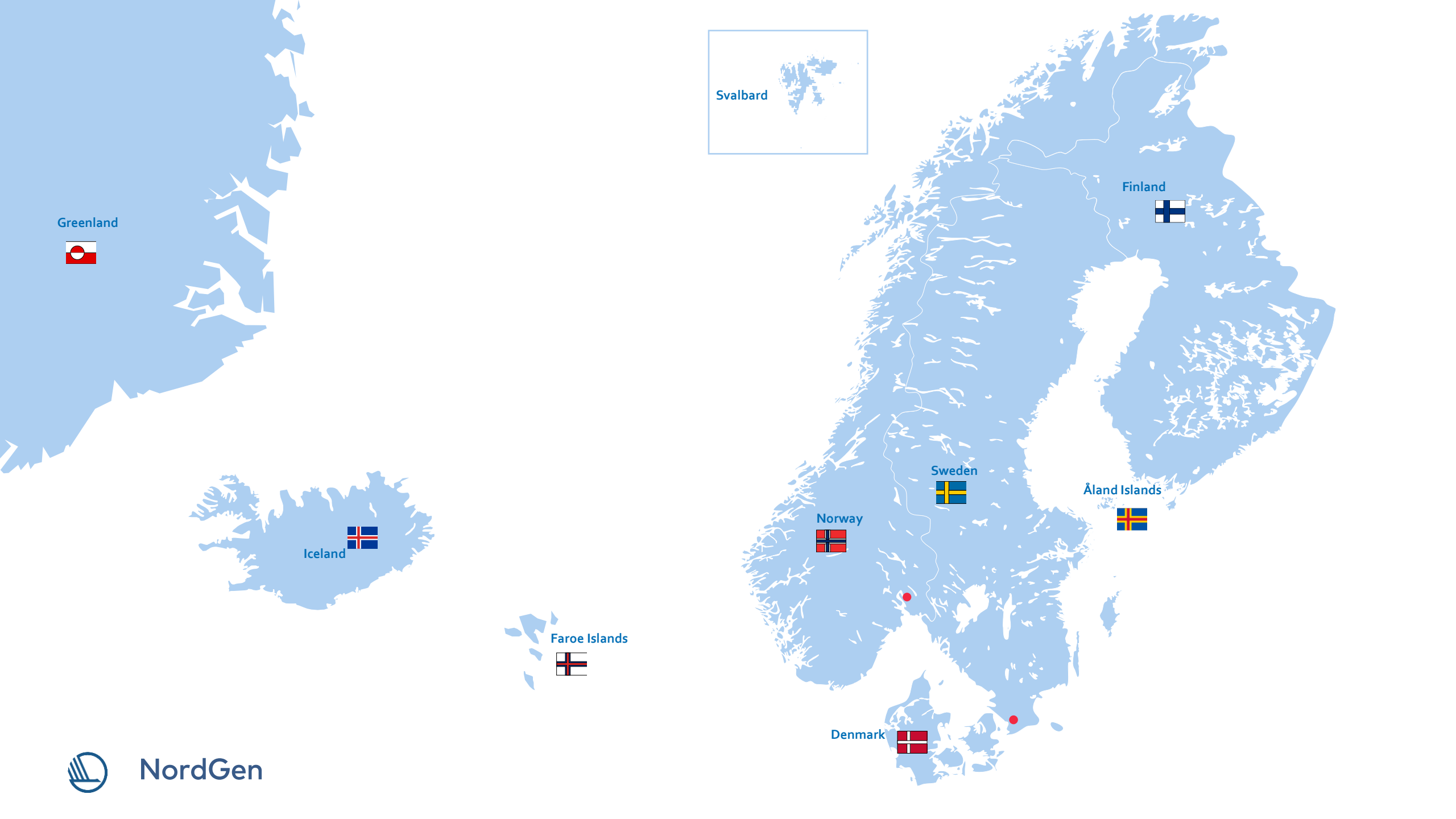
Plants


Farm Animals


Forest

Nordic Knowledge Centre for Genetic Resources

Genebank conserving and distributing plant genetic resources


Svalbard
Greenland
Finland
Sweden
Åland Islands
Norway
Iceland
Faroe Islands
Denmark

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The genebank at NordGen

- Part of NordGen Plants in Alnarp
- Working here:
  - Plant Scientists
  - Seed Technicians
  - Garden
- Seed storage room, but also:
  - Greenhouse, garden and fields
  - Seed, *in vitro*- and molecular laboratory

