NordGen

Welcome to Malmö

NordGen





Welcome to the Nordic area!

These are the Nordic countries

Iceland

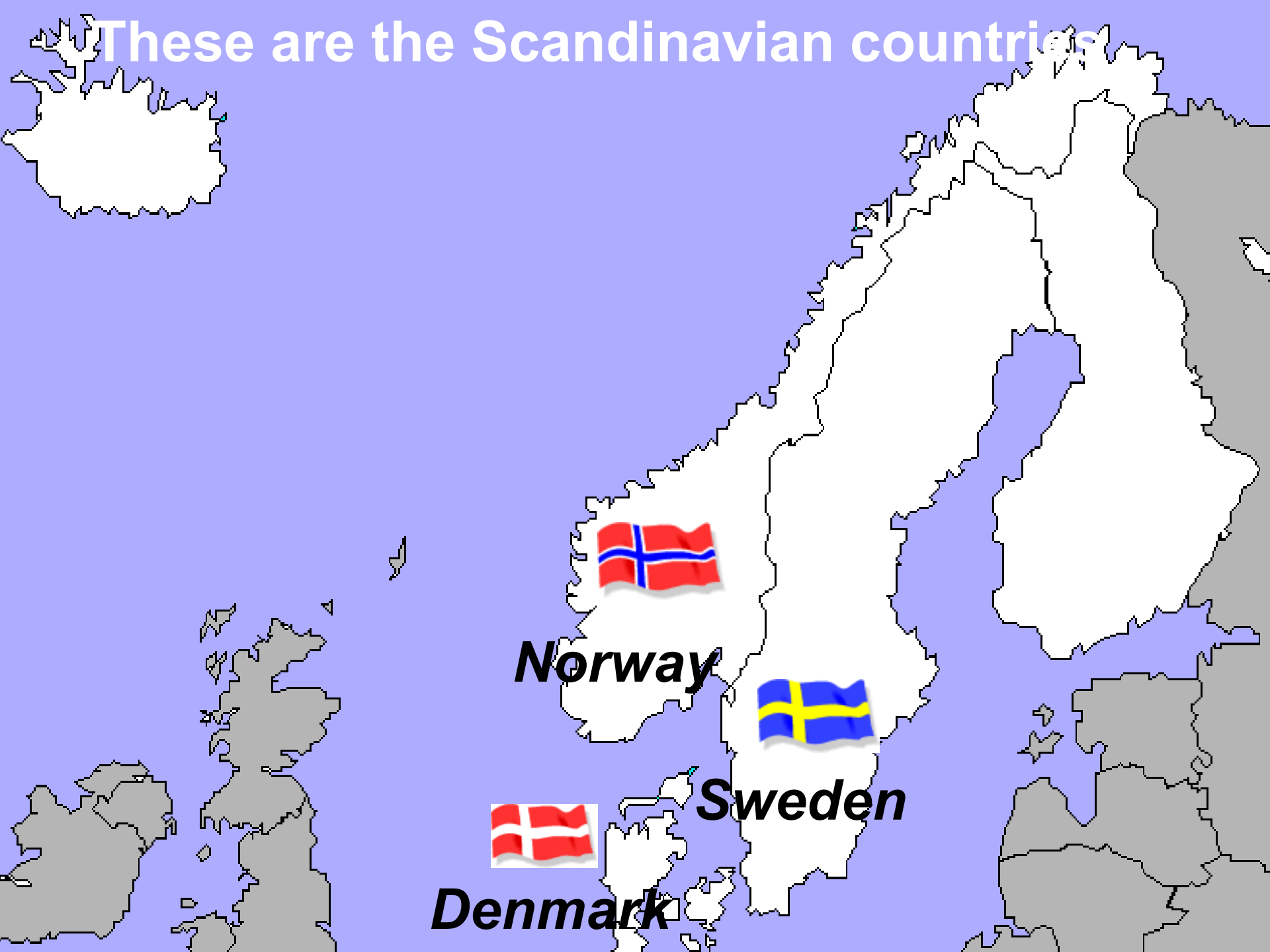
Norway

Finland

Sweden

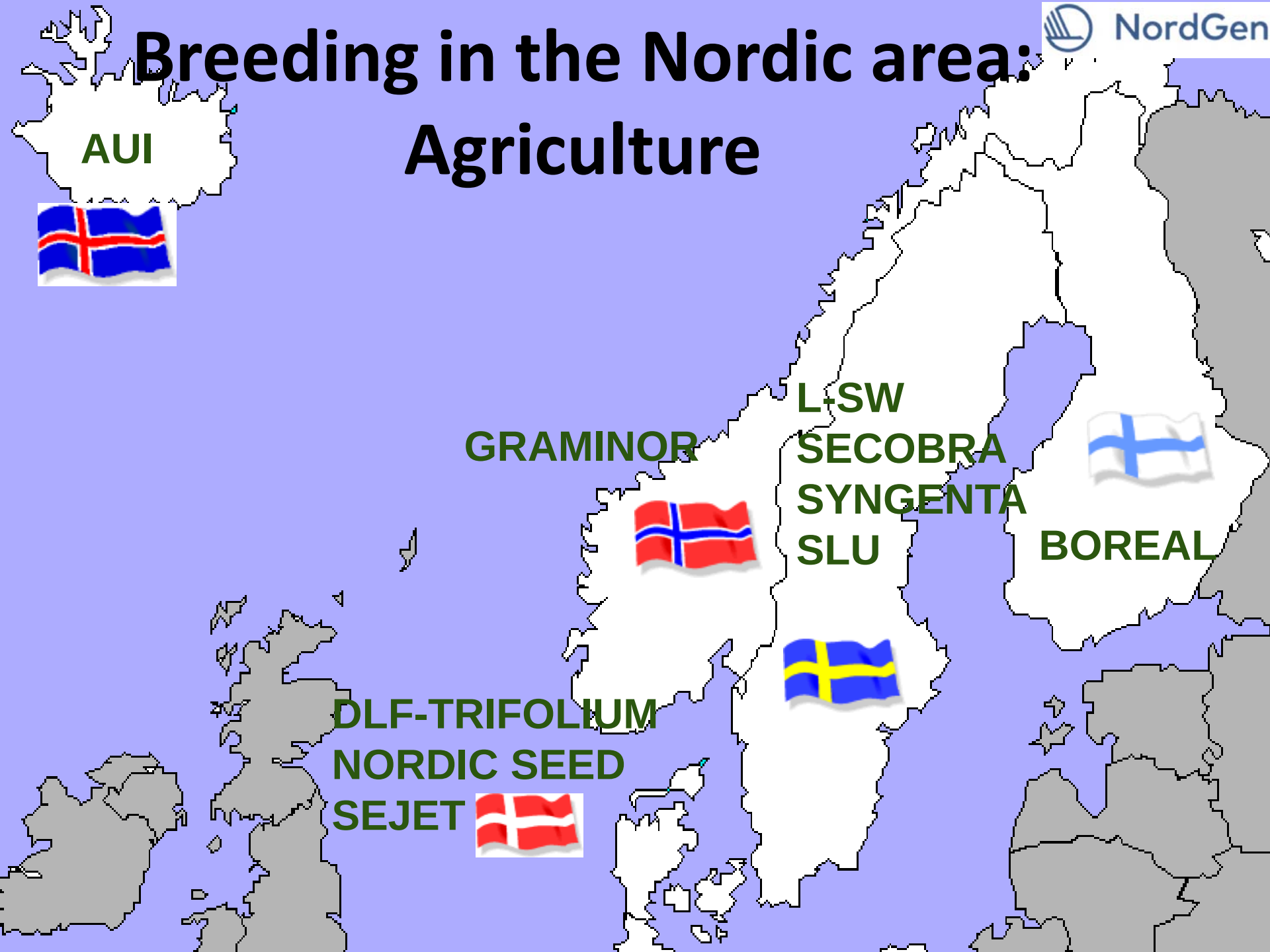
Denmark

These are the Scandinavian countries

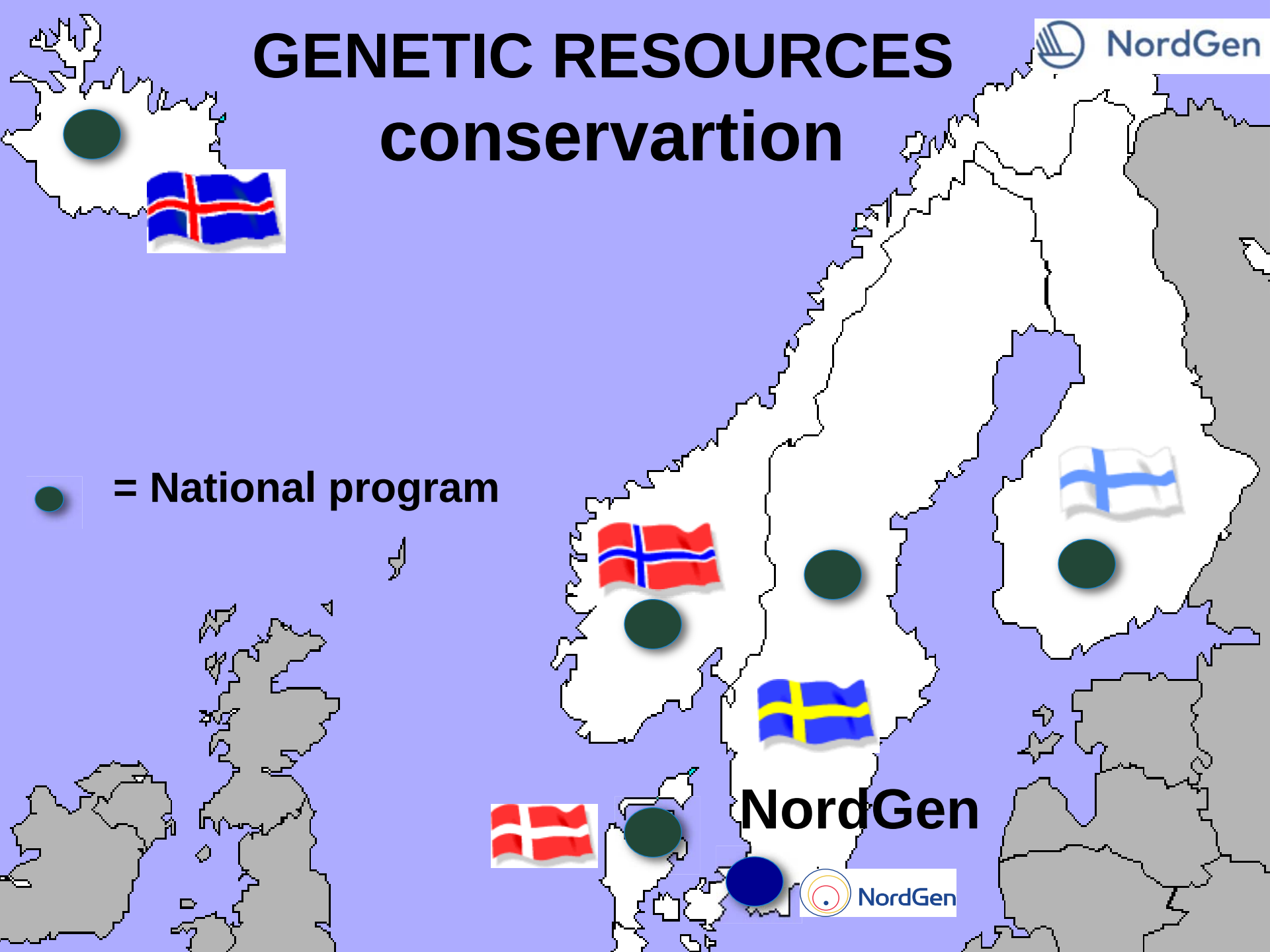


- Agriculture & Climatic gradients:
  - West – East, maritime – continental, precipitation
  - North – South, increasing growth period, temperature

Breeding in the Nordic area: Agriculture



GENETIC RESOURCES conservartion



NordGen - Nordic Genetic Resource Center

Governed by the Nordic Council of Ministers
Denmark, Finland, Iceland, Norway, Sweden

Regional gene bank for the Nordic countries

Nordic Gene Bank: established in 1979
Converted to NordGen Plants January 1, 2008

NordGen

NordGen is a Nordic institute for the conservation and sustainable use of plants, farm animals and forest trees

NordGen´s basic goal is to secure genetic diversity for agriculture, horticulture and forestry in the Nordic countries



NordGen

Nordic Genetic Resources Center, from 2008

NordGen Plants **is the Nordic center for cultivated plants. We work with conservation and sustainable use of cultivated plants and their wild relatives.**

NordGen Farm Animals **is a service and knowledge center for sustainable management of farm animal genetic resources for the Nordic countries.**

NordGen Forest **serves as a Nordic meeting place for forest genetics and genetic resources, supply of seeds and plants, and methods for regeneration.**

NordGen Plants

- **Active collection –**
  Alnarp, Sweden

- **Base collection –**
  Årslev, Denmark

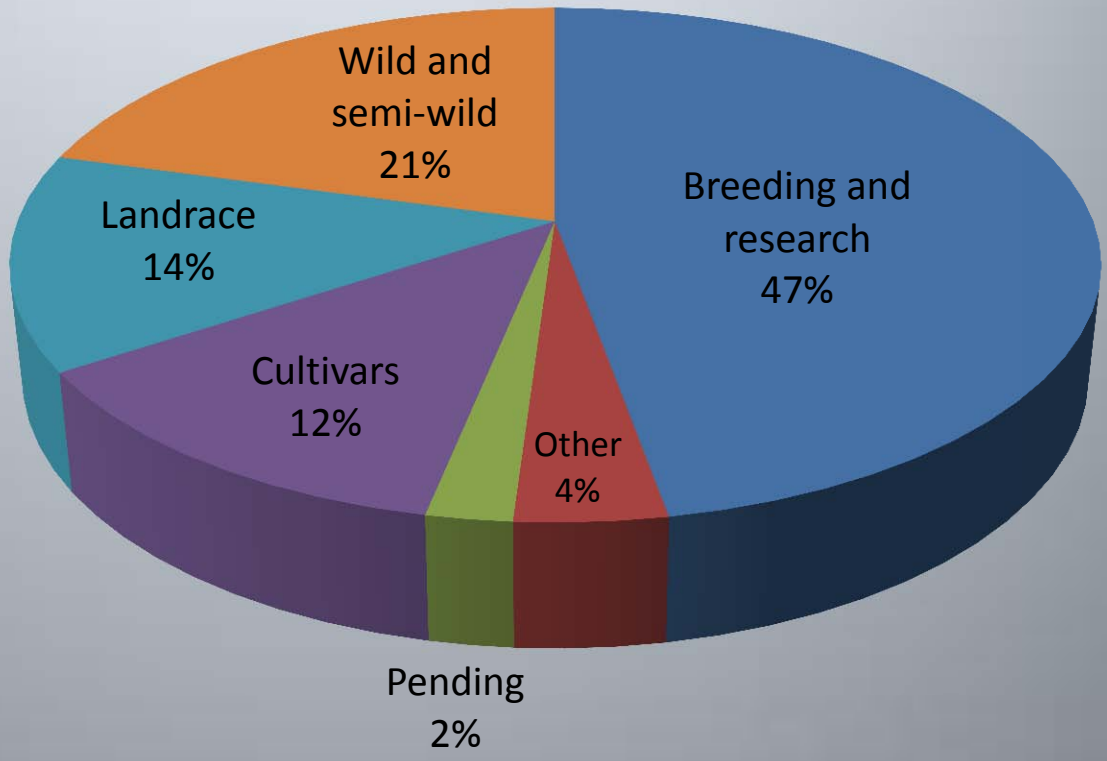
- **Security collection -**
  Svalbard, Norway

Nordic Seed Collection

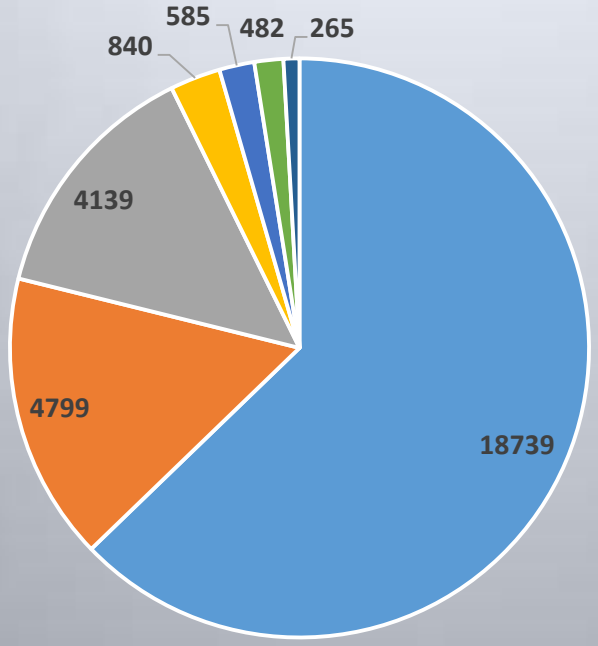
The collection includes 513 species and varieties of cultivated crops and their wild relatives, with 35,700 registered accessions (20,000 unregistered)