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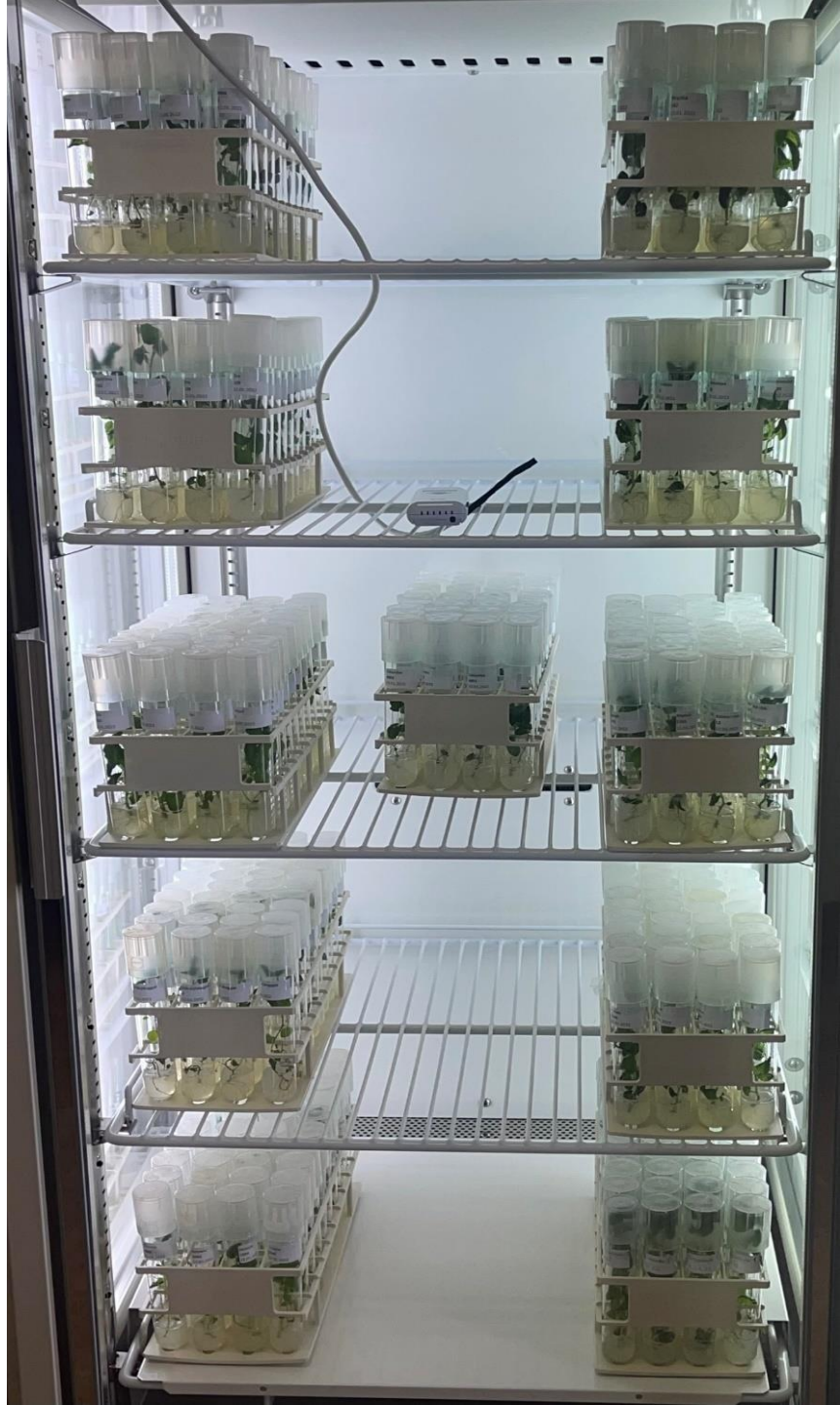
Why is it important to conserve genetic resources of potato?

Potato genetic resources contain the natural gene pool responsible for:

- yield that results in increased food security
- resistance to diseases
- adaptation to changing climate
- people's future needs



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NordGen's potato collection

NordGen is responsible for long-term conservation of:

- **Nordic local potato cultivars** (landraces)
- **Nordic commercial cultivars** produced at Nordic plant breeding institutes
- **Nordic breeding lines** with valuable traits
- **Old non-Nordic cultivars** cultivated over large areas in the Nordic countries

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Potato

Criteria for conservation

NordGen has set the following criteria for conservation:

— one or several valuable agronomical, resistance or quality traits

— cultural or historical value.