The Gene Bank is working with material of Nordic origin and/or relevance

Type of material: the whole collection

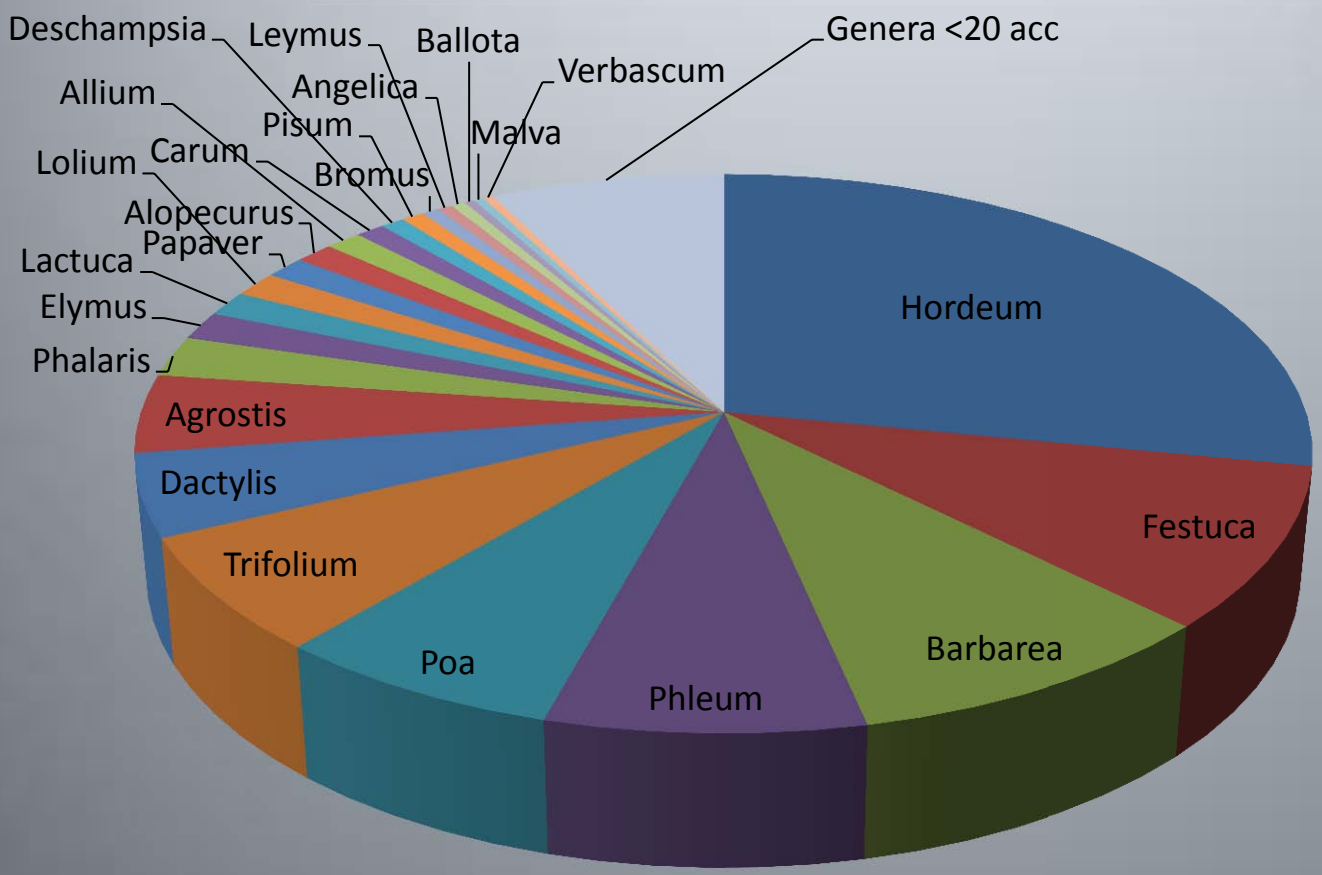


NordGen



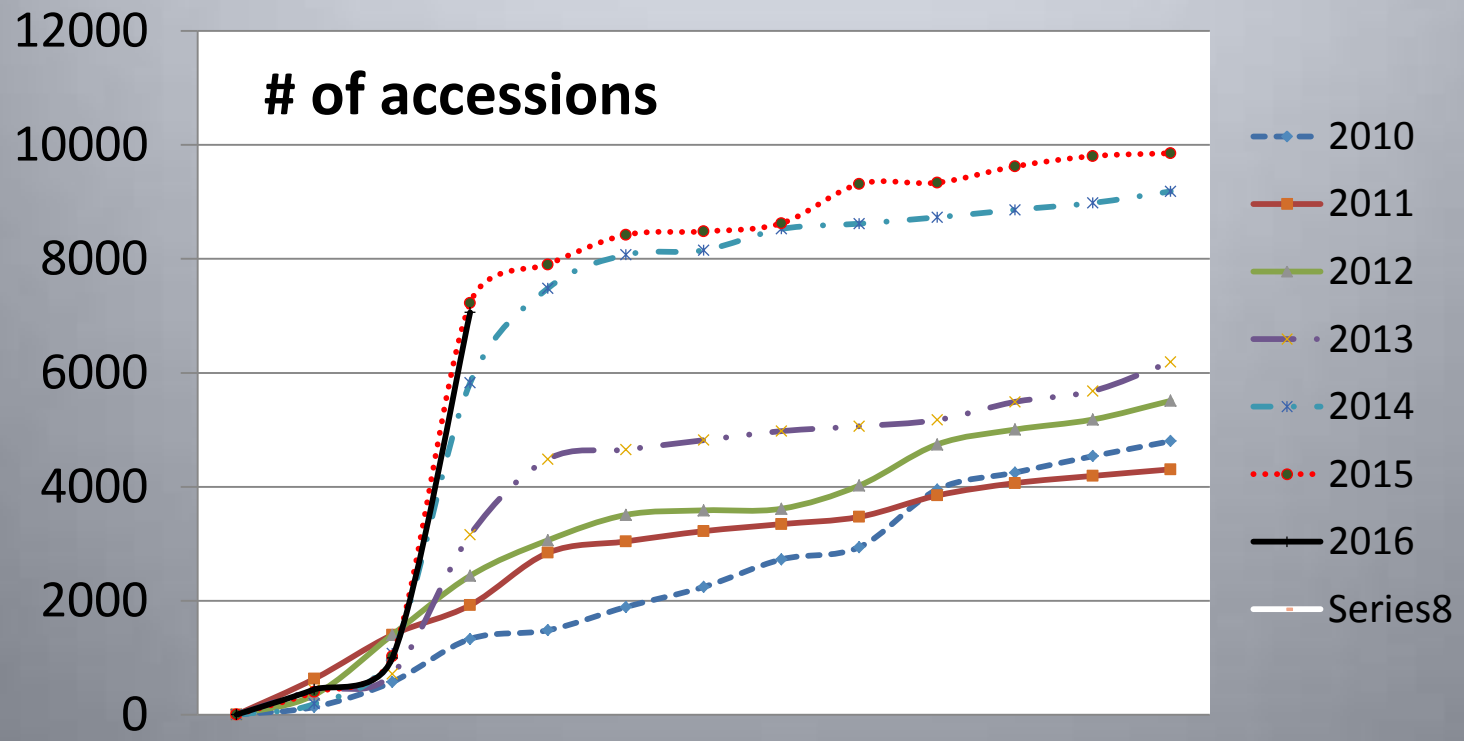
29.000 ACC/PEN
6.700 TEM
+ INCOMING

Wild accessions at NordGen



NordGen

Seed requests 2010 - 2016



Cereal collection (ACC/PEN)

Jan Svensson

Genus	*Accesions*
Hordeum	16.531
Triticum	1.979
Avena	531
Secale	328
Other	347
	19.716

Type	*Accesions*
Cultivar	1.731
Landrace	2.508
Breeding / Research	14.926
Wild	2.159

In total 121 species

NordGen

Barley genetic stock collection
> 13 600 accessions

No of acc.	*Types of Genetic Stocks*
10776	Mutant collection
980	Bowman near isogenic lines (NIL)
685	Translocation lines
58	Duplication lines
242	James Mac Key near isogenic lines (NIL)
176	*H. bulbosum* introgression lines