— is not preserved elsewhere

— is unique and can be documented

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Potato conservation

- in numbers

Numbers	Active
Number accessions in 2020	77
Number accessions in 2021	92
Number accessions in 2022	95

Cultivar type	Active
Traditional cultivar/landrace	40
Advanced or improved cultivar	46
Breeding/research material	9
Total	95

Donor country	Active
Denmark	16
Finland	17
Iceland	3
Norway	14
Sweden	41
Faroe Islands	1
Other	3
Total	95

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The value of Nordic potato germplasm

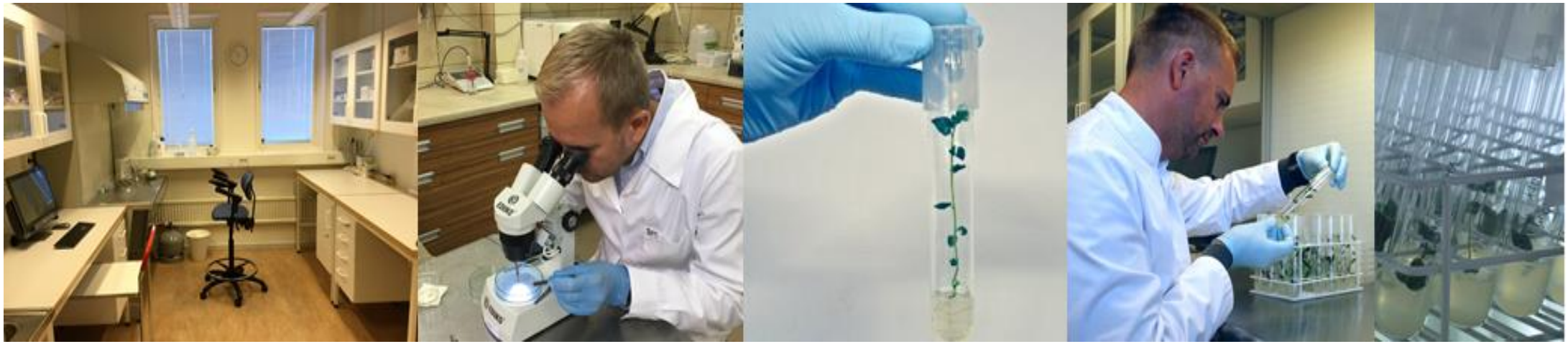
- The old Nordic potato germplasm probably has a rather **narrow genetic base**
- Many of the cultivars have small tubers, uneven tuber shape and other p**rimitive characteristics**
- Continuously **grown for more than 200 years** - a clear indication that **certain valuable traits are present** in this material
- Some of the cultivars have **fairly good resistance** to some **storage diseases**
- Others are notable for their **extreme dormancy**, which is very important under Nordic conditions

The value of Nordic potato germplasm

- The Nordic **breeding lines** which will be included in the collection primarily have important **resistance genes**
- The cultivation history of old local strains indicates that they have a **good and stable food quality**
- Organoleptic tests show that certain older cultivars represent a level of **quality** which is **rarely found in modern cultivars** (10/32 of interest for Nordic Food Lab)
- A source for **quality breeding**. Some of the genotypes among the old germplasm have a **high nutritional quality**, which may also be valuable in future breeding programs

In vitro collection

- **Active collection** – located in Alnarp, 95 accessions – 638 single *in vitro* plants
- **Back-up collection** – located at The Finish Seed Potato Center -SPK, Tyrnävä, Finland
- **Conditions**: plants are grown in glas tubes in medium, in incubators: 15˚C, 16 hours light
- **Transfer** of plants to new medium is done 3 times a year
- **We also produce *in vitro* plants** for research and educational purposes as well as for production of minitubers



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Why back-up in Finland?

- It is strategic to place the backup and the main collection far from each other.
- SPK is Finland's leading company with high expertise in potato *in vitro* culture.
- SPK is located in one of the European Union's High-Grade Zones.
- Finland has for many years expressed a desire to host NordGen's potato backup.
- The move of the backup to Finland means that NordGen conducts conservation operations in four Nordic countries.

Potato - latest projects

Characterization and evaluation of 15 accessions of older Nordic heritage potato to enable increased utilization

- Project financed by NordGen and conducted in 2021
- Morphological characterization in a field trial at Bodaholms gård, 16 descriptors for above-ground part, specific gravity (D.M. and starch content)
- Morfological characterization of tubers done at NordGen, 5 descriptors
- Cooking quality (ezymatic darkening, cooking discoloration, cooking type, content of glucose in raw tubers)
- The light sprouts will be evaluated in spring 2022

Potato -latest projects - PPP SustainPotato

- Financed by PPP for pre-breeding (Nordic countries, secretariat is placed at NordGen)
- Time: 2021-2023
- Partners: Graminor, SLU, Danespo, NIBIO, NordGen

Main goal:

- To facilitate efficient development of robust potato varieties with better adaptation for the changing climate and better resistance to diseases

Subgoals:

- To expand the genetic base for the Nordic potato breeding
- To develop modern methods for more efficient characterization and evaluation (high-throughput phenotyping HTP and genotyping)
- To discover interesting potato varieties that have better resistance against diseases for further use in crosses.
- To establish a Nordic potato network

Cooperation ideas

- Characterization and evaluation of traits important for the use
- Field trials and testing
- Health parameters
- Culinary evaluations
- Climate modelling for growing potatoes
- Any conservation activity