Forage crops

Genus	No. of acc.
Trifolium	860
Phleum	830
Festuca	800
Poa	560
Agrostis	350

Industrial crops

Genus	No. of acc.
Barbarea	570
Linum	365
Brassica	260
Beta	120
Papaver	92

Anna Palmé

NordGen

Public-Private Partnership for Pre-breeding
PPP - a Nordic model –

NordGen

Challenges:

Adaptation to climate change

Meeting environment goals

Consumer & market demand

- **Day length remains stable,**
- **Location NORTH – market size;**
- **Increasing gap between reserach, breeding & conservation – need public engagement**
- **Maintain competitiveness, maintain agricultural production maintain rural livelihood**
- **Sustainable intensification – ”green agriculture”**

NordGen

PPP Project 1: NordApp

Pre-breeding for Future Challenges in Nordic Apples

- **Breeding for resistance against storage rot and apple cancker**
  SLU, Graminor & MTT



Coordinator: Prof. *Hilde Nybom*
Link to EU project Fruitbreedomics





NordGen

PPP Project 2: Barley

Combining Knowledge from Field and from Laboratory in Barley

Validation, testing, developing molecular markers for disease resistance

All Nordic barley breeders

Coordinator: Prof. *Ahmed Jahoor*

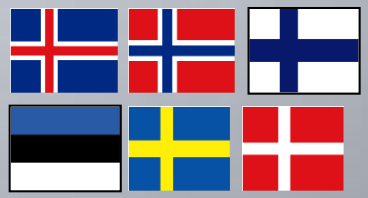
NordGen

PPP Project 3: Ryegrass

Base Broadening in perennial ryegrass (Lolium perenne L.)

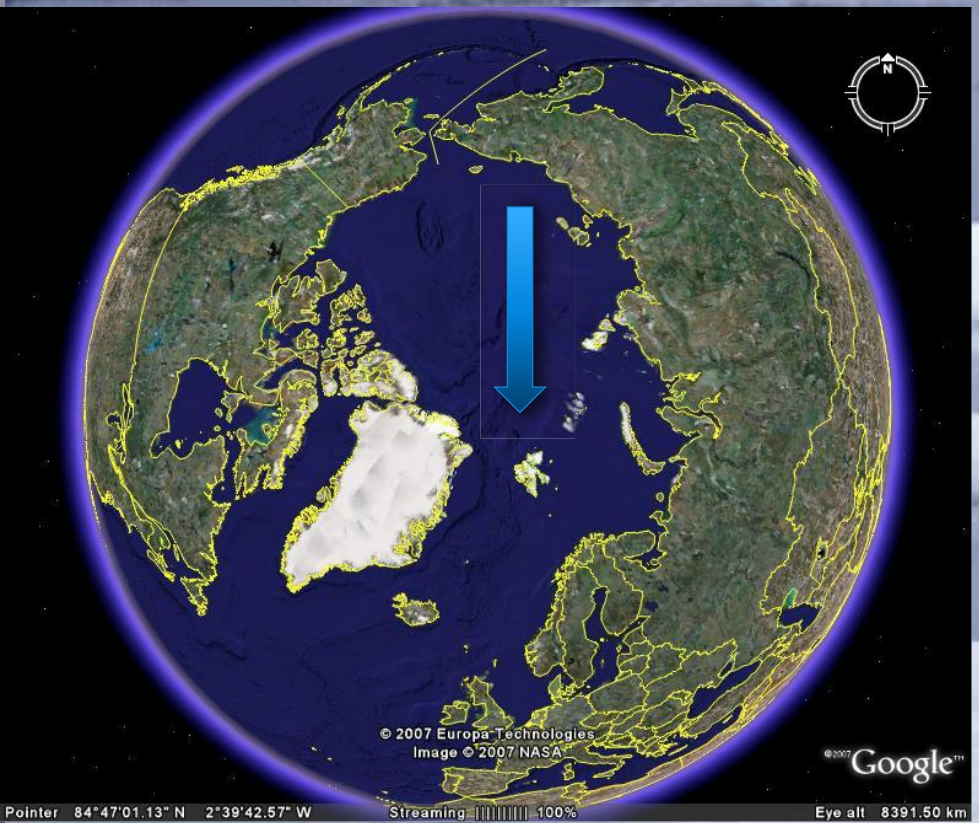
All Nordic forage grass breeders + Estonia

Coordinator: Prof. *Odd Arne Rognli*

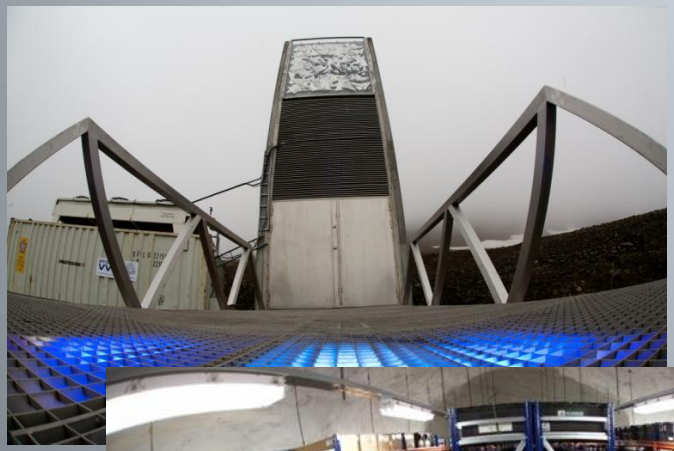


SVALBARD

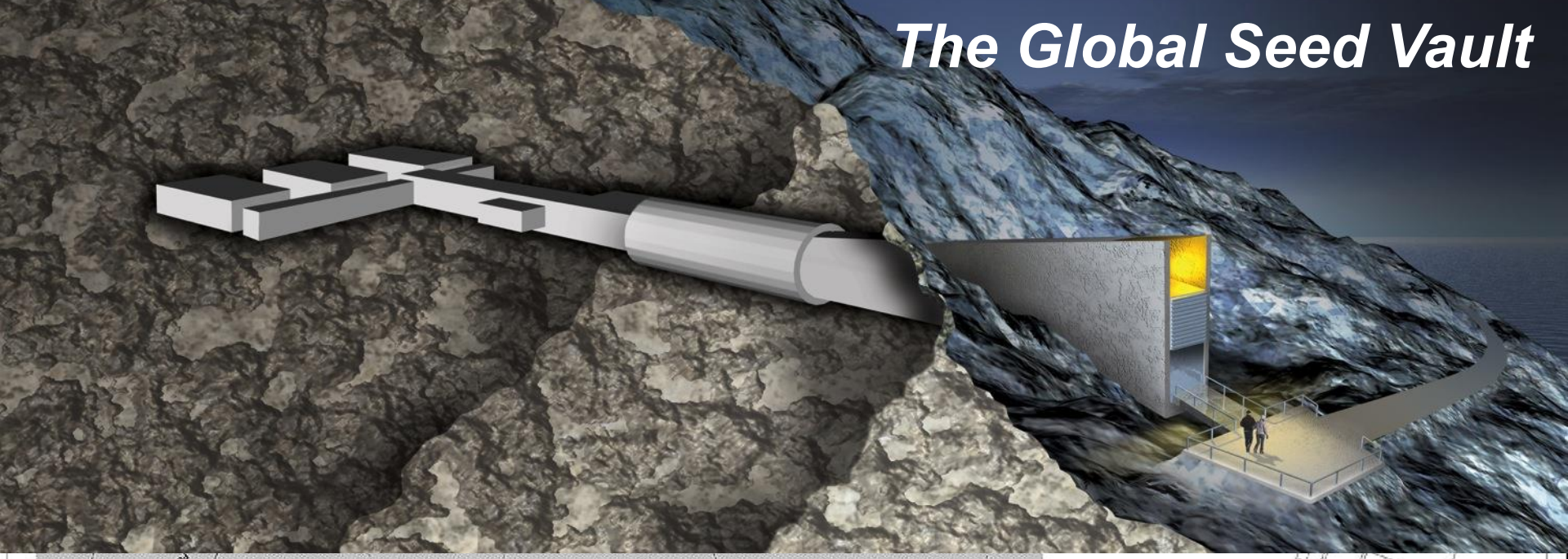
Svalbard, Norway 74-81 North, 10-35 East

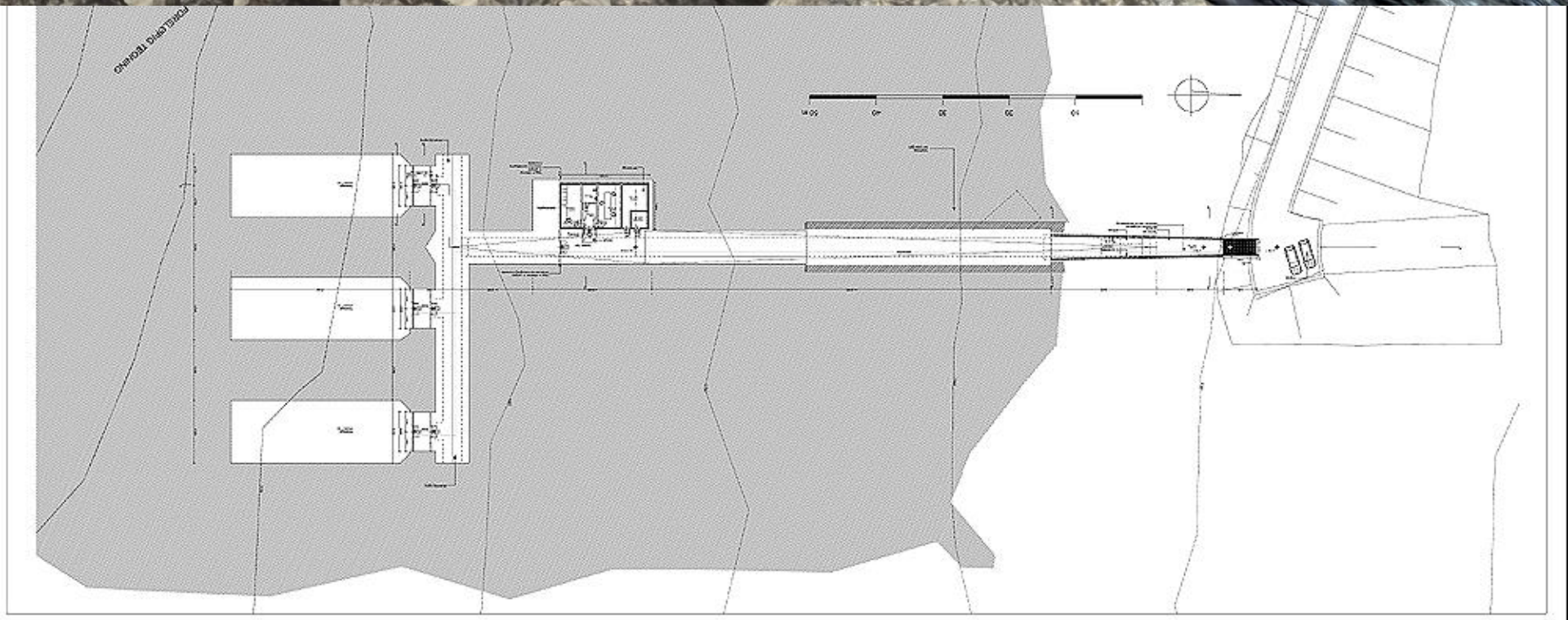


The Seed Vault on Svalbard is part of a global system to conserve PGR!



The Global Seed Vault





Organisation

The Norwegian Ministry for Food and Agriculture

- **owner, resp. authority, financier**

Statsbygg

- **Daily monitoring**

Crop Trust

- **Paying part of the runing costs**

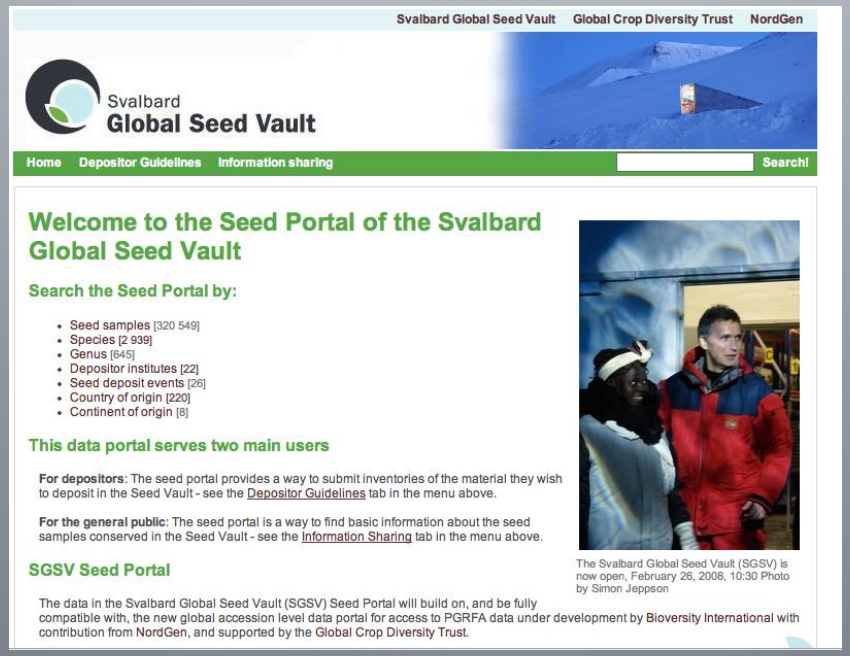
NordGen

- **Management**

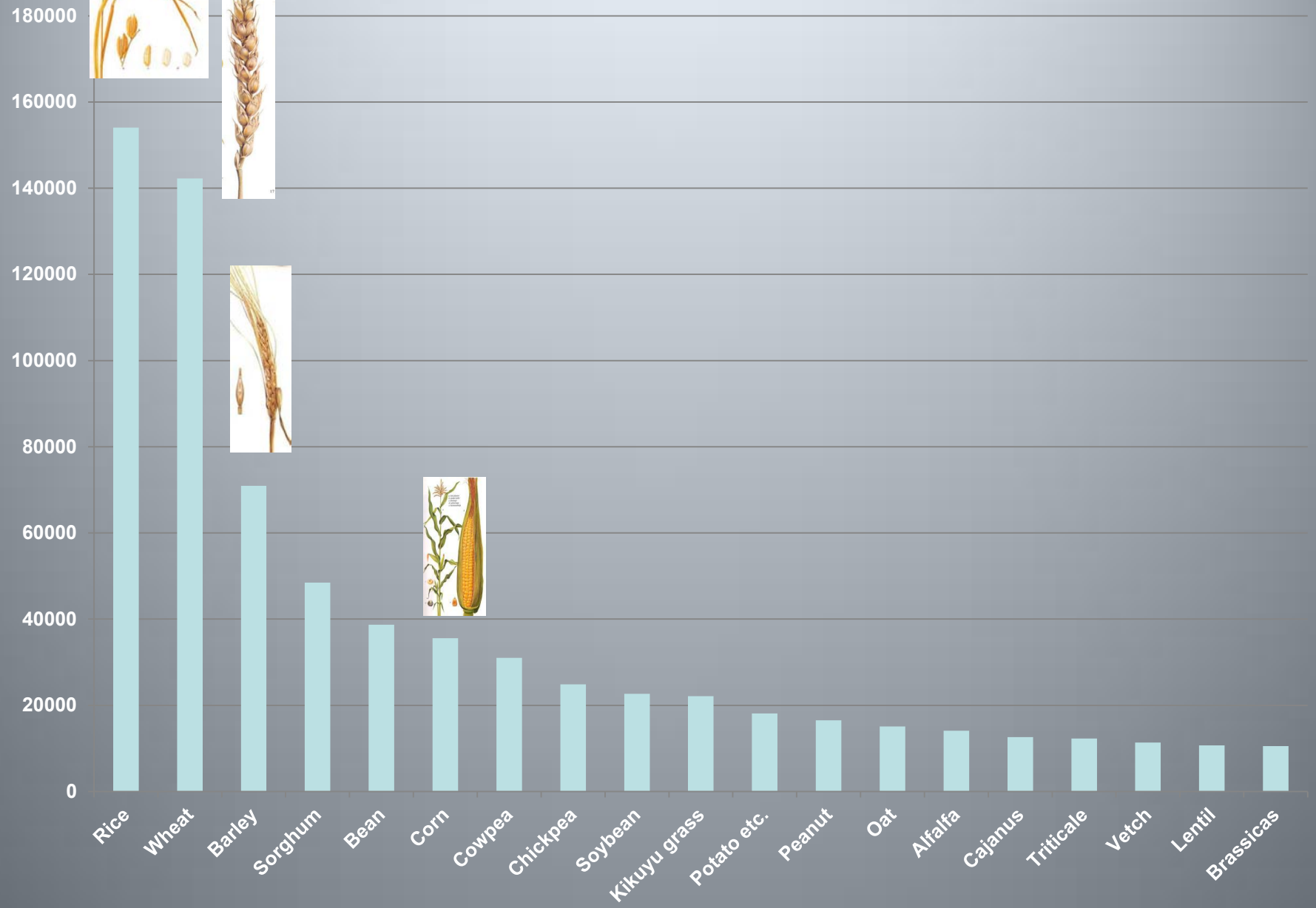
International Advisory Council

Accessions in *The Global Seed Vault*
March 14, 2017

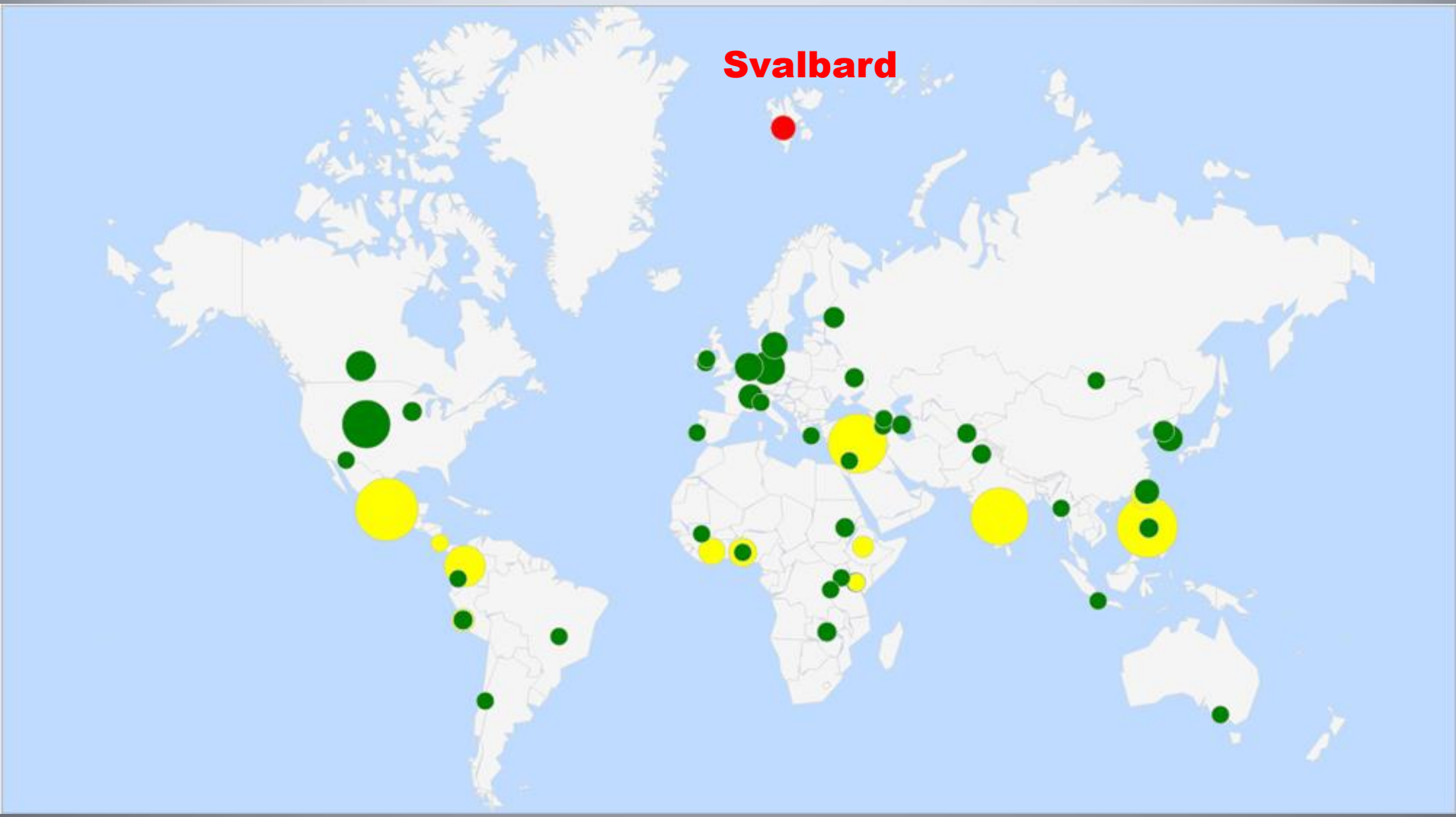
Countries of origin: 234
No of genera: 991
No of species: 5 441
Antal accessioner: 930 591



The 20 most important crops in The Vault



Depositors in The Seed Vault



International Agricultural Centers

NordGen

We wish you successful workshop!

The structure

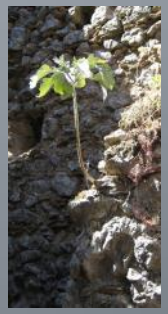
- The Vault is embedded 120 m into the mountain
- 130 m above sea level; above the worst case scenario for climate change
- Geologically (and politically?) stable area
- Temperature at -18° C
- The permafrost is a guarantee for cooling at -4 ° C if the technology fails
- Monitoring and control with gas-, temperature- and motion detectors

Conditions

- Deposit and storage is free of charge for public and private collections
- Ownership stays with the depositor
- “Black box – system”; material will not be opened
- Responsibility for tests of germinability and multiplication remains by the depositor
- Information is available via an open, online, data portal
- Resending after request

Major crops in the Global Seed Vault

ORYZA	154 060
TRITICUM	142 235
HORDEUM	71 313
SORGHUM	48 504
PHASEOLUS	38 866
ZEA	35 599
……	
BRASSICA	10 561



March 2016

GENEBANKS and *THE SVALBARD GLOBAL SEED VAULT*

Roland von Bothmer
The Global Seed Vault
NordGen

Vision

A global security net

The Svalbard Global Seed Vault shall be the most secure back-up storage for a global system of *ex situ* collections of diversity in crops

The Svalbard Global Seed Vault shall have the capacity to store all unique all plant genetic resources in conventional genebanks of the world

Svalbard
Global Seed Vault

Visits: Media-magazines

AMICA

Fashion-magazine

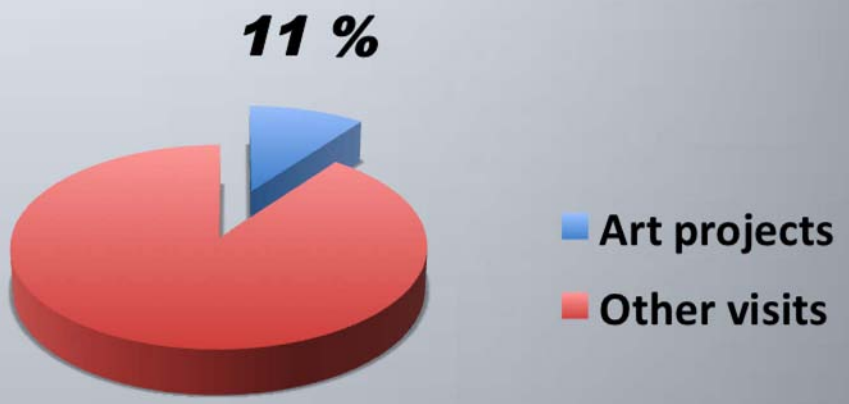
Media-magazine

Other visits

Topolino

Children's comics

Visits: Art projects

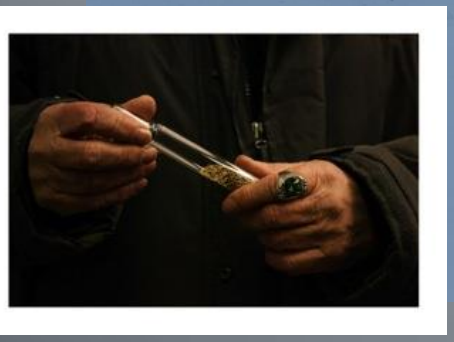


A special visit to the Vault

13 Mars, 2013:
H R H Highness
Maha Chakri Sirindhorn,
Thailand

What about my last visit to Svalbard (last week)?

WE THINK THAT THE VAULT IS IMPORTANT



THANK YOU!

The Svalbard Global Seed Vault

Tefre

Conservation of genetic diversity in seed genebanks

A major goal is to preserve natural patterns of genetic diversity to the extent possible to preserve options for future "evolutionary" change

Active use of genebank material is conservation

Note: not everything can be preserved in a gene bank!!





Cereal collection

Regeneration 2015 and 2016

-> 3000 accessions
-> € 700.000

Cost to recreate the cereal collection
Estimated at > €5 million

Composition of the sub-collections